Use of Data from "Development of Generic Link-Level Driving Cycles", Sierra Research, May 5, 2009

United States
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Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

Prepared for EPA by
Sierra Research, Inc.
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NOTICE

This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.

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The report "Development of Generic Link-Level Driving Cycles", Sierra Research, May 5, 2009, was developed to document inputs provided to the EPA Motor Vehicle Emissions Simulator. This cover note provides additional detail on how this data was incorporated into official versions of MOVES, particularly MOVES2010, MOVES2010a and MOVES2010b, as released in 2009, 2010 and 2012. All three of these versions of MOVES use the same driving cycles and same basic methodology for the road cycles. Only light-duty vehicle driving cycles were updated as part of this effort. No new data were available to develop heavy or medium duty vehicle driving cycles.

A driving cycle in the MOVES context is a one hertz vehicle speed – time trace that represents typical driving of a vehicle over a period of time. It shows the acceleration, deceleration and steady state driving events. In MOVES the cycles range in length from as little as 265 seconds to over 5000 seconds. The set of default driving schedules in MOVES represent typical driving in the United States.

The central purpose of this study and the subsequent report by Sierra Research was to build a library of link-specific and/or project level driving cycles for use in the MOVES model as default cycles. In the project Sierra reviewed and analyzed existing driving datasets for the purpose of developing actual project-level cycles for specific links/roadway types that could be determined from these existing datasets. A total of 15 of these new cycles were added to the MOVES model as default cycles.

The MOVES model contains driving cycles for each road-type and speed bin. They also reflect traffic congestion levels "A" through "F" as defined by the Federal Highway Administration. There are four road-types (combinations of rural and urban and freeway and arterial), and thirteen speed bins ranging from 2.5 miles per hour to 75 miles per hour. The study was not extensive enough to fill all combinations of road-type and speed bin. For these road type and speed bin combinations the existing MOVES driving cycle was retained. In a few cases, more than one driving cycle was developed by Sierra for a given road-type and speed bin combination. In these cases, the one that was thought to be most representative of actual in-use driving was chosen for inclusion in the MOVES model as a default driving cycle. Table P-1 lists the set of cycles which were incorporated into the MOVES model as default driving cycles.

Sierra developed some very specific ramp cycles as part of the work assignment. Because of the nature of the study, most of these cycles were off-ramp and were highly specific to the geography of ramp. As a result, they were not incorporated into MOVES. Instead, a cycle with an average speed of 34.7 mph that represents all ramp types – on-ramp, off-ramp and transition ramp was retained in MOVES.

Table P-1: Driving Cycles Used in MOVES2010A/B Developed by Sierra Research for Report No. SR2009-05-02

Driving Cycles Used in MOVES2010A/B Developed by Sierra Research for Report No. SR2009-05-02		
Driving Cycle Name	Average Speed	MOVES Index Value
FC01LOSAF Cycle (C10R04-00854)	73.80	1009
FC11LOSB Cycle (C10R02-00546)	66.36	1017
FC11LOSC Cycle (C15R09-00849)	64.40	1018
FC11LOSD Cycle (C15R10-00068)	58.79	1019
FC11LOSE Cycle (C15R11-00851)	46.13	1020
FC11LOSF Cycle (C15R01-00876)	20.60	1021
FC14LOSF Cycle (C15R05-00424)	8.72	1033
FC19LOSAC Cycle (C15R08-00267)	15.73	1043
FC02LOSDF Cycle (C10R05-00513)	49.07	1011
FC14LOSB Cycle (C15R07-00177)	31.02	1029
FC14LOSC Cycle (C10R04-00104)	25.38	1030
FC17LOSD Cycle (C15R05-00480)	18.58	1041
FC12LOSC Cycle (C15R04-00582)	63.66	1024
FC12LOSD Cycle (C15R09-00037)	52.83	1025
FC12LOSE Cycle (C15R10-00782)	43.27	1026

sierra research

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Development of Generic Link-Level Driving Cycles

prepared for:

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DEVELOPMENT OF GENERIC LINK-LEVEL DRIVING CYCLES

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1. SUMMARY

Under Contract No. EP-C-05-037, Work Assignment No. 3-02 funded by the U.S. Environmental Protection Agency (EPA), Sierra Research, Inc. (Sierra) developed a set of specific link-level driving cycles* to support future project-level emissions analysis capabilities being built into the MOVES vehicle emission model.

The MOtor Vehicle Emissions Simulator (MOVES) model has been designed to provide emission estimates ranging from the microscale level (individual projects or roadways) to the macroscale level (county, state, and nationwide inventories). Thus far, the MOVES development process has focused primary on macroscale applications, such as estimating emission inventories in specific counties or regulatory planning areas.

The next development stage for the model is intended to include more microscale-oriented applications, such as roadway link level modeling or project level modeling. For example, the user may want to model the vehicle emissions from a specific expressway interchange, or model the expected change in emissions from an arterial roadway corridor for which congestion level improvements are expected through signal synchronization or widening/capacity increases.

The central purpose of this study was to build a library of link-specific and/or project level driving cycles for use in the MOVES model as default cycles.

EPA originally anticipated that the link-level cycles developed under this study would be generic in nature and represent default cases or "placeholders" within the MOVES model until more detailed data became available in the future. However, after initial discussions between EPA and Sierra, it became clear that "generic" cycles for many types of links or project-level applications simply could not be easily or defensibly developed without actual measurements. Thus, it was mutually agreed that Sierra would review and analyze existing driving datasets for the purpose of developing actual project-level cycles for specific links/roadway types that could be determined from these existing datasets within the resource limits of the study. In addition, the study would include a brief assessment of other types of useful project-level driving cycles that might be of interest to MOVES end users, even if driving data for those types of cycles were not currently available.

The key elements of this effort are summarized as follows.

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* Driving "cycles" are second-by-second speed vs. time traces that have been developed from a broader sample of driving pattern measurements that are intended to represent a particular population of vehicle operation (e.g., all freeways).

Existing Data Assessment – Before consideration was given to the particular type of link-level cycles to be developed under this study for use in MOVES, an assessment of available data for generating such cycles was first performed. In reviewing potential sources of existing driving data, specific criteria were established that would be used to determine whether the type of data was adequate for the development of link-level driving cycles. These criteria included the following:

- The type of measurement technologies employed;
- The range of data collected; and
- The parameters or attributes that had been used in the existing data to characterize different types of driving, or that could be determined through subsequent post-processing.

Ten existing driving studies (or types of studies) were evaluated. Data from two of these studies were selected for use in developing link-level driving cycles:

1. Caltrans/CARB 2000 California Route-Based Driving; and
2. CARB/Sierra 2004 Sacramento Ramp Driving.

These datasets were selected because they were very well-suited to being able to be organized into logical groups that matched these capabilities of other models (travel models) that would often be used or available for project-level analysis.

Although significant post-processing had to be performed on the 2004 Sacramento Ramp Driving data, EPA placed a very high priority on development of freeway on-ramp cycles under this effort.

Data Validation and Post-Processing – A series of data cleaning/validation procedures were applied to both datasets under this effort. A key validation element consisted of the development and application of an algorithm to post-process GPS-based altitude measurements to produce reasonable estimates of second-by-second road grade.

As alluded to above, another significant component of this validation/processing phase consisted of "mining" freeway on-ramp traverses from a broader collection of data over other roadway types contained in the 2004 Sacramento Ramp Driving database. In addition, the ramp traverses were able to be classified into several different configurations (e.g., metered vs. non-metered ramps) for which project-level analyses are often of interest.

Driving Data Grouping and Statistical Characterization – Under this element, the validated and post-processed driving data were categorized into two separate sets of driving groups: (1) roadway type and congestion level groups; and (2) common ramp

configuration groups. Exhaustive sets of driving data statistics, including MOVES-based Vehicle-Specific Power distributions, were then calculated and tabulated for each individual "link-level" driving group.

Driving Cycle Development – A total of 47 distinct link-level second-by-second driving cycles were developed to best match the statistical characterizations developed for each driving group. Thirty-nine (39) of the cycles were developed for individual roadway type and congestion level combinations (covering all roadway types and congestion levels).

Eight of the cycles were specific to freeway on-ramps. Although these on-ramp cycles were limited in their representativeness by the relative lack of available data, an alternative approach based on driving data Vehicle Specific Power (VSP) distributions is suggested for implementation of the specialized on-ramp driving patterns into MOVES.

MOVES Emission Rate Evaluation – Finally, a "sidebar" task was performed under this effort that consisted of a comparative analysis of MOVES emission estimates against actual modal emission measurements from an earlier transient cycle testing program. The purpose was to provide EPA with another source of actual emission measurements for MOVES validation purposes. Although the comparison was limited to a degree by the size of the emission measurement dataset and the resources available under this study, a series of detailed comparisons of actual total hydrocarbon (THC), carbon monoxide (CO), and oxides of nitrogen (NOx) emission rates from the study were compared to equivalent rates currently contained in MOVES. Although a few anomalies were found, MOVES' rates were found to be in general agreement with the actual measurements, once sample size and content were considered.

Tables 1-1 and 1-2 present key statistics for each of the link-level driving cycles developed under this effort.

Table 1-1 lists these statistics for the cycles developed by roadway type and congestion level. The notations for the cycle names listed are based on the HPMS Functional Class (a roadway type categorization scheme) and Level of Service (LOS, a measure of congestion). (Section 3 of the report provides more details about these schemes.) Both rural (FC01 through FC09) and urban (FC11 through FC19) cycles were developed. The summary statistics presented in Table 1-1 show expected differences across driving groups. For example, speeds generally decrease with increasing congestion (from LOS A to LOS F).

Table 1-2 presents similar statistical comparisons for the specialized on-ramp cycles. These cycles were developed for distinct ramp shapes (Diamond vs. Loop), road grades (Downgrade, Level, Update), and ramp metering states (On or Off).

Table 1-1
Cycle Statistics Summary for Functional Class (FC) Cycles

Driving Cycle	No. of Segs	Time (min)	Dist. (miles)	Speeds (mph)			Mean Specific Power (hp/lb)	**Total DiffSum**
				Mean	Max	Min		
FC01LOSAF	6	9.47	11.64	73.80	84.43	60.51	0.0431	**0.1264**
FC02LOSAC	9	12.45	11.47	55.26	78.84	0.00	0.0452	**0.1593**
FC02LOSDF	7	11.33	9.27	49.07	73.06	0.00	0.0585	**0.2258**
FC06LOSAF	10	13.25	9.82	44.45	67.70	0.00	0.0527	**0.1783**
FC07LOSAF	4	24.27	17.18	42.47	69.87	0.00	0.0646	**0.1466**
FC08LOSAF	5	11.07	7.12	38.62	63.61	0.00	0.0725	**0.2111**
FC09LOSAF	12	16.47	8.25	30.05	65.79	0.00	0.0617	**0.1982**
FC11LOSA	7	7.87	8.47	64.60	80.15	42.33	0.0589	**0.2092**
FC11LOSB	7	8.63	9.55	66.37	81.84	50.28	0.0537	**0.1428**
FC11LOSC	13	15.07	16.17	64.41	78.19	42.53	0.0513	**0.0990**
FC11LOSD	13	12.15	11.90	58.79	76.78	15.25	0.0494	**0.1585**
FC11LOSE	13	16.20	12.45	46.12	71.50	0.00	0.0567	**0.2032**
FC11LOSF	12	15.07	5.18	20.62	55.48	0.00	0.0364	**0.1653**
FC12LOSA	12	13.20	11.87	53.97	78.98	0.00	0.0491	**0.1870**
FC12LOSB	10	13.23	14.63	66.35	79.05	50.07	0.0458	**0.1032**
FC12LOSC	10	14.77	15.67	63.67	79.39	42.84	0.0562	**0.1293**
FC12LOSD	13	13.33	11.75	52.88	73.15	0.00	0.0555	**0.1981**
FC12LOSE	12	15.20	10.96	43.28	70.87	6.73	0.0605	**0.2300**
FC12LOSF	11	16.37	5.19	19.01	53.65	0.00	0.0339	**0.1514**
FC14LOSA	9	15.48	6.59	25.55	63.09	0.00	0.0520	**0.1394**
FC14LOSB	14	12.55	6.49	31.02	63.81	0.00	0.0619	**0.3005**
FC14LOSC	12	8.53	3.61	25.39	53.09	0.00	0.0626	**0.2991**
FC14LOSD	14	13.33	4.82	21.71	54.80	0.00	0.0467	**0.1346**
FC14LOSE	18	14.20	4.09	17.26	49.94	0.00	0.0435	**0.1569**
FC14LOSF	22	14.20	2.07	8.73	44.16	0.00	0.0246	**0.1444**
FC16LOSA	17	14.13	6.27	26.62	62.88	0.00	0.0528	**0.1702**
FC16LOSB	16	13.77	6.78	29.54	69.88	0.00	0.0679	**0.2234**
FC16LOSC	22	14.98	5.81	23.29	53.11	0.00	0.0567	**0.1747**
FC16LOSD	15	15.35	5.60	21.91	54.10	0.00	0.0479	**0.1224**
FC16LOSE	17	12.30	3.01	14.67	50.64	0.00	0.0451	**0.1764**
FC16LOSF	12	9.80	1.72	10.55	43.46	0.00	0.0315	**0.1428**
FC17LOSAC	21	14.12	5.12	21.76	53.28	0.00	0.0525	**0.1393**
FC17LOSD	18	11.80	3.66	18.60	50.33	0.00	0.0505	**0.1941**
FC17LOSEF	17	8.22	1.53	11.19	49.24	0.00	0.0391	**0.2342**
FC19LOSAC	27	14.48	3.80	15.74	37.95	0.00	0.0410	**0.1125**
FC19LOSDF	29	14.88	2.98	12.02	37.62	0.00	0.0336	**0.1072**
FC21LOSAF	10	4.02	1.71	25.55	59.56	0.00	0.0761	**0.5328**
FC22LOSAF	17	5.70	1.86	19.61	62.05	0.00	0.0491	**0.4144**
FC23LOSAF	9	6.23	4.46	42.95	75.06	0.00	0.0574	**0.3080**
LA4 (FTP)	18	22.87	7.44	19.53	56.70	0.00	N/A	**N/A**
UC (LA92)	15	24.15	10.00	24.85	67.20	0.00	N/A	**0.3520**

Table 1-2
Cycle Statistics Summary for Freeway On-Ramp (OR) Cycles

Driving Cycle	No. of Segs	Time (min)	Dist. (miles)	Speeds (mph)			Mean Specific Power (hp/lb)	**Total DiffSum**
				Mean	Max	Min		
OR_D-D	1	0.47	0.29	37.17	60.18	0.00	0.2442	**1.0688**
OR_D-L	2	1.15	0.56	29.37	60.86	0.00	0.1103	**0.8692**
OR_D-U	2	0.48	0.21	26.23	45.37	0.00	0.1342	**1.1215**
OR_L-D	1	0.40	0.24	36.52	46.96	30.08	0.1119	**0.9810**
OR_L-L	1	0.42	0.28	39.72	56.84	31.08	0.1640	**1.2125**
OR_L-U	1	0.40	0.24	36.41	54.38	29.18	0.1647	**1.0110**
OR_MON	3	1.08	0.25	13.71	37.88	0.00	0.0442	**0.8785**
OR_MOF	1	0.52	0.23	27.04	46.96	0.00	0.1348	**1.1339**

###

2. INTRODUCTION

This introduction provides a review of the background behind the effort, the project objectives, and the organization of the remainder of the report.

2.1 Background

The successor to MOBILE6, MOtor Vehicle Emissions Simulator (MOVES), has been designed to provide emission estimates ranging from the microscale level (individual projects or roadways) to the macroscale level (county, state, and nationwide inventories). Thus far, the MOVES development process has focused primary on macroscale applications, such as estimating emission inventories in specific counties or regulatory planning areas.

The next development stage for the model will include more microscale-oriented applications, such as roadway link level modeling or project level modeling. For example, the user may want to model the vehicle emissions from a specific expressway interchange, or model the expected change in emissions from an arterial roadway corridor for which congestion level improvements are expected through signal synchronization or widening/capacity increases.

It is well-known that vehicle emissions vary significantly with the manner in which vehicles are driven. Emissions in today's almost entirely catalyst-equipped fleet are very sensitive to changes in driving patterns and acceleration rates. Moreover, driving patterns and acceleration rates are inherently related to the types of roadways (and their respective speed limits), traffic conditions, and drivers or vehicles being considered. Other factors that affect driving patterns include road grade (i.e., elevation change) and curvature.

For example, vehicles traveling on an uncongested freeway are likely to be characterized by sustained high-speed cruising patterns. On the other hand, one would expect travel along a signalized arterial corridor with heavy traffic levels to be characterized by frequent stop-and-go (i.e., transient) driving patterns. Depending on the congestion level, this could include substantial idling or queuing at the red phase of a traffic signal with top speeds not even approaching the posted speed limit. Travel patterns (specifically, acceleration characteristics) on a particular type of arterial road in a hilly, winding region are likely to differ from those on the same type of arterial road in a flat, level area with little road curvature.

Driving "cycles" are second-by-second speed vs. time traces that have been developed from a broader sample of driving pattern measurements that are intended to represent a particular population of vehicle operation (e.g., all freeways).

For macroscale (regional, county-wide) emission estimates, MOVES uses basic emission rates that are developed from a series* of "composite" driving cycles intended to represent collective driving patterns aggregated over all types of roadways, speed limits, congestion levels, and variations in individual driver behavior. However, these composite cycles cannot be used to represent microscale vehicle operating patterns specific to individual types of roadways or traffic conditions (e.g., congested vs. uncongested).

As EPA enhances the MOVES model to incorporate emissions analysis on a smaller "project-level" scale such as an individual roadway, freeway interchange, or corridor, it is necessary to develop characterizations of specific types of vehicle operating patterns that match these project-level scales.

2.2 Project Objectives

The purpose of this study was to build a library of link-specific and/or project-level driving cycles for use in the MOVES model as default cycles. EPA originally anticipated that the link-level cycles developed under this study would be generic in nature and represent default cases or "placeholders" within the MOVES model until more detailed data became available in the future. However, after initial discussions between EPA and Sierra, it became clear that "generic" cycles for many types of links or project-level applications simply could not be easily or defensibly developed without actual measurements. Thus, it was mutually agreed that Sierra would review and analyze existing driving datasets for the purpose of developing actual project-level cycles for specific links/roadway types that could be determined from these existing datasets within the resource limits of the study. In addition, the study would include a brief assessment of other types of useful project-level driving cycles that might be of interest to MOVES end users, even if driving data for those types of cycles were not currently available.

The tern "link" as used here comes from transportation modeling and refers to a particular type and length of roadway, e.g., a half-mile arterial road segment between two major intersections. The intent was that this library of cycles be developed in a manner in which they could be well-matched or aligned with roadway "link-level" activity outputs produced by regional or intersection-level transportation planning models. Thus, a key component of the analysis consisted of reviewing and identifying the types of transportation/traffic model outputs typically available to perform project-level motor vehicle emission calculations.

* These cycles include the LA4 Urban Driving Cycle used in the Federal Test Procedure (FTP), the EPA Highway (HFET) cycle and the US06 (Supplemental FTP) Driving Cycle.

Once the types of travel classifications that are typically available from upstream traffic models had been established, another key element of the study consisted of reviewing the existing driving datasets to determine how well their data classifications matched those schemes generally used in traffic modeling. It was also important to identify where useful variations of these classifications could be rendered from re-processing or "mining" the existing driving datasets.

For example, as discussed in detail later in the report, some of the existing driving datasets evaluated under the study identified the type of roadway being driven, which included separate classifications for freeway on-ramps, off-ramps, and freeway-to-freeway transition ramps. A valuable variation on this scheme that is well-suited to potential microscale project-level use would further subdivide the on-ramp data into metered and non-metered on-ramps. This "data mining" or re-processing was performed when possible within the available resources for the study. Where useful data mining could not be performed within the study resources, but techniques or ancillary datasets were available to do so, the report points these out for future analysis.

2.3 Organization of the Report

Following this introductory section, the remainder of the report is organized as follows.

Section 3 describes the data sources considered and evaluated for use in development of the initial set of MOVES link-level driving cycles. It discusses the criteria used to assess whether particular types of existing driving data were viable for use under the study. It also summarizes the basic data processing and quality assurance methodologies used to validate the data prior to their use in constructing driving cycles.

Section 4 discusses the step-by-step methodologies used to develop representative driving cycles that can be applied in a wide variety of link-specific or project-level applications. These steps include grouping of the driving data in a manner well-suited to link-level project analysis, development of statistical characterizations of the data in each group, construction of candidate cycles, and selection and optimization of the most representative cycles within each driving group.

Section 5 shows and explains the resulting final cycles in each group. Both tabular statistics and speed-time traces plots are provided and discussed.

Section 6 presents and discusses detailed results of a comparison of modal (second-by-second) emissions measured over a series of driving cycles to corresponding operating mode-specific THC, CO, and NOx emission estimates currently contained in MOVES.

Section 7 contains a list of references cited in the body of the report.

Appendix A contains detailed statistics for each driving group population including speed-acceleration frequency distributions and MOVES-based Vehicle-Specific Power

bin distributions. The VSP distributions in this appendix were calculated to account for measured road grade.

Appendix B is a similar to Appendix A, except the VSP bin distributions were determined without accounting for road grade (i.e. level roadways were assumed).

Appendix C contains the complete set of speed vs. time traces for each of the driving cycles developed under this effort.

Finally, a detailed emission rate comparison of MOVES against actual measurements from a recent transient cycle testing study are is presented in Appendix D.

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3. DATA IDENTIFICATION AND VALIDATION

Before consideration was given to the particular type of link-level cycles to be developed under this study for use in MOVES, an assessment of available data for generating such cycles was first performed. This section of the report describes the types of driving data and sources evaluated for the purpose of developing link-level cycles. It also explains which types of data were utilized for this effort and why. Finally, it summarizes the procedures used to check, validate, and, in some cases, correct "as measured" data from the field.

(In this section and the following sections, computer programs or scripts written under this effort to process, analyze, and validate driving data and develop driving cycles from those data for use in MOVES are identified in *italics*.)

3.1 Assessment and Compilation of Existing Driving Datasets

Data Sources Considered – In reviewing potential sources of existing driving data, it was necessary to define certain criteria that would be used to determine whether the type of data was adequate for the central purpose of the study, which was to develop driving cycles for future use in MOVES. These criteria are outlined below.

- *Availability of second-by-second speed (or GPS position) data* – MOVES requires input driving patterns or cycles to be defined either by operating mode (VSP/speed) or second-by-second. Practically, when considering the types of existing driving data studies that have been conducted, this translates to a need for second-by-second measurements; preferably, actual vehicle speed measurements would be collected. Speeds calculated from differentiated second-by-second GPS position (latitude, longitude) measurements would be minimally acceptable if the measurements reflect sub-meter position accuracy. (This level of accuracy is needed to properly capture and represent transient driving patterns on par with direct speed measurements.)

- *Ability to identify the specific roadways and locations being driven* – Some types of studies used either GPS measurements or ancillary measurements/procedures to identify the specific roadway (and classify roadway types) being driven. Obviously, in order to develop MOVES driving cycles that represent specific type of roadway links (e.g., urban, major arterials), it is vital to identify the types of roadways over which the driving data are collected.

- *Knowledge of the vehicle type(s) being measured* – Driving patterns differ significantly between light- and heavy-duty vehicles due to differences in acceleration performance and maneuverability between the two types of vehicles. If a driving study did not identify the type of vehicles that were measured, it would not be useful unless it was able to properly represent the mix of light- and heavy-duty vehicles traveling on a given type of roadway.

- *Understanding of the manner in which the data were collected* – Some existing driving studies used an instrumented "chase car" to covertly follow and measure speeds of randomly selected vehicles. Other types of studies involved the placement of a self-contained instrumentation package (including data acquisition and storage) in a sample of vehicles, which was then retrieved after a given period (e.g., a week). Both the chase car (CC) and self-contained instrumented vehicle (IV) studies have the potential not only to measure the average or typical driving pattern over a given type of roadway, but also, with sufficient samples, to represent driver-to-driver variations in driving patterns (e.g., aggressive vs. cautious drivers). Other types of studies, called "floating car" studies (primarily conducted by transportation planning agencies), collect speed measurements on specific roadways or facilities using a vehicle where the driver is directed to "float" along at what is judged to be the mean speed of surrounding vehicles. This floating car-based approach has limited usefulness for development of link-level driving cycles in MOVES because it does not capture the actual speed-time profiles that affect resulting vehicle emissions estimated for the link.

  (A simple example of this variation might consist of two different vehicles traversing an arterial roadway corridor with a series of signalized intersections that are pre-timed to allow the corridor to be traversed at a steady cruise speed of 30 mph. The cautious vehicle/driver might follow that intended steady 30 mph cruise pattern. On the other hand, an aggressive or impatient driver might accelerate to speeds well over 30 mph between signals and have to slow to a stop or a speed well below 30 mph when approaching the red phase at each intersection. In both cases, the average speeds of each vehicle would be identical, but the individual driving patterns and vehicle emissions would be dramatically different; the second vehicle, with much more stop-and-go transient operation, would be expected to have measurably higher emissions than the first.)

Given these requirements, Sierra reviewed existing driving data from a variety of existing sources.

Table 3-1 lists each of these potential data sources (sorted in reverse chronological order) and briefly summarizes the nature of each study. It also identifies the speed measurement method used in each study and highlights the key issues that were considered in weighing whether the data were adequate and available for use under this effort.

Table 3-1
Summary of Driving Data Sources Evaluated for Use in Development of Initial MOVES Link-Level Driving Cycles

Study	Method	Key Considerations	Verdict
EPA 2004-2005 Kansas City PEMS Driving - Limited sample of real-world driving - Recruited under Phase 2 PEMS testing	Instrumented Vehicle	- Potential data quality problems - Availability issues	Rejected
CARB/Sierra 2004 Sacramento Ramp Driving - Driving measurements collected on over 250 freeway ramps of different configurations	Chase Car	- Ramp segments not identified - Post-processing required	**Used**
SCAG 2004 Arterial Speed Study - Multiple traverses of ten arterial corridors in Los Angeles area during congested conditions	Floating Car	- Limited sample - Floating car-based	Rejected
Georgia Tech 2001-2004 Atlanta Driving - Over 1,600 vehicles, instrumented 2-3 years - GPS, accelerometer, and OBD system based speeds	Instrumented Vehicle	- Robust dataset - Lack of data availability due to privacy concerns	Rejected
Caltrans/CARB 2000 California Route Driving - Data collected over several hundred representative driving routes in four areas of California - Included both urban and rural areas - Used standardized method for classifying road types and congestion levels encountered	Chase Car	- Robust dataset - Data already validated from prior study	**Used**
2000-Present MPO Travel Time Studies - Speed and/or travel time measurements collected over key corridors in metropolitan areas - Data collected for validation of travel model speeds	Floating Car/ Stopwatch	- Floating car speeds at best - Only point-to-point travel times often measured	Rejected
Caltrans 1997-2000 California Segment Driving - Speeds measured over traverses of samples of HPMS roadway segments in Sacramento, San Francisco and San Joaquin Valley - Included both urban and rural segments	Chase Car	- 20% of the 2000 Route Driving sample size - Data not fully validated	Rejected
1997-2000 CARB Heavy-Duty Truck Studies - GPS-based speeds of heavy-duty trucks performed by Battelle and Jack Faucett & Associates - Roughly 150 vehicles from the combined studies - Vehicles instrumented roughly 5 days, on average	GPS-Only Instrumented Vehicle	- Concerns with data quality - Likely sample bias - Significant post-processing requirements	Rejected
1992 EPA/ERG "3-City" Driving Studies - Representative samples of drivers/vehicle speeds - Some 250 vehicles instrumented for one week each in Atlanta, Baltimore and Spokane	Instrumented Vehicle	- Roadway types & locations not available - Dated study – preceded repeal of 55 mph speed limit	Rejected
1992 CARB/Sierra Route Driving - Data collected over a few hundred representative road routes in Baltimore, Los Angeles, and Spokane	Chase Car	- Roadway types & locations not available - Dated study – preceded repeal of 55 mph speed limit	Rejected

As shown in Table 3-1, although some ten existing study datasets (or type) were reviewed and evaluated, only two were found to be both viable and readily available for use in developing link-level MOVES driving cycles:

1. Caltrans/CARB 2000 California Route-Based Driving; and
2. CARB/Sierra 2004 Sacramento Ramp Driving.

Although the Georgia Tech (GT) instrumented vehicle data appear to be very extensive, EPA has indicated that the data have been difficult to obtain from GT due to privacy concerns. As indicated in Table 3-1, a number of the other datasets were rejected due to the quality of the data (floating-car-based measurements, substantial additional post-processing requirements, etc.). The two 1992 study datasets listed at the bottom of Table 3-1 were collected prior to the 1995 repeal of the federal 55-mph freeway speed limit. Comparisons of driving patterns between the chase-car-based route driving studies conducted in Los Angeles in 1992 and 2000 indicated a significant shift toward more higher speed, higher acceleration/deceleration driving. This has been attributed to both the 55-mph speed limit repeal on freeways as well as a significant increase in the power-to-weight ratio and acceleration capability of the average light-duty vehicle since the early 1990s. Thus, the two 1992 datasets were excluded from the analysis because they do not represent driving patterns of today's light-duty vehicle fleet.

More extensive descriptions of the two driving datasets selected for use in development of link-level cycles are given below. As explained in these sections, the 2000 Caltrans/CARB Route-Based data were well-suited for representing link-level driving patterns by standardized roadway type and congestion level. The 2004 Sacramento Ramp data were used to characterize driving over different types of freeway on-ramps, a key roadway type that EPA indicated of high interest for improving within MOVES.

Caltrans/CARB 2000 California Route-Based Driving – These route-based studies[1,2] were performed in calendar year 2000 under a joint agency workgroup called CAMP (Caltrans/ARB Modeling Program) led by the California Department of Transportation (Caltrans) and the California Air Resources Board (CARB), which coordinated a multi-study research program to develop and implement speed correction factor (SCF) and emissions modeling improvements. These CAMP driving studies consisted of collecting second-by-second speed data using an instrumented chase car over a representative set of actual road routes within each of four separate study areas in California:

1. Sacramento metropolitan area;
2. San Francisco Bay Area;
3. Stanislaus County (including the Modesto metropolitan area); and
4. South Coast (i.e., Los Angeles) combined metropolitan area.

The set of road routes were determined from trip-weighted random samples of origin to destination based trips obtained from each study area's regional travel demand model. These route samples were also stratified by time of day (and directionally driven in each time period) based on time-of-day trip population weightings obtained from the travel

models. The road routes driven under these studies therefore contained AM peak, PM peak, and off-peak routes on a representative mixture of congested and uncongested roads in each study area. Under the route-based studies, 100 routes (across all three time periods) were generally driven from two to four times each.

The datasets from each of these driving studies consisted of second-by-second measurements of the chase car speed and the "target" vehicle (i.e., the vehicle being randomly followed by the chase car) speed when a target was being followed and tracked by the laser. (During these studies, the chase car was usually, but not always, "locked on" in pursuit of a target vehicle. For example, if a target vehicle being followed turned off the chase car's intended route, the chase car was instructed to flow with traffic until a new target vehicle could be randomly selected and followed and tracked with the laser.) The post-processed datasets thus also included a third second-by-second speed trace, referred to as the "composite" trace, which was created by combining target vehicle speeds when a target was being followed with the chase car speeds when no target was available. (Since the chase car was instructed to flow with traffic during these generally short periods when a target vehicle was dropped until another target could be selected and followed, this substituted chase car speed in the composite trace was considered representative.)

These datasets contained driving in both urban and rural areas. In the post-processing that was performed under each of these studies, the type of roadway the vehicle was traveling on during each second was also recorded in the output dataset.[*] (The reader is referred to the original study reports cited earlier for more details on how the roadway type classifications were performed and validated.) The fact that second-by-second roadway type determinations had already been performed was a key factor in selecting the CAMP driving data for use in development of roadway-specific link-level driving cycles for MOVES.

Moreover, these determinations were performed using a standardized roadway classification scheme used by every state transportation agency to submit travel data to the Federal Highway Administration through the Highway Performance Monitoring System (HPMS): the Functional Class scheme for roadway types.

Table 3-2 describes this roadway type scheme. As it shows, this scheme categorizes roadways into both rural and urban classes. Within each broad class, six separate categories are used to distinguish each type of roadway, based primarily on its purpose or function within a regional roadway system.

[*] The technique for "locating" the roadway during each second of data collected used digitally marked flags in the raw data that were recorded by the chase car navigator using a hand-held switchbox. By flipping a switch, the navigator "time stamped" points along road routes or segments that corresponded to the start and end of each type of roadway. During post-processing, these time-stamps were temporally merged with the types of roadway within each route or on each segment from Route/Segment definition tables to identify the type of road during each second of data collection.

Table 3-2 HPMS-Based Functional Class Definitions			
Code	Road Classification	Abbrev	Definition
HPMS Rural Functional Classes			
01	Principal Arterial Interstate	R-PAI	Serves corridor movements having trip length and travel density characteristics of statewide or interstate travel
02	Other Principal Arterial	R-OPA	
06	Minor Arterial	R-MA	Links cities, larger towns, and traffic generators
07	Major Collector	R-MJC	Provides service to county seats and larger towns not served by arterials
08	Minor Collector	R-MNC	Serves intracounty corridors and developed areas within a reasonable distance of a major collector road
09	Local	R-LOC	Provides access to adjacent land and service to short distance travel
HPMS Urban Functional Classes			
11	Principal Arterial Interstate	U-PAI	Carries the major portion of trips entering or leaving urban areas as well as the majority of through trips bypassing the central city
12	Principal Arterial Other Freeway/Expressway	U-OFE	
14	Other Principal Arterial	U-OPA	
16	Minor Arterial	U-MA	Interconnects and expands the Principal Arterial system and provides services for moderate distance travel
17	Collector	U-COL	Provides land access and traffic circulation within urban neighborhoods, commercial, and industrial areas
19	Local	U-LOC	Provides access to neighboring land or functionally classified roads
Other Classifications			
21	On-Ramp	-	On-ramp section providing access to freeway from arterial system
22	Off-Ramp	-	Off-ramp section providing egress from freeway to arterial system
23	Transition Ramp	-	Freeway-to-freeway transition ramp

Although Metropolitan Planning Organizations (MPOs) use different schemes to represent roadway types within their regional networks, these MPO-specific schemes generally can be easily mapped to the HPMS Functional Class scheme. Thus, driving data (and cycles generated from them) that have been categorized by HPMS Functional Class can be universally utilized for project-level uses across many jurisdictions.

In addition to the Functional Class categories as defined under HPMS, Table 3-2 highlights separate classifications that were also made for freeway on-ramps, off-ramps,

and freeway-to-freeway transition ramps. This represents a revision to the way in which roadways are classified within HPMS, where ramps are considered part of the interstates or other freeways they serve. However, separation of ramps from freeway segments themselves is consistent with the way in which they are distinctly classified in MPO travel models and allows driving pattern differences between freeways and ramps to be explicitly distinguished.

Since the datasets contained the Functional Class designation for each second of data based on the post-processing as described in the preceding paragraphs, it was also easy to divide the driving data from all of these studies into both urban and rural groups for creating separate urban and rural (or non-urban) driving cycles.

Table 3-3 shows the number of second-by-second urban and rural driving data records contained in each of the chase car study datasets. As shown, the combined datasets contain over 267,000 rural records and over 1.2 million urban records, providing large samples of actual driving patterns measured in both urban and rural areas for cycle development.

Table 3-3
Caltrans/CARB (CAMP) 2000 Route-Based Driving Study
Single-Second Record Counts by Study Area

Driving Study Area	Single-Second Data Records		
	Rural	Urban	Total
Bay Area (SF)	5,361	404,753	410,114
Sacramento	51,633	330,413	382,046
Stanislaus County	210,349	317,402	527,751
South Coast (LA)	0	187,725	187,725
Totals	267,343	1,240,293	1,507,636

Another element that made the CAMP driving data very useful for this effort was the fact that, in addition to Functional Class, the data were categorized by observed congestion level in a manner* attempting to match Level of Service (LOS) designations defined in the Highway Capacity Manual[3] (HCM). The HCM uses six letter categories from "A" for least congested, through "F" for extreme congestion.

As defined in the HCM, LOS is determined on freeways based on traffic density measured over each freeway section. On arterial roads, LOS is generally determined

* As discussed in more detail in the original study reports, the observed congestion level was made by the study observer in the passenger seat using the hand-held switchbox in a manner similar to that used to digitally time-stamp changes in roadway type.

based on intersection delay. The observed congestion levels (using similar letter designations) recorded during the CAMP driving studies generally matched those calculated using formal techniques defined in the HCM, based on comparisons to more rigorously calculated LOS performed on the driving data collected from the South Coast study area.

Since transportation planning models or intersection models generally calculate and output LOS for roadways or intersections being modeled, the CAMP driving dataset enabled the development of a series of LOS-specific driving cycles for each roadway type. Thus, these cycles can be used to evaluate emission impacts associated with changes in LOS over a roadway link under project-level analyses.

CARB/Sierra 2004 Sacramento Ramp Driving – This study[4] was performed for CARB as part of an assessment of the fraction of the light-duty vehicle fleet that could be measured by a series of Remote Sensing Devices (RSDs) deployed at freeway on-ramps. To assess the suitability of freeway ramps for the use of RSDs, each freeway ramp in the Sacramento region was driven using an instrumented chase car. The driver of the survey car was instructed to try to emulate the driving of ramps by other drivers ahead of the survey vehicle.

Second-by-second speed measurements were collected over 266 on-ramps, 211 off-ramps, and 24 freeway-to-freeway transition ramps. Each ramp was driven during the AM (6:00-9:00), PM (3:00-6:00), and off-peak periods (usually 9:00 am to 3:00 pm). (Driving in all three time periods was usually necessary because the type of driving that occurs on a ramp can be influenced by the other traffic on the ramp and by the traffic on the freeway, both of which can vary by time of day.)

For this EPA study, only the on-ramp data were used. Since on-ramp, off-ramp, and transition ramp cycles were being developed from the 2000 CAMP data, the 2004 CARB Ramp dataset was used to develop separate types of on-ramp cycles. (Because high rates of acceleration occur on on-ramps, and since this driving mode is associated with high emission rates, EPA and Sierra concluded that development of more specific types of on-ramp cycles was of higher priority than off-ramps or transition ramps.)

Over the 266 separate on-ramps, a total of 675 traverses were performed, encompassing a total of over 256,000 valid second-by-second on-ramp speed measurements.

Unlike the CAMP driving data, the ramp segments were not digitally time-stamped so they could be easily separated from the rest of the speed measurements. (In the CARB Ramp driving, the chase car instrumentation was operated continuously as the vehicle drove each on-ramp, onto the freeway, along the freeway over an off-ramp, turned around on the nearby arterial, etc.) As described in the next sub-section, significant post-processing had to be performed on the CARB Ramp dataset to cull out only that operation occurring on the on-ramps and to classify the ramps into specific types.

(From this point in the report forward, we refer to the 2000 CAMP Route-Based and 2004 CARB Ramp driving data as the Functional Class [FC] and On-Ramp [OR] driving datasets, respectively, since the former was used to develop cycles by roadway functional class and the latter was employed to generate a series of specialized on-ramp cycles.)

3.2 Driving Data Cleaning and Processing

The FC and OR driving data sets as measured in the field were post-processed to clean, validate, and merge different data streams from the in-field measurements. A summary of these steps is presented in this sub-section. Descriptions of these post-processing steps are organized in three groups:

1. Processing steps that were performed in common on both datasets;
2. Processing performed specifically on the FC driving data; and
3. Processing performed solely on the OR data.

(For the FC driving data, all the processing steps except the revised road grade processing discussed later had already been performed under the previous study. All of these steps were performed on the OR data under this EPA effort.)

Common Processing – In these chase car-based studies, the chase car's instrumentation does not directly measure the speed of the target vehicles being followed, but measures its own speed and the relative distance (i.e., range) to the target using a laser rangefinder, from which the target speed can be computed. The first processing steps performed on the raw data measured in the field consisted of computing second-by-second target vehicle speeds and consolidating data from each individual drive file for a study area into a single "processed" data set for that study area. These basic raw data processing steps were performed using two Fortran programs, *Clean1E* and *Clean2E*, and are described below.

Initial Range and Chase Car Speed Data Processing (*Clean1E*) – The *Clean1E* program was used to perform the following functions:

- Smooth raw laser range measurements;
- Smooth raw chase car speed;
- Select the appropriate speed trace (patrol vs. target); and
- Interpret and filter switch box settings.

Smoothing of Laser Range Data – As described in greater detail in Sierra's LA92 study report,[*] the laser rangefinder on the chase cars resolves distance based on laser pulse

[*] T.C. Austin, et al., "Characterization of Driving Patterns and Emissions from Light-Duty Vehicles in California," prepared for the California Air Resources Board, Report No. SR93-11-02, November 12, 1993.

time-of-flight measurements in discrete "bins" that produce a relative accuracy of roughly one foot. As a result, the first basic processing step consisted of digitally filtering the raw second-by-second range measurements in each raw Drive file to smooth the effects of the discrete bins. A differential form Savitzky-Golay seven-point smoothing filter* was applied to the raw range measurements in *Clean1E*. Both quadratic and cubic forms of the filter were calculated for the range at each second. If the difference in filtered values was above a specific threshold (2 feet), the cubic form was used; otherwise, the quadratic form was applied. These filters effectively remove outliers. As described in the above-referenced report, the filters do not lead to smoothing of the actual speed-time profile for the vehicle being measured.

The differential quadratic and cubic filtering coefficients used to filter the raw range data are shown below.

Differential Quadratic Filter Coefficients

	Differentiation Index						
Time	-3	-2	-1	0	1	2	3
t-3	-13	-29	-19	-3	1	11	7
t-2	-2	-6	-6	-2	-6	-6	-2
t-1	5	9	3	-1	-9	-15	-7
t	8	16	8	0	-8	-16	-8
t+1	7	15	9	1	-3	-9	-5
t+2	2	6	6	2	6	6	2
t+3	-7	-11	-1	3	19	29	13
Normalize	28	84	84	28	84	84	28

Differential Cubic Filter Coefficients

	Differentiation Index						
Time	-3	-2	-1	0	1	2	3
t-3	-257	-122	-29	22	31	-2	-77
t-2	122	17	-46	-67	-46	17	122
t-1	185	62	-19	-58	-55	-10	77
t	72	48	24	0	-24	-48	-72
t+1	-77	10	55	58	19	-62	-185
t+2	-122	-17	46	67	46	-17	-122
t+3	77	2	-31	-22	29	122	257
Normalize	252	252	252	252	252	252	252

If range data were not available over the entire seven-second window (i.e., if there were some missing values), missing values were linearly interpolated from non-missing values within the window prior to applying the filters. Logic was also included to deal with instances where a different target was obtained within the seven-point (i.e., seven-second) filtering window.

* Savitzky, A., et al., "Smoothing and Differentiating of Data by Simplified Least Squares Procedures," Analytical Chemistry, Vol. 36, No. 8, July 1964, p. 1627-1639.

In both the FC and OR studies, the chase cars were instrumented with three speed measurement sources. The primary source measured speed by counting drive shaft rotations. The secondary source measured analog voltages from the OEM speed pickup coil. The third source was based on differentiated second-by-second position measurements from the GPS system.

Smoothing of Raw Chase Car Speeds – For the sole purpose of calculating target vehicle speed in the *Clean1E* program, primary and GPS-based speed measurements were also smoothed with a quadratic seven-point filter. Raw primary speed measurements were obtained from pulse counts of magnets mounted on the chase car's drive shaft and thus reflected similar "binned" effects in the range data. The position-differentiated GPS speed was also filtered to remove binning effects. Both the primary and GPS speeds were similarly filtered with a non-differential quadratic filter using the coefficients given below.

Non-Differential Quadratic Filter

Time	Coefficient
t-3	-2
t-2	3
t-1	6
t	7
t+1	6
t+2	3
t+3	-2
Normalize	21

(Note that since this is a non-differential form of the quadratic filter, there is no differentiation index, or second dimension of filtering coefficients as in the earlier differential forms.)

Chase Car Speed Trace Selection – In addition to the range and speed data filtering, the *Clean1* program included logic that examined the primary, secondary, and GPS speed measurements and selected one or the other to best represent the chase car's second-by-second speed, as follows:

- If the filtered primary speed was less than 10 mph and the secondary speed was less than 5 mph, the secondary speed measurement was used;

- If the difference between the above speed and the filtered GPS speed exceeded 10 mph, the filtered GPS speed was used;

- Otherwise, the filtered primary speed was used.

It should be noted that the number of seconds for which the secondary and GPS speeds were used (instead of the primary speed) was very small. For example, in the South Coast, a total of 215,950 raw second-by-second data records were processed. Secondary speeds were used for only 86 seconds and GPS speeds for 628 seconds; the remaining 215,236 records (constituting 99.7%) were all based on the primary speed.

Although substitution of the secondary or GPS speed for the primary speed was infrequent, it was necessary because of rare instances when the primary drive shaft magnet pulse counts were corrupted. These instances typically occurred at idling or very low speeds when a magnet was positioned in a manner in which vehicle vibrations triggered an anomalously high number of magnetic pulses.

Switchbox Data Filtering – The *Clean1E* program also translated nominal floating-point voltages from the switchbox to discrete integer values that more clearly reflected the switch settings on a second-by-second basis. Logic was also included to correct momentary or inadvertent switch transitions.

The output from *Clean1E* was an "intermediate" version of each input Drive file that reflected these filtering calculations and was fed into the next program (*Clean2E*).

Calculation of Target Vehicle Speed and Road Grade (*Clean2E*) – The *Clean2E* program was then executed to perform the following functions:

- Compute target vehicle speed;
- Calculate road grade;
- Remove initial and trailing idling; and
- Combine individual run files.

Computation of Target Vehicle Speed – The *Clean2E* calculated second-by-second absolute speed of the target vehicle (when a target was available) from the differentiated relative range and added it to the chase car's absolute speed. (When no locked-on target was available, the target speed was set to a missing value in the output data set.)

Road Grade Calculations – Calculations of second-by-second road grade were also performed in *Clean2E* based on the GPS-based altitude measurements. In past driving studies conducted in the early 1990s, Sierra had calculated road grade using only the vehicle speed and accelerometer data.[*] Because of noise in the raw accelerometer

[*] During previous studies, road grade was calculated from the longitudinally mounted accelerometer and vehicle speed data using the second-by-second measurements from each source as follows. First, speeds were centered-differenced from *t-1* to *t+1* to calculate acceleration at each point *t* (expressed in G's). This vehicle acceleration was then subtracted from the accelerometer-measured longitudinal acceleration (also in G's) at each time *t*. This difference, which represents the fractional road grade (where 0=horizontal and 1=vertical), was then multiplied by the vehicle speed at each second to produce an array of "elevation change" in feet over each second. This array was then filtered in a manner in which only elevation changes over 7.5 feet (per second) were used to calculate road grade. Given the noise in the raw accelerometer data, the intent of this approach was to estimate road grade during "significant" elevation changes. The filter

measurements, elevation changes of less than 7.5 feet within 5 seconds could not be accurately resolved. Logic was applied to ignore elevation changes measured below this threshold. Accelerometer-based road grade was then computed as a running average over a five-second window.

After those studies were completed, Sierra found these accelerometer-based grade estimates (using the smoothing logic described above) were too noisy to be useful in calculating grade-compensated power-related driving statistics. (Road grade calculated in previous driving studies was never used by the study sponsors. Thus, the output grade values were never thoroughly examined under the earlier studies.)

In processing the FC and OR chase car data under this current EPA study, road grade was calculated using the second-by-second GPS-based altitude measurements. Although the GPS-based altitude data are not highly accurate in an absolute sense when low-horizon satellites are not available, they were found to be sufficiently accurate in a relative sense for calculating road grade over a route with proper filtering of anomalous readings as described below.

GPS-based altitudes frequently exhibited anomalous values at low speeds (below 10 mph). As a result, the first filtering step consisted of substituting the altitude reading from the nearest second after the vehicle speed was over 10 mph for at least three seconds. Because they occurred only at very low speeds, these substitutions were only applied to very short sections of routes (typically near the start and end). After these anomalous altitude values at low speeds were corrected, a second filter was applied to find altitude changes from one second to the next that exceeded a speed-dependent cutoff value equivalent to a "maximum" allowed fractional grade* of ±0.22. (This is equivalent to a 19.8 degree angular grade or a 36% grade.) For example, at a speed of 60 mph, the maximum allowed altitude change over one second was 30 feet [60 mph × 1.4667 ft per sec/mph × SINE (0.22× π/2 radians)]. Altitude change anomalies detected in this manner were then corrected by linear interpolation from neighboring valid altitudes. Finally, road grade was calculated at each second from a centered difference of the change in altitude two seconds forward and two seconds backward and the distance driven by the chase car over that interval. (Grade was calculated as the ARCSINE of the altitude change divided by the distance driven, where the distance driven was determined from the patrol car speed.)

The resulting altitude-based grade calculations were checked for roughly a dozen routes in both flat terrain (Sacramento and Stanislaus County) and rolling or hilly areas (San Francisco Bay Area and Los Angeles) using known elevations obtained from topographic maps downloaded from MapTech at http://mapserver.maptech.com/homepage/index.cfm.

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also excluded points when the lateral accelerometer measured acceleration exceeded ±0.25 G and vehicle speed dropped below 25 mph (indicative of vehicle turning). After applying this filtering, the "final" estimated road grade was calculated from those remaining data points using a five-second running average.

* Road grade was calculated and reported in this study in units of fractional grade between 0 and ±1 where a value of zero is horizontal and values of +1 and -1 are vertical upward and vertical downward, respectively. A fractional grade of 0.5 is equivalent to an angular grade of 45 degrees and a percentage grade of 100%.

Only routes that did not include travel on raised roadway sections (e.g., freeways and ramps) were used to ensure a proper crosscheck using the topographic map-based land elevations. With the appropriate filtering and smoothing as described above, it is believed the altitude-based grade calculations can accurately resolve fractional road grade down to roughly ±0.01 (which is equivalent to about 1 degree or 2%, in angular and percentage grade units, respectively).

Removal of Leading and Trailing Idle – The *Clean2E* program also removed leading and trailing idle (i.e., zero speed) records at the start and end of each drive. (In each case, a single zero speed record was retained at the beginning and end of each driving run that did not begin or end "on the fly.") Usually this idling lasted for less than five seconds, but in some cases it lasted up to 60 seconds. This idling occurred while the drive teams were readying to start or forgot to immediately end data acquisition at the end of a trip, and thus are not representative of actual driving behavior.

Combining of Driving Run Files – Finally, the *Clean2E* program also combined the second-by-second data from each input route run file into a single combined file for each study area. As a result, the combined output file also included route ID and date and time stamp fields so the individual run data could be distinguished in later processing.

FC Processing – For the FC driving data, another Fortran post-processing program, *LOSSEGS*, was also written and executed to perform the following functions:

- Discard data from invalid route runs,
- Identify facility segment endpoints within each route run, and
- Perform and output results from a series of automated quality assurance (Q/A) and consistency checks.

Discarding of Invalid Route Runs – Data from a "Routes Driven" spreadsheet were input into *LOSSEGS* to identify and discard all invalid runs, based on the status of each run as entered in the spreadsheet. Route runs marked "BAD" were discarded; runs marked "OK" were kept and processed further.

Facility Segment Identification – During the original study, spreadsheet tables were compiled for each route that identified the roadway name (e.g., Main Street), start and end points (e.g., 1st Ave and 4th Ave), and length of each connecting road segment in the route. These route spreadsheets were then assembled into a master database for each study area. Each record in the database represented an individual segment of a road route. The database was used both to translate "directions" of each route indicated by its segments onto actual maps and to perform data analysis and validation during post-processing of the collected driving data in conjunction with changes in roadway type identified using the hand-held switchbox. (Chase car drive teams were instructed to flip the "Roadway Type" switch on the hand-held switchbox as each "stop" way marker point

was passed along a route. Stop way markers identified surface street-to-ramp or ramp-freeway transitions [and vice versa] as they were encountered along each route, not changes in individual HPMS segment types. This latter element was performed by the *LOSSEGS* program, as illustrated below.)

The *LOSSEGS* program counted the number of expected stops in the road segment database for each route based on a change in roadway type. These expected stops were then compared to those actually marked in the second-by-second data from the switchbox. Multiple segments that occurred between stops were then identified based on apportionment of driven distance and expected segment length as defined in the road segment database. This is illustrated in Table 3-4, which shows the segment database for an example route in the South Coast.

As shown in Table 3-4, this example route consisted of four stop way marker points. Second-by-second data from the beginning of the route on Otis Dr. until the Imperial Blvd. on-ramp were marked by the "Surface Street" setting on the Roadway Type switch). For stops that spanned multiple segments, such as this stretch of surface street travel, the endpoints of the individual segment were identified in the second-by-second data by apportioning the total distance of the drive between stops with the expected length of each individual segment contained in the road segment database. For example, the last three segments after stop 4 in Table 3-4 represent an expected length of 0.60 miles (0.27 + 0.19 + 0.14). If the measured distance in the second-by-second data (determined from the chase car speed) between the "stop 4" switch point and the end of the route was 0.66 miles, the endpoints of the individual segments would be marked off based on apportioned distances as follows:

- Hawthorne, off-ramp to Lennox $= 0.66 \div 0.60 \times 0.27 = 0.297$ miles
- Hawthorne, Lennox to W 105th $= 0.66 \div 0.60 \times 0.19 = 0.209$ miles
- W 105th to end of route $= 0.66 \div 0.60 \times 0.14 = 0.154$ miles

In this manner, each individual segment as defined in the road segment database was spatially identified in the second-by-second data.

<u>Segment Distance Checks</u> – If the drive team ever forgot or was late in flipping the Roadway Type switch at the intended stop locations, the calculated segment endpoints would be erroneous. Thus, these spatial segment calculations had to be carefully checked. This process is discussed below.

As illustrated by the example in Table 3-4, the expected number of stops for each route run was determined from the road segment database and compared to the number of "flips" of the Segment rotary switch that were recorded in the second-by-second data for

Table 3-4
Illustration of Stops in South Coast Road Segment Database

Route ID	Starting Street Name	Ending Street Name	Segment Length (miles)	Segment Category Code	**Stop Number**
SC-PM-II-012	Missouri	Otis/Missouri	0.01	19	
SC-PM-II-012	Otis/Missouri	Otis/Tweedy	0.16	16	
SC-PM-II-012	Otis/Tweedy	Abbott/Otis	0.55	16	
SC-PM-II-012	Abbott/Otis	Abbott/Otis	0.01	16	
SC-PM-II-012	Abbott/Otis	Imperial/Otis	0.23	16	
SC-PM-II-012	Imperial/Otis	Century/Imperial	0.24	14	
SC-PM-II-012	Century/Imperial	Imperial	0.13	14	
SC-PM-II-012	Imperial	California/Imperial	0.21	14	
SC-PM-II-012	California/Imperial	Imperial/Long Beach	0.17	14	
SC-PM-II-012	Imperial/Long Beach	Imperial/State	0.28	14	
SC-PM-II-012	Imperial/State	Alameda/Imperial	0.52	14	
SC-PM-II-012	Alameda/Imperial	Alameda/Imperial	0.03	14	
SC-PM-II-012	Alameda/Imperial	Imperial/Mona	0.27	14	
SC-PM-II-012	Imperial/Mona	Imperial	0.17	14	
SC-PM-II-012	Imperial	On Ramp	0.01	14	
SC-PM-II-012	On Ramp	I105	0.36	21	**1**
SC-PM-II-012	I105	I105	0.59	11	**2**
SC-PM-II-012	I105	I105	0.52	11	
SC-PM-II-012	I105	I105	0.82	11	
SC-PM-II-012	I105	I105	0.17	11	
SC-PM-II-012	I105	I105	0.24	11	
SC-PM-II-012	I105	I105	0.37	11	
SC-PM-II-012	I105	I105	0.14	11	
SC-PM-II-012	I105	I105	0.19	11	
SC-PM-II-012	I105	I105	0.20	11	
SC-PM-II-012	I105	I105	1.52	11	
SC-PM-II-012	I105	I105	0.24	11	
SC-PM-II-012	I105	I105	0.27	11	
SC-PM-II-012	I105	I105	0.83	11	
SC-PM-II-012	I105	Off Ramp	0.20	11	
SC-PM-II-012	Off Ramp	Hawthorne	0.43	22	**3**
SC-PM-II-012	Hawthorne	Hawthorne/Lennox	0.27	14	**4**
SC-PM-II-012	Hawthorne/Lennox	Hawthorne/W 105th	0.19	14	
SC-PM-II-012	Hawthorne/W 105th	W 105th	0.14	19	

the run. Runs for which these counts did not match were immediately flagged for further review and correction (see "Video Review" below).

In addition, even when stops counts matched, the calculated distances of each segment leg were compared to their expected distances in the road segment file. Distance comparisons that did not match within a 10% relative tolerance were used to flag individual segments for further review. Roughly 5% of the route runs were affected by these inconsistencies.

Videotape Review – As alluded to above, detailed videotape review was performed for some 5% of the route runs to correct anomalies identified during Q/A checks. To correct for Roadway Type switch flip count and distance inconsistencies, the videotapes for affected runs were played back and observed. The second-by-second time that was displayed on the videotape was used to identify the time stamps in the data file that corresponded to each segment endpoint. These video times were reread into the *LOSSEGS* program and used to properly identify road segments for those affected runs.

OR Processing – After processing the raw OR driving data using the *CLEAN1E* and *CLEAN2E* as described earlier in the "Common Processing" section, additional post-processing was performed to locate and output only that portion of the driving that occurred on the on-ramp segments. This was done by using the second-by-second position and heading* data recorded by the GPS unit in the chase car.

Ramp Coordinates File – Prior to this processing, a file was developed that precisely identified the latitude and longitude coordinates of the start and end point for each on-ramp. For ramps with ramp meters, the coordinates of the meter stop bar were also identified. The coordinates for each of the 266 on-ramps were carefully determined from Google Earth high-resolution images of the Sacramento area.

In addition to the latitude and longitude coordinates, the bearing or heading of each ramp's start and end points was also determined using Google Earth and entered in the Ramp Coordinates file. The bearing data were needed during post-processing to resolve cases when the chase car traversed freeway sections that were elevated above or in depressed sections below their adjoining on-ramps. (Common examples of these situations occurred on "clover leaf" or "loop" freeway interchanges.) When the lat/long coordinates measured by the GPS were the same for both an arterial overcrossing and the on-ramp as it crossed beneath the overpass, it was found that the chase car's location (on either the overcrossing or the ramp) could be determined by examining the heading and comparing it to the expected heading on the ramp. Thus, headings at both the ramp start and end locations were entered into the Ramp Coordinates file and used during post-processing to properly identify when the vehicle was actually traversing an on-ramp.

Table 3-5 shows an excerpt of the Ramp Coordinates file for one of the many interchanges contained in the Sacramento study area. Figure 3-1 shows an aerial image of this ramp interchange obtained from Google Earth.

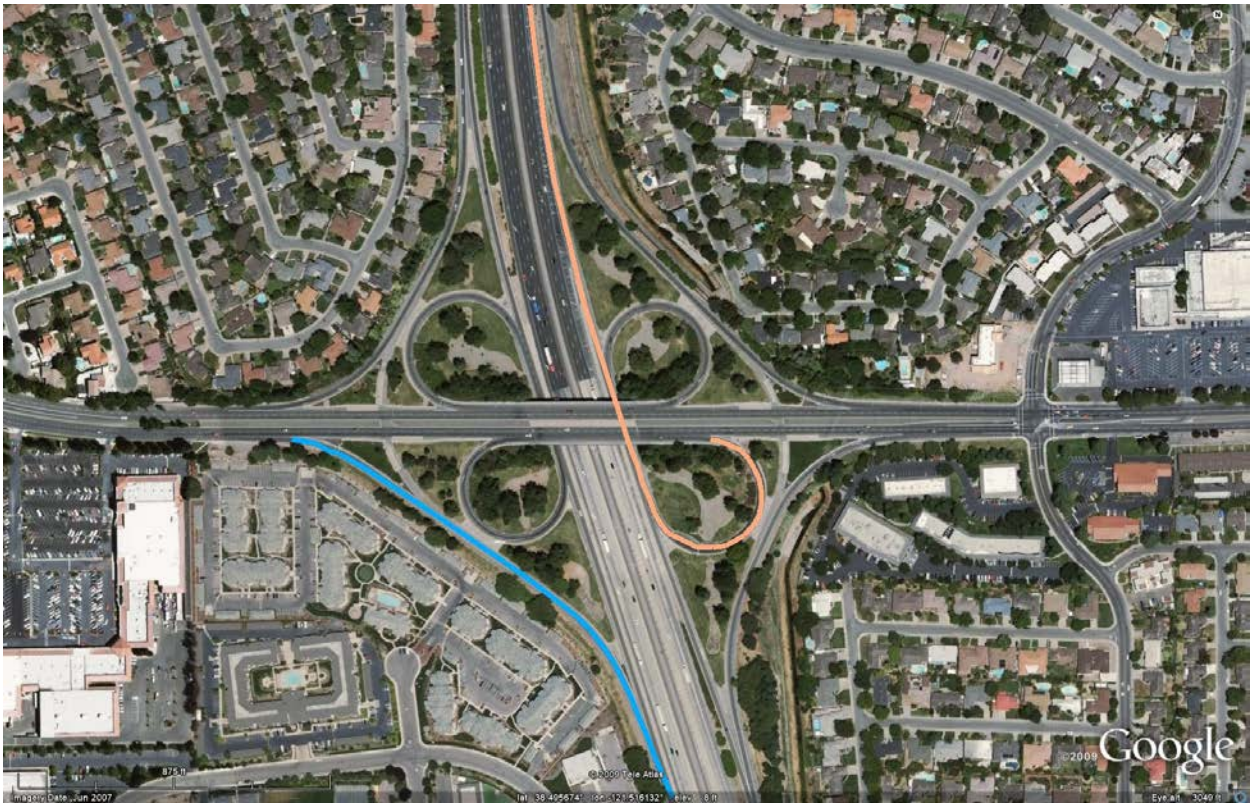
As listed in Table 3-5, coordinates and directional orientation information are specified for each of the four on-ramps of this interchange. (As can be seen in Figure 3-1, there are also four off-ramps, but off-ramp driving from the OR driving study were not used. Thus, they do not appear in the Ramp Coordinates file.) Each ramp is described by latitude and longitude coordinates at both the start and end of the ramp. For ramps with signal meters (the majority of on-ramps in Sacramento have signal meters that operate

* Heading refers to the direction of travel in degrees from true north.

Table 3-5
Excerpt of Ramp Coordinates File Used in OR Study Post-Processing

Ramp Interchange	Ramp Leg	Meter	Latitude (deg)	Longitude (deg)	Bearing (deg N)	Bearing Diff	Ramp Type
Florin Rd. & I-5	WB to NB Start	yes	38.495667	-121.513933	290	70	D
Florin Rd. & I-5	Stop Line	yes	38.498851	-121.516988		70	D
Florin Rd. & I-5	WB to NB End	yes	38.500272	-121.517262	0	70	D
Florin Rd. & I-5	WB to SB Start	no	38.495645	-121.517794	110	240	L
Florin Rd. & I-5	Stop Line	no				240	L
Florin Rd. & I-5	WB to SB End	no	38.495349	-121.516818	350	240	L
Florin Rd. & I-5	EB to NB Start	yes	38.495408	-121.515324	120	230	L
Florin Rd. & I-5	Stop Line	yes	38.494553	-121.515432		230	L
Florin Rd. & I-5	EB to NB End	yes	38.495783	-121.516286	350	230	L
Florin Rd. & I-5	EB to SB Start	no	38.495397	-121.519448	110	50	D
Florin Rd. & I-5	Stop Line	no				50	D
Florin Rd. & I-5	EB to SB End	no	38.490443	-121.514677	160	50	D

Figure 3-1
Aerial Image of I-5 and Florin Road Interchange in Sacramento Metropolitan Area



during AM and PM commute periods), indicated with a "yes" in the "Meter" column, coordinates of the meter stop line are also given.

The "Bearing" column in Table 3-5 lists the travel direction or heading at both the stop and end of each ramp. For example, the start of the EB Florin Rd to NB I-5 on-ramp has a directional bearing of 120°, just south of due east. This on-ramp is one of the "loop" ramps and is highlighted with an orange path in Figure 3-1. The end of the ramp (which extends beyond the area shown in Figure 3-1) has a bearing of 350°, just west of due north.

The next column labeled "Bearing Diff" simply shows the calculated difference (in degrees) between the bearing at the start and end of each ramp. For the ramp leg highlighted in Figure 3-1, Table 3-5 shows a directional difference or rotation of 230° (from 120° to 350°). (As described later, both the Bearing and Bearing Diff values were used to properly identify and extract those portions of the OR driving that occurred only on the on-ramps.)

Finally, the rightmost column in Table 3-5 indicates the type of ramp configuration. "D" represents a "Diamond" style ramp leg and "L" denotes a "Loop" type ramp. The interchange shown in Figure 3-1 contains a mixture of both Diamond and Loop on-ramps. The Diamond ramp (in the southwest quadrant) is highlighted in blue while the Loop ramp as noted above is highlighted in orange. These configurations were determined and coded into the Ramp Coordinates file by visual inspection of each ramp leg within Google Earth.

Spatial Post-Processing – Once all these data were determined from the Google Earth aerial images and entered into the Ramp Coordinates file, a spatial post-processing program called *GPSRampProc* was written and executed to perform the actual identification and extraction of the cleaned second-by-second chase car driving data along the on-ramps. (Travel on off-ramps, mainline freeways, and nearby arterials was discarded by the *GPSRampProc* program.)

The GPSRampProc program began by reading in the cleaned and validated second-by-second chase car driving data (speeds and GPS-based position and heading data) as well the latitudes/longitudes, metering, bearing, and ramp type for each on-ramp from the Ramp Coordinates file. The spatial processing to extract the on-ramp traverses began by comparing the starting coordinates for every on-ramp defined in the Ramp Coordinates file to the second-by-second GPS position measurements within a large program loop.

Once the chase car position was found to be within a pre-defined distance (100 feet) from any ramp start location, that ramp was flagged. The program then scanned forward in the second-by-second chase car data array (usually only a few seconds) until the nearest point to the ramp start was determined. At this point, the directional heading measurement from the chase car was compared to that at the start of the flagged on-ramp. If these directional values agreed to within a prescribed tolerance (set to 60°), a flag was

set establishing that a ramp start had been found (as was validated by the combination of position and heading measurements).

If the flagged on-ramp had a signal meter (determined from the Ramp Coordinates file), the driving data array was then scanned forward until the chase car's distance to the stop line reached a minimum and this minimum distance was within a required tolerance (80 feet). The ramp meter "stop line" point was then flagged in the driving data array. Programming logic was also used to determine if the ramp meter was also operating at the time it was traversed.[*] A meter was determined to be operating if the following criteria were met:

- The traverse occurred within the 6-9 AM or 3-6 PM peak periods; and
- Either the minimum speed up to the meter stop line was less than 5 mph or there was a decrease in vehicle speed between the start and meter stop line of at least 10 mph.

(This latter criterion handled situations on multi-lane ramps where the chase car was able to "cruise" through on a green light triggered by a vehicle in front of it, but did not have to slow to a very low speed or make a complete stop.)

Using this logic, a ramp with a meter was marked with a "MeterOn" flag set to either "True" or "False."

Similar to the ramp start, the ramp end was determined by scanning forward in the driving data array (from the start on a ramp without a meter or the stop line point on a metered ramp) until the chase car's distance to the known endpoint coordinates reached a minimum value and was within the allowed tolerance (100 feet). Once the start and end point (and ramp meter stop line point where applicable) were identified in this manner, the on-ramp was marked as a valid traverse.

The distance tolerances employed in the processing were set at the values indicated above by running the GPSRampProc program several times and "tuning" the tolerances. This tuning resulted in values that accommodated the accuracy of the GPS position data (±30 feet), the measurement frequency (1 second) and traverse speeds (typically 20-60 mph), yet were low enough to ensure that driving on other nearby roadways was not incorrectly deduced to be an on-ramp.

The next step consisted of classifying the on-ramp traverse. Three classification elements were determined for each valid traverse:

- *Ramp Configuration* – "D" for Diamond or "L" for Loop;

[*] Sierra initially contacted the Caltrans District office for the Sacramento area in an attempt to determine ramp meter operating times and locations. In was learned that historical day-specific records back to 2004 when the driving was conducted were spotty. Caltrans was able to confirm that meters, if operated, were only running during the 6-9 AM and 3-6 PM peak periods.

- *Road Grade Type* – "D" for downgrade, "L" for level grade, "U" for upgrade; and

- *Meter Operating Status* – "MON" for meter operating, "MOF" for meter not operating or no meter.

The ramp configuration was obtained by lookup from the Ramp Coordinates file. Meter operating status was based on the MeterOn flag discussed above. The road grade type was determined from the change in second-by-second road grade calculated earlier in the driving data file. Ramps with descending grades of 1.2% or more were classified as Downgrade ramps. Those with ascending grades of 1.2% or higher were called Upgrade ramps. All other ramps (with grades less than ±1.2%) were treated as Level ramps. (The 1.2% grade threshold was set to get a sufficient number of traverses into each of the three Road Grade groups. If more driving data were available, the threshold could be set based on more formal freeway ramp design criteria.)

Once these classification elements had been determined, they were written to an output file along with the second-by-second driving data from the start point to the end point of the valid ramp traverse.

Albeit somewhat complicated, the OR driving data were spatially processed and classified in this manner and an output file containing second-by-second speeds (and forward-differenced accelerations) for on-ramp driving was produced.

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4. CYCLE DEVELOPMENT METHODOLOGY

Development of link-level driving cycles from second-by-second vehicle speed measurements that are representative of different types of roadway types and driving behavior is not a simple task. The measured speed data must be categorized into groups that represent each type of driving behavior from which an individual cycle is to be created. Techniques must be applied to characterize the driving patterns in each group. Cycles must then be constructed in a manner that best represents the driving patterns in each group while preserving the integrity of actual measured speed-time traces.

Vehicle emissions are highly sensitive to second-by-second changes in speed due to the advanced, computer-controlled emission systems in most of the current vehicle fleet. Accurately representing second-by-second speed changes is vital to ensuring that the resulting cycles reflect actual driving patterns without acceleration "artifacts" caused by improper joining of the as-measured data.

This section of the report documents the detailed methodology that was employed to develop the link-level driving cycles generated under this effort.

4.1 Driving Data Grouping

FC Data Groupings – As described earlier, the FC driving database contains measured driving patterns over a number of road routes and at different levels of traffic congestion. Driving cycles were developed from the FC database by individual Functional Class (roadway type) and observed LOS groups because these strata are well-matched to many project-level applications.

Thus, the first step in development of the FC driving cycles consisted of dividing or grouping the second-by-second speed measurements in the driving database into separate Functional Class and LOS specific files that represented the ranges of operation within each distinct driving data group for which individual cycles were to be constructed.

A simple SAS program called *FC&LOSDist_CT2000* was written to tabulate the number of second-by-second records in the master FC driving database by Functional Class (including those added for freeway ramps as described earlier in Section 3.1) and observed LOS. Table 4-1 presents the results of these tabulations, which were used to determine if sufficient data were available within each joint Functional Class/LOS stratum to represent a distinct driving group for which a cycle would be developed.

Table 4-1
Distribution of FC Driving Data Records by Functional Class and Observed LOS

Functional Class	Observed LOS						All LOS Totals
	A	B	C	D	E	F	
01 – Rural Interstate	68,789	7,974	1,168	206	275	29	78,441
02 – Rural Principal Arterial	29,897	2,871	1,241	6,746	41	545	41,341
06 – Rural Minor Arterial	18,278	493	0	1,492	0	346	20,609
07 – Rural Major Collector	73,901	74	101	2,514	44	58	76,692
08 – Rural Minor Collection	37,256	306	186	1,124	267	58	39,197
09 – Rural Local	12,053	290	131	148	70	128	12,820
11 – Urban Interstate	50,419	17,534	27,008	20,310	19,447	45,729	180,447
12 – Urban Other Fwy/Expwy	87,328	36,754	32,774	29,752	19,821	36,722	243,151
14 – Urban Principal Arterial	204,543	8,194	8,703	109,307	6,920	22,692	360,359
16 – Urban Minor Arterial	171,745	7,449	8,295	49,728	5,621	10,388	253,226
17 – Urban Collector	84,528	3,745	3,519	12,178	1,543	1,563	107,076
19 – Urban Local	68,596	1,660	2,149	5,923	1,089	2,200	81,617
21 – Freeway On-Ramp	10,549	186	151	3,045	166	733	14,830
22 – Freeway Off-Ramp	11,296	1,441	1,906	1,855	254	621	17,373
23 – Freeway Transition Ramp	1,165	705	655	925	158	806	4,414
Total (All Functional Classes)	930,343	89,676	87,987	245,253	55,716	122,618	1,531,593

Given the available study resources, a robust statistical analysis of how to group the data was not performed. Instead, a minimum sample size of 3,600 single-second records (1 hour) was used to determine where driving groups by Functional Class and individual LOS category contained sufficient data or when some of the LOS categories had to be combined together.

The resulting groupings for which individual driving cycles were developed are listed below (together with the cycles within each Functional Class).

- FC01 (Rural Interstate) - Single group, all LOS
- FC02 (Rural Principal Arterial) - Two groups, LOS A-C and LOS D-F
- FC06 (Rural Minor Arterial) - Single group, all LOS
- FC07 (Rural Major Collector) - Single group, all LOS
- FC08 (Rural Minor Collection) - Single group, all LOS
- FC09 (Rural Local) - Single group, all LOS
- FC11 (Urban Interstate) - Six groups, by LOS from A through F
- FC12 (Urban Other Fwy/Expwy) - Six groups, by LOS from A through F
- FC14 (Urban Principal Arterial) - Six groups, by LOS from A through F
- FC16 (Urban Minor Arterial) - Six groups, by LOS from A through F
- FC17 (Urban Collector) - Three groups, LOS A-C, LOS D and LOS E-F
- FC19 (Urban Local) - Two groups, LOS A-C and LOS D-F

- FC21 (Freeway On-Ramp) - Single group, all LOS
- FC22 (Freeway Off-Ramp) - Single group, all LOS
- FC23 (Freeway Transition Ramp) - Single group, all LOS

In all, 39 separate driving groups were defined from the FC database and driving cycles were developed for each individual group.

OR Data Groupings – As discussed earlier in Section 3, the on-ramp (OR) driving data were coded by the ramp type or configuration (Diamond or Loop), road grade type (Downgrade, Level or Upgrade), and ramp metering status (On or Off/Not Used). Another simple SAS program called *SacRamp_TypeDist* was written to perform similar tabulations to determine sample sizes and define driving groups for the OR driving data.

Table 4-2 shows the results of these tabulations, stratified both by combined ramp/grade type and metering status. The rightmost column shows total record counts by ramp/grade type across both ramp metering states. As shown, there were much fewer data collected in the OR driving database than the FC database discussed earlier.

Table 4-2
Distribution of OR Driving Data Records by Combined Ramp/Grade Type and Ramp Metering Status

Ramp Type – Grade Type	Ramp Metering State		Total
	On	Off/Not Used	
Diamond-Downgrade (D-D)	1,430	31	1,461
Diamond-Level (D-L)	8,451	1,338	9,789
Diamond-Update (D-U)	1,840	444	2,284
Loop-Downgrade (L-D)	3,367	773	4,140
Loop-Level (L-L)	1,967	300	2,267
Loop-Upgrade (L-U)	477	0	477
Total	17,532	2,886	20,418

In order to provide a "complete" series of on-ramp cycles for project-level MOVES use, the 3,600 record minimum sample size requirement was not applied to the OR data. Instead, OR driving groups were simply defined for each of the six ramp type-grade type combinations and then separately (not jointly) for the two metering groups. This resulted in the eight OR driving groups listed below.

- Diamond-Downgrade (D-D)
- Diamond-Level (D-L)
- Diamond-Upgrade (D-U)
- Loop-Downgrade (L-D)
- Loop-Level (L-L)

- Loop-Upgrade (L-U)
- Metering On (MON)
- Metering Off or No Meter (MOF)

As clearly shown in Table 4-2, this resulted in very limited samples within some of the defined groups. Moreover, the Sacramento driving study from which these data originated was not conducted in a manner in which driving by time-of-day period (e.g., peak vs. non-peak) was proportionally represented. (Although driving runs from this earlier study were performed in peak and non-peak periods, no attempt was made to sample each period in proportion to its daily travel fraction.) Although the cycles developed from these limited data may contain some bias, results shown later in this section and in Section 5 suggest that differences in the operating patterns reflected in these driving groups follow expected trends. (For example, stronger accelerations in Diamond groups than Loop groups where a vehicle's ability to accelerate in less limited by the curvature of the on-ramp.)

4.2 Driving Group Statistical Characterizations

Once the FC and OR driving data had been divided into groups for which separate families of driving cycles were to be constructed, the next step in cycle development consisted of generating joint speed-acceleration frequency distributions (or SAFDs) from the driving data in each group. As explained later in Section 4.4, the SAFD was the primary metric used to compare the speed and acceleration patterns contained in an individual driving cycle to those of the driving database it was intended to represent. Vehicle emissions can be highly affected by specific second-by-second speed variations and the frequency with which these variations occur under in-use driving. Thus, compilation of driving data into joint frequency distributions of speed and acceleration provides an effective means to represent modal (i.e., second-by-second) driving patterns.

The SAFDs were constructed from all of the second-by-second composite vehicle speeds and forward-differenced accelerations in each driving data group. They are subsequently referred to as population SAFDs so as to distinguish them from cycle SAFDs that are generated from the second-by-second speeds in each driving cycle.

A Fortran program called ***DrvStats*** was developed and used to calculate the population SAFDs and a series of summary statistics for the data in each of the FC and OR driving groups. Definitions of the SAFD intervals and each of the driving data statistics calculated by the ***DrvStats*** program are given below.

SAFD Intervals – SAFDs were calculated by assigning the second-by-second speed and accelerations in each driving data group into 861 (21 × 41) joint speed and acceleration bins. The 21 speed bin intervals were defined as follows:

Speed Bin	Speed Range
0	zero (i.e., < 0.1 mph)
1	0.1 to ≤ 7.5 mph
2	7.5 to ≤ 12.5 mph
3	12.5 to ≤ 17.5 mph
.	.
.	.
.	.
20	97.5 to ≤ 102.5 mph

The acceleration bins were defined at 1 mph per second (mph/s) intervals, as listed below.

Accel Bin	Accel Range
-20	-20.5 ≥ to < -19.5 mph/s
.	.
.	.
.	.
-3	-3.5 ≥ to < -2.5 mph/s
-2	-2.5 ≥ to < -1.5 mph/s
-1	-1.5 ≥ to < -0.5 mph/s
0	-0.5 ≥ to ≤ 0.5 mph/s
1	> 0.5 to ≤ 1.5 mph/s
2	> 1.5 to ≤ 2.5 mph/s
3	> 2.5 to ≤ 3.5 mph/s
.	.
.	.
.	.
20	> 19.5 to ≤ 20.5 mph/s

The frequencies in each joint speed-acceleration bin are reported as percentages (i.e., a value of 0.25 indicates that 0.25% of the total number of second-by-second data records occur within that joint bin).

Speed Statistics – Speed statistics produced by *DrvStats* consist of average and maximum speed, average non-idle speed, and average cruise speed. Average non-idle speed is the mean speed when not fully stopped at zero speed. Average cruise speed is the mean speed when in "cruise" mode, where cruise mode is defined as acceleration or deceleration rates less than or equal to ± 1.5 mph/s at speeds below 57.5 mph and less than or equal to ± 0.5 mph/sec at speeds above 57.5 mph.

Acceleration Statistics – Reported acceleration statistics include both average and maximum acceleration and average and maximum deceleration rates.

Time-in-Mode Statistics – *DrvStats* also reports the percentage of time that occurred in each of four modes: (1) idle; (2) cruise; (3) accel; and (4) decel. Idle mode refers to zero speed and cruise mode was defined above. Accel and decel modes contain accelerations and decelerations above those cutoffs used to define the cruise mode.

Trip Length Statistics – Mean trip or segment lengths expressed on both a distance (miles) and time (minutes) basis are calculated from changes in the value of the RouteID field in the database. For the FC and OR driving data analyzed under this effort, these statistics represent the average distance (or time) of contiguous driving sections under the same FC/LOS or OR group.

Stops Per Mile – *DrvStats* defines a "stop" event as at least two consecutive speeds less than or equal to 0.5 mph and treats low speed "creep" below 5 mph as a single stop event. Stops per mile are reported as the average number of these stop events per mile driven.

Number of Observations – This is simply the number of second-by-second records in the input driving data group.

PKE and Specific Power Statistics – *DrvStats* reports positive kinetic energy (PKE) as the sum of positive differences in kinetic energy per unit distance. It also calculates average positive power per unit mass and reports the average across all seconds as "Average Total Specific Power" and across acceleration periods only as "Average Non-Zero Specific Power." Maximum single-second specific power and specific power distributions are also reported. Note that these power statistics are not the same as Vehicle Specific Power (VSP) as defined by EPA and utilized in MOVES. They were developed and defined by Sierra prior to EPA's use of VSP (which is used in MOVES).

MOVES Vehicle-Specific Power (VSP) Bin Distributions and Statistics – Under this effort, calculation of MOVES-equivalent VSP statistics were incorporated into the *DrvStats* program. The VSP calculations were based on methods described by EPA in Appendix B of its MOVES2004 Energy and Emissions Inputs draft report.[5] Second-by-second VSP is a function of terms related to vehicle speed, acceleration, aerodynamic drag, rolling resistance, and road grade. In practice, as described in Equation B-3 of that report, VSP is calculated from a simplified form that uses track road-load coefficients A, B, and C to account for rolling, rotational, and aerodynamic resistance, respectively.

In order to calculate these three coefficients for light-duty vehicles, an additional parameter—"track road load horsepower at 50 mph" (TRLHP)—is needed. Values of TRLHP have been compiled by Sierra Research in its "I/M Lookup Table" for individual light-duty vehicle models from model years 1973 through 2008. However, these model-specific TRLHP values could not be used for this effort because the chase-car based FC and OR driving data studies did not include recording of the individual vehicle models being followed at any given time.

Instead, TRLHP was estimated using regression equations developed by EPA as a function of vehicle test weight. In applying this method for the chase car driving data,

reference test weights for sales weighted average MY2008 passenger cars and light trucks were determined from EPA's "Fuel Economy Trends" report.[6] These values were 3,541 lb and 4,742 lb, respectively. Using these reference weights, TRLHP and A, B, and C coefficients were estimated as representing the "average" passenger car and light-truck followed in the chase car driving using equations B-4, B-5, and Table B-11 regression coefficients from Appendix B of EPA's MOVES2004 report. Second-by-second average car and average light truck VSP could then be computed from the FC and OR chase car data from equation B-3 of that report.

In addition, since validated second-by-second road grade was available from the post-processed FC and OR driving data, VSP calculations were performed two different ways: (1) accounting for second-by-second road grade; and (2) ignoring measured road grade (i.e., assuming constant level grade travel). Using an assumed split of 52% cars and 48% light trucks from the Fuel Economy Trends report, average light-duty vehicle VSP was then computed (both grade-compensated and un-compensated).

Once second-by-second VSP was computed (in units of kW/tonne), the data in each driving group were also binned into operating mode (VSP/speed) bins using bin definitions defined by EPA and used in MOVES. (These bin definitions are listed later in the report in Section 6.) Thus, the DrvStats program also reported MOVES-based VSP/Speed bin distributions for the data in each driving group as well as the mean VSP.

Figures 4-1 and 4-2 provide examples of a driving population SAFD and summary statistics for the two different extremes of Urban Interstate (FC11) driving, the LOS A and LOS F groups, respectively. (The VSP statistics in these figures reflect no grade compensation.) In comparing the SAFD distributions contained in these two figures, LOS A (uncongested) driving in Figure 4-1 is characterized by much more high speed operation (86% of travel at or above 55 mph) than the heavily congested LOS F driving shown in Figure 4-2 (3% of travel at or above 55 mph). This comparison highlights the need to account for differences in operating patterns between driving groups that will be applied on a link- or project-level basis.

The complete set of driving population SAFDs and summary statistics computed for each of the FC and OR driving groups are provided in Appendices A and B. Appendix A present the VSP statistics when compensating for or accounting for measured road grade. VSP statistics in Appendix B are not road grade compensated.

To provide a broader comparison of driving differences, Table 4-3 compares several key statistics for each FC and OR group from the detailed output provided in Appendix A. As shown in Table 4-3, the driving characteristics within each population group generally show expected variations.

For example, the average speeds of the LOS data groups generally decrease from LOS A (uncongested) to LOS F (very congested). In addition, both the average and maximum speeds are expectedly higher for <u>rural</u> interstate driving (FC01LOSAF) than <u>urban</u> interstate groups (FC11LOSA through FC11LOSF).

Figure 4-1
Example Driving Population SAFD and Summary Statistics - Urban Interstate (FC11) LOS A Driving

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11												0.002										**0.002**
-10															0.002							**0.002**
-9								0.002		0.002												**0.004**
-8					0.002	0.002								0.004								**0.008**
-7									0.002		0.002				0.002		0.004					**0.010**
-6				0.006	0.004	0.004	0.004		0.002		0.002	0.004	0.002	0.002	0.002							**0.032**
-5			0.008	0.014	0.012	0.008	0.008	0.006	0.006	0.008	0.004	0.008	0.002	0.002		0.004	0.002					**0.091**
-4		0.010	0.022	0.028	0.024	0.024	0.018	0.022	0.044	0.032	0.030	0.018	0.014	0.014	0.008	0.004	0.002	0.002				**0.313**
-3		0.024	0.044	0.046	0.056	0.063	0.050	0.044	0.050	0.050	0.077	0.075	0.067	0.042	0.022	0.022	0.004					**0.734**
-2		0.060	0.028	0.046	0.052	0.089	0.089	0.107	0.091	0.133	0.194	0.234	0.216	0.184	0.123	0.048	0.016	0.002				**1.712**
-1		0.192	0.117	0.117	0.099	0.103	0.190	0.163	0.202	0.367	0.706	1.287	2.172	2.392	2.198	1.144	0.335	0.050	0.010			**11.845**
0	0.395	0.301	0.165	0.155	0.135	0.155	0.391	0.230	0.206	0.690	1.771	5.218	10.692	16.067	18.291	10.395	2.309	0.405	0.044			**68.014**
1	0.018	0.202	0.103	0.125	0.117	0.159	0.258	0.240	0.294	0.569	1.275	1.880	2.612	2.896	2.158	1.170	0.256	0.030				**14.362**
2	0.006	0.083	0.060	0.085	0.069	0.121	0.137	0.121	0.117	0.202	0.254	0.272	0.226	0.161	0.077	0.054	0.010					**2.055**
3		0.060	0.024	0.036	0.060	0.065	0.058	0.077	0.069	0.042	0.020	0.022	0.022	0.014	0.012	0.014	0.002	0.002				**0.597**
4		0.020	0.018	0.024	0.014	0.010	0.008	0.004	0.002	0.002	0.004	0.006	0.006	0.012	0.006	0.002						**0.137**
5	0.002	0.010	0.014	0.002	0.002		0.002	0.002		0.002			0.004	0.008		0.004		0.002				**0.054**
6		0.002											0.004			0.004	0.002					**0.012**
7		0.002	0.002										0.002	0.002	0.002							**0.010**
8			0.002							0.002		0.002										**0.006**
9						0.002																**0.002**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.420**	**0.966**	**0.605**	**0.682**	**0.645**	**0.805**	**1.212**	**1.017**	**1.085**	**2.100**	**4.340**	**9.028**	**16.042**	**21.799**	**22.902**	**12.864**	**2.941**	**0.492**	**0.054**			**100.000**

Summary Statistics

Avg Speed (mph)	62.08	Time at Idle (%)	0.421	Avg Specific PKE (hp-sec/lb)	7.70
Min Speed (mph)	0.00	Time at Cruise (%)	76.386	Avg Total Specific Power (hp/lb)	0.0556
Max Speed (mph)	90.33	Time in Accel (%)	11.986	Avg Non-Zero Specific Power (hp/lb)	0.1071
Avg Non-Idle Speed (mph)	62.34	Time in Decel (%)	11.208	Max Specific Power (hp/lb)	1.9627
Avg Cruise Speed (mph)	62.83	Avg Trip Length (miles)	2.389	Spec Pwr Freq (%): 0 hp/lb	48.06
Avg Acceleration (mph/sec)	0.50	Avg Trip Time (min)	2.309	Spec Pwr Freq (%): >0-0.1 hp/lb	31.15
Max Acceleration (mph/sec)	8.62	# Stops per Mile	0.027	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.51
Avg Deceleration (mph/sec)	-0.52	# of 1-Sec Observations	50,419	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.69
Max Deceleration (mph/sec)	-10.73	# of Trips	364	Spec Pwr Freq (%): >0.3 hp/lb	2.58

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.545		
		Bin 0 % (braking)	1.848		
		Bin 1 % (idle)	0.565		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.809	Bin 21 % (25-50 mph, <0 kw/tonne)	1.480		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.953	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.757	Bin 33 % (>50 mph, <6 kw/tonne)	10.740
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.374	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.769		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.232	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.809	Bin 35 % (>50 mph, 6-12 kw/tonne)	22.190
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.132	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.799		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.142		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.235	Bin 37 % (>50 mph, 12-18 kw/tonne)	32.061
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.537	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.784
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.238	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.859
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.064	Bin 40 % (>50 mph, >=30 kw/tonne)	1.624

Figure 4-2
Example Driving Population SAFD and Summary Statistics - Urban Interstate (FC11) LOS F Driving

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13								0.002														**0.002**
-12																						
-11																						
-10						0.002																**0.002**
-9			0.002	0.004	0.002	0.002	0.002	0.002	0.002		0.002	0.002										**0.022**
-8			0.002	0.004	0.004	0.002	0.011		0.002	0.004		0.004	0.002									**0.037**
-7			0.002	0.007	0.011	0.009	0.007	0.009	0.007	0.007	0.002	0.002	0.002									**0.063**
-6		0.009	0.011	0.022	0.015	0.033	0.015	0.007	0.013		0.004	0.002	0.002	0.002								**0.136**
-5		0.007	0.046	0.048	0.046	0.039	0.044	0.028	0.017	0.013	0.017	0.004	0.002									**0.313**
-4		0.063	0.074	0.103	0.092	0.103	0.061	0.050	0.046	0.031	0.022	0.013	0.004									**0.663**
-3		0.186	0.286	0.247	0.212	0.232	0.164	0.142	0.125	0.090	0.048	0.046	0.026	0.009								**1.813**
-2	0.007	0.787	0.894	0.862	0.783	0.612	0.553	0.381	0.289	0.227	0.133	0.079	0.037	0.024								**5.668**
-1	0.011	3.153	2.644	2.266	2.036	2.018	1.513	1.211	0.800	0.573	0.553	0.286	0.140	0.083	0.028							**17.317**
0	2.467	7.437	5.581	4.645	3.969	4.085	3.464	2.528	2.106	1.975	1.784	1.032	0.450	0.227	0.024							**41.774**
1	0.092	3.851	2.965	2.583	2.644	2.690	2.311	1.962	1.612	1.292	1.058	0.485	0.188	0.052	0.007							**23.792**
2	0.007	1.061	0.969	1.091	0.905	0.770	0.595	0.400	0.230	0.129	0.092	0.046	0.013									**6.307**
3		0.321	0.300	0.245	0.203	0.122	0.101	0.066	0.037	0.024	0.011	0.002										**1.432**
4		0.070	0.083	0.074	0.052	0.035	0.015	0.033	0.017	0.007	0.002											**0.389**
5		0.020	0.026	0.022	0.017	0.011	0.011	0.015	0.007	0.011	0.004											**0.144**
6	0.002	0.024	0.022	0.011	0.011	0.007	0.002	0.002														**0.081**
7		0.007	0.002	0.004		0.002	0.002															**0.017**
8			0.002	0.007		0.002			0.002													**0.013**
9				0.002		0.002			0.002													**0.007**
10																						
11					0.002																	**0.002**
12																						
13						0.004																**0.004**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.585**	**16.996**	**13.912**	**12.246**	**11.006**	**10.783**	**8.872**	**6.838**	**5.314**	**4.382**	**3.735**	**2.005**	**0.868**	**0.398**	**0.059**							**100.000**

Summary Statistics

Avg Speed (mph)	21.74	Time at Idle (%)	2.585	Avg Specific PKE (hp-sec/lb)	12.20
Min Speed (mph)	0.00	Time at Cruise (%)	79.816	Avg Total Specific Power (hp/lb)	0.0395
Max Speed (mph)	70.60	Time in Accel (%)	8.636	Avg Non-Zero Specific Power (hp/lb)	0.0739
Avg Non-Idle Speed (mph)	22.32	Time in Decel (%)	8.964	Max Specific Power (hp/lb)	1.7925
Avg Cruise Speed (mph)	22.40	Avg Trip Length (miles)	1.866	Spec Pwr Freq (%): 0 hp/lb	46.54
Avg Acceleration (mph/sec)	0.86	Avg Trip Time (min)	5.150	Spec Pwr Freq (%): >0-0.1 hp/lb	39.12
Max Acceleration (mph/sec)	13.48	# Stops per Mile	0.829	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.50
Avg Deceleration (mph/sec)	-0.95	# of 1-Sec Observations	45,729	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.84
Max Deceleration (mph/sec)	-13.28	# of Trips	148	Spec Pwr Freq (%): >0.3 hp/lb	1.00

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.132		
		Bin 0 % (braking)	5.116		
		Bin 1 % (idle)	4.458		
Bin 11 % (0-25 mph, <0 kw/tonne)	17.237	Bin 21 % (25-50 mph, <0 kw/tonne)	6.827		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	25.392	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.928	Bin 33 % (>50 mph, <6 kw/tonne)	1.384
Bin 13 % (0-25 mph, 3-6 kw/tonne)	7.720	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.695		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.021	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.213	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.654
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.987	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.736		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.507		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.416	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.233
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.575	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.483
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.145	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.108
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.136	Bin 40 % (>50 mph, >=30 kw/tonne)	0.029

Table 4-3
Comparison of Key Driving Statistics Across Driving Groups

Driving Group	Number of Observations	Speed (mph)		Accel (mph/s)		Mean VSP (kW/tonne)
		Mean	Max	Mean	Max	
FC01LOSAF	78,441	72.84	104.72	0.34	8.37	17.34
FC02LOSAC	34,009	55.04	98.36	0.63	9.33	9.89
FC02LOSDF	7,332	48.77	83.00	0.71	7.54	8.09
FC06LOSAF	20,609	44.55	78.32	0.87	12.20	6.72
FC07LOSAF	76,717	42.85	81.81	1.02	10.19	5.97
FC08LOSAF	39,197	38.90	82.79	1.18	11.52	4.75
FC09LOSAF	12,820	30.10	74.46	1.24	7.18	3.81
FC11LOSA	50,419	62.08	90.33	0.50	8.62	12.54
FC11LOSB	17,534	64.81	86.47	0.40	5.78	12.88
FC11LOSC	27,008	63.76	91.73	0.42	7.51	12.48
FC11LOSD	20,310	57.18	80.82	0.51	7.83	10.89
FC11LOSE	19,447	46.61	78.10	0.65	17.70	7.77
FC11LOSF	45,729	21.74	70.60	0.86	13.48	2.13
FC12LOSA	87,328	53.35	88.19	0.60	11.05	10.09
FC12LOSB	36,754	65.42	85.06	0.38	9.70	13.01
FC12LOSC	32,775	62.98	97.70	0.43	12.12	11.88
FC12LOSD	29,751	50.90	79.27	0.61	10.82	8.56
FC12LOSE	19,821	42.33	79.39	0.71	7.27	6.42
FC12LOSF	36,722	19.67	72.42	0.87	10.14	2.03
FC14LOSA	204,543	25.78	81.47	1.23	17.32	2.72
FC14LOSB	8,194	35.15	78.01	1.10	10.31	3.85
FC14LOSC	8,703	27.20	74.53	1.39	9.27	2.69
FC14LOSD	109,307	21.72	69.33	1.20	11.21	2.11
FC14LOSE	6,920	17.26	56.33	1.42	10.04	1.25
FC14LOSF	22,692	9.55	68.47	1.24	11.15	0.77
FC16LOSA	171,745	27.17	77.35	1.26	14.70	2.77
FC16LOSB	7,449	29.16	69.88	1.41	7.75	2.08
FC16LOSC	8,295	23.68	78.50	1.43	12.37	1.80
FC16LOSD	49,728	22.06	77.02	1.26	12.76	2.08
FC16LOSE	5,621	14.62	56.22	1.54	7.82	0.86
FC16LOSF	10,388	11.13	49.09	1.41	11.69	0.84
FC17LOSAC	91,792	22.26	67.32	1.41	13.05	1.72
FC17LOSD	12,178	18.49	61.41	1.48	10.63	1.56
FC17LOSEF	3,106	11.41	56.02	1.74	9.37	0.52
FC19LOSAC	72,405	16.88	64.65	1.44	12.45	0.89
FC19LOSDF	9,212	12.31	44.69	1.45	8.46	0.20
FC21LOSAF	17,157	26.99	83.44	1.71	13.21	7.68
FC22LOSAF	20,117	25.07	74.71	1.42	11.98	-1.85
FC23LOSAF	7,224	41.14	83.05	0.69	12.32	6.32
OR_D-D	1,461	38.61	70.09	1.75	6.69	14.84
OR_D-L	9,789	37.96	78.85	1.43	8.63	11.42
OR_D-U	2,284	32.89	65.58	1.73	7.30	10.49
OR_L-D	4,140	33.12	67.85	1.48	7.24	10.37
OR_L-L	2,267	32.36	66.71	1.27	6.93	8.05
OR_L-U	477	31.90	55.85	1.43	4.11	8.77
OR_MON	2,886	21.32	61.97	1.83	8.63	3.25
OR_MOF	17,532	38.06	78.85	1.44	6.93	12.19

In this manner, SAFDs and other statistics were compiled for all of the vehicle data in each driving group and were used as the basis to measure the representativeness of individual driving cycles developed for each driving group. How these individual driving cycles were constructed is explained in the following sub-section.

4.3 Candidate Cycle Construction

Given a set of driving data that may encompass many thousands of second-by-second speed measurements, it is not practical to develop a driving cycle for emission testing purposes by simply stringing together all the data into a very long speed-time trace. To minimize the cost of emission test programs (or to maximize the number of vehicles that can be tested for a fixed level of resources), it is desirable to make driving cycles as short as possible in length while maintaining their representativeness of the entire driving data set from which they were created.

The LA4 driving cycle used in EPA's Federal Test Procedure (FTP) is 1372 seconds or nearly 23 minutes long. CARB's Unified Cycle is of similar length (just under 24 minutes). EPA's facility-specific freeway cycles used to develop the speed correction factors contained in its MOBILE6 emission factor model range from six to ten minutes in length. Thus, a key element in driving cycle development of driving cycles consists of sifting through the speed measurements and constructing individual speed-time traces that:

1. Represent the distribution of speeds and accelerations in the entire data set;
2. Preserve multi-second driving patterns as measured; and
3. Are short enough in length for practical emissions testing use or implementation as input driving schedules within MOVES.

Based on these considerations, target cycle lengths in the range of 10-15 minutes were established for the cycles constructed under this effort.

Trip Segment Identification – A similar methodology to that employed by Sierra in development of the EPA facility-specific cycles[7] was used to construct driving cycles under this study that met the three key objectives listed above. Under this methodology, a computerized "trial and error" approach was used to select combinations of "trip segments" that best matched the population SAFD for each driving data set for which cycles were constructed. Under cycle development work performed for EPA and CARB in the early 1990s, Sierra had used an approach that generated candidate cycles from microtrips, rather than trip segments. Microtrips were defined as chunks of speed data that began and ended at rest (i.e., zero speed). The microtrip approach was used to develop "composite cycles" that covered a range of travel on both freeways and surface streets. It does not work for development of freeway specific cycles since vehicles rarely come to a complete stop under freeway driving. Thus, a different element of speed-time

trace, the trip segment, was defined and used under the EPA facility-specific cycle development effort and this study.

A trip segment was defined as a second-by-second speed trace whose endpoints were determined by <u>any</u> of the following conditions:

- The vehicle came to a complete stop (defined as at least two seconds of zero speed);

- There was a time discontinuity of more than one second from one record to the next within the chronologically sorted data for a driving group; or

- A contiguous portion of data was identified with a minimum time of 120 seconds that started and ended at cruise (defined for this use as acceleration $\leq \pm 0.5$ mph/sec) or at rest.

As explained earlier in Section 3-1, time discontinuities occur in the driving database where the chase car moved off the freeway sampling segment to turn around and begin the next sampling traverse. When the records in the overall freeway driving database are grouped into separate chronologically sorted driving files for each LOS or speed bin, a time discontinuity also occurs if the LOS or speed bin changes (or is missing) from one freeway section to the next.

For example, consider an excerpt of continuously measured second-by-second speeds collected over a traverse of a five-mile length of freeway comprised of ten half-mile sections. Suppose the LOS on each of the first three sections was "B", "C", and "B", respectively. Further assume that each section was traversed in 30 seconds, as follows:

- Section 1 from 08:00:00 to 08:00:30,
- Section 2 from 08:00:30 to 08:01:00, and
- Section 3 from 08:01:00 to 08:01:30.

When the data are grouped into separate files for each LOS, the records in the LOS B group will exhibit a time discontinuity from 08:00:30 (the end of Section 1) to 08:01:00 (the start of Section 3).

Thus, the first element in cycle construction consisted of identifying the individual trip segments within each Functional Class and LOS driving data group file as described above.

Table 4-4 summarizes the number of individual trip segments that were found for each driving group. As shown, most driving groups contained several hundred or more individual trip segments. Therefore, the number of possible combinations of trip segments chained or grafted together into a candidate driving cycle nominally ten minutes in length was quite large.

Table 4-4
Trip Segment Counts by Driving Data Group

Driving Group	Trip Segments
FC01LOSAF	120
FC02LOSAC	32
FC02LOSDF	74
FC06LOSAF	322
FC07LOSAF	245
FC08LOSAF	197
FC09LOSAF	364
FC11LOSA	116
FC11LOSB	231
FC11LOSC	293
FC11LOSD	277
FC11LOSE	148
FC11LOSF	516
FC12LOSA	200
FC12LOSB	263
FC12LOSC	352
FC12LOSD	266
FC12LOSE	150
FC12LOSF	1,511
FC14LOSA	164
FC14LOSB	183
FC14LOSC	757
FC14LOSD	99
FC14LOSE	206
FC14LOSF	1,416
FC16LOSA	169
FC16LOSB	157
FC16LOSC	477
FC16LOSD	80
FC16LOSE	114
FC16LOSF	1,374
FC17LOSAC	258
FC17LOSD	71
FC17LOSEF	1,690
FC19LOSAC	321
FC19LOSDF	683
FC21LOSAF	678
FC22LOSAF	187
FC23LOSAF	120
OR_D-D	55
OR_D-L	317
OR_D-U	81
OR_L-D	145
OR_L-L	59
OR_L-U	18
OR_MON	55
OR_MOF	620

For example, assume the average length of a trip segment in the FC11LOSF driving group was 30 seconds in length and thus a 10-minute cycle in this group would be made up of 20 segments (on average). This group contains a total of 516 segments as highlighted in Table 4-4. Assuming there were no other cycle construction constraints, the FC11LOSF group would contain a total of 5.07×10^{37} possible trip segment combinations. This is a prohibitively large number of combinations to individually evaluate, even with current computing technology. Thus, "intelligent" cycle construction logic had to be applied that didn't examine every possible combination in trying to find trip segment combinations that closely matched the SAFD of the intended driving group.

Trip Segment Chaining Constraints – Unlike microtrips that start and end at zero speed and thus can easily be chained or grafted together, not all trip segments can be chained together because the starting and ending speeds (and accelerations) vary from segment to segment. Consider two trip segments, one at a steady 55 mph speed and another at a steady 70 mph. If the 70 mph trip segment was chained onto the end of the 55 mph segment, the result would be an artificial acceleration of 15 mph/sec (70-55) at the chaining point that clearly does not represent actual driving patterns.

Thus, constraints were imposed that allowed only certain combinations of trip segments to be chained together in order to eliminate these speed/acceleration artifacts. Trip segments could be chained together only when the starting speed and acceleration of a "candidate" segment matched the ending speed and acceleration of the "current" segment within tolerances of ±0.5 mph and ±0.5 mph/sec, respectively. These tight tolerances ensure that trip segments are chained only in "smooth" combinations in a manner that virtually eliminates unrepresentative grafting artifacts.

Cycle Construction Logic – The "Hybrid Random/Best Incremental" cycle construction logic developed under the 1997 facility-specific cycle work for EPA was used to generate a series of candidate driving cycles for each driving group from combinations of its individual trip segments.

Under this approach, a "seed" sample of trip segments for some subset of the desired cycle time (e.g., the first 4 minutes of a 10-minute cycle) was selected completely at random (with replacement). After the seed sample time was reached, subsequent trip segments were selected and successively built onto the seed sample by finding the segment that produced the best match of the cycle SAFD to the population SAFD for the driving group when added to the existing segments. This latter trip segment sampling phase is referred to as the "best incremental" phase because successive trip segments built on to the cycle after the random phase are selected by producing the best marginal improvement in matching the cycle's SAFD to that of the driving population.

Conceptually, an approach based exclusively on the best incremental logic may appear more reasonable. The problem with this approach, however, is that the longest trip segments are, individually, much better at fitting the population SAFD than are shorter

segments. Thus, a purely "best incremental" method would result in only a few of the longest trip segments being selected before the target time is reached.

Under the hybrid method, by first creating a seed sample of randomly selected trip segments onto which successive trip segments were added, the best incrementally fitting trip segments that remained were not simply the longest segments.

Comparative evaluation of several hundred cycles in past work[8] that compared random, best incremental, and hybrid approaches clearly showed that the hybrid approach was superior in constructing candidate cycles that best fit the population SAFD.

During both sampling phases, the trip chaining constraints described earlier were used to identify a subset of "Matching Segments" whose starting speeds and accelerations matched the ending speeds and accelerations of the current trip segment within the listed tolerances. Only those segments that were contained in the Matching Segments subset were then considered for random or best incremental selection as described above. Note that identification of the Matching Segments subset was a dynamic process, performed before each new trip segment is added, and thus it produced a different subset of trip segments at each step.

Finally, since the cycles generated under this effort are link-level or project-specific cycles, no attempt was made to preserve the natural order of the trip segments as they were traversed. (In composite cycle development, it is important to preserve this order to properly account for driving patterns that occur during engine and catalyst warm-up. For these link-level cycles, this constraint did not need to be imposed.)

Candidate Cycle Generation – A Fortran program called *GenCycs* was written and executed to apply the Hybrid Random/Best Incremental cycle construction logic described earlier to iteratively "build" trip segments into a candidate driving cycle and repeated to generate thousands of candidate cycles.

The *GenCycs* program was designed to input varying constraints on both the total cycle time and the amount of initial time that each candidate driving cycle was built using randomly selected trip segments. (During the time after the initial time but before the total time was reached, trip segments were built into each candidate cycle using "best incremental" selection.)

GenCycs was also written to allow different methods of candidate cycle vs. population optimization to be performed by the program as each cycle was generated:

- Total SAFD – optimize (i.e., minimize) the total difference between candidate cycle and population SAFD over the entire SAFD;

- Non-Idle SAFD – optimize the difference between candidate cycle and population SAFD over the non-idle portion of the SAFD;

- Non-Cruise SAFD – optimize the difference between candidate cycle and population SAFD over the non-cruise portion* of the SAFD;

- Total Power – optimize the difference in total specific power distribution between the candidate cycle and its driving population; and

- High Power – optimize the difference in specific power distribution for "high power" intervals of 200 mph^2/sec and greater.

These optimization strategies were developed over earlier cycle development studies performed by Sierra. For this effort, all candidate cycles were generated using "Non-Cruise SAFD" optimization. This method was selected in conjunction with manual cycle editing procedures applied later in the process, with the rationale that cycle editing would focus on and optimize representativeness for the cruise portion of the SAFD. (Cycle editing is discussed in Section 4.5.) Therefore, a non-cruise optimization strategy was selected during candidate cycle generation knowing that the cruise portion of the cycle would be optimized later.

Using the non-cruise optimization strategy and varying total cycle time and initial random time inputs, GenCycs runs were set up and executed to produce thousands of candidate cycles for each of the 39 FC and 8 OR driving groups discussed earlier. As stated at the beginning of this section, the targeted cycle length was 10-15 minutes. Thus, a number of cycle "sets" were generated for each group for total cycle times of 10 and 15 minutes and different combinations of initial random times for each set. Table 4-5 lists the combinations of total time and initial random time used for building sets of candidate cycles in every group.

Table 4-5
Candidate Cycle Building Input Combinations Per Driving Group

Total Cycle Time (min)	Initial Random Time Sets (min)	Number of Sets	Candidate Cycles Per Set	Number of Candidate Cycles
FC Groups				
10	1, 2, 3, 4, 5, 6, 7	7	1,000	7,000
15	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	12	1,000	12,000
Per FC Group Totals		19	1,000	19,000
OR Groups				
10	1, 2, 3, 4, 5, 6, 7	8	200	1,400
Per OR Group Totals		8	200	1,400

* The non-cruise portion of the SAFD under this optimization method was defined as the entire SAFD except that portion with accelerations or decelerations at or below 0.5 mph/sec (i.e., everything except the "Zero Accel" row in the tabular SAFD).

Encompassing all 47 driving groups (39 FC and 8 OR groups), a total of 752,200 individual candidate cycles (19,000×39 + 1,400×8) were generated under this effort.

4.4 Selection of Most Representative Cycles

Once the many thousands of candidate cycles were generated for each cycle group, another Fortran program called ***FindBest*** was used to identify "short lists" of candidate cycles whose SAFDs best matched the population SAFD.

DiffSum Metric – A statistical metric labeled the "DiffSum" was computed within the *FindBest* program to quantify the match between each candidate cycle's SAFD and that of the population. The DiffSum is computed as the difference between the joint speed and acceleration frequency of the candidate cycle compared to that of the population, summed on an absolute basis (i.e., without regard to positive or negative bias) across each frequency bin of the SAFD. Mathematically, the DiffSum is expressed as follows:

$$DiffSum = \sum_{a=-20}^{20} \sum_{s=0}^{20} |CycSAFD_{s,a} - PopSAFD_{s,a}|$$

where

CycSAFD = the cycle's joint speed-acceleration frequency at speed interval *s* and acceleration interval *a*; and

PopSAFD = the driving population's joint speed-acceleration frequency at speed interval *s* and acceleration interval *a*.

Candidate Cycle Short Lists – Using the same "Non-Cruise SAFD" optimization strategy employed in generating candidate cycles, the *FindBest* program sifted through the summary statistics generated for each candidate cycle and produced a sorted short list of the 50 top-ranked candidate cycles for each driving group.

Figure 4-3 shows the "Best 50" short list produced by *FindBest* for the FC01LOSAF candidate driving cycles. The candidate cycles in the short list are sorted in ascending order by Non-Cruise S/A Diff (or DiffSum) from best (lowest) to worst (highest). Overall, these 50 candidate cycles had the lowest Non-Cruise DiffSums of all 19,000 FC01LOSAF candidate cycles generated.

As shown in Figure 4-3, the short lists also include Total, Non-Idle, and "Emis-Wtd" DiffSums and cycle times (in minutes) for each candidate cycle. All of the DiffSums except the Emis-Wtd DiffSum were computed on an un-weighted basis. In other words, each joint speed-acceleration bin in the SAFD was given equal weight.

The Emis-Wtd (short for Emissions-Weighted) DiffSum was computed using a weighting scheme developed from analysis modal emissions data collected under an earlier testing

Figure 4-3
Short List of Best Candidate Cycles for FC01-LOSA-F Driving

RANK	CYCLE FILE	TOTAL S/A DIFF	NON-IDLE S/A DIFF	NON-CRUISE S/A DIFF	EMIS-WTD S/A DIFF	TOTAL POWER DIFF	HIGH (200+) POWER DIFF	SEGMENTS	TIME (min)	MEAN SPD (mph)	MAX SPD (mph)	FST SPD (mph)	LST SPD (mph)	Finish Build?	Best Selected
1	FC01LOSAF_C10R04-00854.OUT	0.21518	0.21499	0.06090	0.20624	0.36651	0.17740	6	12.00	73.77	84.43	75.7	71.0	T	X
2	FC01LOSAF_C10R03-00050.OUT	0.53021	0.53002	0.06197	0.52128	0.38032	0.17871	6	12.00	74.82	84.43	67.4	72.8	T	
3	FC01LOSAF_C10R03-00129.OUT	0.35456	0.35437	0.06359	0.34563	0.36921	0.18288	6	12.00	74.70	84.45	79.8	82.2	T	
4	FC01LOSAF_C10R07-00391.OUT	0.38954	0.38935	0.06421	0.38061	0.35475	0.18149	6	12.02	76.24	85.08	75.0	80.4	T	
5	FC01LOSAF_C10R02-00866.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
6	FC01LOSAF_C10R02-00017.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
7	FC01LOSAF_C10R01-00996.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
8	FC01LOSAF_C10R01-00915.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
9	FC01LOSAF_C10R01-00039.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
10	FC01LOSAF_C10R01-00006.OUT	0.37009	0.36990	0.06454	0.36116	0.35188	0.17939	6	10.25	73.18	82.18	64.6	72.6	T	
11	FC01LOSAF_C10R03-00258.OUT	0.31953	0.31934	0.06482	0.31059	0.35472	0.18149	6	12.00	75.78	86.11	85.4	78.4	T	
12	FC01LOSAF_C10R02-00662.OUT	0.47295	0.47276	0.06531	0.46401	0.34917	0.17594	6	12.00	73.77	84.45	78.7	77.1	T	
13	FC01LOSAF_C10R01-00938.OUT	0.47295	0.47276	0.06531	0.46401	0.34917	0.17594	6	12.00	73.77	84.45	78.7	77.1	T	
14	FC01LOSAF_C10R01-00632.OUT	0.47295	0.47276	0.06531	0.46401	0.34917	0.17594	6	12.00	73.77	84.45	78.7	77.1	T	
15	FC01LOSAF_C10R04-00595.OUT	0.51508	0.51489	0.06568	0.50615	0.39707	0.17740	6	12.00	74.25	81.54	74.3	74.5	T	
16	FC01LOSAF_C10R01-00091.OUT	0.51508	0.51489	0.06568	0.50615	0.39707	0.17740	6	12.00	74.25	81.54	74.3	74.5	T	
17	FC01LOSAF_C10R01-00024.OUT	0.51508	0.51489	0.06568	0.50615	0.39707	0.17740	6	12.00	74.25	81.54	74.3	74.5	T	
18	FC01LOSAF_C10R02-00208.OUT	0.47258	0.47239	0.06604	0.46364	0.35483	0.17742	6	12.02	76.24	84.43	74.3	73.0	T	
19	FC01LOSAF_C10R02-00196.OUT	0.47258	0.47239	0.06604	0.46364	0.35483	0.17742	6	12.02	76.24	84.43	74.3	73.0	T	
20	FC01LOSAF_C10R02-00007.OUT	0.36382	0.36363	0.06615	0.35488	0.37477	0.17871	6	12.00	73.71	81.41	71.8	75.4	T	
21	FC01LOSAF_C10R07-00714.OUT	0.49390	0.49371	0.06643	0.48496	0.35776	0.17888	6	12.13	72.84	83.98	67.4	54.9	T	
22	FC01LOSAF_C10R03-00361.OUT	0.63365	0.63346	0.06661	0.62471	0.35480	0.17740	6	12.00	76.03	84.43	77.2	72.8	T	
23	FC01LOSAF_C10R03-00376.OUT	0.49020	0.49001	0.06662	0.48126	0.35678	0.17839	6	11.45	72.91	84.55	80.5	70.3	T	
24	FC01LOSAF_C10R03-00049.OUT	0.49020	0.49001	0.06662	0.48126	0.35678	0.17839	6	11.45	72.91	84.55	80.5	70.3	T	
25	FC01LOSAF_C10R02-00684.OUT	0.49020	0.49001	0.06662	0.48126	0.35678	0.17839	6	11.45	72.91	84.55	80.5	70.3	T	
26	FC01LOSAF_C10R02-00426.OUT	0.49020	0.49001	0.06662	0.48126	0.35678	0.17839	6	11.45	72.91	84.55	80.5	70.3	T	
27	FC01LOSAF_C10R01-00242.OUT	0.49020	0.49001	0.06662	0.48126	0.35678	0.17839	6	11.45	72.91	84.55	80.5	70.3	T	
28	FC01LOSAF_C10R04-00191.OUT	0.24605	0.24586	0.06708	0.23711	0.42536	0.17772	6	10.63	73.27	87.35	67.3	70.3	T	
29	FC01LOSAF_C10R01-00384.OUT	0.44743	0.44724	0.06725	0.43850	0.35483	0.17742	6	12.02	76.00	84.43	79.0	63.7	T	
30	FC01LOSAF_C10R02-00213.OUT	0.29441	0.29422	0.06756	0.28547	0.35707	0.17854	6	11.65	73.46	85.27	80.5	73.9	T	
31	FC01LOSAF_C10R03-00561.OUT	0.89223	0.89204	0.06783	0.88329	0.35195	0.18288	6	12.00	73.69	83.10	73.1	73.6	T	
32	FC01LOSAF_C10R06-00411.OUT	0.23203	0.23184	0.06797	0.22309	0.35295	0.18427	6	10.85	74.93	88.42	83.8	78.4	T	
33	FC01LOSAF_C10R03-00975.OUT	0.56914	0.56895	0.06833	0.56021	0.35479	0.18704	6	12.05	76.40	85.50	74.8	72.7	T	
34	FC01LOSAF_C10R03-00925.OUT	0.45669	0.45650	0.06846	0.44775	0.35776	0.17888	6	12.13	74.68	83.98	72.9	54.9	T	
35	FC01LOSAF_C10R03-00955.OUT	0.35873	0.35854	0.06882	0.34979	0.35758	0.17879	6	12.00	74.84	85.23	85.0	78.0	T	
36	FC01LOSAF_C10R03-00759.OUT	0.42225	0.42205	0.06882	0.41331	0.35777	0.17889	5	10.12	74.63	83.98	74.0	69.8	T	
37	FC01LOSAF_C10R03-00579.OUT	0.42225	0.42205	0.06882	0.41331	0.35777	0.17889	5	10.12	74.63	83.98	74.0	69.8	T	
38	FC01LOSAF_C10R02-00190.OUT	0.39439	0.39420	0.06895	0.38546	0.35472	0.18149	6	12.00	73.24	81.77	76.3	78.4	T	
39	FC01LOSAF_C10R01-00215.OUT	0.39439	0.39420	0.06895	0.38546	0.35472	0.18149	6	12.00	73.24	81.77	76.3	78.4	T	
40	FC01LOSAF_C10R01-00148.OUT	0.39439	0.39420	0.06895	0.38546	0.35472	0.18149	6	12.00	73.24	81.77	76.3	78.4	T	
41	FC01LOSAF_C10R01-00706.OUT	0.56949	0.56930	0.06903	0.56055	0.38178	0.17742	6	12.02	73.97	81.54	78.1	80.9	T	
42	FC01LOSAF_C10R01-00067.OUT	0.56949	0.56930	0.06903	0.56055	0.38178	0.17742	6	12.02	73.97	81.54	78.1	80.9	T	
43	FC01LOSAF_C10R05-00997.OUT	0.22121	0.22102	0.06925	0.21227	0.37701	0.17724	6	10.12	73.94	87.35	67.9	74.2	T	
44	FC01LOSAF_C10R02-00083.OUT	0.70542	0.70523	0.06926	0.69648	0.36651	0.17740	6	12.00	76.78	84.43	71.8	81.9	T	
45	FC01LOSAF_C10R01-00334.OUT	0.70542	0.70523	0.06926	0.69648	0.36651	0.17740	6	12.00	76.78	84.43	71.8	81.9	T	
46	FC01LOSAF_C10R03-00750.OUT	0.42750	0.42731	0.06937	0.41856	0.35480	0.17740	6	12.00	73.60	84.43	68.2	81.9	T	
47	FC01LOSAF_C10R03-00374.OUT	0.42750	0.42731	0.06937	0.41856	0.35480	0.17740	6	12.00	73.60	84.43	68.2	81.9	T	
48	FC01LOSAF_C10R03-00149.OUT	0.42750	0.42731	0.06937	0.41856	0.35480	0.17740	6	12.00	73.60	84.43	68.2	81.9	T	
49	FC01LOSAF_C10R02-00384.OUT	0.83487	0.83468	0.06944	0.82593	0.35487	0.17710	6	11.63	77.24	86.23	77.8	78.9	T	
50	FC01LOSAF_C10R05-00824.OUT	0.48831	0.48812	0.06961	0.47938	0.35430	0.17715	7	11.70	73.60	84.55	80.5	70.3	T	

program[8] Sierra performed for the University of California, Davis. Under that program, 12 relatively new light-duty vehicles were tested over a variety of transient driving cycles. Under this effort, Sierra analyzed the second-by-second emissions data from that study that were collected under fully warmed-up conditions. The resulting analysis was used to construct a weighting function over those SAFD speed and acceleration bins for which high emissions were found on a relative basis from analysis of the modal data from the 12-vehicle test fleet. The analysis was based on combined THC (total hydrocarbon) and NOx (oxides of nitrogen) emissions.

Since the weighting analysis was based on a limited sample of 12 vehicles, Sierra recognized it was not fully representative of an entire on-road fleet and is unlikely to represent emissions weighting of future vehicle fleets using different emission control technologies and emission strategies. Thus, the resulting relative emission frequencies were intentionally assigned bin values of either zero or one to produce an "approximate" emissions weighting over the SAFD.

Table 4-6 shows this approximate emissions weighting and identifies those bins that were given weights of either zero or one, based on the analysis described above.

Table 4-6 Approximated Emissions Weighting Scheme		
Accel Intervals	Speed Intervals with Weighting of One (1)	Speed Intervals with Weighting of Zero (0)
-5 to – 20	None	All
-4	Intervals of 70 mph and above	Intervals of 65 mph and below
-3	Intervals of 60 mph and above	Intervals of 55 mph and below
-2	Intervals of 50 mph and above	Intervals of 45 mph and below
-1	Intervals of 50 mph and above	Intervals of 45 mph and below
0	Intervals of 40 mph and above	Intervals of 35 mph and below
1 to 20	All	None

As explained below, this approximate emissions weighting function was used in conjunction with the Non-Cruise DiffSum and the candidate cycle time to select a single "best" cycle from each short list.

Selection of Best Single Cycle – Once each "Best 50" candidate cycle short list was generated, the candidate cycle at the top of the list (lowest Non-Cruise DiffSum) was not always selected as the single best cycle. Instead, the Emis-Wtd DiffSum and the resulting cycle time were considered as "secondary ranking factors" in conjunction with the primary factor, Non-Cruise DiffSum.

The basic logic used in this selection process consisted of comparing both the Non-Cruise and Emis-Wtd DiffSums of all 50 top-ranked cycles. Starting at the top of the list and working down, if a candidate cycle had a much better (lower) Emis-Wtd than that of the top ranked cycle on the basis of Non-Cruise DiffSum and the difference in Non-Cruise DiffSums was less, that candidate cycle was selected instead of the one with simply the lowest Non-Cruise DiffSum. In situations where this trade off was roughly even, the lowest cycle time between the two candidates was used as a "tiebreaker."

Table 4-7 lists the single best cycle selected from each short list and that cycle's ranking based on Non-Cruise DiffSum. Also shown in Table 4-7 are the Total, Non-Cruise, and Emis-Wtd DiffSums and the cycle time (in minutes). (The Total Diffsum in Table 4-7 refers to the Diffsum over the entire speed-acceleration range. It is not the sum of the other Diffsum elements in the table.)

At this point in the cycle development process, this collection of single best cycles is referred to as the final *unedited* cycles. The next sub-section describes how the speed-time trace for each cycle was interactively edited within a series of utility spreadsheets to optimally match the cruise portion of each cycle's SAFD with that of its intended driving population.

Table 4-7
Selected Best Cycles and Their Ranking Based on Non-Cruise DiffSum

Driving Group	Cycle Name	Rank	DiffSum			Cycle Time (minutes)
			Total	Non-Cruise	Emis-Wtd	
FC01LOSAF	FC01LOSAF C10R04-00854	1	0.2152	0.0609	0.2062	12.00
FC02LOSAC	FC02LOSAC C15R02-00646	4	0.2898	0.1239	0.2215	15.03
FC02LOSDF	FC02LOSDF C10R05-00513	1	0.4389	0.2262	0.3416	11.32
FC06LOSAF	FC06LOSAF C15R01-00276	6	0.3040	0.1491	0.1890	15.82
FC07LOSAF	FC07LOSAF C10R07-00913	1	0.3438	0.1270	0.1412	29.67
FC08LOSAF	FC08LOSAF C10R05-00330	1	0.3491	0.1870	0.2069	12.70
FC09LOSAF	FC09LOSAF C15R06-00563	1	0.3393	0.1887	0.1942	17.65
FC11LOSA	FC11LOSA C10R03-00929	3	0.2688	0.1223	0.2160	11.87
FC11LOSB	FC11LOSB C10R02-00546	13	0.2232	0.0922	0.2045	11.13
FC11LOSC	FC11LOSC C15R09-00849	11	0.1729	0.0742	0.1524	16.90
FC11LOSD	FC11LOSD C15R10-00068	3	0.2984	0.1426	0.2225	15.80
FC11LOSE	FC11LOSE C15R11-00851	7	0.3566	0.2066	0.2588	16.02
FC11LOSF	FC11LOSF C15R01-00876	9	0.2380	0.1403	0.1320	15.58
FC12LOSA	FC12LOSA C15R02-00501	14	0.3237	0.1284	0.2301	16.60
FC12LOSB	FC12LOSB C15R08-00003	9	0.1620	0.0608	0.1455	15.10
FC12LOSC	FC12LOSC C15R04-00582	3	0.1806	0.0884	0.1507	16.70
FC12LOSD	FC12LOSD C15R09-00037	8	0.3080	0.1510	0.1878	16.03
FC12LOSE	FC12LOSE C15R10-00782	1	0.3932	0.2370	0.2154	15.52
FC12LOSF	FC12LOSF C15R08-00294	7	0.2573	0.1390	0.1169	16.85
FC14LOSA	FC14LOSA C15R03-00651	2	0.2379	0.1000	0.1451	16.75
FC14LOSB	FC14LOSB C15R07-00177	3	0.4398	0.2487	0.2347	12.75
FC14LOSC	FC14LOSC C10R04-00104	1	0.4008	0.2253	0.1991	10.15
FC14LOSD	FC14LOSD C15R01-00836	6	0.2543	0.1025	0.0698	15.32
FC14LOSE	FC14LOSE C15R03-00606	1	0.2114	0.1338	0.0974	15.07
FC14LOSF	FC14LOSF C15R05-00424	2	0.1953	0.0869	0.0476	16.10
FC16LOSA	FC16LOSA C15R05-00755	24	0.3812	0.1187	0.1227	16.08
FC16LOSB	FC16LOSB C15R03-00219	1	0.2937	0.1908	0.1488	14.40
FC16LOSC	FC16LOSC C15R05-00252	2	0.2320	0.1509	0.1050	15.58
FC16LOSD	FC16LOSD C15R02-00561	4	0.2566	0.1010	0.0925	15.95
FC16LOSE	FC16LOSE C15R05-00799	1	0.2265	0.1563	0.0946	12.80
FC16LOSF	FC16LOSF C10R02-00249	1	0.2521	0.1283	0.0764	10.68
FC17LOSAC	FC17LOSAC C15R01-00333	3	0.2159	0.1022	0.0904	14.70
FC17LOSD	FC17LOSD C15R05-00480	1	0.2743	0.1510	0.1064	12.12
FC17LOSEF	FC17LOSEF C15R02-00734	1	0.3561	0.1970	0.1042	9.47
FC19LOSAC	FC19LOSAC C15R08-00267	26	0.2066	0.0741	0.0582	15.28
FC19LOSDF	FC19LOSDF C15R03-00074	2	0.1346	0.0900	0.0471	15.50
FC21LOSAF	FC21LOSAF C10R01-00166	1	0.7094	0.3905	0.3642	5.67
FC22LOSAF	FC22LOSAF C15R03-00264	1	0.5612	0.2805	0.1849	7.90
FC23LOSAF	FC23LOSAF C15R09-00816	11	0.7289	0.3738	0.4821	7.55
OR D-D	OR D-D C10R05-00026	1	1.1363	0.7110	0.7059	0.70
OR D-L	OR D-L C10R04-00200	10	1.1071	0.6882	0.5943	1.40
OR D-U	OR D-U C10R07-00029	1	1.3228	0.5714	0.5845	1.47
OR L-D	OR L-D C10R07-00176	1	0.9972	0.5801	0.5839	0.47
OR L-L	OR L-L C10R07-00170	1	1.2732	0.5345	0.8396	0.90
OR L-U	OR L-U C10R07-00184	1	1.0143	0.5871	0.5385	0.42
OR MON	OR MON C10R03-00068	1	0.8967	0.5697	0.3607	1.30
OR MOF	OR MOF C10R04-00118	4	1.4555	0.5990	0.6387	1.42

4.5 Cycle Optimization Editing

The next step in the cycle development process involved manually editing each of the computer-generated final unedited cycles to improve their fit to the target SAFD. Using a procedure developed under previous work[7] for EPA, editing was limited to two types of operations: (1) segment addition, and (2) segment shortening.

Each of these is described below.

Segment Addition – Segment addition consisted of inserting segments of actual speed-time trace from the entire data set for that driving group that began and ended with a speed within 0.5 mph of the speed at the insertion point. Segment addition was performed for the cycle's "cruise" SAFD bins (i.e., those along the "Zero Accel" row in the SAFD) that underrepresented the frequency of those bins compared to the population SAFD. The entire second-by-second data for each cycle's driving group were manually examined and pieces of actual speed-time trace from the master data set were identified and inserted into the cycle's trace using the criterion described above.

For example, during editing of the Urban Interstate (FC=11) LOS C cycle, Sierra determined that the cycle underrepresented operation in SAFD Bin 10,0, which represents speeds between 47.5 and 52.5 mph and accelerations less than ±0.5 mph/sec. A six-second speed-time trace was found from the FC11-LOS C driving data set (driven on) that began and ended at approximately 52.2 mph. An appropriate insertion point was found in the cycle with adjacent speeds close to 52.2 mph. This six-second trace was then inserted into the cycle at the insertion point.

Note that in some instances, the inserted trace also contained some amount of operation at accel/decel rates outside the ±0.5 mph/sec range of the "cruise" bins in the SAFD. As long as the inserted trace began and ended within 0.5 mph of the speed at the insertion point and this amount of non-cruise operation was improving (rather than worsening) the representation of those affected non-cruise bins, it was considered acceptable.

Segment Shortening – Segment shortening involved removing portions of the speed-time trace between two cruise speeds that were within 0.5 mph. Segment shortening was applied for SAFD bins where the cycle overstated the frequency of operation in those bins compared to the population SAFD.

Again using the Urban Interstate LOS C cycle as an example, it was determined that the unedited cycle contained significantly more operation in Bin (15,0), which represents speeds between 72.5 and 77.5 mph and accelerations less than ±0.5 mph/sec, than its population SAFD. Thus, a 33-second portion of "cruise" speed-time trace that started at 74.97 mph and ended at 74.77 mph was removed from the cycle.

By constraining the segment insertion and shortening operations to within 0.5 mph of the speed at the insertion or deletion points, the procedure avoids changes to the speed-time profile that alter the characteristics of any existing accelerations.

During the editing, Sierra lengthened or shortened cruise operation until an optimum match to the speed-acceleration distribution of the target data set was achieved within the target cycle length. This process was performed interactively within a series of separate spreadsheets for each cycle. Logic was programmed into each spreadsheet that dynamically kept track of the cycle's revised SAFD and compared it to its population SAFD as the edits were being considered and iteratively applied.

Both the unedited and edited trace for each cycle developed under this effort (and descriptions of the edits that were performed and their locations) are contained on the final deliverables CD accompanying this report. These traces and detailed edits are contained in a series of spreadsheets with the name ***CycEdt_*.xls***).

###

5. CYCLE RESULTS

The previous section of the report documented the detailed methodologies that were applied to develop link-level driving cycles under this study. This section of the report presents a detailed summary of the resulting cycles and contains both key statistics and plots of the final speed-time traces for each cycle.

5.1 Cycle Statistics

As described earlier in Section 4, the DiffSum metric was the key statistical measure used to quantify the representativeness of a driving cycle compared to the entire driving data set for each driving group. (DiffSum represents the sum of differences between the cycle and the population joint speed-acceleration frequency distributions.) In addition to DiffSum, a number of other basic statistics were also computed for each cycle.

Table 5-1 presents these statistics for each of the link-level FC driving cycles developed under this study. For comparative purposes, the same statistics are also shown for the two historical driving cycles currently used by EPA and CARB in emissions testing: the LA4 driving cycle (upon which the FTP or Federal Test Procedure is based), and the Unified Cycle (UC) or LA92 developed by CARB. These historical cycles are intended to represent operation over all types of roadways combined, not specific facilities (or congestion levels) like the new cycles developed under this study.

As shown in Table 5-1, the DiffSum values for the 39 FC cycles are generally much better (lower) than that for the Unified Cycle, 0.3520. (No DiffSum is available for the LA4 since that cycle was developed in the 1970s prior to the quantitative cycle development methods used since the early 1990s.)

Table 5-2 presents similar statistics for the eight specialized on-ramp (OR) cycles developed under this effort. As discussed below, two things stand out when comparing these statistics to those for the FC cycles in Table 5-1.

First, the cycles are very short, typically one minute or less. As explained earlier the cycle generation software tries to build an optimal set of trip segments until the target cycle time is reached. When no other candidate segments can be grafted onto the current segment (based on speed-matched endpoints), the software stops short of the targeted time (ten minutes in this case) and starts building the next cycle.

Table 5-1
Cycle Statistics Summary for Functional Class (FC) Cycles
(Final Cycles After Cruise Optimization Editing)

Driving Cycle	No. of Segs	Time (min)	Dist. (miles)	Speeds (mph)			Mean Specific Power (hp/lb)	**Total DiffSum**
				Mean	Max	Min		
FC01LOSAF	6	9.47	11.64	73.80	84.43	60.51	0.0431	**0.1264**
FC02LOSAC	9	12.45	11.47	55.26	78.84	0.00	0.0452	**0.1593**
FC02LOSDF	7	11.33	9.27	49.07	73.06	0.00	0.0585	**0.2258**
FC06LOSAF	10	13.25	9.82	44.45	67.70	0.00	0.0527	**0.1783**
FC07LOSAF	4	24.27	17.18	42.47	69.87	0.00	0.0646	**0.1466**
FC08LOSAF	5	11.07	7.12	38.62	63.61	0.00	0.0725	**0.2111**
FC09LOSAF	12	16.47	8.25	30.05	65.79	0.00	0.0617	**0.1982**
FC11LOSA	7	7.87	8.47	64.60	80.15	42.33	0.0589	**0.2092**
FC11LOSB	7	8.63	9.55	66.37	81.84	50.28	0.0537	**0.1428**
FC11LOSC	13	15.07	16.17	64.41	78.19	42.53	0.0513	**0.0990**
FC11LOSD	13	12.15	11.90	58.79	76.78	15.25	0.0494	**0.1585**
FC11LOSE	13	16.20	12.45	46.12	71.50	0.00	0.0567	**0.2032**
FC11LOSF	12	15.07	5.18	20.62	55.48	0.00	0.0364	**0.1653**
FC12LOSA	12	13.20	11.87	53.97	78.98	0.00	0.0491	**0.1870**
FC12LOSB	10	13.23	14.63	66.35	79.05	50.07	0.0458	**0.1032**
FC12LOSC	10	14.77	15.67	63.67	79.39	42.84	0.0562	**0.1293**
FC12LOSD	13	13.33	11.75	52.88	73.15	0.00	0.0555	**0.1981**
FC12LOSE	12	15.20	10.96	43.28	70.87	6.73	0.0605	**0.2300**
FC12LOSF	11	16.37	5.19	19.01	53.65	0.00	0.0339	**0.1514**
FC14LOSA	9	15.48	6.59	25.55	63.09	0.00	0.0520	**0.1394**
FC14LOSB	14	12.55	6.49	31.02	63.81	0.00	0.0619	**0.3005**
FC14LOSC	12	8.53	3.61	25.39	53.09	0.00	0.0626	**0.2991**
FC14LOSD	14	13.33	4.82	21.71	54.80	0.00	0.0467	**0.1346**
FC14LOSE	18	14.20	4.09	17.26	49.94	0.00	0.0435	**0.1569**
FC14LOSF	22	14.20	2.07	8.73	44.16	0.00	0.0246	**0.1444**
FC16LOSA	17	14.13	6.27	26.62	62.88	0.00	0.0528	**0.1702**
FC16LOSB	16	13.77	6.78	29.54	69.88	0.00	0.0679	**0.2234**
FC16LOSC	22	14.98	5.81	23.29	53.11	0.00	0.0567	**0.1747**
FC16LOSD	15	15.35	5.60	21.91	54.10	0.00	0.0479	**0.1224**
FC16LOSE	17	12.30	3.01	14.67	50.64	0.00	0.0451	**0.1764**
FC16LOSF	12	9.80	1.72	10.55	43.46	0.00	0.0315	**0.1428**
FC17LOSAC	21	14.12	5.12	21.76	53.28	0.00	0.0525	**0.1393**
FC17LOSD	18	11.80	3.66	18.60	50.33	0.00	0.0505	**0.1941**
FC17LOSEF	17	8.22	1.53	11.19	49.24	0.00	0.0391	**0.2342**
FC19LOSAC	27	14.48	3.80	15.74	37.95	0.00	0.0410	**0.1125**
FC19LOSDF	29	14.88	2.98	12.02	37.62	0.00	0.0336	**0.1072**
FC21LOSAF	10	4.02	1.71	25.55	59.56	0.00	0.0761	**0.5328**
FC22LOSAF	17	5.70	1.86	19.61	62.05	0.00	0.0491	**0.4144**
FC23LOSAF	9	6.23	4.46	42.95	75.06	0.00	0.0574	**0.3080**
LA4 (FTP)	18	22.87	7.44	19.53	56.70	0.00	N/A	**N/A**
UC (LA92)	15	24.15	10.00	24.85	67.20	0.00	N/A	**0.3520**

Table 5-2
Cycle Statistics Summary for Freeway On-Ramp (OR) Cycles
(Final Cycles After Cruise Optimization Editing)

Driving Cycle	No. of Segs	Time (min)	Dist. (miles)	Speeds (mph)			Mean Specific Power (hp/lb)	**Total DiffSum**
				Mean	Max	Min		
OR_D-D	1	0.47	0.29	37.17	60.18	0.00	0.2442	**1.0688**
OR_D-L	2	1.15	0.56	29.37	60.86	0.00	0.1103	**0.8692**
OR_D-U	2	0.48	0.21	26.23	45.37	0.00	0.1342	**1.1215**
OR_L-D	1	0.40	0.24	36.52	46.96	30.08	0.1119	**0.9810**
OR_L-L	1	0.42	0.28	39.72	56.84	31.08	0.1640	**1.2125**
OR_L-U	1	0.40	0.24	36.41	54.38	29.18	0.1647	**1.0110**
OR_MON	3	1.08	0.25	13.71	37.88	0.00	0.0442	**0.8785**
OR_MOF	1	0.52	0.23	27.04	46.96	0.00	0.1348	**1.1339**

For the on-ramp driving, which generally consisted of relatively uncongested, steadily accelerating traverses, it was difficult to find and join two individual segments based on the speed and acceleration matching criteria described earlier in Section 4. Thus, most of the OR cycles shown in Table 5-2 consisted of a single segment. Not coincidentally, the metered on-ramp cycle (OR_MON) contained several segments because that driving group contained operation that generally involved stopping at the metering line (and thus a trip segment ended). In this group, there were more "degrees of freedom" for segment grafting to occur in the cycle building process.

Second, and partially a product of the above as well as the much more limited driving data samples, the DiffSums presented in Table 5-2 reflect much poorer fits for the OR cycle SAFDs to their respective driving populations that for the FC cycles. Unless more driving data can be gathered over on-ramps and/or the cycle generation process can be modified to address the difficulties of grafting on-ramp trip segments, ramp cycles will be less representative than their counterparts on other types of facilities. Nevertheless, these cycles provide EPA with a starting point for the development of a library of project-level cycles within MOVES.

A working assumption that EPA has reflected in its current MOVES design is that a <u>second-by-second driving cycle</u> (and the emissions produced by a vehicle following it) can be well represented by a <u>VSP bin distribution</u>. Utilizing this assumption, an alternative approach to the ill-fitting OR cycles would involve <u>using the OR population VSP bin distributions as project-level library inputs to MOVES instead of the second-by-second OR cycle traces</u>. In this way, the fact that the OR cycles do not closely fit their intended population would be avoided by simply using the OR population VSP distributions in the MOVES link-level library. Moreover, since one variation of these driving population VSP distributions was computed in a manner that accounted for the road grade measured during the ramp traverses, they would account for the power demand along non-level road sections. This is an important consideration for on-ramp driving since much of it occurs at non-level grades.

5.2 Speed-Time Traces

Second-by-second speed vs. time traces for several of the "final" link-level cycles (i.e., after cycle editing) are plotted in Figures 5-1 through 5-20. In each of these plots, speeds are shown using a thick blue line against the left axis; acceleration (in mph/sec) is plotted using a thin red line against the right axis. For easier comparison, the same time scale (zero to 1000 second) was used for each plot. For shorter or longer cycles, the different time scale is noted on those plots. (A complete set of cycle trace plots is contained in Appendix C.)

As shown in Figures 5-1 through 5-3, the Urban Interstate (FC11) cycles for LOS A, LOS D, and LOS F, respectively, reflect increasing frequency of stop-and-go operation that occurs as congestion builds on urban freeways. When uncongested, Figure 5-1 illustrates that accelerations are modest and more time is spent at cruising speeds in the 65 mph range. In sharp contrast, Figure 5-3 clearly illustrates how heavy freeway congestion results in much stronger accelerations and decelerations over a lower, but much wider, speed range (zero to about 55 mph).

Figures 5-4 through 5-6 and 5-7 through 5-9 present similar plots of the final driving cycles for Urban Principal Arterial and Urban Collector roadways, respectively. (As with Figures 5-1 through 5-3, three cycle plots are shown for each of the two roadway types, in order of increasing congestion from LOS A to LOS F). The cycle plots shown for these arterial and collector roadways again reflect the overall effect of reduced speeds and more stop-and-go operation with increasing congestion. They also illustrate the effect of signalization; in Figures 5-4 and 5-7. even lightly congested roadways with signalization (or controlled stops) reflect frequent stops and idling.

Figures 5-10 through 5-12 plot the cycle traces for Rural Interstate, Major Arterial and Collector driving (over all combined levels of congestion). The fact that congestion is much less frequent and the number of controlled stops per mile (from signals or stop signs) is much lower than in urban areas is clearly apparent from the generally higher speeds, less frequent idling, and generally milder accelerations than exhibited by their urban counterparts.

Finally, Figures 5-13 through 5-20 present cycle trace plots for each of the eight on-ramp cycles. (Note the time scale is much shorter, from zero to 100 seconds, than in the preceding plots.) One interesting and expected feature in the on-ramp cycle plots is that the Diamond ramp cycles always show some amount of zero speed operation (either at the start. as in Figures 5-13 and 5-1, or in the middle, as in Figure 5-14). In contrast, none of the Loop ramp cycles represented in Figures 5-16 through 5-18 contain zero speed operation. This stands to reason: access to Diamond ramp configurations is often controlled from a directly upstream traffic signal; on the other hand, signals are not immediately upstream of the entrance to Loop ramps.

Figure 5-1
Urban Interstate (FC=11) LOS A Driving Cycle

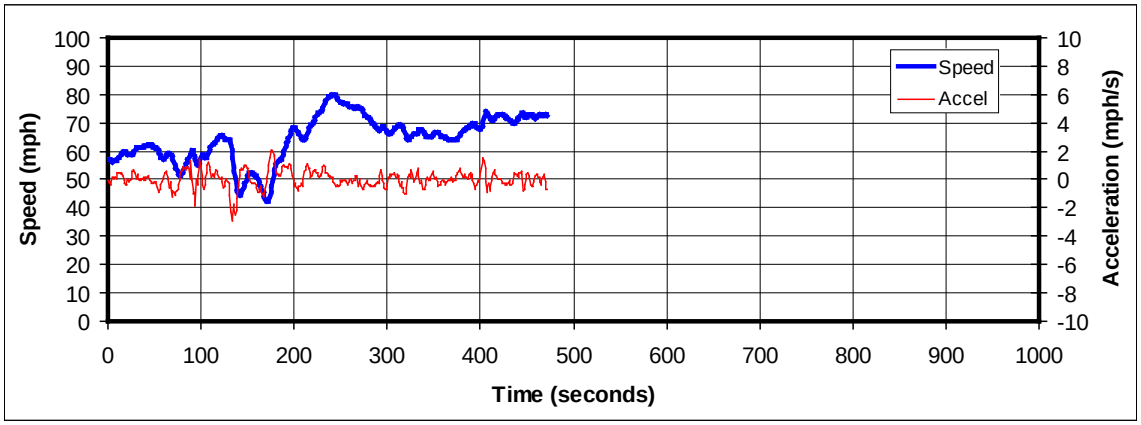


Figure 5-2
Urban Interstate (FC=11) LOS D Driving Cycle

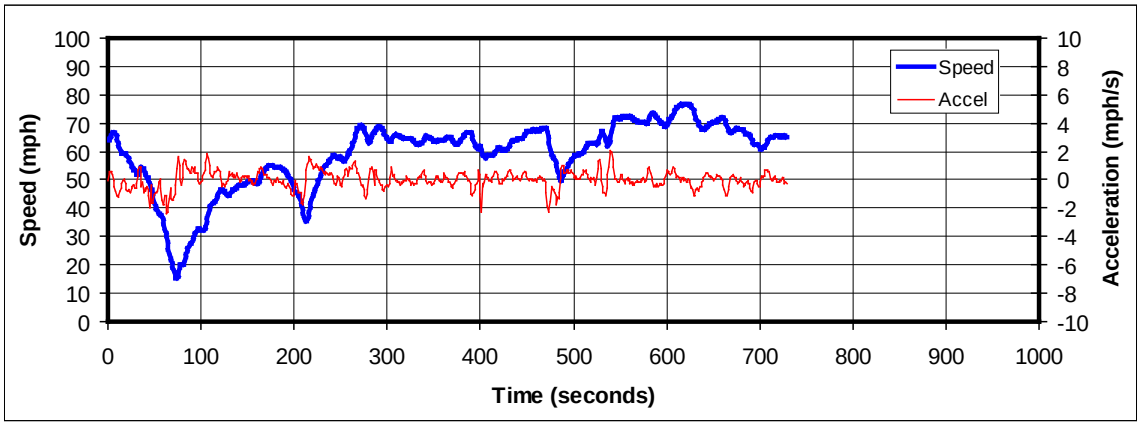


Figure 5-3
Urban Interstate (FC=11) LOS F Driving Cycle

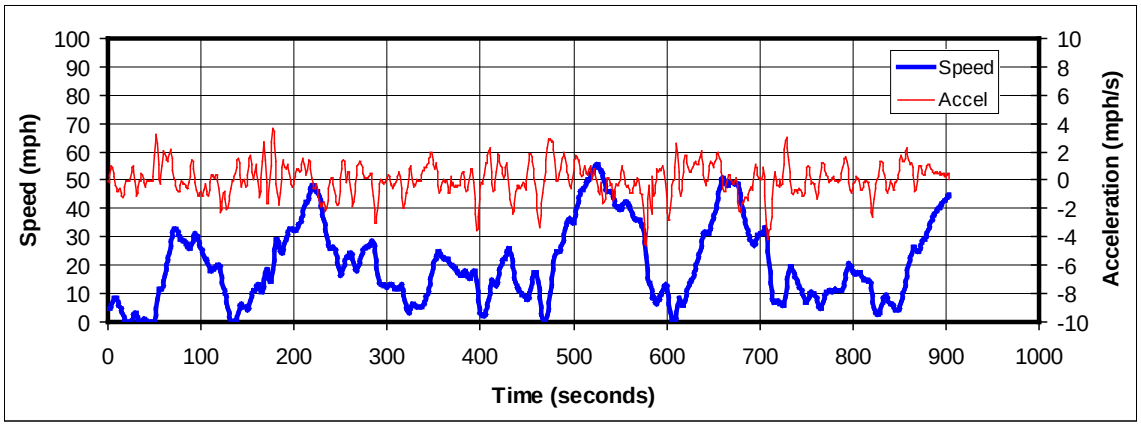


Figure 5-4
Urban Principal Arterial (FC=14) LOS A Driving Cycle

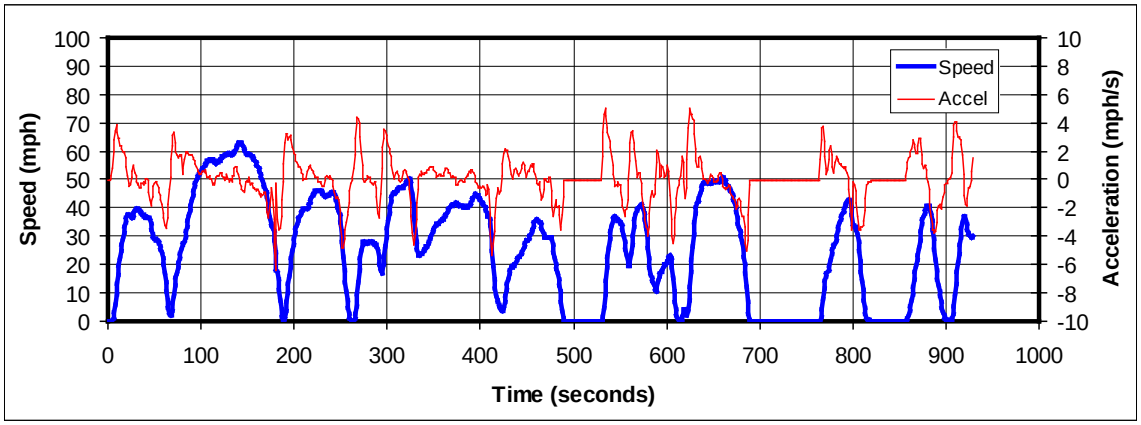


Figure 5-5
Urban Principal Arterial (FC=14) LOS D Driving Cycle

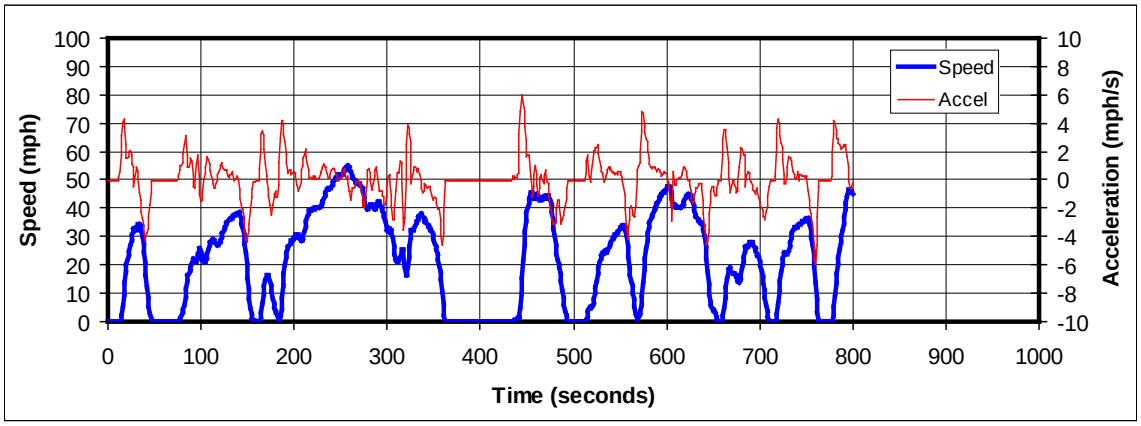


Figure 5-6
Urban Principal Arterial (FC=14) LOS F Driving Cycle

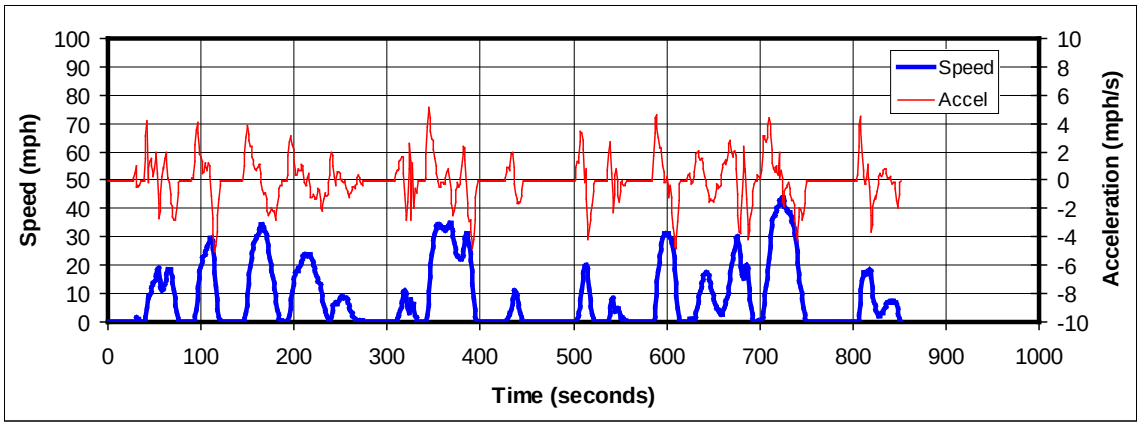


Figure 5-7
Urban Collector (FC=17) LOS A-C Driving Cycle

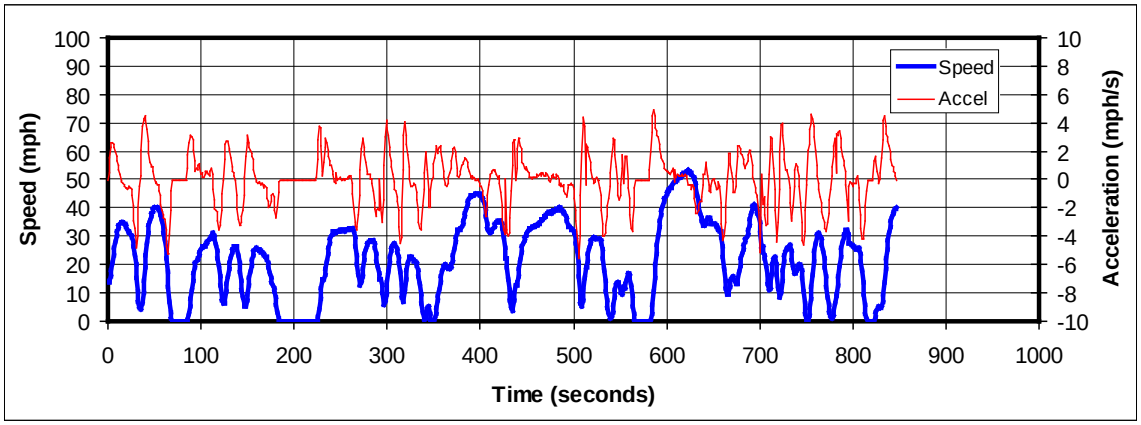


Figure 5-8
Urban Collector (FC=17) LOS D Driving Cycle

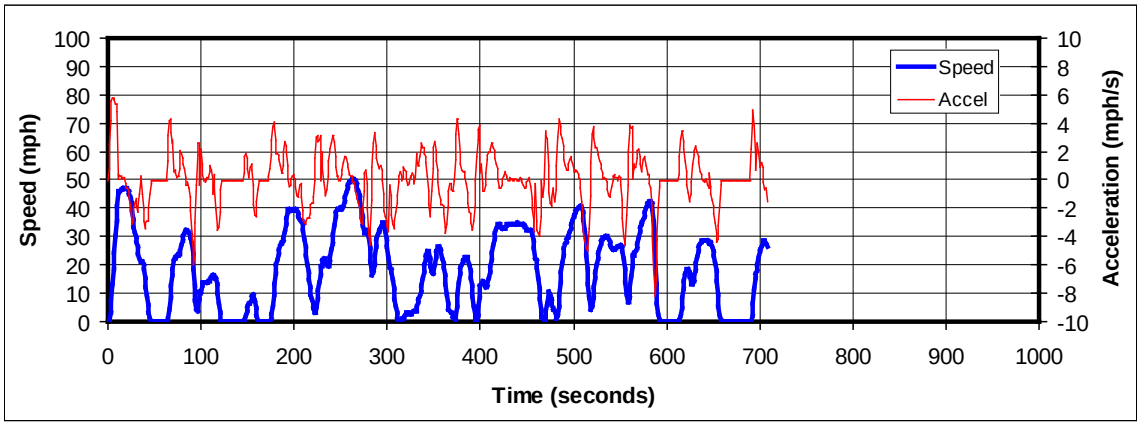


Figure 5-9
Urban Collector (FC=17) LOS E-F Driving Cycle

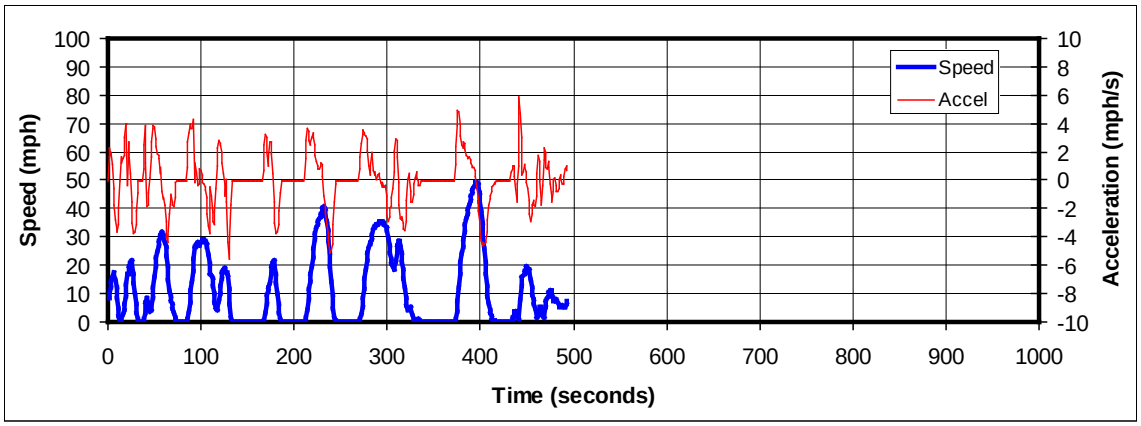


Figure 5-10
Rural Interstate (FC=01) LOS A-F Driving Cycle

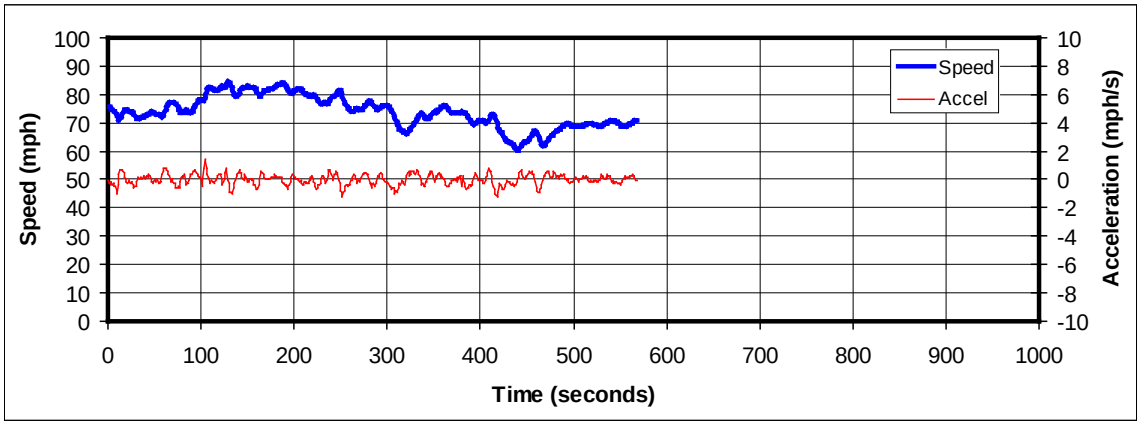


Figure 5-11
Rural Major Arterial (FC=06) LOS A-F Driving Cycle

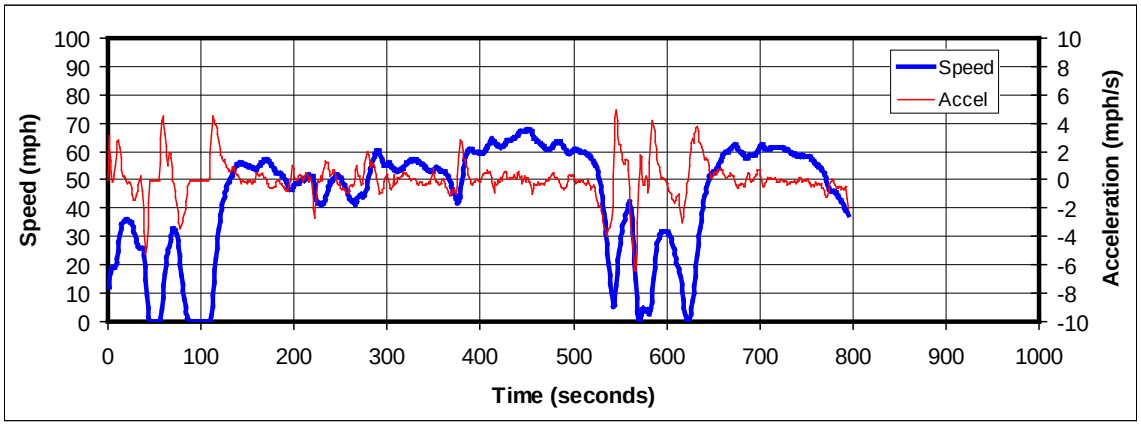


Figure 5-12
Rural Collector (FC=08) LOS A-F Driving Cycle

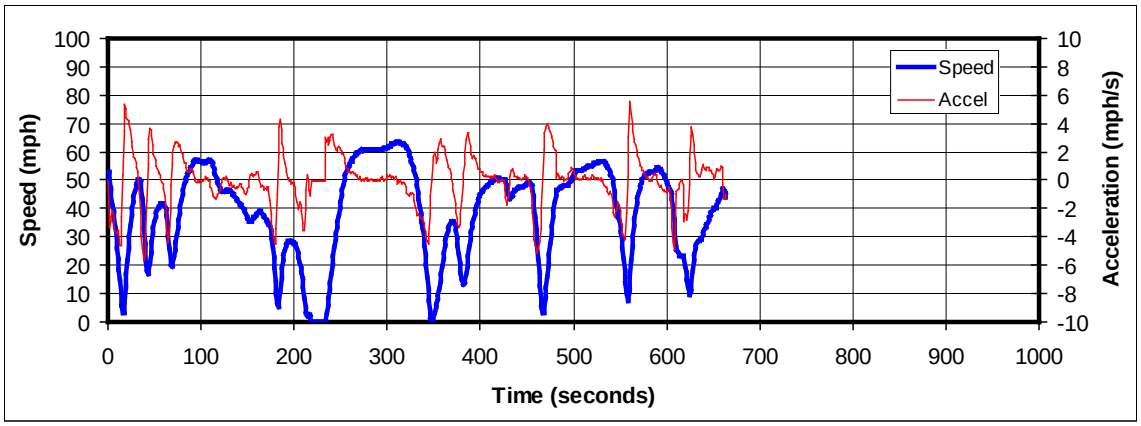


Figure 5-13
Diamond, Downgrade (D-D) On-Ramp Driving Cycle

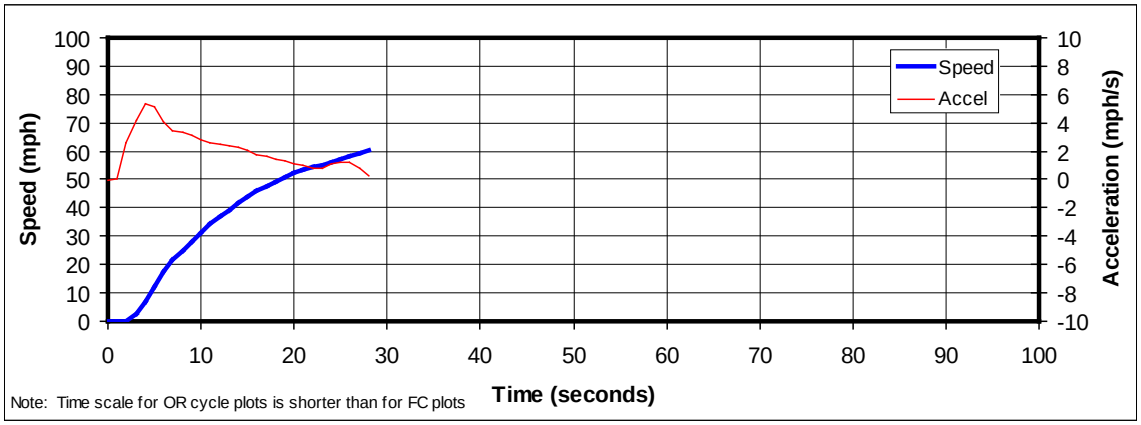


Figure 5-14
Diamond, Level Grade (D-L) On-Ramp Driving Cycle

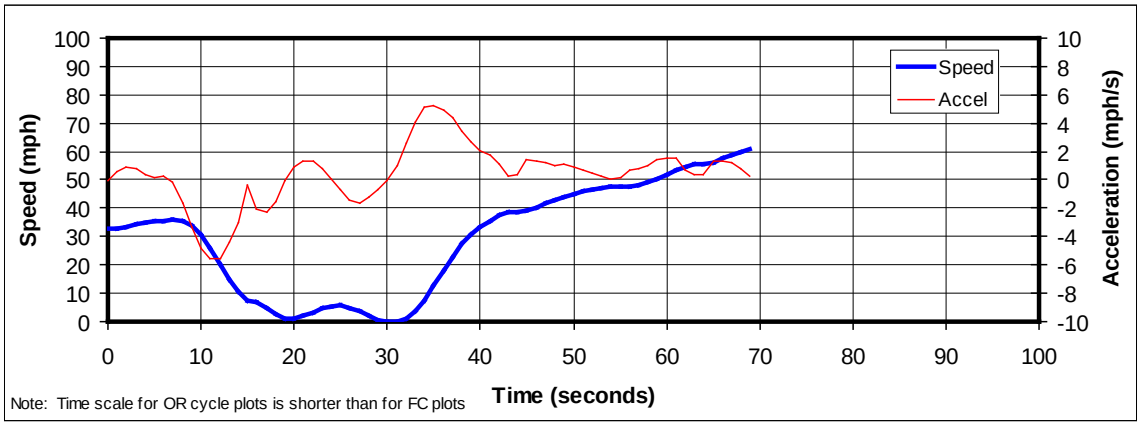


Figure 5-15
Diamond, Upgrade (D-U) On-Ramp Driving Cycle

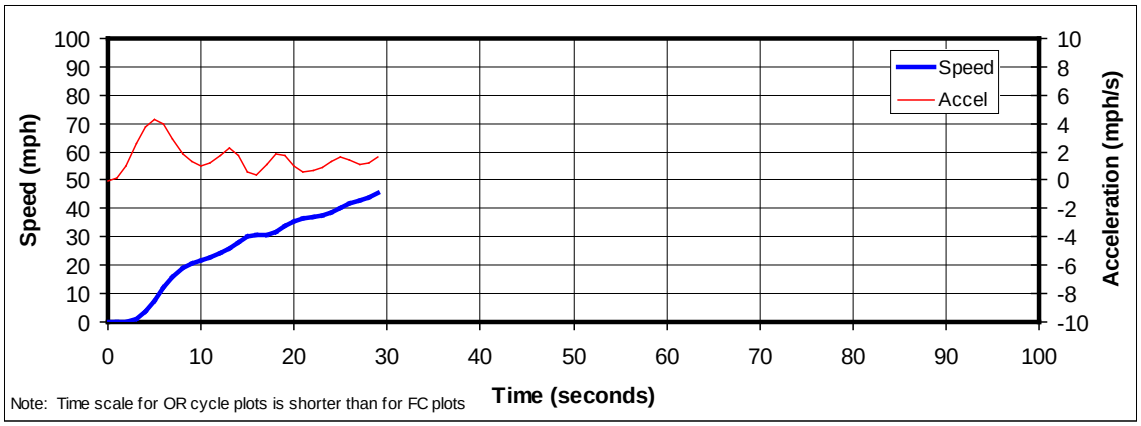


Figure 5-16
Loop, Downgrade (L-D) On-Ramp Driving Cycle

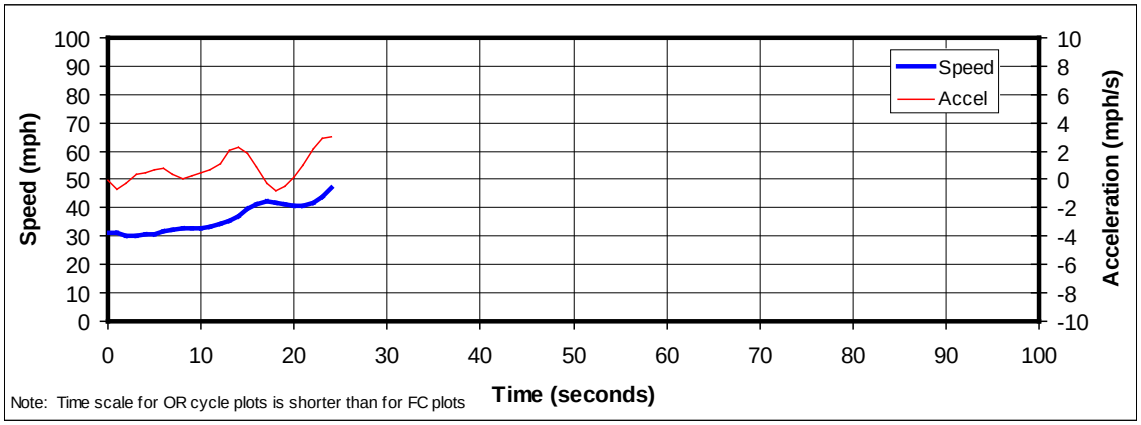


Figure 5-17
Loop, Level Grade (L-L) On-Ramp Driving Cycle

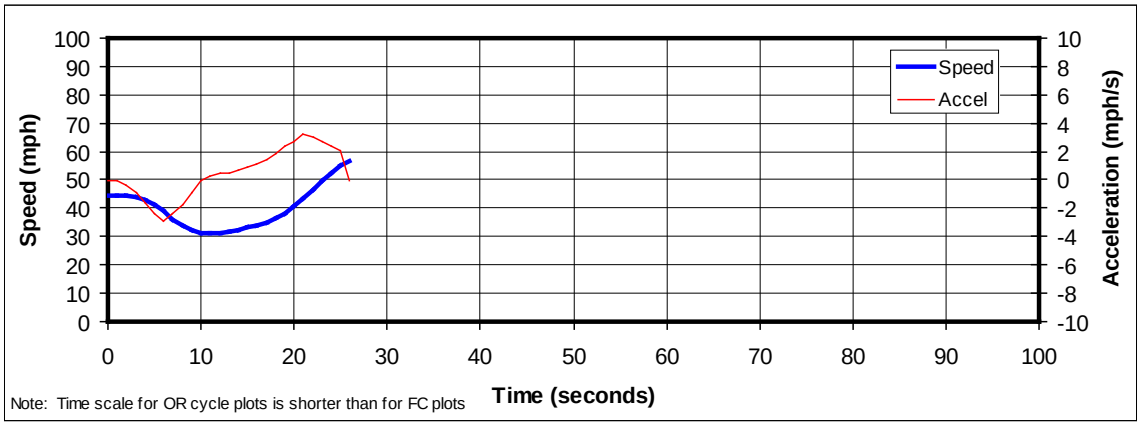


Figure 5-18
Loop, Upgrade (L-U) On-Ramp Driving Cycle

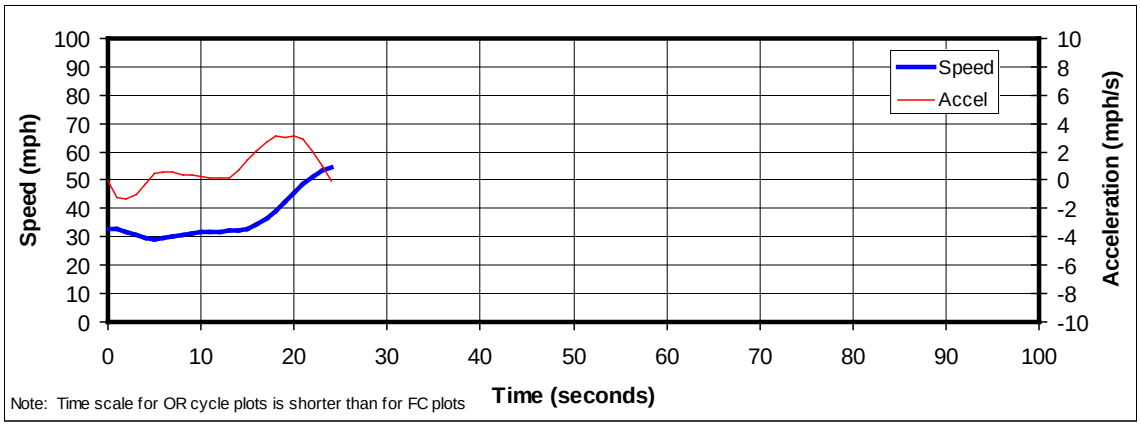


Figure 5-19
Metered On-Ramp Driving Cycle

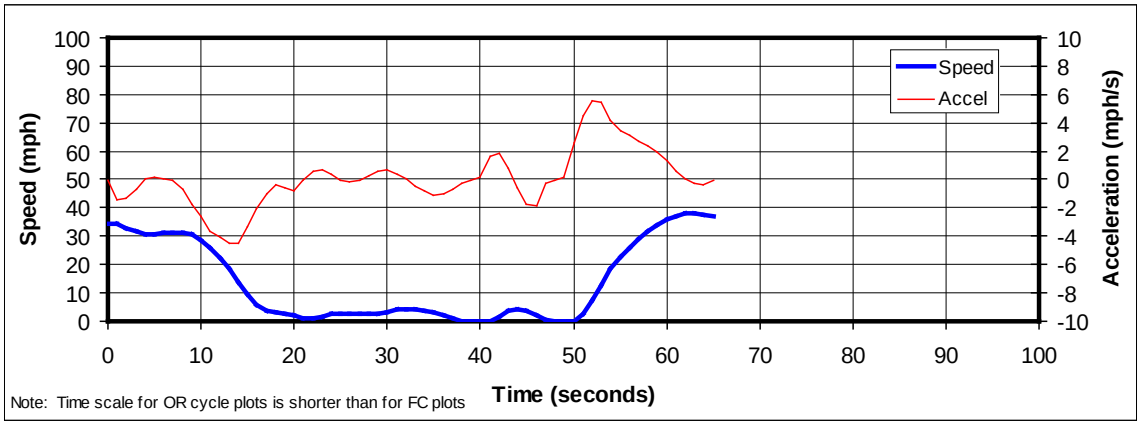
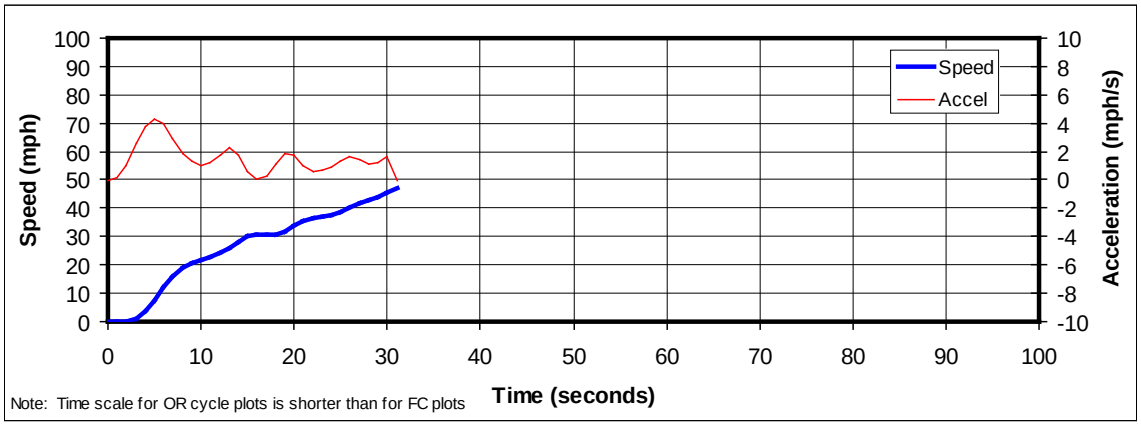


Figure 5-20
Non-Metered On-Ramp Driving Cycle



Although these specialized ramp cycles may not fit their intended driving populations as well at the FC cycles, they nevertheless preserve reasonable features.

Another example of this is seen in Figures 5-19 and 5-20, which show ramp metered and non-metered cycles (across all shape and grade configurations), respectively. As expected, the metered cycle exhibits significant idling and low-speed creep operation that would not be expected to occur when the meter is off (during non-peak periods) or no meter exists.

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6. MOVES CYCLE EMISSIONS COMPARISON

As noted earlier, the CAMP SCF Improvement research program also included an element that consisted of modal emission measurements over a series of transient driving cycles developed earlier in that research program. With EPA's concurrence, a comparative analysis of MOVES emission estimates against actual emission measurements from the CAMP testing program was performed under this study. The purpose was to provide EPA with another source of actual emission measurements for MOVES validation purposes. This section of the report discusses the CAMP testing data and how they were assembled and compared to equivalent emission rate estimates contained in MOVES.

6.1 Testing Study Data and Processing

CAMP Emission Test Data Description – The CAMP SCF Improvement emissions testing program encompassed more than 1,450 emissions tests of 39 1992 and newer model year passenger cars and light-duty trucks from model years 1992 through 2004 that were recruited primarily from local used car dealers. All of the vehicles accepted for testing had reportedly passed a Smog Check test and were free from obvious emissions-related defects.[*] Each vehicle was tested using a series of driving cycles that were developed under the CAMP project to represent freeway operation during varying levels of congestion or in different speed ranges. In addition to the CAMP freeway cycles, each vehicle was tested using the cold start Federal Test Procedure (FTP) and a hot start version of the "LA92" or "Unified" cycle. Each vehicle was tested over a total 16 cycles, generally with two or three "replicate" tests over each cycle.

One set of driving cycles used for this program was representative of Los Angeles freeway operation at the "Level of Service" levels defined by the U.S. Federal Highway Administration (LOS A through LOS F). In-road traffic monitors were used to measure LOS levels, while chase vehicles equipped with laser range finders were used to collect vehicle speed data[9]. Data collection and subsequent analysis was performed using procedures that paralleled those used by Sierra Research under contract to EPA in support of its speed correction cycle development.[10] Note that these CAMP freeway by LOS cycles are similar but not identical to those developed under this work assignment

[*] Forty-four vehicles were originally recruited for testing, but four vehicles were subsequently rejected from the program when mechanical or emissions-related defects developed or were discovered during the course of testing. One four-wheel-drive vehicle was rejected when it was determined that, contrary to the owner's claims, the four-wheel-drive had no provision for disablement by the user.

and discussed earlier in Sections 4 and 5. The CAMP freeway cycles were developed only from driving data collected in the Los Angeles metropolitan area. The freeway cycles generated under this EPA work assignment were developed using driving data from the San Francisco Bay Area, Sacramento, and Modesto/Stanislaus County, CA areas in addition to the Los Angeles area data.

Under the earlier CAMP study, additional driving cycles were developed to represent freeway operation stratified by speeds, defined in 10 mph increments from 10-20 mph to 70-80 mph. These "Speed Bin" freeway cycles were included in the CAMP emissions measurement program.

Two widely used standard cycles were also included. The Federal Test Procedure, or FTP, is used in the emissions certification procedures for light duty cars and trucks. It has, however, been criticized as not representing current driving conditions. The acceleration rates included in the FTP, for example, are limited to a maximum of 3.3 mph/s, corresponding to the capabilities of the belt-drive dynamometers used during in the late 1960s and early 1970s. A vehicle would take 10 seconds to accelerate from 0 to 33 mph at this rate, a very sluggish pace.

A second widely used driving cycle, the LA92, was developed under contract to the California Air Resources Board by Sierra Research,[11] and is often included in tests performed for emission inventory development. The LA92 includes higher average and maximum speeds than the FTP, and acceleration rates of up to 6.7 mph/s. Finally, emissions results were collected during steady state operation at 65 mph, using the vehicle cruise control if available.

The FTP is a cold start test, requiring that test to be the first of any series of tests. The order of the remaining cycles was assigned randomly, with the six LOS cycles being performed in order of LOS A through LOS F or LOS F through LOS A. The speed bin cycles received independent random assignment of order, progressing from lowest to highest speed or highest to lowest speed. During the course of testing, the instrument operator would note the cumulative emissions at the end of each cycle, and compare the results achieved during the next test of that cycle on that vehicle. Unusually large differences were resolved with a third test at a later time. Void tests were similarly repeated.[12]

Table 6-1 summarizes key statistics for each of the 16 driving cycles over which second-by-second modal emissions were measured in the CAMP testing program.

Limited bag sampling was performed on subsets of tests for quality control purposes. All emission data used in this analysis were derived from continuous, time-aligned dilute modal emissions measurements obtained with a Constant Volume Sampler and certification grade dilute analyzers. Analyzer range selection was controlled by a host computer, which was also used to perform time alignment, monitor ambient conditions and vehicle speed, and log emission results.

Table 6-1 Key CAMP Emission Test Cycle Statistics					
Driving Cycle	Time (min)	Dist. (miles)	Speeds (mph)		
			Mean	Max	Min
LOS A	6.65	7.51	67.79	79.52	55.62
LOS B	6.10	6.80	66.92	78.34	51.71
LOS C	7.47	8.28	66.53	78.74	47.79
LOS D	7.22	7.85	65.26	77.56	48.18
LOS E	7.85	7.49	57.22	74.43	16.06
LOS F	8.93	4.85	32.60	63.85	3.92
Spd 10-20	7.43	1.88	15.21	65.42	0.00
Spd 20-30	3.25	1.38	25.44	39.96	10.97
Spd 30-40	7.78	4.25	32.75	53.67	5.09
Spd 40-50	6.63	5.05	45.68	63.07	28.60
Spd 50-60	8.63	8.14	56.59	65.42	36.04
Spd 60-70	8.38	9.12	65.30	73.25	56.02
Spd 70-80	8.60	10.45	72.91	82.26	66.59
LA4 (FTP)	22.87	7.44	19.53	56.70	0.00
Unified (LA92)	24.15	10.00	24.85	67.20	0.00

The vehicle test fleet included only newer vehicles equipped with multipoint port fuel injection. The final test fleet included 24 cars and 15 trucks. All vehicles were to have recently passed a California Smog Check I/M test. Vehicle procurement was limited to relatively high production volume models produced by GM, Ford, DaimlerChrysler, Toyota, Nissan and Honda, and attempted to include a range of accumulated mileages, with an objective of at least half of the test fleet with more than 75,000 miles.

The test vehicles were obtained from local car dealerships and employees and acquaintances of Sierra Research employees. Full-time four wheel drive and traction control equipped vehicles, which could not be tested on a two-wheel drive dynamometer, were excluded. In addition, all vehicles were gasoline-powered. Only vehicles with automatic transmissions were recruited.

All testing was performed with commercial California Phase II reformulated gasoline using fuel from a single source for each vehicle. No fuel sampling or analysis was performed.

Data Processing for MOVES Comparisons – The results of all valid tests performed in the Caltrans program were copied into Excel spreadsheets, attempting to follow the format required for MSOD second-by-second laboratory emissions. We intended to submit these results to EPA for inclusion in the MSOD database, but discovered transcription errors that would require correction before EPA could use the information.

The data required to satisfy the requirements of this Work Assignment were available, however, and were used for this analysis. (Additional resources would be required to complete the MSOD data submission; this element was postponed to a later date with EPA's approval.)

The basic approach in processing the second-by-second CAMP emission measurements consisted of organizing the data in a manner in which they could be most directly or equivalently compared to the emission rate estimates contained in MOVES. Since MOVES estimates emissions by individual Vehicle Specific Power (VSP) bin, this first involved computing the second-by-second emissions over each vehicle test in the CAMP database, as explained below.

Each vehicle tested was identified with respect to VIN, Make, Model, Model Year, and engine size. The dynamometer Equivalent Test Weight (ETW) and Actual dynamometer Horsepower (AHP) were also recorded. This permitted the Total Road Load Horsepower (TRLHP) to be obtained from the Sierra Look-up Tables used by Inspection/Maintenance programs. The TRLHP value was used to estimate Road Load A, B, and C power coefficients using the procedures described in EPA's MOVES2004 Energy and Emission Inputs - Draft Report.[13] A VSP value was then assigned to each second of vehicle operation, accompanying the previously reported speed and THC, CO, and NOx and emissions for that second. The speed used for the VSP calculation was the actual vehicle speed, not the dynamometer target speed. Only running exhaust emissions were processed; thus Bag 1 emissions from the FTP measurements in the CAMP study were excluded.

The February 2007 MOVES Software Design and Reference Manual provides VSP/speed bin definitions for running exhaust THC, CO, and NOx.[14] These MOVES-based bins, numbered 0 through 40, are defined in Table 6-2.

The results of each second of operation on each vehicle were assigned to a MOVES bin in accordance with Table 6-2. A running count for occurrences in a given bin and the sum of emissions occurring in that bin were then computed for each driving cycle. This permitted later calculation of average emissions by bin for that driving cycle/vehicle combination, or accumulation of counts and emissions if one wanted to combine vehicles, driving cycles, model year, or any other stratum.

Since all tests in the CAMP program were performed in calendar year 2002 , a new model year 2002 vehicle was assigned an age of 0, while older vehicles were assigned ages by subtracting the vehicle's model year from 2002. The vehicle results for a given model year/age combination were then combined for comparison with the average results used in the MOVES model based on the age groupings employed in MOVES.

Average emissions are reported in bins ranging from number 0 to 40 (23 bins are used). The process of placing emissions into VSP bins permitted the average emissions obtained in specific bins using a variety of different driving cycles to be compared directly to MOVES estimates.

Table 6-2 MOVES Running Exhaust Operating Mode Bin Definitions			
Vehicle Specific Power (VSP, kW/tonne)	Instantaneous Speed (mph)		
	0-25	25-50	>50
Braking – Bin 0			
Idling – Bin 1			
<0	Bin 11	Bin 21	-
0-3	Bin 12	Bin 22	-
3-6	Bin 13	Bin 23	-
6-9	Bin 14	Bin 24	-
9-12	Bin 15	Bin 25	-
≥12	Bin 16	-	-
<6	-	-	Bin 33
6-12	-	-	Bin 35
12-18	-	Bin 27	Bin 37
18-24	-	Bin 28	Bin 38
24-30	-	Bin 29	Bin 39
≥30	-	Bin 30	Bin 40

For this analysis, all of the emissions results obtained on each vehicle were combined by summing the emissions occurring in individual bins and dividing by the number of occurrences observed in those bins. For example, a total of 10 seconds from a given cycle might have occurred in Bin X. The second-by-second emissions recorded for those seconds were accumulated in corresponding emissions bins for that bin and cycle. The average emission rate for Bin X is obtained by dividing the accumulated sum of the second-by-second emissions observed in Bin X by 10.

Based on EPA's inherent assumption in MOVES that emission rates, once binned by VSP/operating mode, are independent, sums of all emissions in Bin X across all of the driving cycles performed on a given vehicle were added, and then divided by the total number of seconds included in those bins to compute an overall average emission rate for a vehicle/bin combination.

6.2 Comparison to MOVES Estimates

After average emissions for each VSP bin were tabulated, they were compared to MOVES VSP bin emission rates by model year, vehicle age, and vehicle type. In the CAMP measurement program, only Passenger Car and Light Truck vehicle types (with MOVES sourceTypeIDs 21 and 31) were tested.

The MOVES emission rates were based on version 20081106 of the model's underlying database. A MySQL query was written and applied to extract specific records from the *EmissionRateByAge* table within the MOVES model database for gasoline-fueled running exhaust THC, CO and NO_X emissions of passenger cars and light trucks covering the model year and vehicle age ranges represented in the CAMP testing program.

When stratified by model year, age group and vehicle type, a total of 15 groups (9 car and 6 truck) were represented within the CAMP testing data. For each of these model year/age/vehicle type groups, individual comparisons of measured vs. MOVES exhaust emissions by VSP bin were performed.

Table 6-3 presents overall results of the emission rate comparisons between MOVES and the CAMP testing data. It also lists the number of CAMP sample vehicles and second-by-second measurements represented in each group. The MOVES and CAMP tested rates (the latter shown in the "Meas" columns) are simple averages taken across all VSP bins. In this overall comparison, no attempt was made to weight results by individual VSP bin to represent overall composite in-use operation. (The "%Diff" columns represent the relative proportion of the average CAMP-measured rates compared to MOVES average rates for each stratum shown.)

Table 6-3
Overall Emission Comparison Between MOVES vs. CAMP Measurements by Model Year, Age Group and Vehicle Type

ModYr/Age/ VehType	Meas. Vehs	Meas. Secs	THC (grams/hour)			CO (grams/hour)			NOx (grams/hour)		
			MOVES	Meas	%Diff	MOVES	Meas	%Diff	MOVES	Meas	%Diff
93/8-9/C	1	18,507	20.43	0.60	3%	567.6	210.7	37%	78.42	9.29	12%
94/8-9/C	2	35,176	15.51	6.12	39%	***767.5***	232.5	30%	72.46	4.28	6%
95/6-7/C	1	18,885	13.05	1.81	14%	360.9	140.7	39%	66.48	36.72	55%
96/6-7/C	4	76,892	8.39	3.31	39%	**301.6**	**331.5**	**110%**	44.26	10.12	23%
97/4-5/C	1	22,610	4.81	2.15	45%	261.9	87.1	33%	39.40	19.96	51%
98/4-5/C	3	54,501	3.73	3.46	93%	**231.6**	**285.5**	**123%**	22.28	4.63	21%
99/0-3/C	4	81,042	2.75	1.32	48%	262.2	182.3	70%	19.58	10.61	54%
00/0-3/C	5	89,033	2.75	0.95	35%	262.2	108.1	41%	19.58	2.65	14%
01/0-3/C	3	51,391	1.52	0.45	29%	145.3	22.9	16%	6.95	2.36	34%
97/4-5/T	2	35,662	6.12	0.92	15%	428.6	11.4	3%	40.86	10.72	26%
98/4-5/T	5	89,610	4.04	2.43	60%	261.2	67.0	26%	32.98	14.25	43%
99/0-3/T	2	34,496	4.38	1.21	28%	157.7	40.9	26%	29.59	7.05	24%
00/0-3/T	2	34,077	4.38	0.46	11%	157.7	13.5	9%	29.59	2.44	8%
01/0-3/T	3	52,310	3.16	0.49	16%	90.8	50.7	56%	14.72	2.74	19%
02/0-3/T	1	15,556	3.20	0.55	17%	90.8	6.9	8%	13.55	1.09	8%

Shaded cells in Table 6-3 highlight possible anomalies in the MOVES emission rates. First, shaded in bold italics, the CO running exhaust rate of 767.5 grams/hour for 1994 model year passenger cars at ages 8-9 in MOVES is significantly higher than that for 1993 models in the same age range (567.6 grams/hour). Although these values may reflect results from the test data used to develop the MOVES rates, they are likely the result of limited measurements for one of these model year/age/vehicle type strata. As appears to have been done for other strata, EPA should combine data from both groups or assign the same rates to both.

Second, instances where the average CAMP-measured emission rate exceeded those in MOVES are shaded in bold. Generally speaking, the MOVES rates were higher than the corresponding CAMP measurements. As elaborated later, this does not necessarily indicate problems with the MOVES rates because the CAMP vehicles were not a representative sample and were biased toward lower emission rates. Given the "cleaner" bias of the CAMP sample, instances of higher CAMP rates were flagged in Table 6-3.

Figures 6-1 through 6-3 present more detailed comparisons by individual VSP bin for THC, CO, and NOx, respectively, for one of the model year/age/vehicle type groups—model year 1996 passenger cars that are six to seven years old. In each of these figures, MOVES model emission rates by bin are shown in black. Individual vehicle rates within the model year/age/vehicle type stratum from the CAMP study are shown in different colors; the mean rates averaged across the vehicles in the stratum are shown in blue.

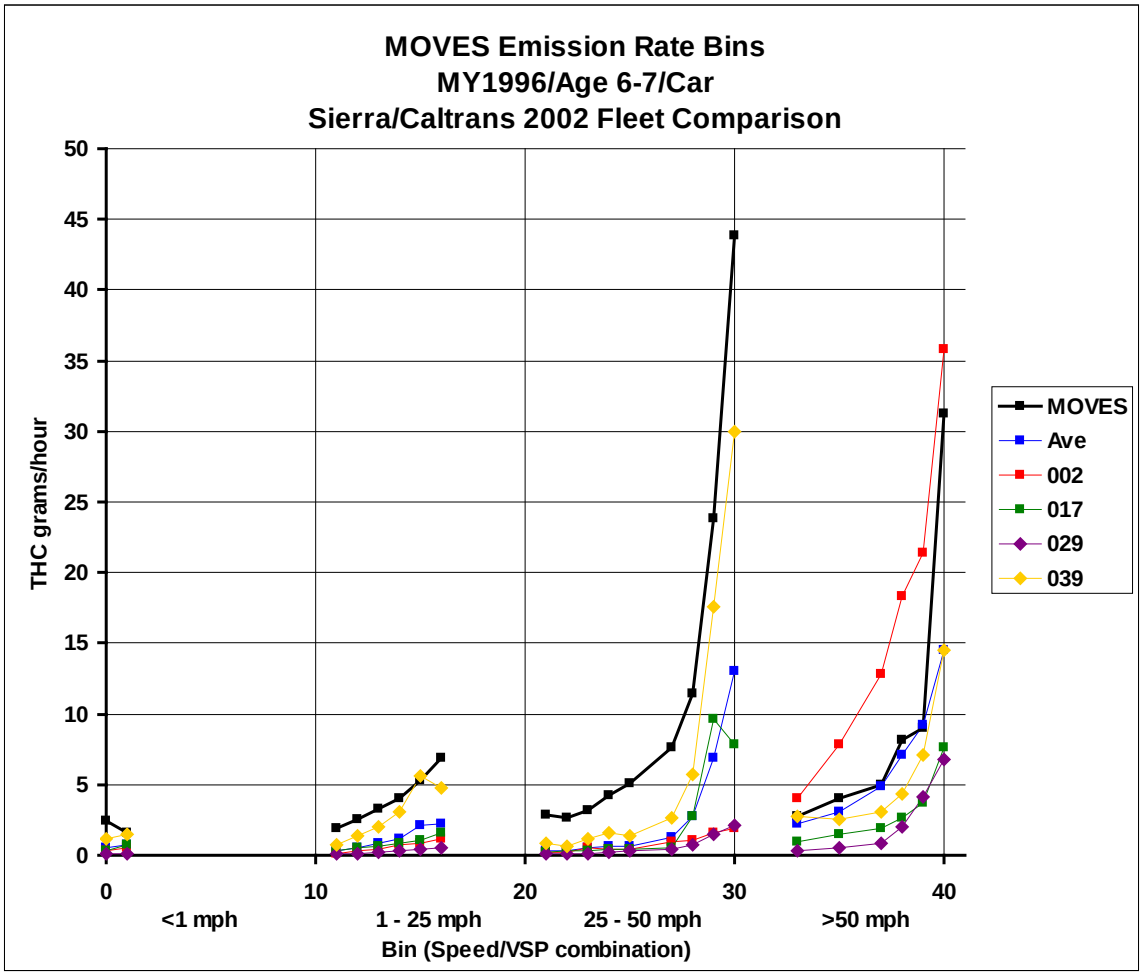
As seen in each of these three figures (as well as the overall comparison in Table 6-3), the MOVES emission rates are generally and sometimes significantly higher than those corresponding rates measured in the CAMP testing.

Several characteristics of the CAMP test fleet make these observations directionally consistent with the population used in the underlying MOVES model. As noted earlier, all of the test vehicles in the CAMP program were in good operating condition, and had recently passed a Smog Check test. All were normally operated in California, and can be assumed to meet all California certification requirements. The test fuel was California Phase II reformulated fuel. The owner demographics—car dealerships and employees of Sierra Research—do not represent the in-use owner population that might be expected for vehicles of similar age.

Under the CAMP study, no attempt was made to recruit a fully representative sample of in-use light-duty vehicles, nor to quantify the bias resulting from the recruitment process employed. Thus, we simply note that MOVES emission rates that exceed those from the CAMP sample do not necessarily signal a problem with MOVES.

Conversely, instances where CAMP measured rates exceed corresponding MOVES rates may indicate under-estimated rates in MOVES. Figure 6-2 shows such an occurrence for VSP bins in the speed ranges above 25 mph. As shown in the figure, however, when the

Figure 6-1
MOVES vs. CAMP Measured THC Emission Rates by VSP Bin for Model Year 1996 Passenger Cars, Ages 6-7 Years

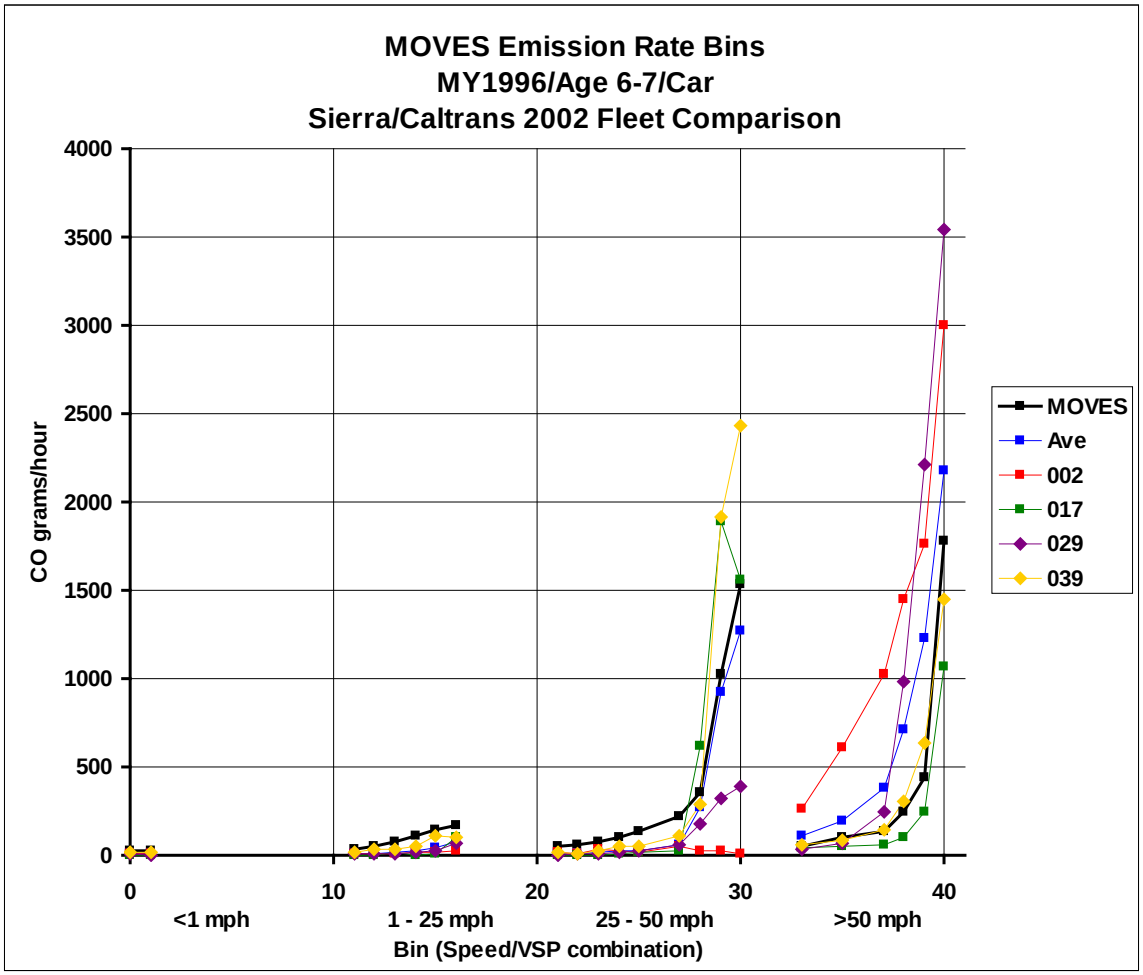


CAMP tested fleet is stratified by model year, age, and vehicle type, each stratum contains a very limited number of vehicles; one or two of the vehicles in the stratum can significantly affect the stratum averages.

Detailed charts summarizing complete results by VSP bin for every group and pollutant are contained in Appendix D.

A broader review of the results in Appendix D reveals that the average emission rates incorporated in the MOVES model are generally higher than the rates observed in this program. While specific vehicles achieved higher average emission scores, the tested results in general averaged 25–50% of the levels used in MOVES.

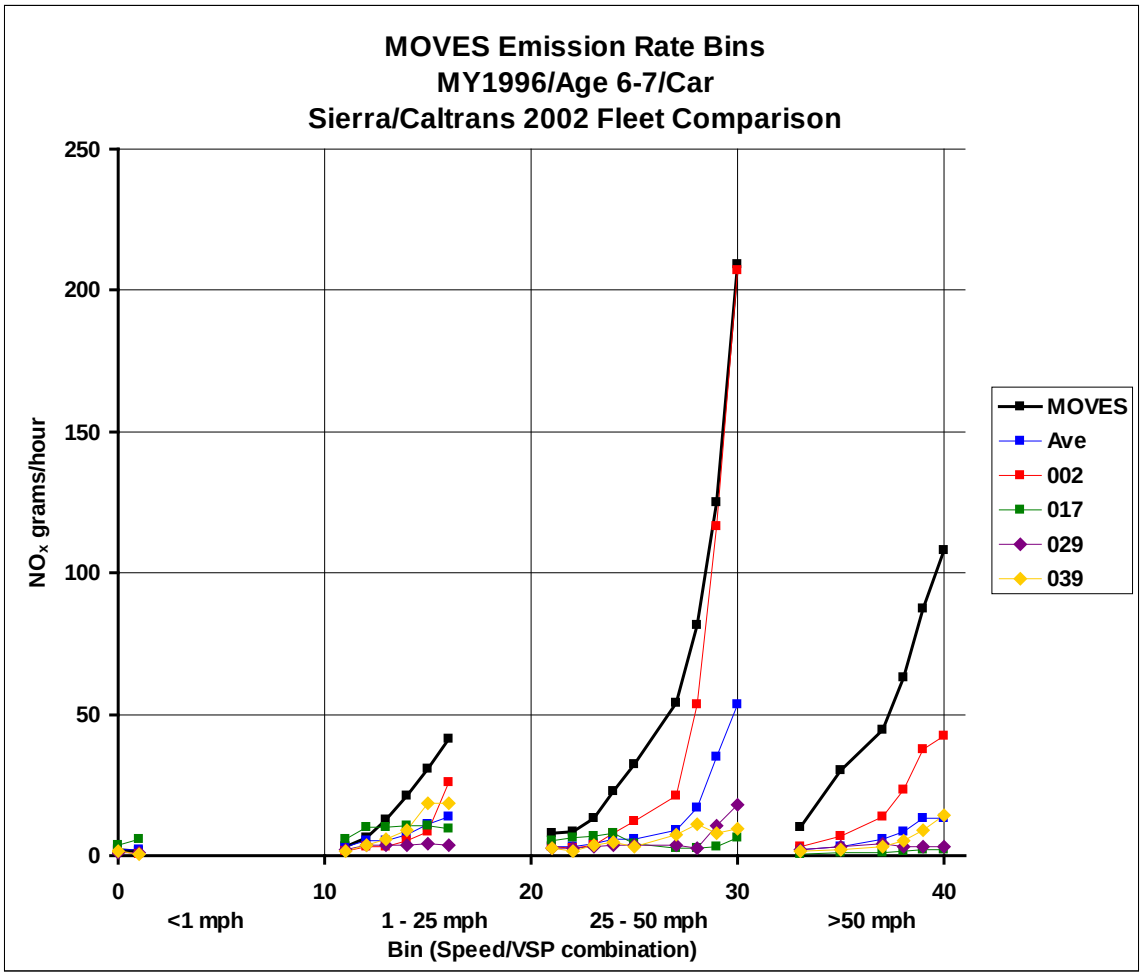
Figure 6-2
MOVES vs. CAMP Measured CO Emission Rates by VSP Bin for Model Year 1996 Passenger Cars, Ages 6-7 Years



The expected pattern of increasing emission rates with increasing VSP is also seen. The very newest vehicles are extremely clean, with many vehicles achieving less than 10% of the MOVES value for all bins.

The results of this program, however, support the gathering and incorporation of additional data in the MOVES model, particularly for the higher VSP bins. It appears as if a relatively small sample of data was included in MOVES for some of the high power modes. This is reflected in the consistency of the average rates reported in comparison to the patterns observed within and between vehicles at lower power levels. It is also corroborated by the fact that the MOVES rates are largely based on IM240 measurements from several I/M programs and special studies.[15] (The IM240 cycle is a subset of the FTP and thus any operating modes in the IM240 are also represented in the FTP.)

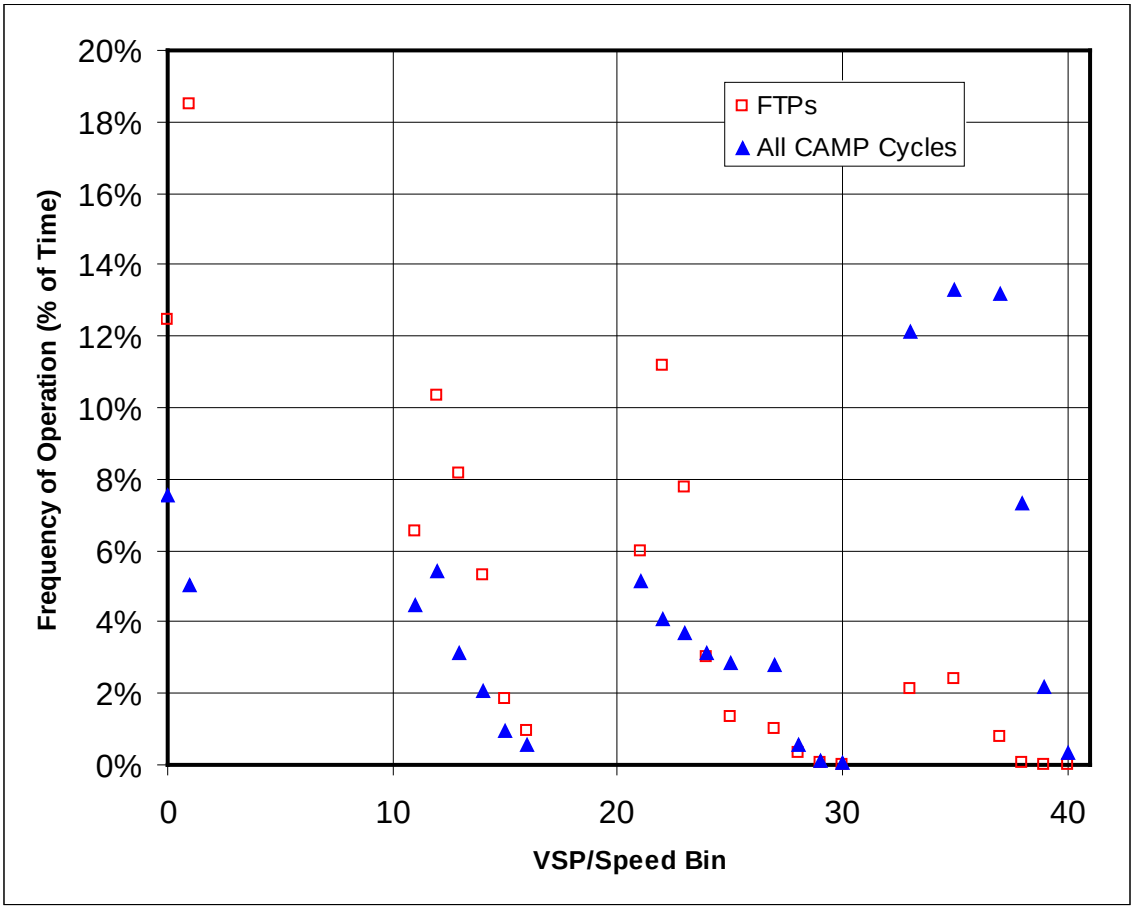
Figure 6-3
MOVES vs. CAMP Measured NOx Emission Rates by VSP Bin for Model Year 1996 Passenger Cars, Ages 6-7 Years



Examining the relative count frequencies in the CAMP testing program, which was focused on relatively high power freeway vehicle operation, indicates that some of the highest power bins include less than 0.1% of the total sample. A similar examination of the frequency observed during the FTP, which was limited by historical driving patterns and dynamometer design to lower VSP levels, further emphasizes the lack of proportionate sampling of the highest power levels.

Figure 6-4 illustrates this. It plots the distribution of operation (expressed as the percentage of total operating time) in each VSP/Speed bin from the CAMP database, first

Figure 6-4
Distribution of Operating Frequencies by VSP/Speed Bin,
FTP vs. All CAMP Driving Cycles



for just the FTP, and then for all of the CAMP cycles tested (the freeway, Unified, and FTP cycles). Recall from Table 6-2 that the higher power bins are those numbered in the high 20s and 30s plus Bin 40. As clearly shown in Figure 6-4, the FTP (and IM240) contains a negligible percentage of operation in these bins. Although the combined CAMP cycles also reflect small operation frequency in the highest power bins (Bins 30 and 40), they contain substantially more operation in the moderately high power bins (Bins 26-29 and 36-39) than the FTP.

It is also interesting to note an apparent NOx control strategy reflected in both the MOVES averages and the CAMP test results. Vehicles generally increase NOx levels with increasing VSP. Some then hold steady or drop at the highest power levels. This effect is not observed in the THC and CO emissions. It is seen in both the truck and car groups, in some of the MOVES reported levels, and several, but not all, of the individual vehicle results.

Given the limited number of vehicles available from the CAMP testing and resource limitations for this task element under the study, no quantitative statistical analysis of the significance of the emission rates differences between the CAMP measurements and MOVES was performed. The primary purpose of this element was to assemble the data into equivalent groups to those used in MOVES and to perform some preliminary comparisons.

Two additional tasks are recommended for future study. First, the detailed VSP bin-level comparisons (such as those plotted in Appendix D) should be expanded to include not just the mean emission rates from MOVES, but also representation of the variance in these rates. In addition to the mean rate, the *EmissionRateByAge* table within the MOVES model database includes EPA's estimate of the coefficient of variation (CV), which is the standard deviation divided by the mean, of the underlying data. It would be useful to see whether the measured CAMP rates fall within a single standard deviation from the mean, or reflect emissions at the tails of the assumed normally distributed underlying MOVES measurements.

Second, to test MOVES' inherent assumption that, once binned by VSP/Speed operating mode, emissions are independent, it is recommended that a reconstructive analysis of the summed emissions measured over each cycle in the CAMP testing study be computed from the average measured emission rates in each VSP bin calculated under this current study and compared to the actual emission totals measured over each cycle.

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7. REFERENCES

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9. T.R. Carlson, et al., "SCF Improvement – Supplemental Data Gathering on Los Angeles Area Freeways (Task Order No. 8) – Draft Report," prepared for the California Department of Transportation, June 30, 2003.

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APPENDIX A

Driving Population SAFDs, VSP Distributions and Summary Statistics - Compensated for Road Grade

California 2000 Rural Principal Arterial Interstate Driving (FC=01) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16															0.001							**0.001**
-15																						
-14																						
-13																						
-12																						
-11																	0.001					**0.001**
-10																						
-9															0.001							**0.001**
-8																0.001						**0.001**
-7														0.001			0.003	0.001				**0.005**
-6					0.004	0.003						0.001	0.001	0.001	0.001	0.004	0.001					**0.017**
-5			0.003	0.006	0.006	0.004	0.005	0.003		0.003		0.001	0.005	0.001	0.005	0.004	0.004	0.003	0.001			**0.054**
-4		0.001	0.005	0.019	0.023	0.008	0.006	0.008	0.005	0.001	0.004	0.003	0.003	0.004	0.005	0.011	0.005	0.005	0.001			**0.117**
-3		0.006	0.017	0.019	0.018	0.024	0.006	0.011	0.015	0.010	0.020	0.017	0.025	0.025	0.023	0.041	0.024	0.011	0.003			**0.317**
-2		0.019	0.027	0.014	0.010	0.018	0.009	0.004	0.006	0.018	0.025	0.064	0.068	0.083	0.098	0.119	0.094	0.031	0.010		0.001	**0.718**
-1		0.048	0.023	0.020	0.013	0.023	0.003	0.005	0.013	0.018	0.045	0.116	0.292	0.904	1.773	2.045	1.383	0.579	0.127	0.014		**7.444**
0	0.019	0.087	0.024	0.066	0.020	0.038	0.011	0.003	0.020	0.037	0.125	0.310	1.884	6.634	23.003	28.027	15.593	4.915	0.866	0.140	0.005	**81.828**
1	0.003	0.059	0.038	0.040	0.010	0.022	0.020	0.040	0.032	0.080	0.113	0.204	0.469	1.062	1.948	2.030	1.303	0.504	0.112	0.006	0.005	**8.099**
2	0.003	0.032	0.029	0.032	0.036	0.038	0.028	0.027	0.028	0.040	0.048	0.057	0.085	0.105	0.129	0.112	0.084	0.015	0.004			**0.932**
3	0.008	0.031	0.034	0.048	0.033	0.014	0.014	0.010	0.011	0.010	0.010	0.011	0.013	0.010	0.019	0.018	0.009	0.005			0.001	**0.311**
4		0.006	0.010	0.008	0.009	0.009	0.004	0.005	0.008	0.005	0.003		0.003	0.003	0.006	0.015	0.004	0.003				**0.099**
5		0.001	0.004	0.001	0.004	0.005	0.006	0.006	0.003	0.001	0.001			0.001		0.003	0.001	0.001				**0.040**
6					0.001	0.001	0.001										0.001					**0.005**
7														0.003	0.001	0.001	0.001					**0.006**
8													0.001		0.001							**0.003**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.032**	**0.291**	**0.214**	**0.274**	**0.187**	**0.207**	**0.115**	**0.121**	**0.142**	**0.223**	**0.395**	**0.784**	**2.849**	**8.837**	**27.016**	**32.431**	**18.512**	**6.072**	**1.124**	**0.161**	**0.013**	**100.000**

Summary Statistics

Avg Speed (mph)	72.84	Time at Idle (%)	0.032	Avg Specific PKE (hp-sec/lb)	49.63
Min Speed (mph)	0.00	Time at Cruise (%)	82.793	Avg Total Specific Power (hp/lb)	0.0462
Max Speed (mph)	104.72	Time in Accel (%)	8.825	Avg Non-Zero Specific Power (hp/lb)	0.0922
Avg Non-Idle Speed (mph)	72.87	Time in Decel (%)	8.350	Max Specific Power (hp/lb)	2.3605
Avg Cruise Speed (mph)	73.41	Avg Trip Length (miles)	21.742	Spec Pwr Freq (%): 0 hp/lb	49.89
Avg Acceleration (mph/sec)	0.34	Avg Trip Time (min)	17.909	Spec Pwr Freq (%): >0-0.1 hp/lb	32.48
Max Acceleration (mph/sec)	8.37	# Stops per Mile	0.003	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.04
Avg Deceleration (mph/sec)	-0.34	# of 1-Sec Observations	78,441	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.61
Max Deceleration (mph/sec)	-15.94	# of Trips	73	Spec Pwr Freq (%): >0.3 hp/lb	1.98

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	17.267		
		Bin 0 % (braking)	0.776		
		Bin 1 % (idle)	0.040		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.181	Bin 21 % (25-50 mph, <0 kw/tonne)	0.092		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.297	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.052	Bin 33 % (>50 mph, <6 kw/tonne)	5.014
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.133	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.043		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.084	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.059	Bin 35 % (>50 mph, 6-12 kw/tonne)	13.002
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.088	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.091		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.080		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.179	Bin 37 % (>50 mph, 12-18 kw/tonne)	33.777
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.120	Bin 38 % (>50 mph, 18-24 kw/tonne)	29.689
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.061	Bin 39 % (>50 mph, 24-30 kw/tonne)	11.616
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.029	Bin 40 % (>50 mph, >=30 kw/tonne)	4.498

California 2000 Rural Other Principal Arterial LOS A-C Driving (FC=02) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14								0.003														**0.003**
-13																						
-12																						
-11																						
-10																						
-9									0.003	0.006												**0.009**
-8					0.003		0.003	0.003	0.006													**0.015**
-7			0.003		0.006	0.012	0.012	0.012	0.003	0.006	0.003											**0.056**
-6			0.012	0.050	0.059	0.050	0.044	0.021	0.021	0.012	0.006	0.003										**0.276**
-5			0.053	0.103	0.091	0.126	0.112	0.076	0.047	0.024	0.018	0.018	0.009	0.003								**0.679**
-4		0.021	0.121	0.109	0.171	0.135	0.132	0.156	0.121	0.076	0.044	0.018	0.009	0.021								**1.132**
-3		0.103	0.147	0.103	0.082	0.109	0.153	0.215	0.168	0.115	0.091	0.068	0.035	0.009	0.006	0.009						**1.411**
-2		0.226	0.123	0.068	0.062	0.071	0.097	0.129	0.229	0.221	0.176	0.171	0.097	0.059	0.035	0.006		0.003		0.009		**1.782**
-1	0.003	0.412	0.047	0.032	0.050	0.076	0.085	0.135	0.368	0.823	0.850	1.276	2.026	1.429	0.809	0.447	0.118	0.029	0.015		0.003	**9.033**
0	2.632	0.326	0.032	0.041	0.050	0.068	0.088	0.221	1.385	1.991	3.134	7.389	20.015	18.292	8.507	4.631	0.767	0.088	0.009	0.006	0.003	**69.676**
1	0.059	0.247	0.029	0.053	0.094	0.085	0.168	0.306	0.676	0.982	0.917	1.550	2.141	1.517	0.832	0.303	0.074	0.024	0.012	0.015		**10.083**
2	0.024	0.203	0.059	0.076	0.082	0.191	0.276	0.379	0.262	0.191	0.262	0.265	0.171	0.094	0.041	0.038	0.018	0.003				**2.635**
3		0.300	0.156	0.212	0.215	0.215	0.185	0.135	0.106	0.085	0.068	0.059	0.044	0.024	0.012	0.003						**1.817**
4	0.018	0.126	0.179	0.150	0.162	0.132	0.094	0.062	0.050	0.018	0.012	0.009			0.006							**1.017**
5		0.009	0.065	0.062	0.047	0.038	0.041	0.018	0.012	0.009	0.003		0.006		0.003							**0.312**
6		0.006	0.009	0.015	0.006	0.006								0.003								**0.044**
7		0.006								0.003						0.003						**0.012**
8			0.003																			**0.003**
9			0.003								0.003											**0.006**
10																						
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18																						
19																						
20																						
Totals	**2.735**	**1.985**	**1.041**	**1.073**	**1.179**	**1.314**	**1.491**	**1.870**	**3.455**	**4.561**	**5.587**	**10.824**	**24.552**	**21.450**	**10.250**	**5.440**	**0.976**	**0.147**	**0.035**	**0.029**	**0.006**	**100.000**

Summary Statistics

Avg Speed (mph)	55.04	Time at Idle (%)	2.735	Avg Specific PKE (hp-sec/lb)	14.82
Min Speed (mph)	0.00	Time at Cruise (%)	76.306	Avg Total Specific Power (hp/lb)	0.0523
Max Speed (mph)	98.36	Time in Accel (%)	10.721	Avg Non-Zero Specific Power (hp/lb)	0.1056
Avg Non-Idle Speed (mph)	56.59	Time in Decel (%)	10.239	Max Specific Power (hp/lb)	2.1165
Avg Cruise Speed (mph)	59.29	Avg Trip Length (miles)	4.333	Spec Pwr Freq (%): 0 hp/lb	50.50
Avg Acceleration (mph/sec)	0.63	Avg Trip Time (min)	4.724	Spec Pwr Freq (%): >0-0.1 hp/lb	31.47
Max Acceleration (mph/sec)	9.33	# Stops per Mile	0.092	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.58
Avg Deceleration (mph/sec)	-0.68	# of 1-Sec Observations	34,009	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.16
Max Deceleration (mph/sec)	-13.87	# of Trips	120	Spec Pwr Freq (%): >0.3 hp/lb	3.31

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	9.928		
		Bin 0 % (braking)	4.420		
		Bin 1 % (idle)	2.995		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.856	Bin 21 % (25-50 mph, <0 kw/tonne)	1.992		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.797	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.316	Bin 33 % (>50 mph, <6 kw/tonne)	9.752
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.546	Bin 23 % (25-50 mph, 3-6 kw/tonne)	1.824		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.437	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.871	Bin 35 % (>50 mph, 6-12 kw/tonne)	28.151
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.449	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.440		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.847		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.254	Bin 37 % (>50 mph, 12-18 kw/tonne)	26.702
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.941	Bin 38 % (>50 mph, 18-24 kw/tonne)	8.575
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.387	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.086
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.404	Bin 40 % (>50 mph, >=30 kw/tonne)	0.959

California 2000 Rural Other Principal Arterial LOS D-F Driving (FC=02) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.014	0.014					0.014												**0.041**
-8			0.014		0.014				0.014													**0.041**
-7		0.014		0.014		0.014	0.041	0.041	0.014													**0.136**
-6		0.014	0.041	0.055	0.041	0.027			0.014	0.027												**0.218**
-5		0.014	0.014		0.123	0.095	0.095	0.027	0.014	0.055	0.041	0.027			0.014	0.014						**0.532**
-4		0.027	0.027	0.055	0.055	0.109	0.109	0.082	0.068	0.041	0.068			0.014								**0.655**
-3		0.136	0.136	0.095	0.150	0.082	0.164	0.136	0.232	0.136	0.150	0.082	0.082	0.027	0.014							**1.623**
-2		0.218	0.041	0.136	0.109	0.259	0.177	0.423	0.232	0.355	0.327	0.382	0.082	0.041	0.014	0.041	0.041					**2.878**
-1		0.477	0.109	0.055	0.314	0.232	0.355	0.709	1.091	0.941	1.828	2.400	2.728	1.091	0.559	0.123		0.014				**13.025**
0	4.842	0.518	0.095	0.109	0.191	0.164	0.532	1.214	2.605	2.946	4.733	10.543	13.148	9.547	5.619	0.873		0.014				**57.692**
1	0.068	0.409	0.068	0.041	0.191	0.164	0.600	1.091	1.391	1.637	2.973	3.505	2.810	1.227	0.627	0.123	0.014					**16.939**
2		0.177	0.041	0.123	0.218	0.396	0.559	0.436	0.436	0.341	0.259	0.245	0.055	0.123	0.055	0.014	0.014					**3.492**
3	0.014	0.218	0.123	0.218	0.218	0.191	0.150	0.123	0.095	0.095	0.068	0.041	0.041	0.027	0.014	0.027						**1.664**
4		0.136	0.095	0.109	0.164	0.150	0.055	0.041			0.014		0.014	0.014								**0.791**
5		0.068	0.041	0.027	0.027	0.014																**0.177**
6						0.014				0.014												**0.027**
7		0.014	0.014							0.014				0.014								**0.055**
8												0.014										**0.014**
9																						
10																						
11																						
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16																						
17																						
18																						
19																						
20																						
Totals	**4.924**	**2.441**	**0.859**	**1.050**	**1.828**	**1.909**	**2.837**	**4.324**	**6.206**	**6.615**	**10.461**	**17.239**	**18.958**	**12.125**	**6.915**	**1.214**	**0.068**	**0.027**				**100.000**

Summary Statistics

Avg Speed (mph)	48.77	Time at Idle (%)	4.924	Avg Specific PKE (hp-sec/lb)	15.22
Min Speed (mph)	0.00	Time at Cruise (%)	73.432	Avg Total Specific Power (hp/lb)	0.0664
Max Speed (mph)	83.00	Time in Accel (%)	11.007	Avg Non-Zero Specific Power (hp/lb)	0.1280
Avg Non-Idle Speed (mph)	51.29	Time in Decel (%)	10.638	Max Specific Power (hp/lb)	1.9395
Avg Cruise Speed (mph)	52.99	Avg Trip Length (miles)	3.104	Spec Pwr Freq (%): 0 hp/lb	48.12
Avg Acceleration (mph/sec)	0.71	Avg Trip Time (min)	3.819	Spec Pwr Freq (%): >0-0.1 hp/lb	27.33
Max Acceleration (mph/sec)	7.54	# Stops per Mile	0.161	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.53
Avg Deceleration (mph/sec)	-0.79	# of 1-Sec Observations	7,332	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.21
Max Deceleration (mph/sec)	-9.18	# of Trips	32	Spec Pwr Freq (%): >0.3 hp/lb	4.81

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.754		
		Bin 0 % (braking)	4.247		
		Bin 1 % (idle)	5.480		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.301	Bin 21 % (25-50 mph, <0 kw/tonne)	3.973		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.260	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.027	Bin 33 % (>50 mph, <6 kw/tonne)	11.795
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.562	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.836		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.616	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.959	Bin 35 % (>50 mph, 6-12 kw/tonne)	19.795
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.603	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.069		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.726		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.096	Bin 37 % (>50 mph, 12-18 kw/tonne)	21.466
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.808	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.562
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.877	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.685
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.219	Bin 40 % (>50 mph, >=30 kw/tonne)	1.041

California 2000 Rural Minor Arterial Driving (FC=06) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9								0.010														**0.010**
-8			0.010	0.005		0.005	0.005		0.015				0.005									**0.044**
-7				0.005	0.005	0.015	0.005	0.010	0.005	0.010	0.005											**0.058**
-6		0.010	0.015	0.029	0.044	0.034	0.044	0.015		0.010	0.010											**0.209**
-5		0.010	0.058	0.112	0.131	0.126	0.131	0.082	0.039	0.005	0.015	0.005										**0.713**
-4	0.005	0.005	0.165	0.194	0.204	0.272	0.233	0.184	0.126	0.073	0.029	0.015	0.005	0.005								**1.514**
-3	0.005	0.155	0.262	0.238	0.277	0.286	0.277	0.388	0.277	0.238	0.180	0.102	0.019									**2.703**
-2		0.383	0.204	0.170	0.141	0.170	0.218	0.257	0.349	0.403	0.359	0.194	0.121		0.005	0.010						**2.984**
-1		0.742	0.184	0.165	0.170	0.204	0.335	0.485	0.805	1.645	1.980	2.038	1.203	0.388	0.044	0.005	0.005					**10.398**
0	4.013	1.538	0.286	0.272	0.286	0.374	1.038	1.480	1.917	2.586	5.464	14.392	20.278	5.769	0.442	0.053	0.010					**60.197**
1	0.102	0.684	0.126	0.146	0.204	0.281	0.529	0.631	1.077	1.727	2.518	2.130	1.359	0.359	0.049	0.019						**11.941**
2	0.049	0.514	0.136	0.189	0.233	0.320	0.446	0.524	0.577	0.500	0.330	0.155	0.029	0.010	0.010							**4.023**
3	0.015	0.374	0.233	0.286	0.335	0.354	0.374	0.238	0.180	0.087	0.053	0.029										**2.557**
4		0.359	0.209	0.272	0.281	0.218	0.150	0.102	0.087	0.024	0.015	0.005										**1.723**
5		0.092	0.189	0.102	0.087	0.063	0.053	0.024	0.010			0.005										**0.626**
6		0.039	0.049	0.019	0.029	0.005	0.010	0.005		0.005	0.010											**0.170**
7		0.005	0.015	0.024	0.010		0.005	0.005	0.005													**0.068**
8			0.005	0.010	0.005																	**0.019**
9				0.005																		**0.005**
10		0.005	0.005	0.005		0.005																**0.019**
11			0.005	0.005																		**0.010**
12			0.010																			**0.010**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**4.187**	**4.915**	**2.164**	**2.251**	**2.441**	**2.732**	**3.853**	**4.440**	**5.468**	**7.312**	**10.966**	**19.069**	**23.019**	**6.531**	**0.548**	**0.087**	**0.015**					**100.000**

Summary Statistics

Avg Speed (mph)	44.55	Time at Idle (%)	4.188	Avg Specific PKE (hp-sec/lb)	16.34
Min Speed (mph)	0.00	Time at Cruise (%)	74.992	Avg Total Specific Power (hp/lb)	0.0587
Max Speed (mph)	78.32	Time in Accel (%)	10.952	Avg Non-Zero Specific Power (hp/lb)	0.1177
Avg Non-Idle Speed (mph)	46.50	Time in Decel (%)	9.870	Max Specific Power (hp/lb)	1.2703
Avg Cruise Speed (mph)	50.29	Avg Trip Length (miles)	3.446	Spec Pwr Freq (%): 0 hp/lb	50.17
Avg Acceleration (mph/sec)	0.87	Avg Trip Time (min)	4.642	Spec Pwr Freq (%): >0-0.1 hp/lb	28.43
Max Acceleration (mph/sec)	12.20	# Stops per Mile	0.149	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.34
Avg Deceleration (mph/sec)	-0.87	# of 1-Sec Observations	20,609	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.35
Max Deceleration (mph/sec)	-9.12	# of Trips	74	Spec Pwr Freq (%): >0.3 hp/lb	4.70

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.775		
		Bin 0 % (braking)	6.725		
		Bin 1 % (idle)	5.050		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.235	Bin 21 % (25-50 mph, <0 kw/tonne)	5.469		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.630	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.761	Bin 33 % (>50 mph, <6 kw/tonne)	11.702
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.037	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.727		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.906	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.868	Bin 35 % (>50 mph, 6-12 kw/tonne)	24.222
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.804	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.581		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.631		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.779	Bin 37 % (>50 mph, 12-18 kw/tonne)	14.819
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.245	Bin 38 % (>50 mph, 18-24 kw/tonne)	3.287
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.794	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.813
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.463	Bin 40 % (>50 mph, >=30 kw/tonne)	0.453

California 2000 Rural Major Collector Driving (FC=07) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14										0.003												**0.003**
-13																						
-12				0.001				0.001														**0.003**
-11						0.001		0.001			0.001	0.001										**0.005**
-10								0.001		0.003												**0.004**
-9				0.001	0.004	0.001	0.001	0.003		0.001												**0.012**
-8			0.005	0.003	0.004	0.007	0.001	0.007	0.003	0.005	0.001	0.001	0.001									**0.038**
-7			0.004	0.012	0.023	0.034	0.036	0.013	0.017	0.008	0.009	0.004	0.001									**0.162**
-6		0.001	0.016	0.074	0.113	0.090	0.061	0.055	0.040	0.027	0.004	0.008	0.003	0.001								**0.494**
-5		0.009	0.103	0.232	0.223	0.274	0.244	0.158	0.109	0.051	0.031	0.014	0.012	0.001								**1.461**
-4		0.053	0.321	0.338	0.371	0.421	0.403	0.362	0.278	0.203	0.109	0.042	0.013	0.008								**2.922**
-3	0.001	0.226	0.361	0.270	0.355	0.293	0.295	0.382	0.431	0.370	0.228	0.125	0.047	0.009	0.003							**3.396**
-2	0.001	0.417	0.262	0.199	0.190	0.215	0.275	0.374	0.458	0.546	0.503	0.296	0.139	0.023	0.012							**3.912**
-1	0.001	0.757	0.173	0.209	0.128	0.197	0.283	0.416	0.693	1.290	1.988	1.927	1.126	0.345	0.090	0.027	0.005					**9.656**
0	2.650	1.120	0.207	0.215	0.231	0.596	0.923	1.161	1.861	3.651	7.809	12.001	12.055	5.191	0.940	0.164	0.030					**50.805**
1	0.068	0.554	0.155	0.262	0.284	0.447	0.597	0.983	1.710	2.496	3.006	2.312	1.130	0.322	0.082	0.025	0.005					**14.439**
2	0.020	0.489	0.189	0.349	0.339	0.469	0.654	0.965	0.989	0.714	0.353	0.126	0.035	0.007	0.004	0.001						**5.704**
3	0.009	0.488	0.373	0.502	0.579	0.618	0.632	0.437	0.241	0.085	0.035	0.021	0.004									**4.023**
4	0.001	0.304	0.386	0.385	0.456	0.355	0.215	0.089	0.030	0.007	0.005	0.005	0.001									**2.238**
5	0.001	0.064	0.166	0.123	0.074	0.056	0.020	0.014	0.007	0.003	0.003	0.001										**0.531**
6		0.010	0.043	0.038	0.023	0.010	0.010	0.003	0.003	0.003												**0.143**
7		0.007	0.007	0.014	0.003	0.003				0.001												**0.034**
8		0.004	0.007	0.001		0.001																**0.013**
9			0.001																			**0.001**
10			0.001	0.001																		**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.753**	**4.502**	**2.779**	**3.229**	**3.401**	**4.088**	**4.651**	**5.424**	**6.871**	**9.467**	**14.087**	**16.885**	**14.568**	**5.907**	**1.130**	**0.218**	**0.040**					**100.000**

Summary Statistics

Avg Speed (mph)	42.85	Time at Idle (%)	2.753	Avg Specific PKE (hp-sec/lb)	15.95
Min Speed (mph)	0.00	Time at Cruise (%)	69.023	Avg Total Specific Power (hp/lb)	0.0670
Max Speed (mph)	81.81	Time in Accel (%)	14.222	Avg Non-Zero Specific Power (hp/lb)	0.1273
Avg Non-Idle Speed (mph)	44.07	Time in Decel (%)	14.002	Max Specific Power (hp/lb)	1.4592
Avg Cruise Speed (mph)	49.18	Avg Trip Length (miles)	2.836	Spec Pwr Freq (%): 0 hp/lb	47.38
Avg Acceleration (mph/sec)	1.02	Avg Trip Time (min)	3.971	Spec Pwr Freq (%): >0-0.1 hp/lb	28.04
Max Acceleration (mph/sec)	10.19	# Stops per Mile	0.189	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.49
Avg Deceleration (mph/sec)	-1.24	# of 1-Sec Observations	76,717	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.47
Max Deceleration (mph/sec)	-13.80	# of Trips	322	Spec Pwr Freq (%): >0.3 hp/lb	5.61

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	5.918		
		Bin 0 % (braking)	10.430		
		Bin 1 % (idle)	3.214		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.138	Bin 21 % (25-50 mph, <0 kw/tonne)	4.366		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.651	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.037	Bin 33 % (>50 mph, <6 kw/tonne)	9.867
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.508	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.885		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.342	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.169	Bin 35 % (>50 mph, 6-12 kw/tonne)	20.367
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.221	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.676		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.186		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.587	Bin 37 % (>50 mph, 12-18 kw/tonne)	12.801
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	3.286	Bin 38 % (>50 mph, 18-24 kw/tonne)	2.351
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	1.064	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.424
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.264	Bin 40 % (>50 mph, >=30 kw/tonne)	0.169

California 2000 Rural Minor Collector Driving (FC=08) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12						0.003																**0.003**
-11																						
-10						0.003																**0.003**
-9			0.005	0.003			0.003	0.005	0.003		0.005											**0.023**
-8				0.003	0.008	0.013	0.005	0.008	0.005			0.003										**0.043**
-7			0.003	0.010	0.023	0.033	0.013	0.018	0.015	0.008	0.003		0.003	0.003								**0.130**
-6		0.003	0.026	0.099	0.115	0.084	0.102	0.077	0.033	0.031	0.010	0.003		0.003								**0.584**
-5		0.010	0.128	0.283	0.276	0.291	0.296	0.217	0.102	0.074	0.028	0.020	0.005		0.003							**1.732**
-4		0.059	0.344	0.472	0.490	0.546	0.513	0.452	0.355	0.163	0.077	0.036	0.005	0.008	0.003	0.003						**3.523**
-3		0.260	0.454	0.365	0.513	0.546	0.459	0.531	0.485	0.406	0.242	0.122	0.028	0.003	0.008	0.003						**4.424**
-2	0.003	0.485	0.360	0.258	0.301	0.367	0.426	0.436	0.648	0.661	0.482	0.327	0.143	0.026	0.010	0.031	0.015					**4.977**
-1	0.005	0.824	0.168	0.232	0.270	0.441	0.661	0.770	1.199	1.595	1.990	1.561	0.645	0.245	0.110	0.036	0.048					**10.802**
0	2.265	0.906	0.181	0.237	0.342	1.074	1.916	2.271	3.100	4.832	6.677	10.526	6.314	2.021	0.497	0.242	0.133	0.003				**43.536**
1	0.107	0.645	0.181	0.286	0.408	0.730	0.947	1.309	1.949	2.602	2.531	1.717	0.625	0.189	0.128	0.066	0.041					**14.460**
2	0.059	0.653	0.278	0.370	0.556	0.740	0.941	1.143	1.105	0.755	0.337	0.094	0.048	0.026	0.010	0.003	0.005					**7.123**
3	0.041	0.681	0.569	0.671	0.765	0.783	0.735	0.549	0.227	0.099	0.043	0.028	0.018	0.018	0.005	0.010						**5.243**
4	0.013	0.253	0.475	0.472	0.526	0.431	0.237	0.079	0.033	0.020	0.005	0.010	0.003			0.003						**2.559**
5	0.003	0.077	0.191	0.151	0.079	0.054	0.038	0.023	0.015	0.005	0.003											**0.638**
6	0.003	0.010	0.046	0.043	0.018	0.015	0.005	0.005						0.003								**0.148**
7		0.003	0.008	0.005	0.008		0.003	0.003														**0.028**
8		0.003	0.005	0.005						0.003												**0.015**
9			0.003																			**0.003**
10																						
11																						
12			0.003																			**0.003**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.498**	**4.870**	**3.426**	**3.965**	**4.697**	**6.154**	**7.299**	**7.893**	**9.274**	**11.253**	**12.432**	**14.448**	**7.837**	**2.541**	**0.773**	**0.395**	**0.242**	**0.003**				**100.000**

Summary Statistics

Avg Speed (mph)	38.90	Time at Idle (%)	2.498	Avg Specific PKE (hp-sec/lb)	11.61
Min Speed (mph)	0.00	Time at Cruise (%)	64.288	Avg Total Specific Power (hp/lb)	0.0725
Max Speed (mph)	82.79	Time in Accel (%)	16.690	Avg Non-Zero Specific Power (hp/lb)	0.1390
Avg Non-Idle Speed (mph)	39.90	Time in Decel (%)	16.524	Max Specific Power (hp/lb)	1.5754
Avg Cruise Speed (mph)	45.29	Avg Trip Length (miles)	1.729	Spec Pwr Freq (%): 0 hp/lb	47.80
Avg Acceleration (mph/sec)	1.18	Avg Trip Time (min)	2.667	Spec Pwr Freq (%): >0-0.1 hp/lb	25.72
Max Acceleration (mph/sec)	11.52	# Stops per Mile	0.290	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.72
Avg Deceleration (mph/sec)	-1.44	# of 1-Sec Observations	39,197	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.53
Max Deceleration (mph/sec)	-12.17	# of Trips	245	Spec Pwr Freq (%): >0.3 hp/lb	6.22

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	4.757		
		Bin 0 % (braking)	12.847		
		Bin 1 % (idle)	3.124		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.642	Bin 21 % (25-50 mph, <0 kw/tonne)	6.475		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.747	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.204	Bin 33 % (>50 mph, <6 kw/tonne)	7.283
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.954	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.604		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.756	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.153	Bin 35 % (>50 mph, 6-12 kw/tonne)	14.405
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.779	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.282		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.680		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.583	Bin 37 % (>50 mph, 12-18 kw/tonne)	7.995
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	3.692	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.641
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.991	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.454
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.349	Bin 40 % (>50 mph, >=30 kw/tonne)	0.362

California 2000 Rural Local Driving (FC=09) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12								0.008														**0.008**
-11																						
-10										0.008												**0.008**
-9						0.008																**0.008**
-8			0.008		0.008			0.008		0.008												**0.031**
-7			0.016	0.016	0.023	0.031	0.031	0.016	0.008						0.008							**0.148**
-6			0.023	0.047	0.086	0.070	0.055	0.031	0.023			0.008										**0.343**
-5		0.023	0.101	0.218	0.296	0.164	0.101	0.070	0.047	0.016	0.008											**1.045**
-4		0.078	0.624	0.881	0.515	0.320	0.234	0.242	0.164	0.109	0.039	0.016										**3.222**
-3		0.608	1.108	0.835	0.897	0.515	0.320	0.304	0.335	0.242	0.117	0.070	0.023	0.008								**5.382**
-2	0.008	1.092	0.593	0.671	1.076	0.655	0.273	0.265	0.312	0.445	0.289	0.086	0.039	0.031	0.008							**5.842**
-1		1.420	0.413	0.608	0.866	1.100	0.780	0.507	0.733	1.045	1.170	0.655	0.296	0.062	0.094	0.023						**9.774**
0	2.972	1.841	0.523	0.827	2.691	3.853	1.919	1.225	1.498	2.878	6.513	7.246	3.471	0.647	0.164	0.133						**38.401**
1	0.172	1.451	1.256	1.404	1.973	1.630	0.983	0.819	1.591	2.410	1.934	1.232	0.546	0.164	0.094	0.016						**17.676**
2	0.281	1.958	1.349	1.716	1.076	0.523	0.569	0.764	0.741	0.312	0.164	0.086	0.039	0.016	0.016							**9.610**
3	0.226	1.264	1.076	0.967	0.616	0.429	0.390	0.218	0.187	0.109	0.055	0.031										**5.569**
4	0.031	0.335	0.452	0.328	0.382	0.281	0.226	0.125	0.070	0.055												**2.285**
5	0.008	0.047	0.125	0.101	0.117	0.055	0.008	0.023	0.008													**0.491**
6	0.016	0.008	0.016	0.047	0.016	0.008	0.008		0.008													**0.125**
7		0.008	0.016	0.008																		**0.031**
8																						
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11																						
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19																						
20																						
Totals	**3.713**	**10.133**	**7.699**	**8.674**	**10.640**	**9.641**	**5.897**	**4.626**	**5.725**	**7.637**	**10.289**	**9.431**	**4.415**	**0.928**	**0.382**	**0.172**						**100.000**

Summary Statistics

Avg Speed (mph)	30.10	Time at Idle (%)	3.713	Avg Specific PKE (hp-sec/lb)	4.16
Min Speed (mph)	0.00	Time at Cruise (%)	61.412	Avg Total Specific Power (hp/lb)	0.0639
Max Speed (mph)	74.46	Time in Accel (%)	18.370	Avg Non-Zero Specific Power (hp/lb)	0.1179
Avg Non-Idle Speed (mph)	31.26	Time in Decel (%)	16.506	Max Specific Power (hp/lb)	1.0580
Avg Cruise Speed (mph)	36.63	Avg Trip Length (miles)	0.544	Spec Pwr Freq (%): 0 hp/lb	45.80
Avg Acceleration (mph/sec)	1.24	Avg Trip Time (min)	1.085	Spec Pwr Freq (%): >0-0.1 hp/lb	30.15
Max Acceleration (mph/sec)	7.18	# Stops per Mile	0.718	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.75
Avg Deceleration (mph/sec)	-1.49	# of 1-Sec Observations	12,820	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.10
Max Deceleration (mph/sec)	-12.02	# of Trips	197	Spec Pwr Freq (%): >0.3 hp/lb	4.20

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.803		
		Bin 0 % (braking)	12.881		
		Bin 1 % (idle)	4.072		
Bin 11 % (0-25 mph, <0 kw/tonne)	7.130	Bin 21 % (25-50 mph, <0 kw/tonne)	5.744		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	9.546	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.080	Bin 33 % (>50 mph, <6 kw/tonne)	4.531
Bin 13 % (0-25 mph, 3-6 kw/tonne)	7.106	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.191		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	4.539	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.246	Bin 35 % (>50 mph, 6-12 kw/tonne)	9.277
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.028	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.462		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.115		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.912	Bin 37 % (>50 mph, 12-18 kw/tonne)	4.880
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.274	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.244
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.808	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.261
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.452	Bin 40 % (>50 mph, >=30 kw/tonne)	0.222

California 2000 Urban Principal Arterial Interstate LOS A Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11												0.002										**0.002**
-10															0.002							**0.002**
-9								0.002		0.002												**0.004**
-8					0.002	0.002								0.004								**0.008**
-7									0.002		0.002				0.002		0.004					**0.010**
-6				0.006	0.004	0.004	0.004		0.002		0.002	0.004	0.002	0.002	0.002							**0.032**
-5			0.008	0.014	0.012	0.008	0.008	0.006	0.006	0.008	0.004	0.008	0.002	0.002		0.004	0.002					**0.091**
-4		0.010	0.022	0.028	0.024	0.024	0.018	0.022	0.044	0.032	0.030	0.018	0.014	0.014	0.008	0.004	0.002	0.002				**0.313**
-3		0.024	0.044	0.046	0.056	0.063	0.050	0.044	0.050	0.050	0.077	0.075	0.067	0.042	0.022	0.022	0.004					**0.734**
-2		0.060	0.028	0.046	0.052	0.089	0.089	0.107	0.091	0.133	0.194	0.234	0.216	0.184	0.123	0.048	0.016	0.002				**1.712**
-1		0.192	0.117	0.117	0.099	0.103	0.190	0.163	0.202	0.367	0.706	1.287	2.172	2.392	2.198	1.144	0.335	0.050	0.010			**11.845**
0	0.395	0.301	0.165	0.155	0.135	0.155	0.391	0.230	0.206	0.690	1.771	5.218	10.692	16.067	18.291	10.395	2.309	0.405	0.044			**68.014**
1	0.018	0.202	0.103	0.125	0.117	0.159	0.258	0.240	0.294	0.569	1.275	1.880	2.612	2.896	2.158	1.170	0.256	0.030				**14.362**
2	0.006	0.083	0.060	0.085	0.069	0.121	0.137	0.121	0.117	0.202	0.254	0.272	0.226	0.161	0.077	0.054	0.010					**2.055**
3		0.060	0.024	0.036	0.060	0.065	0.058	0.077	0.069	0.042	0.020	0.022	0.022	0.014	0.012	0.014	0.002	0.002				**0.597**
4		0.020	0.018	0.024	0.014	0.010	0.008	0.004	0.002	0.002	0.004	0.006	0.006	0.012	0.006	0.002						**0.137**
5	0.002	0.010	0.014	0.002	0.002		0.002	0.002		0.002			0.004	0.008		0.004		0.002				**0.054**
6		0.002											0.004			0.004	0.002					**0.012**
7		0.002	0.002										0.002	0.002	0.002							**0.010**
8			0.002							0.002		0.002										**0.006**
9						0.002																**0.002**
10																						
11																						
12																						
13																						
14																						
15																						
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19																						
20																						
Totals	**0.420**	**0.966**	**0.605**	**0.682**	**0.645**	**0.805**	**1.212**	**1.017**	**1.085**	**2.100**	**4.340**	**9.028**	**16.042**	**21.799**	**22.902**	**12.864**	**2.941**	**0.492**	**0.054**			**100.000**

Summary Statistics

Avg Speed (mph)	62.08	Time at Idle (%)	0.421	Avg Specific PKE (hp-sec/lb)	8.17
Min Speed (mph)	0.00	Time at Cruise (%)	76.386	Avg Total Specific Power (hp/lb)	0.0590
Max Speed (mph)	90.33	Time in Accel (%)	11.986	Avg Non-Zero Specific Power (hp/lb)	0.1135
Avg Non-Idle Speed (mph)	62.34	Time in Decel (%)	11.208	Max Specific Power (hp/lb)	2.0029
Avg Cruise Speed (mph)	62.83	Avg Trip Length (miles)	2.389	Spec Pwr Freq (%): 0 hp/lb	48.06
Avg Acceleration (mph/sec)	0.50	Avg Trip Time (min)	2.309	Spec Pwr Freq (%): >0-0.1 hp/lb	28.31
Max Acceleration (mph/sec)	8.62	# Stops per Mile	0.027	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.69
Avg Deceleration (mph/sec)	-0.52	# of 1-Sec Observations	50,419	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.73
Max Deceleration (mph/sec)	-10.73	# of Trips	364	Spec Pwr Freq (%): >0.3 hp/lb	3.21

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.608		
		Bin 0 % (braking)	1.848		
		Bin 1 % (idle)	0.565		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.803	Bin 21 % (25-50 mph, <0 kw/tonne)	1.508		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.939	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.663	Bin 33 % (>50 mph, <6 kw/tonne)	12.796
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.372	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.685		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.246	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.797	Bin 35 % (>50 mph, 6-12 kw/tonne)	21.197
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.144	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.715		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.138		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.237	Bin 37 % (>50 mph, 12-18 kw/tonne)	28.433
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.647	Bin 38 % (>50 mph, 18-24 kw/tonne)	18.020
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.298	Bin 39 % (>50 mph, 24-30 kw/tonne)	6.015
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.138	Bin 40 % (>50 mph, >=30 kw/tonne)	1.796

California 2000 Urban Principal Arterial Interstate LOS B Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7																						
-6												0.011	0.006	0.006								**0.023**
-5												0.017		0.006								**0.023**
-4					0.006	0.006		0.006	0.011	0.023		0.011	0.023	0.006	0.017	0.011						**0.120**
-3		0.006	0.011	0.006	0.006	0.011	0.006	0.017	0.034	0.034	0.063	0.040	0.040	0.040	0.017	0.029	0.006					**0.365**
-2		0.029	0.011	0.029	0.051	0.051	0.046	0.046	0.034	0.091	0.097	0.108	0.188	0.245	0.171	0.034	0.023					**1.255**
-1		0.063	0.011	0.017	0.029	0.017	0.074	0.063	0.114	0.217	0.525	1.283	1.979	2.777	3.000	1.546	0.405	0.051				**12.171**
0	0.262	0.063	0.006	0.040	0.057		0.057	0.029	0.114	0.599	1.819	6.023	11.093	19.676	20.646	10.363	1.871	0.154				**72.870**
1	0.006	0.040		0.029	0.029	0.006	0.017	0.029	0.103	0.257	0.616	1.392	2.201	3.097	2.886	1.009	0.314	0.040				**12.068**
2		0.017		0.011	0.011	0.029	0.029	0.023	0.046	0.080	0.103	0.137	0.165	0.097	0.080	0.046						**0.873**
3		0.011	0.006	0.011	0.006		0.011	0.017	0.017	0.023	0.017	0.023	0.006	0.006								**0.154**
4								0.006	0.017	0.006	0.006			0.006	0.006							**0.046**
5		0.006								0.006		0.006		0.006		0.006						**0.029**
6													0.006									**0.006**
7																						
8																						
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20																						
Totals	**0.268**	**0.234**	**0.046**	**0.143**	**0.194**	**0.120**	**0.240**	**0.234**	**0.490**	**1.335**	**3.245**	**9.051**	**15.707**	**25.967**	**26.822**	**13.043**	**2.618**	**0.245**				**100.000**

Summary Statistics

Avg Speed (mph)	64.81	Time at Idle (%)	0.268	Avg Specific PKE (hp-sec/lb)	7.12
Min Speed (mph)	0.00	Time at Cruise (%)	77.535	Avg Total Specific Power (hp/lb)	0.0471
Max Speed (mph)	86.47	Time in Accel (%)	10.654	Avg Non-Zero Specific Power (hp/lb)	0.0963
Avg Non-Idle Speed (mph)	64.99	Time in Decel (%)	11.543	Max Specific Power (hp/lb)	1.5836
Avg Cruise Speed (mph)	64.91	Avg Trip Length (miles)	2.721	Spec Pwr Freq (%): 0 hp/lb	51.05
Avg Acceleration (mph/sec)	0.40	Avg Trip Time (min)	2.519	Spec Pwr Freq (%): >0-0.1 hp/lb	30.59
Max Acceleration (mph/sec)	5.78	# Stops per Mile	0.010	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.69
Avg Deceleration (mph/sec)	-0.44	# of 1-Sec Observations	17,534	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.49
Max Deceleration (mph/sec)	-6.34	# of Trips	116	Spec Pwr Freq (%): >0.3 hp/lb	2.18

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.316		
		Bin 0 % (braking)	0.959		
		Bin 1 % (idle)	0.327		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.258	Bin 21 % (25-50 mph, <0 kw/tonne)	0.867		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.121	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.322	Bin 33 % (>50 mph, <6 kw/tonne)	17.097
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.075	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.310		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.034	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.339	Bin 35 % (>50 mph, 6-12 kw/tonne)	25.083
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.034	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.373		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.000		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.500	Bin 37 % (>50 mph, 12-18 kw/tonne)	28.895
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.276	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.644
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.155	Bin 39 % (>50 mph, 24-30 kw/tonne)	5.655
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.052	Bin 40 % (>50 mph, >=30 kw/tonne)	1.625

California 2000 Urban Principal Arterial Interstate LOS C Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																	0.004					**0.004**
-8																		0.004				**0.004**
-7													0.007									**0.007**
-6			0.004		0.004					0.004	0.004	0.007										**0.022**
-5			0.004	0.007	0.007	0.007	0.011	0.007	0.007	0.007	0.007	0.004	0.011	0.011	0.015	0.011	0.004					**0.122**
-4		0.004	0.004	0.004	0.004	0.007	0.019	0.030	0.022	0.026	0.030	0.015	0.015	0.033	0.033	0.007	0.004	0.004				**0.259**
-3		0.004	0.019	0.015	0.004	0.019	0.019	0.019	0.030	0.052	0.048	0.063	0.081	0.059	0.056	0.026	0.007					**0.518**
-2		0.022	0.004	0.007	0.011	0.011	0.048	0.056	0.078	0.096	0.137	0.326	0.307	0.230	0.118	0.037	0.015	0.004				**1.507**
-1	0.004	0.067	0.011	0.022	0.019	0.063	0.070	0.100	0.141	0.285	0.881	1.766	2.355	2.625	2.651	1.052	0.126	0.037				**12.274**
0	0.074	0.081	0.004	0.052	0.067	0.126	0.067	0.107	0.348	0.485	2.407	6.946	11.152	15.755	23.767	8.412	0.915	0.037	0.004			**70.805**
1	0.007	0.044	0.022	0.011	0.007	0.030	0.052	0.048	0.107	0.211	0.977	2.473	2.881	2.747	2.540	0.789	0.093	0.015	0.004			**13.059**
2		0.015	0.004		0.007	0.026	0.007	0.015	0.030	0.089	0.096	0.133	0.185	0.200	0.122	0.007	0.022	0.011	0.004			**0.974**
3		0.007	0.007	0.004		0.007	0.007	0.011	0.022	0.011	0.026	0.041	0.041	0.044	0.041	0.011	0.007					**0.289**
4		0.004		0.004				0.004			0.004	0.011	0.007	0.007	0.004	0.015	0.007					**0.067**
5		0.007	0.004				0.004				0.004	0.007	0.004	0.011								**0.041**
6						0.004				0.004	0.004	0.004	0.004			0.011						**0.030**
7			0.004	0.004								0.007										**0.015**
8																0.004						**0.004**
9																						
10																						
11																						
12																						
13																						
14																						
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16																						
17																						
18																						
19																						
20																						
Totals	**0.085**	**0.255**	**0.089**	**0.130**	**0.130**	**0.300**	**0.304**	**0.396**	**0.785**	**1.270**	**4.625**	**11.804**	**17.051**	**21.723**	**29.347**	**10.382**	**1.203**	**0.111**	**0.011**			**100.000**

Summary Statistics

Avg Speed (mph)	63.76	Time at Idle (%)	0.085	Avg Specific PKE (hp-sec/lb)	6.41
Min Speed (mph)	0.00	Time at Cruise (%)	78.140	Avg Total Specific Power (hp/lb)	0.0549
Max Speed (mph)	91.73	Time in Accel (%)	10.486	Avg Non-Zero Specific Power (hp/lb)	0.1076
Avg Non-Idle Speed (mph)	63.81	Time in Decel (%)	11.289	Max Specific Power (hp/lb)	2.3457
Avg Cruise Speed (mph)	63.77	Avg Trip Length (miles)	2.071	Spec Pwr Freq (%): 0 hp/lb	49.03
Avg Acceleration (mph/sec)	0.42	Avg Trip Time (min)	1.949	Spec Pwr Freq (%): >0-0.1 hp/lb	30.11
Max Acceleration (mph/sec)	7.51	# Stops per Mile	0.011	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.23
Avg Deceleration (mph/sec)	-0.48	# of 1-Sec Observations	27,008	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.83
Max Deceleration (mph/sec)	-8.65	# of Trips	231	Spec Pwr Freq (%): >0.3 hp/lb	2.81

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.580		
		Bin 0 % (braking)	1.430		
		Bin 1 % (idle)	0.134		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.213	Bin 21 % (25-50 mph, <0 kw/tonne)	0.945		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.276	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.556	Bin 33 % (>50 mph, <6 kw/tonne)	14.602
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.049	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.549		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.026	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.497	Bin 35 % (>50 mph, 6-12 kw/tonne)	22.516
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.019	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.444		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.015		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.616	Bin 37 % (>50 mph, 12-18 kw/tonne)	32.920
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.172	Bin 38 % (>50 mph, 18-24 kw/tonne)	17.186
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.097	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.665
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.056	Bin 40 % (>50 mph, >=30 kw/tonne)	2.017

California 2000 Urban Principal Arterial Interstate LOS D Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11											0.005											**0.005**
-10																						
-9				0.005																		**0.005**
-8											0.005	0.005										**0.010**
-7								0.005	0.015							0.005						**0.025**
-6			0.005					0.005	0.005			0.010		0.005								**0.030**
-5		0.005		0.020	0.015			0.005	0.010		0.005	0.010	0.020	0.010								**0.098**
-4		0.005	0.030	0.025	0.025	0.039	0.020	0.034	0.025	0.005	0.005	0.005	0.005	0.020								**0.241**
-3		0.044	0.054	0.049	0.054	0.039	0.044	0.054	0.059	0.084	0.030	0.044	0.054	0.015	0.039	0.010	0.005					**0.679**
-2		0.098	0.094	0.118	0.143	0.079	0.123	0.133	0.177	0.212	0.182	0.162	0.172	0.187	0.118	0.030	0.005					**2.033**
-1		0.231	0.084	0.202	0.286	0.310	0.369	0.374	0.487	0.724	1.068	1.162	1.551	3.087	1.364	0.369	0.044					**11.713**
0	0.862	0.276	0.158	0.359	0.522	0.542	0.596	0.369	1.039	2.782	4.003	5.372	9.700	22.590	14.077	3.245	0.153					**66.642**
1	0.015	0.177	0.158	0.222	0.241	0.369	0.443	0.551	0.753	1.157	1.645	1.940	2.334	3.806	1.379	0.305	0.020					**15.515**
2	0.010	0.094	0.079	0.217	0.148	0.084	0.128	0.148	0.143	0.202	0.310	0.231	0.231	0.192	0.074	0.020						**2.309**
3	0.005	0.059	0.054	0.039	0.010	0.015	0.010	0.025	0.034	0.039	0.034	0.034	0.015	0.030	0.020	0.010						**0.433**
4		0.020	0.005	0.005	0.005		0.010	0.015	0.015		0.010		0.005	0.010	0.005							**0.103**
5		0.020	0.005		0.010		0.015	0.010			0.005		0.010			0.005						**0.079**
6		0.015	0.010	0.010		0.010	0.005	0.005				0.005	0.005									**0.064**
7												0.005										**0.005**
8										0.005				0.005								**0.010**
9																						
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19																						
20																						
Totals	**0.891**	**1.044**	**0.734**	**1.270**	**1.457**	**1.487**	**1.763**	**1.733**	**2.762**	**5.209**	**7.307**	**8.986**	**14.101**	**29.956**	**17.075**	**3.998**	**0.226**					**100.000**

Summary Statistics

Avg Speed (mph)	57.18	Time at Idle (%)	0.891	Avg Specific PKE (hp-sec/lb)	4.02
Min Speed (mph)	0.00	Time at Cruise (%)	78.735	Avg Total Specific Power (hp/lb)	0.0579
Max Speed (mph)	80.82	Time in Accel (%)	10.832	Avg Non-Zero Specific Power (hp/lb)	0.1095
Avg Non-Idle Speed (mph)	57.70	Time in Decel (%)	9.542	Max Specific Power (hp/lb)	2.0615
Avg Cruise Speed (mph)	57.79	Avg Trip Length (miles)	1.101	Spec Pwr Freq (%): 0 hp/lb	47.10
Avg Acceleration (mph/sec)	0.51	Avg Trip Time (min)	1.155	Spec Pwr Freq (%): >0-0.1 hp/lb	29.90
Max Acceleration (mph/sec)	7.83	# Stops per Mile	0.056	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.71
Avg Deceleration (mph/sec)	-0.53	# of 1-Sec Observations	20,310	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.51
Max Deceleration (mph/sec)	-10.94	# of Trips	293	Spec Pwr Freq (%): >0.3 hp/lb	2.78

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.081		
		Bin 0 % (braking)	1.744		
		Bin 1 % (idle)	1.139		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.554	Bin 21 % (25-50 mph, <0 kw/tonne)	3.027		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.459	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.868	Bin 33 % (>50 mph, <6 kw/tonne)	11.260
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.759	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.253		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.475	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.268	Bin 35 % (>50 mph, 6-12 kw/tonne)	21.207
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.160	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.923		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.060		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.518	Bin 37 % (>50 mph, 12-18 kw/tonne)	26.722
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.645	Bin 38 % (>50 mph, 18-24 kw/tonne)	13.698
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.250	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.687
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.140	Bin 40 % (>50 mph, >=30 kw/tonne)	1.184

California 2000 Urban Principal Arterial Interstate LOS E Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17											0.005											**0.005**
-16																						
-15																						
-14																						
-13																						
-12																						
-11														0.005								**0.005**
-10																						
-9													0.005									**0.005**
-8																						
-7				0.005	0.005				0.005		0.005											**0.021**
-6				0.005	0.010	0.021	0.005		0.005	0.010	0.010	0.005										**0.072**
-5			0.010	0.005	0.026	0.015	0.015	0.010	0.015	0.021	0.010	0.005	0.015	0.005								**0.154**
-4		0.026	0.031	0.062	0.051	0.062	0.036	0.021	0.015	0.026	0.026	0.046	0.026	0.026	0.010							**0.463**
-3		0.087	0.087	0.113	0.113	0.093	0.067	0.077	0.067	0.062	0.077	0.077	0.087	0.093	0.041	0.005						**1.147**
-2		0.154	0.247	0.386	0.401	0.273	0.314	0.201	0.129	0.093	0.216	0.406	0.314	0.159	0.062	0.015						**3.368**
-1	0.005	0.401	0.648	1.085	1.028	1.044	0.638	0.761	0.540	0.463	0.802	2.103	2.751	1.738	0.293	0.046						**14.347**
0	0.175	0.879	1.219	1.959	2.062	1.897	1.543	1.687	1.136	1.471	2.648	9.564	16.440	10.819	0.931	0.324	0.026					**54.780**
1	0.026	0.586	0.812	1.095	0.998	1.111	1.070	1.275	1.003	1.142	2.000	3.574	3.949	1.815	0.144	0.041						**20.641**
2		0.190	0.314	0.442	0.375	0.324	0.293	0.309	0.375	0.262	0.309	0.432	0.278	0.098	0.026							**4.026**
3		0.067	0.067	0.113	0.087	0.036	0.031	0.051	0.041	0.067	0.036	0.021	0.010	0.031								**0.658**
4		0.021	0.026	0.005	0.021	0.026	0.026	0.010	0.005	0.026	0.036	0.010										**0.211**
5		0.015	0.005	0.010	0.005			0.010														**0.046**
6		0.005	0.005		0.005																	**0.015**
7							0.005				0.005											**0.010**
8										0.005												**0.005**
9		0.005																				**0.005**
10												0.010										**0.010**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18								0.005														**0.005**
19																						
20																						
Totals	**0.206**	**2.437**	**3.471**	**5.286**	**5.188**	**4.900**	**4.042**	**4.417**	**3.337**	**3.646**	**6.186**	**16.254**	**23.875**	**14.789**	**1.507**	**0.432**	**0.026**					**100.000**

Summary Statistics

Avg Speed (mph)	46.61	Time at Idle (%)	0.206	Avg Specific PKE (hp-sec/lb)	4.42
Min Speed (mph)	0.00	Time at Cruise (%)	78.783	Avg Total Specific Power (hp/lb)	0.0630
Max Speed (mph)	78.10	Time in Accel (%)	10.943	Avg Non-Zero Specific Power (hp/lb)	0.1152
Avg Non-Idle Speed (mph)	46.70	Time in Decel (%)	10.068	Max Specific Power (hp/lb)	3.1331
Avg Cruise Speed (mph)	46.29	Avg Trip Length (miles)	0.909	Spec Pwr Freq (%): 0 hp/lb	45.27
Avg Acceleration (mph/sec)	0.65	Avg Trip Time (min)	1.170	Spec Pwr Freq (%): >0-0.1 hp/lb	29.59
Max Acceleration (mph/sec)	17.70	# Stops per Mile	0.064	Spec Pwr Freq (%): >0.1-0.2 hp/lb	15.90
Avg Deceleration (mph/sec)	-0.71	# of 1-Sec Observations	19,447	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.22
Max Deceleration (mph/sec)	-17.33	# of Trips	277	Spec Pwr Freq (%): >0.3 hp/lb	3.02

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.293		
		Bin 0 % (braking)	3.026		
		Bin 1 % (idle)	0.386		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.738	Bin 21 % (25-50 mph, <0 kw/tonne)	4.079		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	7.121	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.645	Bin 33 % (>50 mph, <6 kw/tonne)	10.480
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.020	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.088		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.335	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.791	Bin 35 % (>50 mph, 6-12 kw/tonne)	18.284
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.454	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.358		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.203		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.671	Bin 37 % (>50 mph, 12-18 kw/tonne)	19.160
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.913	Bin 38 % (>50 mph, 18-24 kw/tonne)	8.618
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.224	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.347
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.167	Bin 40 % (>50 mph, >=30 kw/tonne)	0.892

California 2000 Urban Principal Arterial Interstate LOS F Driving (FC=11) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13								0.002														**0.002**
-12																						
-11																						
-10						0.002																**0.002**
-9			0.002	0.004	0.002	0.002	0.002	0.002	0.002		0.002	0.002										**0.022**
-8			0.002	0.004	0.004	0.002	0.011		0.002	0.004		0.004	0.002									**0.037**
-7			0.002	0.007	0.011	0.009	0.007	0.009	0.007	0.007	0.002	0.002	0.002									**0.063**
-6		0.009	0.011	0.022	0.015	0.033	0.015	0.007	0.013		0.004	0.002	0.002	0.002								**0.136**
-5		0.007	0.046	0.048	0.046	0.039	0.044	0.028	0.017	0.013	0.017	0.004	0.002									**0.313**
-4		0.063	0.074	0.103	0.092	0.103	0.061	0.050	0.046	0.031	0.022	0.013	0.004									**0.663**
-3		0.186	0.286	0.247	0.212	0.232	0.164	0.142	0.125	0.090	0.048	0.046	0.026	0.009								**1.813**
-2	0.007	0.787	0.894	0.862	0.783	0.612	0.553	0.381	0.289	0.227	0.133	0.079	0.037	0.024								**5.668**
-1	0.011	3.153	2.644	2.266	2.036	2.018	1.513	1.211	0.800	0.573	0.553	0.286	0.140	0.083	0.028							**17.317**
0	2.467	7.437	5.581	4.645	3.969	4.085	3.464	2.528	2.106	1.975	1.784	1.032	0.450	0.227	0.024							**41.774**
1	0.092	3.851	2.965	2.583	2.644	2.690	2.311	1.962	1.612	1.292	1.058	0.485	0.188	0.052	0.007							**23.792**
2	0.007	1.061	0.969	1.091	0.905	0.770	0.595	0.400	0.230	0.129	0.092	0.046	0.013									**6.307**
3		0.321	0.300	0.245	0.203	0.122	0.101	0.066	0.037	0.024	0.011	0.002										**1.432**
4		0.070	0.083	0.074	0.052	0.035	0.015	0.033	0.017	0.007	0.002											**0.389**
5		0.020	0.026	0.022	0.017	0.011	0.011	0.015	0.007	0.011	0.004											**0.144**
6	0.002	0.024	0.022	0.011	0.011	0.007	0.002	0.002														**0.081**
7		0.007	0.002	0.004		0.002	0.002															**0.017**
8			0.002	0.007		0.002			0.002													**0.013**
9				0.002		0.002			0.002													**0.007**
10																						
11					0.002																	**0.002**
12																						
13						0.004																**0.004**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.585**	**16.996**	**13.912**	**12.246**	**11.006**	**10.783**	**8.872**	**6.838**	**5.314**	**4.382**	**3.735**	**2.005**	**0.868**	**0.398**	**0.059**							**100.000**

Summary Statistics

Avg Speed (mph)	21.74	Time at Idle (%)	2.585	Avg Specific PKE (hp-sec/lb)	12.45
Min Speed (mph)	0.00	Time at Cruise (%)	79.816	Avg Total Specific Power (hp/lb)	0.0403
Max Speed (mph)	70.60	Time in Accel (%)	8.636	Avg Non-Zero Specific Power (hp/lb)	0.0754
Avg Non-Idle Speed (mph)	22.32	Time in Decel (%)	8.964	Max Specific Power (hp/lb)	1.7808
Avg Cruise Speed (mph)	22.40	Avg Trip Length (miles)	1.866	Spec Pwr Freq (%): 0 hp/lb	46.54
Avg Acceleration (mph/sec)	0.86	Avg Trip Time (min)	5.150	Spec Pwr Freq (%): >0-0.1 hp/lb	38.61
Max Acceleration (mph/sec)	13.48	# Stops per Mile	0.829	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.68
Avg Deceleration (mph/sec)	-0.95	# of 1-Sec Observations	45,729	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.09
Max Deceleration (mph/sec)	-13.28	# of Trips	148	Spec Pwr Freq (%): >0.3 hp/lb	1.07

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.167		
		Bin 0 % (braking)	5.116		
		Bin 1 % (idle)	4.458		
Bin 11 % (0-25 mph, <0 kw/tonne)	17.354	Bin 21 % (25-50 mph, <0 kw/tonne)	7.031		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	24.712	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.958	Bin 33 % (>50 mph, <6 kw/tonne)	1.382
Bin 13 % (0-25 mph, 3-6 kw/tonne)	8.049	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.524		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.175	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.949	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.560
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.042	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.659		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.533		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.565	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.229
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.663	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.570
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.182	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.108
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.138	Bin 40 % (>50 mph, >=30 kw/tonne)	0.042

California 2000 Urban Prin Art Other Fwys & Expwys LOS A Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14														0.001								**0.001**
-13											0.001											**0.001**
-12																						
-11					0.001																	**0.001**
-10					0.002	0.001		0.002						0.001								**0.007**
-9			0.001		0.001	0.001		0.001			0.001					0.001						**0.007**
-8			0.001	0.003		0.001	0.002	0.002	0.003		0.001	0.001	0.001									**0.017**
-7		0.001	0.002	0.002	0.006	0.003	0.006	0.002	0.001	0.002	0.001		0.001		0.001							**0.030**
-6			0.008	0.011	0.015	0.014	0.016	0.015	0.007	0.003	0.003	0.002	0.002	0.002								**0.100**
-5		0.005	0.022	0.040	0.053	0.063	0.047	0.039	0.038	0.021	0.008	0.008	0.005	0.001	0.001			0.001				**0.350**
-4		0.017	0.079	0.102	0.096	0.094	0.081	0.093	0.050	0.049	0.031	0.011	0.015	0.007	0.002	0.002	0.002					**0.733**
-3	0.001	0.077	0.134	0.094	0.121	0.128	0.180	0.128	0.140	0.093	0.079	0.070	0.047	0.029	0.022	0.013	0.003					**1.358**
-2		0.246	0.109	0.102	0.124	0.150	0.172	0.244	0.279	0.251	0.211	0.174	0.174	0.136	0.073	0.032	0.009					**2.486**
-1		0.650	0.150	0.085	0.129	0.184	0.276	0.439	0.558	0.852	0.841	0.979	1.277	1.624	1.580	0.752	0.174	0.031				**10.581**
0	5.566	1.540	0.157	0.090	0.145	0.295	0.451	0.800	1.423	2.542	2.615	3.166	7.400	14.400	16.971	7.711	1.531	0.160	0.010			**66.976**
1	0.060	0.547	0.106	0.124	0.199	0.322	0.401	0.696	0.981	1.201	1.151	1.205	1.561	1.723	1.470	0.672	0.135	0.032				**12.587**
2	0.008	0.220	0.061	0.081	0.173	0.222	0.324	0.317	0.278	0.226	0.199	0.195	0.176	0.117	0.057	0.031	0.002	0.001				**2.689**
3	0.002	0.187	0.074	0.116	0.159	0.192	0.135	0.120	0.077	0.058	0.044	0.023	0.013	0.014	0.010	0.006	0.003					**1.233**
4	0.002	0.120	0.092	0.098	0.084	0.047	0.038	0.022	0.023	0.014	0.014	0.007	0.005	0.005	0.003							**0.573**
5		0.032	0.063	0.037	0.017	0.009	0.005	0.006	0.008	0.002	0.005				0.002	0.001						**0.187**
6		0.009	0.017	0.014	0.003	0.003	0.003	0.001				0.002	0.001									**0.055**
7		0.005	0.007	0.002			0.001								0.003							**0.018**
8		0.001	0.001	0.001		0.001		0.001				0.001										**0.007**
9			0.001			0.001																**0.002**
10																						
11				0.001																		**0.001**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**5.640**	**3.657**	**1.086**	**1.004**	**1.329**	**1.734**	**2.138**	**2.929**	**3.867**	**5.314**	**5.205**	**5.845**	**10.677**	**18.059**	**20.197**	**9.222**	**1.861**	**0.226**	**0.010**			**100.000**

Summary Statistics

Avg Speed (mph)	53.35	Time at Idle (%)	5.640	Avg Specific PKE (hp-sec/lb)	8.85
Min Speed (mph)	0.00	Time at Cruise (%)	73.486	Avg Total Specific Power (hp/lb)	0.0523
Max Speed (mph)	88.19	Time in Accel (%)	10.346	Avg Non-Zero Specific Power (hp/lb)	0.1064
Avg Non-Idle Speed (mph)	56.54	Time in Decel (%)	10.528	Max Specific Power (hp/lb)	2.2034
Avg Cruise Speed (mph)	58.22	Avg Trip Length (miles)	2.508	Spec Pwr Freq (%): 0 hp/lb	50.85
Avg Acceleration (mph/sec)	0.60	Avg Trip Time (min)	2.821	Spec Pwr Freq (%): >0-0.1 hp/lb	29.66
Max Acceleration (mph/sec)	11.05	# Stops per Mile	0.145	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.46
Avg Deceleration (mph/sec)	-0.65	# of 1-Sec Observations	87,328	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.83
Max Deceleration (mph/sec)	-13.97	# of Trips	516	Spec Pwr Freq (%): >0.3 hp/lb	3.19

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	10.137		
		Bin 0 % (braking)	3.650		
		Bin 1 % (idle)	6.696		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.576	Bin 21 % (25-50 mph, <0 kw/tonne)	3.038		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.886	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.898	Bin 33 % (>50 mph, <6 kw/tonne)	8.924
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.617	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.394		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.459	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.441	Bin 35 % (>50 mph, 6-12 kw/tonne)	16.504
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.376	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.261		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.577		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.527	Bin 37 % (>50 mph, 12-18 kw/tonne)	25.253
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.949	Bin 38 % (>50 mph, 18-24 kw/tonne)	12.479
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.306	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.525
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.194	Bin 40 % (>50 mph, >=30 kw/tonne)	1.471

California 2000 Urban Prin Art Other Fwys & Expwys LOS B Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																0.003						**0.003**
-12																						
-11																						
-10																						
-9																						
-8																	0.003					**0.003**
-7											0.003											**0.003**
-6				0.005	0.005		0.005		0.008	0.008	0.003	0.005										**0.041**
-5			0.003		0.003	0.011	0.005	0.003	0.005	0.005	0.011	0.014	0.008	0.008	0.005							**0.082**
-4			0.003	0.003	0.003	0.005	0.008	0.014	0.022	0.022	0.019	0.030	0.030	0.011	0.014	0.005						**0.188**
-3		0.005	0.008	0.008	0.014		0.005	0.014	0.019	0.014	0.035	0.071	0.057	0.041	0.019	0.005	0.008					**0.324**
-2		0.003		0.011	0.014	0.014	0.008	0.016	0.046	0.090	0.109	0.169	0.239	0.269	0.150	0.030		0.005				**1.173**
-1		0.024	0.041	0.041	0.044	0.022	0.024	0.016	0.101	0.147	0.397	1.116	1.986	3.205	2.634	1.167	0.220	0.003				**11.188**
0	0.033	0.041	0.057	0.101	0.144	0.035	0.046	0.033	0.139	0.269	0.890	3.967	10.072	24.650	22.308	10.402	1.744	0.044				**74.974**
1		0.038	0.038	0.060	0.046	0.016	0.024	0.052	0.101	0.169	0.433	1.083	2.079	3.243	2.457	0.977	0.147	0.003				**10.965**
2		0.008	0.011	0.014	0.019	0.011	0.003	0.033	0.063	0.073	0.076	0.133	0.185	0.139	0.068	0.016	0.003					**0.854**
3				0.003		0.005	0.003	0.005	0.008	0.019	0.024	0.022	0.033	0.019	0.005	0.005						**0.152**
4		0.003	0.003					0.003	0.003		0.003	0.003				0.003						**0.019**
5			0.003	0.003	0.003				0.003				0.003	0.005			0.003					**0.022**
6			0.003								0.003											**0.005**
7					0.003																	**0.003**
8																						
9																						
10															0.003							**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.033**	**0.122**	**0.169**	**0.248**	**0.297**	**0.120**	**0.133**	**0.188**	**0.517**	**0.816**	**2.005**	**6.612**	**14.692**	**31.591**	**27.662**	**12.614**	**2.128**	**0.054**				**100.000**

Summary Statistics

Avg Speed (mph)	65.42	Time at Idle (%)	0.033	Avg Specific PKE (hp-sec/lb)	8.28
Min Speed (mph)	0.00	Time at Cruise (%)	78.974	Avg Total Specific Power (hp/lb)	0.0450
Max Speed (mph)	85.06	Time in Accel (%)	9.964	Avg Non-Zero Specific Power (hp/lb)	0.0914
Avg Non-Idle Speed (mph)	65.44	Time in Decel (%)	11.030	Max Specific Power (hp/lb)	2.6274
Avg Cruise Speed (mph)	65.57	Avg Trip Length (miles)	3.339	Spec Pwr Freq (%): 0 hp/lb	50.70
Avg Acceleration (mph/sec)	0.38	Avg Trip Time (min)	3.063	Spec Pwr Freq (%): >0-0.1 hp/lb	32.38
Max Acceleration (mph/sec)	9.70	# Stops per Mile	0.002	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.17
Avg Deceleration (mph/sec)	-0.43	# of 1-Sec Observations	36,754	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.81
Max Deceleration (mph/sec)	-13.14	# of Trips	200	Spec Pwr Freq (%): >0.3 hp/lb	1.93

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.809		
		Bin 0 % (braking)	1.010		
		Bin 1 % (idle)	0.044		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.323	Bin 21 % (25-50 mph, <0 kw/tonne)	0.583		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.347	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.194	Bin 33 % (>50 mph, <6 kw/tonne)	12.951
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.088	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.189		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.044	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.254	Bin 35 % (>50 mph, 6-12 kw/tonne)	24.411
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.016	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.244		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.016		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.326	Bin 37 % (>50 mph, 12-18 kw/tonne)	35.723
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.156	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.871
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.088	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.839
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.030	Bin 40 % (>50 mph, >=30 kw/tonne)	1.256

California 2000 Urban Prin Art Other Fwys & Expwys LOS C Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																		0.003				**0.003**
-10																				0.003		**0.003**
-9					0.003				0.003													**0.006**
-8							0.009					0.003	0.003	0.003	0.009	0.015	0.003					**0.046**
-7									0.003		0.006			0.012		0.003		0.003				**0.027**
-6			0.006	0.003	0.006	0.009	0.006		0.006	0.012	0.006	0.015	0.012	0.006	0.009	0.003						**0.101**
-5			0.003	0.006	0.003		0.009	0.015	0.018	0.021	0.031	0.018	0.009	0.015	0.012	0.006	0.003	0.003				**0.174**
-4		0.003	0.006	0.015	0.024	0.027	0.021	0.034	0.027	0.037	0.058	0.027	0.040	0.031	0.018	0.015						**0.384**
-3		0.006	0.018	0.012	0.015	0.012	0.043	0.037	0.067	0.064	0.070	0.107	0.064	0.052	0.064	0.037	0.012	0.003		0.003		**0.686**
-2		0.024	0.018	0.018	0.018	0.043	0.024	0.058	0.076	0.131	0.180	0.268	0.296	0.253	0.168	0.070	0.024	0.006	0.003			**1.681**
-1		0.052	0.052	0.040	0.082	0.073	0.110	0.113	0.226	0.308	0.668	1.461	2.554	3.109	2.377	0.802	0.131	0.034	0.003			**12.195**
0	0.085	0.043	0.031	0.049	0.052	0.049	0.159	0.171	0.378	0.671	2.359	5.620	13.208	20.946	19.896	5.422	0.818	0.119			0.003	**70.078**
1	0.003	0.021	0.021	0.027	0.064	0.085	0.082	0.088	0.204	0.452	0.921	1.657	2.834	3.082	2.468	0.729	0.131	0.049				**12.921**
2		0.003	0.018	0.012	0.037	0.037	0.052	0.043	0.064	0.052	0.110	0.217	0.207	0.235	0.131	0.034	0.018	0.006				**1.275**
3		0.012	0.012	0.015	0.009	0.012	0.003	0.021	0.012	0.003	0.027	0.027	0.037	0.052	0.021	0.009	0.006					**0.281**
4		0.003		0.006	0.003			0.003	0.003		0.006	0.009	0.006	0.012	0.006	0.015		0.003				**0.076**
5								0.003	0.003	0.003	0.003	0.003	0.003		0.006		0.003					**0.027**
6														0.003	0.003							**0.006**
7		0.003								0.003	0.003							0.003				**0.012**
8															0.003	0.003						**0.006**
9													0.003									**0.003**
10																						
11													0.003									**0.003**
12																		0.003				**0.003**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.088**	**0.171**	**0.186**	**0.204**	**0.317**	**0.348**	**0.519**	**0.586**	**1.092**	**1.757**	**4.449**	**9.434**	**19.280**	**27.811**	**25.193**	**7.164**	**1.150**	**0.235**	**0.006**	**0.006**	**0.003**	**100.000**

Summary Statistics

Avg Speed (mph)	62.98	Time at Idle (%)	0.089	Avg Specific PKE (hp-sec/lb)	6.58
Min Speed (mph)	0.00	Time at Cruise (%)	76.802	Avg Total Specific Power (hp/lb)	0.0528
Max Speed (mph)	97.70	Time in Accel (%)	10.987	Avg Non-Zero Specific Power (hp/lb)	0.1061
Avg Non-Idle Speed (mph)	63.04	Time in Decel (%)	12.122	Max Specific Power (hp/lb)	4.3077
Avg Cruise Speed (mph)	63.02	Avg Trip Length (miles)	2.180	Spec Pwr Freq (%): 0 hp/lb	50.23
Avg Acceleration (mph/sec)	0.43	Avg Trip Time (min)	2.077	Spec Pwr Freq (%): >0-0.1 hp/lb	29.95
Max Acceleration (mph/sec)	12.12	# Stops per Mile	0.009	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.68
Avg Deceleration (mph/sec)	-0.53	# of 1-Sec Observations	32,775	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.44
Max Deceleration (mph/sec)	-11.00	# of Trips	263	Spec Pwr Freq (%): >0.3 hp/lb	2.69

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.899		
		Bin 0 % (braking)	2.095		
		Bin 1 % (idle)	0.108		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.381	Bin 21 % (25-50 mph, <0 kw/tonne)	1.147		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.182	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.658	Bin 33 % (>50 mph, <6 kw/tonne)	13.724
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.132	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.711		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.077	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.707	Bin 35 % (>50 mph, 6-12 kw/tonne)	25.698
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.055	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.603		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.022		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.987	Bin 37 % (>50 mph, 12-18 kw/tonne)	31.687
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.317	Bin 38 % (>50 mph, 18-24 kw/tonne)	14.527
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.083	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.195
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.043	Bin 40 % (>50 mph, >=30 kw/tonne)	1.861

California 2000 Urban Prin Art Other Fwys & Expwys LOS D Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14															0.003							**0.003**
-13									0.003													**0.003**
-12								0.003				0.003										**0.007**
-11														0.003								**0.003**
-10					0.003	0.003					0.003											**0.010**
-9									0.003			0.003	0.003	0.007								**0.017**
-8							0.003		0.003	0.003	0.003			0.003								**0.017**
-7		0.003	0.007	0.010	0.007	0.017	0.003	0.007	0.007		0.010	0.010	0.003	0.003								**0.087**
-6			0.013	0.007	0.003	0.007	0.010	0.013	0.024	0.010	0.010	0.010		0.003	0.003							**0.114**
-5		0.003	0.007	0.020	0.010	0.017	0.020	0.034	0.047	0.027	0.017	0.020	0.013	0.003								**0.239**
-4		0.010	0.024	0.024	0.040	0.044	0.050	0.044	0.057	0.091	0.037	0.037	0.024	0.003	0.003	0.003						**0.491**
-3	0.007	0.044	0.040	0.054	0.081	0.108	0.108	0.091	0.094	0.128	0.145	0.118	0.081	0.044	0.007	0.007						**1.153**
-2		0.141	0.175	0.202	0.155	0.188	0.222	0.319	0.346	0.343	0.356	0.303	0.218	0.138	0.047							**3.153**
-1		0.363	0.259	0.360	0.333	0.333	0.635	0.803	0.800	1.035	1.546	2.023	2.255	2.020	0.827	0.067	0.013					**13.673**
0	1.445	0.676	0.460	0.860	0.528	0.629	1.133	1.721	2.148	3.119	4.561	8.104	12.285	12.107	7.919	0.403	0.017					**58.116**
1	0.020	0.410	0.410	0.356	0.343	0.524	0.790	1.166	1.328	1.593	2.568	2.894	2.968	2.561	0.844	0.067	0.003					**18.846**
2	0.007	0.101	0.097	0.141	0.158	0.245	0.255	0.299	0.306	0.306	0.296	0.316	0.266	0.134	0.047	0.013						**2.988**
3	0.003	0.074	0.013	0.030	0.040	0.057	0.057	0.067	0.057	0.064	0.074	0.050	0.030	0.020	0.010	0.003						**0.652**
4		0.044	0.024	0.020	0.020	0.013	0.010	0.027	0.020	0.024	0.013	0.017	0.010	0.010								**0.252**
5		0.013	0.030	0.027	0.010	0.007	0.003	0.013	0.010	0.007	0.007	0.003										**0.131**
6			0.003			0.003			0.007	0.007												**0.020**
7											0.003											**0.003**
8												0.003		0.003								**0.007**
9			0.003	0.003								0.003										**0.010**
10																						
11			0.003																			**0.003**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**1.482**	**1.882**	**1.570**	**2.114**	**1.731**	**2.195**	**3.301**	**4.608**	**5.260**	**6.756**	**9.650**	**13.919**	**18.157**	**17.065**	**9.711**	**0.565**	**0.034**					**100.000**

Summary Statistics

Avg Speed (mph)	50.90	Time at Idle (%)	1.482	Avg Specific PKE (hp-sec/lb)	5.02
Min Speed (mph)	0.00	Time at Cruise (%)	77.544	Avg Total Specific Power (hp/lb)	0.0594
Max Speed (mph)	79.27	Time in Accel (%)	10.501	Avg Non-Zero Specific Power (hp/lb)	0.1139
Avg Non-Idle Speed (mph)	51.67	Time in Decel (%)	10.474	Max Specific Power (hp/lb)	2.0611
Avg Cruise Speed (mph)	51.57	Avg Trip Length (miles)	1.195	Spec Pwr Freq (%): 0 hp/lb	47.89
Avg Acceleration (mph/sec)	0.61	Avg Trip Time (min)	1.409	Spec Pwr Freq (%): >0-0.1 hp/lb	29.08
Max Acceleration (mph/sec)	10.82	# Stops per Mile	0.062	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.15
Avg Deceleration (mph/sec)	-0.70	# of 1-Sec Observations	29,751	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.49
Max Deceleration (mph/sec)	-13.60	# of Trips	352	Spec Pwr Freq (%): >0.3 hp/lb	3.38

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.548		
		Bin 0 % (braking)	3.310		
		Bin 1 % (idle)	1.799		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.442	Bin 21 % (25-50 mph, <0 kw/tonne)	5.021		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.629	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.065	Bin 33 % (>50 mph, <6 kw/tonne)	12.667
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.031	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.558		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.609	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.670	Bin 35 % (>50 mph, 6-12 kw/tonne)	18.956
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.262	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.364		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.218		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.575	Bin 37 % (>50 mph, 12-18 kw/tonne)	20.436
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.214	Bin 38 % (>50 mph, 18-24 kw/tonne)	8.357
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.327	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.269
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.248	Bin 40 % (>50 mph, >=30 kw/tonne)	0.973

California 2000 Urban Prin Art Other Fwys & Expwys LOS E Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11			0.005																			**0.005**
-10						0.005																**0.005**
-9					0.005																	**0.005**
-8					0.010			0.015	0.005													**0.030**
-7			0.005		0.005	0.005	0.005		0.010	0.010	0.005	0.005										**0.050**
-6				0.020	0.020	0.020	0.025	0.015	0.015	0.025	0.010	0.005	0.005		0.005							**0.166**
-5		0.010	0.010	0.040	0.045	0.040	0.045	0.020	0.005	0.020	0.015	0.020	0.005	0.005								**0.283**
-4		0.015	0.071	0.081	0.081	0.096	0.050	0.020	0.050	0.040	0.040	0.040	0.020	0.015								**0.621**
-3		0.076	0.141	0.161	0.242	0.177	0.166	0.166	0.111	0.061	0.131	0.096	0.045	0.035	0.020							**1.630**
-2		0.177	0.298	0.399	0.363	0.525	0.494	0.388	0.257	0.212	0.277	0.323	0.247	0.116	0.040	0.005						**4.122**
-1		0.631	0.636	0.787	1.281	1.645	1.609	1.201	0.933	0.711	0.893	1.927	2.200	1.226	0.378	0.045	0.015					**16.119**
0	0.187	0.994	0.843	1.297	2.396	2.835	3.163	3.113	2.704	2.588	3.799	6.110	8.718	6.644	2.714	0.277	0.010					**48.393**
1	0.005	0.626	0.595	0.928	1.544	1.821	2.124	2.190	2.063	1.902	2.074	2.487	2.704	1.307	0.267	0.030	0.005					**22.673**
2	0.005	0.283	0.353	0.399	0.600	0.535	0.469	0.434	0.348	0.298	0.368	0.358	0.222	0.076	0.015							**4.763**
3		0.071	0.141	0.131	0.076	0.091	0.055	0.061	0.050	0.025	0.040	0.076	0.050	0.020	0.005							**0.893**
4		0.005	0.030	0.030	0.025	0.010		0.005	0.005	0.015	0.005	0.005	0.005	0.005								**0.146**
5		0.005	0.010	0.005	0.005				0.005				0.010									**0.040**
6			0.005	0.005	0.005	0.005	0.010		0.005													**0.035**
7		0.005	0.005	0.005										0.005								**0.020**
8																						
9																						
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18																						
19																						
20																						
Totals	**0.197**	**2.896**	**3.148**	**4.288**	**6.705**	**7.810**	**8.219**	**7.628**	**6.569**	**5.908**	**7.659**	**11.453**	**14.232**	**9.455**	**3.446**	**0.358**	**0.030**					**100.000**

Summary Statistics

Avg Speed (mph)	42.33	Time at Idle (%)	0.197	Avg Specific PKE (hp-sec/lb)	4.49
Min Speed (mph)	0.00	Time at Cruise (%)	78.815	Avg Total Specific Power (hp/lb)	0.0603
Max Speed (mph)	79.39	Time in Accel (%)	10.206	Avg Non-Zero Specific Power (hp/lb)	0.1112
Avg Non-Idle Speed (mph)	42.41	Time in Decel (%)	10.782	Max Specific Power (hp/lb)	1.7138
Avg Cruise Speed (mph)	42.14	Avg Trip Length (miles)	0.876	Spec Pwr Freq (%): 0 hp/lb	45.77
Avg Acceleration (mph/sec)	0.71	Avg Trip Time (min)	1.242	Spec Pwr Freq (%): >0-0.1 hp/lb	29.69
Max Acceleration (mph/sec)	7.27	# Stops per Mile	0.077	Spec Pwr Freq (%): >0.1-0.2 hp/lb	16.35
Avg Deceleration (mph/sec)	-0.84	# of 1-Sec Observations	19,821	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.54
Max Deceleration (mph/sec)	-10.93	# of Trips	266	Spec Pwr Freq (%): >0.3 hp/lb	2.65

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.619		
		Bin 0 % (braking)	4.337		
		Bin 1 % (idle)	0.378		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.820	Bin 21 % (25-50 mph, <0 kw/tonne)	6.740		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.520	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.083	Bin 33 % (>50 mph, <6 kw/tonne)	9.496
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.513	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.579		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.887	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.134	Bin 35 % (>50 mph, 6-12 kw/tonne)	13.127
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.798	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.787		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.286		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.863	Bin 37 % (>50 mph, 12-18 kw/tonne)	12.800
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.972	Bin 38 % (>50 mph, 18-24 kw/tonne)	5.288
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.297	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.504
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.113	Bin 40 % (>50 mph, >=30 kw/tonne)	0.680

California 2000 Urban Prin Art Other Fwys & Expwys LOS F Driving (FC=12) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10								0.003														**0.003**
-9							0.003															**0.003**
-8				0.003	0.005	0.008	0.003	0.005	0.005		0.003		0.003									**0.035**
-7			0.005	0.008	0.008		0.011	0.008	0.003	0.005	0.003											**0.052**
-6		0.011	0.022	0.019	0.025	0.005	0.005	0.008		0.005		0.005										**0.106**
-5		0.027	0.046	0.052	0.054	0.016	0.014	0.014	0.016	0.016	0.005	0.003										**0.264**
-4		0.041	0.131	0.139	0.098	0.117	0.079	0.033	0.022	0.027	0.022	0.022	0.016									**0.746**
-3		0.218	0.343	0.305	0.300	0.245	0.163	0.133	0.074	0.044	0.057	0.022	0.025	0.005								**1.933**
-2		0.812	0.831	0.880	0.713	0.517	0.422	0.340	0.261	0.144	0.068	0.046	0.016	0.030	0.005							**5.087**
-1	0.003	3.290	2.353	2.511	2.271	1.661	1.465	0.812	0.626	0.449	0.327	0.231	0.144	0.084	0.027							**16.255**
0	3.567	9.354	5.520	5.504	4.371	3.690	3.287	2.157	1.310	1.348	1.348	0.678	0.389	0.291	0.052							**42.865**
1	0.125	3.989	2.903	3.208	2.990	2.489	2.421	1.582	1.261	1.018	0.629	0.411	0.261	0.079	0.011							**23.378**
2	0.005	1.400	1.114	1.122	0.929	0.866	0.618	0.406	0.240	0.163	0.090	0.057	0.016	0.005								**7.031**
3	0.005	0.368	0.373	0.332	0.245	0.136	0.082	0.038	0.033	0.027	0.014	0.016	0.005									**1.675**
4	0.003	0.090	0.079	0.071	0.038	0.030	0.027	0.016	0.003	0.005	0.008	0.005										**0.376**
5		0.033	0.027	0.030	0.019	0.005	0.005	0.003	0.003		0.003											**0.128**
6		0.014	0.008	0.003		0.003																**0.027**
7		0.003	0.003	0.005	0.003		0.003			0.003												**0.019**
8		0.008	0.003																			**0.011**
9				0.003																		**0.003**
10				0.003																		**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.709**	**19.656**	**13.760**	**14.196**	**12.069**	**9.790**	**8.608**	**5.558**	**3.856**	**3.257**	**2.576**	**1.498**	**0.877**	**0.496**	**0.095**							**100.000**

Summary Statistics

Avg Speed (mph)	19.67	Time at Idle (%)	3.709	Avg Specific PKE (hp-sec/lb)	9.54
Min Speed (mph)	0.00	Time at Cruise (%)	78.196	Avg Total Specific Power (hp/lb)	0.0390
Max Speed (mph)	72.42	Time in Accel (%)	9.610	Avg Non-Zero Specific Power (hp/lb)	0.0722
Avg Non-Idle Speed (mph)	20.43	Time in Decel (%)	8.485	Max Specific Power (hp/lb)	1.2585
Avg Cruise Speed (mph)	20.33	Avg Trip Length (miles)	1.338	Spec Pwr Freq (%): 0 hp/lb	46.04
Avg Acceleration (mph/sec)	0.87	Avg Trip Time (min)	4.080	Spec Pwr Freq (%): >0-0.1 hp/lb	39.62
Max Acceleration (mph/sec)	10.14	# Stops per Mile	1.126	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.21
Avg Deceleration (mph/sec)	-0.93	# of 1-Sec Observations	36,722	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.10
Max Deceleration (mph/sec)	-10.47	# of Trips	150	Spec Pwr Freq (%): >0.3 hp/lb	1.04

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.086		
		Bin 0 % (braking)	4.979		
		Bin 1 % (idle)	6.163		
Bin 11 % (0-25 mph, <0 kw/tonne)	17.765	Bin 21 % (25-50 mph, <0 kw/tonne)	5.570		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	28.016	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.134	Bin 33 % (>50 mph, <6 kw/tonne)	0.960
Bin 13 % (0-25 mph, 3-6 kw/tonne)	8.528	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.501		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.030	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.285	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.020
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.176	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.358		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.541		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.257	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.987
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.667	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.585
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.167	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.115
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.093	Bin 40 % (>50 mph, >=30 kw/tonne)	0.104

California 2000 Urban Other Principal Arterial LOS A Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17						0.000																**0.000**
-16																						
-15					0.000																	**0.000**
-14																						
-13																						
-12					0.001				0.000													**0.001**
-11			0.001		0.001	0.002		0.000	0.000			0.000										**0.005**
-10			0.000		0.001	0.001		0.001		0.000												**0.005**
-9			0.000	0.001	0.001	0.003	0.002			0.001												**0.009**
-8			0.004	0.006	0.007	0.006	0.008	0.003	0.001	0.001	0.000	0.000		0.000								**0.039**
-7		0.002	0.007	0.017	0.020	0.018	0.014	0.012	0.006	0.003		0.000	0.000	0.000								**0.100**
-6		0.007	0.020	0.054	0.072	0.059	0.035	0.024	0.013	0.004	0.002	0.000	0.000	0.000								**0.292**
-5		0.011	0.112	0.212	0.206	0.196	0.123	0.076	0.035	0.020	0.007	0.002	0.000	0.001								**1.001**
-4		0.099	0.384	0.440	0.444	0.388	0.292	0.187	0.107	0.058	0.014	0.006	0.001	0.001	0.001							**2.423**
-3	0.000	0.445	0.553	0.512	0.580	0.573	0.550	0.391	0.243	0.119	0.060	0.016	0.004	0.000	0.001	0.000						**4.049**
-2	0.001	0.994	0.431	0.430	0.518	0.649	0.704	0.700	0.532	0.309	0.156	0.063	0.020	0.006	0.004							**5.517**
-1	0.003	1.575	0.261	0.383	0.503	0.758	1.098	1.498	1.609	1.412	0.816	0.438	0.231	0.090	0.052	0.010	0.001					**10.737**
0	17.545	2.121	0.311	0.490	0.751	1.275	2.630	4.053	5.070	4.765	3.003	2.068	2.343	0.883	0.427	0.112	0.004					**47.852**
1	0.274	1.166	0.275	0.559	0.823	1.225	1.799	2.321	2.197	1.650	0.912	0.446	0.208	0.106	0.057	0.007	0.000					**14.024**
2	0.064	0.946	0.359	0.683	0.876	1.025	1.004	0.742	0.482	0.237	0.097	0.041	0.015	0.009	0.004	0.001	0.000					**6.585**
3	0.013	0.948	0.519	0.659	0.752	0.619	0.383	0.215	0.102	0.035	0.010	0.007	0.004	0.003	0.001							**4.270**
4	0.007	0.612	0.501	0.377	0.294	0.198	0.101	0.035	0.013	0.007	0.004	0.002				0.000						**2.151**
5	0.004	0.154	0.219	0.133	0.087	0.043	0.020	0.014	0.008	0.004	0.000		0.000									**0.687**
6	0.000	0.030	0.053	0.040	0.014	0.010	0.003	0.001		0.000			0.000	0.000								**0.154**
7	0.000	0.015	0.021	0.009	0.006	0.003			0.000				0.000									**0.056**
8	0.001	0.009	0.007	0.003	0.002	0.002		0.001		0.000			0.000									**0.026**
9		0.002	0.002	0.001	0.001	0.000	0.000															**0.008**
10		0.002	0.001																			**0.003**
11		0.000	0.001																			**0.001**
12			0.000		0.000																	**0.001**
13			0.000																			**0.000**
14																						
15																						
16																						
17		0.000																				**0.000**
18																						
19																						
20																						
Totals	**17.914**	**9.140**	**4.046**	**5.010**	**5.962**	**7.053**	**8.765**	**10.275**	**10.419**	**8.627**	**5.082**	**3.090**	**2.829**	**1.101**	**0.548**	**0.132**	**0.006**					**100.000**

Summary Statistics

Avg Speed (mph)	25.78	Time at Idle (%)	17.914	Avg Specific PKE (hp-sec/lb)	6.98
Min Speed (mph)	0.00	Time at Cruise (%)	54.030	Avg Total Specific Power (hp/lb)	0.0516
Max Speed (mph)	81.47	Time in Accel (%)	14.231	Avg Non-Zero Specific Power (hp/lb)	0.1153
Avg Non-Idle Speed (mph)	31.41	Time in Decel (%)	13.826	Max Specific Power (hp/lb)	1.9498
Avg Cruise Speed (mph)	36.02	Avg Trip Length (miles)	0.969	Spec Pwr Freq (%): 0 hp/lb	55.30
Avg Acceleration (mph/sec)	1.23	Avg Trip Time (min)	2.256	Spec Pwr Freq (%): >0-0.1 hp/lb	24.38
Max Acceleration (mph/sec)	17.32	# Stops per Mile	1.216	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.33
Avg Deceleration (mph/sec)	-1.34	# of 1-Sec Observations	204,543	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.80
Max Deceleration (mph/sec)	-16.62	# of Trips	1,511	Spec Pwr Freq (%): >0.3 hp/lb	3.19

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.654		
		Bin 0 % (braking)	10.489		
		Bin 1 % (idle)	20.576		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.639	Bin 21 % (25-50 mph, <0 kw/tonne)	8.677		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	4.365	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.169	Bin 33 % (>50 mph, <6 kw/tonne)	2.579
Bin 13 % (0-25 mph, 3-6 kw/tonne)	2.921	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.139		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.511	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.287	Bin 35 % (>50 mph, 6-12 kw/tonne)	3.924
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.917	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.754		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.279		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.108	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.454
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.725	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.615
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.451	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.169
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.167	Bin 40 % (>50 mph, >=30 kw/tonne)	0.087

California 2000 Urban Other Principal Arterial LOS B Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10						0.012	0.012	0.012														**0.037**
-9						0.012			0.012													**0.024**
-8					0.024	0.012				0.012												**0.049**
-7				0.061	0.012	0.037	0.024	0.012		0.012												**0.159**
-6			0.049	0.024	0.073	0.085	0.073	0.012	0.012		0.012											**0.342**
-5		0.049	0.110	0.134	0.073	0.207	0.171	0.122	0.024	0.012	0.012											**0.915**
-4		0.024	0.146	0.232	0.488	0.342	0.427	0.256	0.171	0.098	0.037	0.012										**2.233**
-3		0.220	0.281	0.268	0.378	0.696	0.635	0.769	0.415	0.183	0.122	0.012	0.012									**3.991**
-2		0.366	0.122	0.330	0.342	0.488	1.001	1.184	0.866	0.391	0.183	0.061	0.122	0.061	0.098							**5.614**
-1	0.012	0.464	0.085	0.354	0.427	0.659	1.513	3.039	2.502	1.538	0.744	0.696	0.378	0.464	0.378	0.073						**13.327**
0	3.307	0.635	0.134	0.464	0.403	1.306	3.661	7.762	9.434	5.004	2.392	1.635	0.647	2.392	1.587	0.659	0.073					**41.494**
1	0.146	0.415	0.195	0.342	0.464	1.196	3.381	5.126	3.454	1.770	0.879	0.500	0.195	0.305	0.415	0.012						**18.794**
2	0.037	0.403	0.085	0.427	0.610	1.135	1.648	1.391	0.866	0.378	0.232	0.061	0.037	0.024								**7.335**
3		0.415	0.220	0.391	0.561	0.757	0.500	0.159	0.146	0.098	0.049	0.049	0.012									**3.356**
4		0.232	0.195	0.183	0.330	0.268	0.134	0.024	0.024													**1.391**
5		0.110	0.110	0.146	0.146	0.049	0.049	0.024														**0.635**
6		0.037	0.110	0.037		0.012																**0.195**
7		0.012	0.037		0.012																	**0.061**
8		0.012		0.012	0.012																	**0.037**
9																						
10			0.012																			**0.012**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.503**	**3.393**	**1.892**	**3.405**	**4.357**	**7.274**	**13.229**	**19.893**	**17.928**	**9.495**	**4.662**	**3.027**	**1.403**	**3.246**	**2.477**	**0.744**	**0.073**					**100.000**

Summary Statistics

Avg Speed (mph)	35.15	Time at Idle (%)	3.503	Avg Specific PKE (hp-sec/lb)	3.17
Min Speed (mph)	0.00	Time at Cruise (%)	67.928	Avg Total Specific Power (hp/lb)	0.0634
Max Speed (mph)	78.01	Time in Accel (%)	13.913	Avg Non-Zero Specific Power (hp/lb)	0.1260
Avg Non-Idle Speed (mph)	36.42	Time in Decel (%)	14.657	Max Specific Power (hp/lb)	0.9603
Avg Cruise Speed (mph)	39.01	Avg Trip Length (miles)	0.488	Spec Pwr Freq (%): 0 hp/lb	49.65
Avg Acceleration (mph/sec)	1.10	Avg Trip Time (min)	0.833	Spec Pwr Freq (%): >0-0.1 hp/lb	25.27
Max Acceleration (mph/sec)	10.31	# Stops per Mile	0.388	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.90
Avg Deceleration (mph/sec)	-1.26	# of 1-Sec Observations	8,194	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.08
Max Deceleration (mph/sec)	-10.40	# of Trips	164	Spec Pwr Freq (%): >0.3 hp/lb	4.10

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.603		
		Bin 0 % (braking)	10.423		
		Bin 1 % (idle)	4.533		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.254	Bin 21 % (25-50 mph, <0 kw/tonne)	12.204		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.192	Bin 22 % (25-50 mph, 0-3 kw/tonne)	9.801	Bin 33 % (>50 mph, <6 kw/tonne)	4.346
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.507	Bin 23 % (25-50 mph, 3-6 kw/tonne)	11.046		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.457	Bin 24 % (25-50 mph, 6-9 kw/tonne)	10.772	Bin 35 % (>50 mph, 6-12 kw/tonne)	3.176
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.382	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.559		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.092		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	7.534	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.553
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.117	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.544
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.448	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.498
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.199	Bin 40 % (>50 mph, >=30 kw/tonne)	0.361

California 2000 Urban Other Principal Arterial LOS C Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9			0.011			0.011				0.011												**0.034**
-8			0.023	0.011	0.011	0.034	0.023	0.011														**0.115**
-7			0.011	0.057	0.057	0.034	0.034	0.011	0.011	0.011												**0.230**
-6			0.023	0.069	0.092	0.092	0.057	0.046	0.034													**0.414**
-5		0.023	0.138	0.310	0.287	0.218	0.207	0.103	0.057	0.023	0.023	0.011										**1.402**
-4		0.138	0.333	0.506	0.586	0.552	0.310	0.287	0.069	0.069	0.011	0.034										**2.896**
-3	0.011	0.391	0.563	0.529	0.724	0.862	0.735	0.483	0.322	0.092	0.069	0.046										**4.826**
-2		0.919	0.517	0.609	0.701	1.092	1.092	0.735	0.689	0.264	0.057	0.057	0.046	0.023	0.011							**6.814**
-1	0.011	1.482	0.276	0.529	0.770	1.471	2.229	2.126	1.942	0.919	0.448	0.264	0.299	0.184	0.080							**13.030**
0	7.641	1.942	0.322	0.724	1.046	2.287	3.596	5.469	4.918	2.528	1.574	1.126	1.252	0.839	0.230	0.184						**35.677**
1	0.218	1.057	0.356	0.597	0.965	2.378	2.964	2.700	2.218	1.413	0.586	0.540	0.414	0.241	0.138	0.034						**16.822**
2	0.011	0.919	0.345	0.735	1.023	1.735	1.551	1.034	0.666	0.253	0.103	0.069	0.069									**8.514**
3	0.011	0.850	0.471	0.643	0.931	0.885	0.540	0.356	0.126	0.080	0.034	0.011	0.011									**4.952**
4	0.023	0.620	0.471	0.448	0.517	0.345	0.230	0.080	0.023													**2.758**
5		0.207	0.276	0.230	0.172	0.069	0.023	0.023	0.011	0.011												**1.023**
6		0.046	0.126	0.069	0.023	0.011	0.011															**0.287**
7		0.034	0.034	0.023	0.034																	**0.126**
8			0.046					0.011														**0.057**
9			0.023																			**0.023**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.928**	**8.629**	**4.366**	**6.090**	**7.940**	**12.076**	**13.605**	**13.478**	**11.088**	**5.676**	**2.907**	**2.160**	**2.091**	**1.287**	**0.460**	**0.218**						**100.000**

Summary Statistics

Avg Speed (mph)	27.20	Time at Idle (%)	7.928	Avg Specific PKE (hp-sec/lb)	3.02
Min Speed (mph)	0.00	Time at Cruise (%)	56.268	Avg Total Specific Power (hp/lb)	0.0636
Max Speed (mph)	74.53	Time in Accel (%)	18.522	Avg Non-Zero Specific Power (hp/lb)	0.1305
Avg Non-Idle Speed (mph)	29.54	Time in Decel (%)	17.281	Max Specific Power (hp/lb)	1.2622
Avg Cruise Speed (mph)	32.99	Avg Trip Length (miles)	0.359	Spec Pwr Freq (%): 0 hp/lb	51.26
Avg Acceleration (mph/sec)	1.39	Avg Trip Time (min)	0.793	Spec Pwr Freq (%): >0-0.1 hp/lb	23.84
Max Acceleration (mph/sec)	9.27	# Stops per Mile	1.080	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.66
Avg Deceleration (mph/sec)	-1.53	# of 1-Sec Observations	8,703	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.58
Max Deceleration (mph/sec)	-9.28	# of Trips	183	Spec Pwr Freq (%): >0.3 hp/lb	4.65

EPA VSP (Vehicle Specific Power) Statistics

EPA Avg Veh Spec Pwr, VSP (kW/tonne) 2.504

		Bin 0 % (braking)	12.981		
		Bin 1 % (idle)	10.258		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.951	Bin 21 % (25-50 mph, <0 kw/tonne)	11.033		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	5.528	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.277	Bin 33 % (>50 mph, <6 kw/tonne)	1.831
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.099	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.524		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.782	Bin 24 % (25-50 mph, 6-9 kw/tonne)	7.301	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.725
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.394	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.282		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.204		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.434	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.972
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.019	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.962
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.634	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.364
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.235	Bin 40 % (>50 mph, >=30 kw/tonne)	0.211

California 2000 Urban Other Principal Arterial LOS D Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14				0.001					0.001													**0.002**
-13							0.001			0.001												**0.002**
-12																						
-11			0.001	0.003	0.001	0.001	0.002	0.003														**0.010**
-10				0.003	0.004	0.002	0.002	0.001														**0.011**
-9			0.001	0.005	0.004	0.005	0.002	0.005			0.001											**0.022**
-8			0.005	0.007	0.014	0.011	0.005	0.003	0.001	0.001												**0.047**
-7		0.002	0.009	0.018	0.028	0.021	0.020	0.006	0.004		0.002											**0.111**
-6		0.003	0.024	0.058	0.069	0.056	0.041	0.020	0.010	0.006	0.001		0.001									**0.288**
-5		0.016	0.105	0.160	0.167	0.145	0.085	0.054	0.018	0.010	0.007		0.001	0.002								**0.770**
-4	0.002	0.112	0.308	0.371	0.391	0.338	0.288	0.146	0.073	0.026	0.012	0.003	0.001	0.001								**2.071**
-3	0.002	0.437	0.541	0.529	0.605	0.545	0.437	0.324	0.179	0.092	0.019	0.010	0.004									**3.724**
-2	0.003	1.035	0.513	0.520	0.649	0.659	0.675	0.618	0.428	0.213	0.097	0.018	0.008	0.004								**5.439**
-1	0.008	1.835	0.445	0.595	0.771	1.092	1.456	1.577	1.550	1.153	0.601	0.231	0.044	0.011	0.001							**11.370**
0	19.880	3.006	0.443	0.773	1.111	2.090	3.616	4.365	4.482	3.798	2.112	0.879	0.176	0.051	0.005							**46.787**
1	0.223	1.563	0.411	0.836	1.247	1.941	2.395	2.478	2.116	1.486	0.628	0.215	0.037	0.009	0.001							**15.586**
2	0.030	1.115	0.446	0.796	1.138	1.160	0.970	0.721	0.439	0.202	0.066	0.010	0.004									**7.097**
3	0.010	0.970	0.461	0.691	0.649	0.496	0.313	0.144	0.067	0.018	0.003	0.005	0.002	0.001								**3.829**
4	0.004	0.600	0.497	0.350	0.235	0.146	0.082	0.029	0.018	0.005	0.002	0.003										**1.972**
5	0.003	0.132	0.193	0.132	0.060	0.037	0.017	0.007	0.001	0.002	0.002											**0.586**
6	0.001	0.049	0.060	0.027	0.014	0.005	0.004	0.002		0.001			0.001									**0.164**
7	0.001	0.026	0.023	0.013	0.008	0.004	0.002	0.002					0.001									**0.079**
8		0.008	0.008	0.003	0.002	0.002			0.001													**0.024**
9		0.003	0.004																			**0.006**
10		0.003		0.001																		**0.004**
11						0.001																**0.001**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**20.166**	**10.914**	**4.497**	**5.892**	**7.164**	**8.755**	**10.412**	**10.504**	**9.388**	**7.015**	**3.552**	**1.375**	**0.278**	**0.079**	**0.007**							**100.000**

Summary Statistics

Avg Speed (mph)	21.72	Time at Idle (%)	20.166	Avg Specific PKE (hp-sec/lb)	7.00
Min Speed (mph)	0.00	Time at Cruise (%)	53.529	Avg Total Specific Power (hp/lb)	0.0485
Max Speed (mph)	69.33	Time in Accel (%)	13.759	Avg Non-Zero Specific Power (hp/lb)	0.1051
Avg Non-Idle Speed (mph)	27.21	Time in Decel (%)	12.546	Max Specific Power (hp/lb)	1.9039
Avg Cruise Speed (mph)	30.60	Avg Trip Length (miles)	0.871	Spec Pwr Freq (%): 0 hp/lb	53.84
Avg Acceleration (mph/sec)	1.20	Avg Trip Time (min)	2.407	Spec Pwr Freq (%): >0-0.1 hp/lb	26.48
Max Acceleration (mph/sec)	11.21	# Stops per Mile	1.484	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.82
Avg Deceleration (mph/sec)	-1.31	# of 1-Sec Observations	109,307	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.31
Max Deceleration (mph/sec)	-13.74	# of Trips	757	Spec Pwr Freq (%): >0.3 hp/lb	2.55

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.063		
		Bin 0 % (braking)	9.500		
		Bin 1 % (idle)	23.584		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.338	Bin 21 % (25-50 mph, <0 kw/tonne)	9.055		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	5.738	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.292	Bin 33 % (>50 mph, <6 kw/tonne)	1.186
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.742	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.353		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.138	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.498	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.098
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.177	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.753		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.972		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.867	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.559
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.432	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.196
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.336	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.046
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.120	Bin 40 % (>50 mph, >=30 kw/tonne)	0.021

California 2000 Urban Other Principal Arterial LOS E Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11				0.014			0.014															**0.029**
-10					0.014																	**0.014**
-9					0.014				0.014													**0.029**
-8							0.014															**0.014**
-7			0.014	0.029	0.014	0.058	0.029			0.014												**0.159**
-6		0.029	0.058	0.058	0.101	0.072	0.029	0.014	0.014	0.014												**0.390**
-5		0.029	0.217	0.217	0.188	0.159	0.145	0.116	0.029	0.014												**1.113**
-4		0.159	0.448	0.549	0.592	0.405	0.231	0.159	0.058	0.014	0.014											**2.630**
-3	0.014	0.723	0.853	0.723	0.766	0.607	0.607	0.246	0.145	0.072												**4.754**
-2		1.329	0.347	0.448	0.650	0.723	0.853	0.824	0.434	0.217	0.087	0.029										**5.939**
-1	0.058	2.355	0.246	0.535	0.578	0.896	1.416	1.676	1.647	1.040	0.231	0.072										**10.751**
0	26.156	3.902	0.217	0.780	0.954	1.185	2.587	2.948	2.572	2.717	0.824	0.231										**45.072**
1	0.390	1.951	0.419	0.968	1.127	1.243	1.893	1.879	1.734	1.185	0.347	0.043										**13.179**
2	0.014	1.373	0.535	0.867	1.185	1.185	1.040	0.882	0.275	0.116	0.014											**7.486**
3	0.014	1.402	0.564	0.838	0.665	0.535	0.405	0.159	0.058													**4.639**
4		0.795	0.419	0.491	0.246	0.202	0.130	0.014														**2.298**
5		0.289	0.318	0.202	0.116	0.058			0.014													**0.997**
6		0.029	0.130	0.058	0.029	0.014	0.014															**0.275**
7	0.014	0.029	0.043	0.014																		**0.101**
8		0.029	0.029	0.014	0.014																	**0.087**
9		0.029																				**0.029**
10			0.014																			**0.014**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**26.662**	**14.451**	**4.870**	**6.806**	**7.254**	**7.341**	**9.408**	**8.916**	**6.994**	**5.405**	**1.517**	**0.376**										**100.000**

Summary Statistics

Avg Speed (mph)	17.26	Time at Idle (%)	26.662	Avg Specific PKE (hp-sec/lb)	3.07
Min Speed (mph)	0.00	Time at Cruise (%)	42.399	Avg Total Specific Power (hp/lb)	0.0440
Max Speed (mph)	56.33	Time in Accel (%)	15.882	Avg Non-Zero Specific Power (hp/lb)	0.1038
Avg Non-Idle Speed (mph)	23.53	Time in Decel (%)	15.058	Max Specific Power (hp/lb)	0.8155
Avg Cruise Speed (mph)	26.98	Avg Trip Length (miles)	0.335	Spec Pwr Freq (%): 0 hp/lb	57.64
Avg Acceleration (mph/sec)	1.42	Avg Trip Time (min)	1.165	Spec Pwr Freq (%): >0-0.1 hp/lb	24.34
Max Acceleration (mph/sec)	10.04	# Stops per Mile	2.773	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.36
Avg Deceleration (mph/sec)	-1.57	# of 1-Sec Observations	6,920	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.20
Max Deceleration (mph/sec)	-11.42	# of Trips	99	Spec Pwr Freq (%): >0.3 hp/lb	2.46

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.104		
		Bin 0 % (braking)	12.242		
		Bin 1 % (idle)	32.151		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.366	Bin 21 % (25-50 mph, <0 kw/tonne)	8.620		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.333	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.043	Bin 33 % (>50 mph, <6 kw/tonne)	0.235
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.709	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.102		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.211	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.944	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.191
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.272	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.416		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.434		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.032	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.191
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.114	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.088
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.264	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.044	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Other Principal Arterial LOS F Driving (FC=14) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11					0.004		0.004															**0.009**
-10				0.009	0.004																	**0.013**
-9			0.004			0.004	0.004			0.004												**0.018**
-8			0.013	0.031	0.004		0.004															**0.053**
-7			0.013	0.026	0.035	0.018	0.004	0.013														**0.110**
-6		0.018	0.031	0.093	0.075	0.053	0.018															**0.286**
-5		0.018	0.167	0.163	0.181	0.145	0.048	0.031	0.013													**0.767**
-4		0.150	0.286	0.300	0.269	0.220	0.119	0.062	0.026	0.013	0.004	0.004										**1.454**
-3	0.004	0.586	0.551	0.560	0.370	0.348	0.251	0.132	0.044	0.018	0.004											**2.869**
-2	0.013	1.490	0.846	0.564	0.449	0.449	0.427	0.185	0.075	0.040	0.022	0.009										**4.570**
-1	0.004	4.226	0.930	1.088	0.842	0.692	0.701	0.665	0.348	0.154	0.084	0.044	0.026	0.026	0.004							**9.836**
0	37.974	8.655	1.454	1.481	1.172	1.040	1.397	1.432	0.771	0.361	0.123	0.066	0.449	0.278	0.022							**56.676**
1	0.317	3.843	0.899	1.163	1.291	1.326	1.036	0.683	0.383	0.137	0.075	0.040	0.079	0.048								**11.321**
2	0.071	1.727	0.784	0.925	0.842	0.696	0.449	0.229	0.110	0.009	0.009	0.004	0.004									**5.861**
3	0.031	1.199	0.639	0.533	0.423	0.251	0.106	0.071	0.013	0.009												**3.274**
4	0.026	0.643	0.410	0.278	0.159	0.097	0.062	0.018	0.004	0.004		0.004										**1.705**
5	0.004	0.207	0.273	0.137	0.062	0.026	0.022	0.009	0.009													**0.749**
6		0.101	0.115	0.044	0.026			0.009			0.004											**0.300**
7		0.022	0.018	0.013	0.004		0.004															**0.062**
8		0.009	0.013	0.009	0.004				0.004													**0.040**
9		0.009				0.004																**0.013**
10			0.009																			**0.009**
11				0.004																		**0.004**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**38.445**	**22.902**	**7.456**	**7.421**	**6.218**	**5.372**	**4.658**	**3.539**	**1.802**	**0.749**	**0.326**	**0.172**	**0.560**	**0.353**	**0.026**							**100.000**

Summary Statistics

Avg Speed (mph)	9.55	Time at Idle (%)	38.445	Avg Specific PKE (hp-sec/lb)	3.06
Min Speed (mph)	0.00	Time at Cruise (%)	39.353	Avg Total Specific Power (hp/lb)	0.0278
Max Speed (mph)	68.47	Time in Accel (%)	12.013	Avg Non-Zero Specific Power (hp/lb)	0.0728
Avg Non-Idle Speed (mph)	15.51	Time in Decel (%)	10.189	Max Specific Power (hp/lb)	1.5007
Avg Cruise Speed (mph)	15.62	Avg Trip Length (miles)	0.292	Spec Pwr Freq (%): 0 hp/lb	61.77
Avg Acceleration (mph/sec)	1.24	Avg Trip Time (min)	1.836	Spec Pwr Freq (%): >0-0.1 hp/lb	27.64
Max Acceleration (mph/sec)	11.15	# Stops per Mile	5.183	Spec Pwr Freq (%): >0.1-0.2 hp/lb	6.66
Avg Deceleration (mph/sec)	-1.28	# of 1-Sec Observations	22,692	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.54
Max Deceleration (mph/sec)	-11.11	# of Trips	206	Spec Pwr Freq (%): >0.3 hp/lb	1.39

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.724		
		Bin 0 % (braking)	7.525		
		Bin 1 % (idle)	46.327		
Bin 11 % (0-25 mph, <0 kw/tonne)	10.478	Bin 21 % (25-50 mph, <0 kw/tonne)	2.966		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	11.710	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.801	Bin 33 % (>50 mph, <6 kw/tonne)	0.311
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.879	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.059		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.020	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.703	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.480
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.552	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.201		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.534		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.361	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.316
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.409	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.111
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.151	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.027
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.071	Bin 40 % (>50 mph, >=30 kw/tonne)	0.009

California 2000 Urban Minor Arterial LOS A Driving (FC=16) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17												0.001										**0.001**
-16																						
-15																						
-14				0.001																		**0.001**
-13					0.001																	**0.001**
-12						0.001		0.001														**0.002**
-11				0.001	0.002	0.002	0.002		0.001													**0.007**
-10			0.001	0.001		0.003	0.001	0.001	0.001													**0.007**
-9			0.001	0.002	0.003	0.002	0.003	0.001														**0.012**
-8			0.002	0.009	0.009	0.008	0.004	0.002	0.002	0.002	0.001	0.001	0.001		0.001							**0.041**
-7		0.001	0.010	0.020	0.018	0.024	0.013	0.008	0.003	0.001	0.002	0.001										**0.100**
-6		0.005	0.027	0.069	0.105	0.064	0.048	0.029	0.017	0.006	0.003	0.001	0.001			0.001						**0.376**
-5		0.016	0.140	0.298	0.293	0.239	0.155	0.079	0.040	0.019	0.009	0.003	0.001	0.001								**1.292**
-4	0.001	0.105	0.447	0.510	0.511	0.503	0.371	0.232	0.129	0.059	0.027	0.012	0.003									**2.910**
-3	0.001	0.456	0.582	0.496	0.618	0.620	0.600	0.441	0.273	0.148	0.074	0.026	0.013	0.002	0.001	0.001						**4.352**
-2	0.004	0.944	0.349	0.366	0.456	0.638	0.760	0.707	0.519	0.336	0.161	0.087	0.031	0.007	0.001	0.001						**5.367**
-1	0.003	1.472	0.253	0.370	0.492	0.758	1.216	1.594	1.615	1.293	0.878	0.461	0.208	0.066	0.018	0.001						**10.700**
0	12.749	1.937	0.279	0.508	0.762	1.625	3.321	4.972	5.697	4.319	3.625	2.153	1.881	0.723	0.381	0.119						**45.051**
1	0.249	1.092	0.304	0.610	0.778	1.375	2.189	2.498	2.123	1.574	0.939	0.498	0.206	0.053	0.018	0.002						**14.508**
2	0.076	0.977	0.453	0.764	0.915	1.128	1.125	0.850	0.512	0.263	0.133	0.045	0.012	0.002	0.001							**7.256**
3	0.015	0.943	0.559	0.780	0.889	0.706	0.451	0.233	0.127	0.043	0.015	0.006	0.003									**4.770**
4	0.005	0.581	0.502	0.419	0.367	0.242	0.119	0.061	0.019	0.009	0.002	0.001		0.001	0.001	0.001						**2.328**
5	0.002	0.136	0.218	0.146	0.082	0.041	0.021	0.008	0.004	0.001		0.001	0.001									**0.659**
6	0.001	0.040	0.061	0.038	0.016	0.005	0.005	0.001	0.001		0.001											**0.169**
7	0.001	0.015	0.014	0.004	0.004	0.002	0.001		0.001													**0.042**
8	0.001	0.008	0.012	0.001	0.003	0.001	0.001	0.002														**0.028**
9		0.005	0.003	0.001	0.001	0.003																**0.013**
10		0.001	0.003	0.001	0.001																	**0.005**
11			0.001																			**0.001**
12				0.001																		**0.001**
13			0.001	0.001																		**0.001**
14				0.001																		**0.001**
15				0.001																		**0.001**
16																						
17																						
18																						
19																						
20																						
Totals	**13.108**	**8.735**	**4.222**	**5.416**	**6.324**	**7.991**	**10.404**	**11.716**	**11.086**	**8.074**	**5.871**	**3.297**	**2.359**	**0.854**	**0.420**	**0.124**						**100.000**

Summary Statistics

Avg Speed (mph)	27.17	Time at Idle (%)	13.108	Avg Specific PKE (hp-sec/lb)	6.81
Min Speed (mph)	0.00	Time at Cruise (%)	56.685	Avg Total Specific Power (hp/lb)	0.0561
Max Speed (mph)	77.35	Time in Accel (%)	15.451	Avg Non-Zero Specific Power (hp/lb)	0.1195
Avg Non-Idle Speed (mph)	31.27	Time in Decel (%)	14.756	Max Specific Power (hp/lb)	1.3534
Avg Cruise Speed (mph)	35.90	Avg Trip Length (miles)	0.916	Spec Pwr Freq (%): 0 hp/lb	53.01
Avg Acceleration (mph/sec)	1.26	Avg Trip Time (min)	2.022	Spec Pwr Freq (%): >0-0.1 hp/lb	25.11
Max Acceleration (mph/sec)	14.70	# Stops per Mile	0.997	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.91
Avg Deceleration (mph/sec)	-1.42	# of 1-Sec Observations	171,745	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.31
Max Deceleration (mph/sec)	-17.06	# of Trips	1,416	Spec Pwr Freq (%): >0.3 hp/lb	3.66

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.753		
		Bin 0 % (braking)	11.638		
		Bin 1 % (idle)	15.143		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.386	Bin 21 % (25-50 mph, <0 kw/tonne)	8.976		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	4.631	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.254	Bin 33 % (>50 mph, <6 kw/tonne)	2.434
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.082	Bin 23 % (25-50 mph, 3-6 kw/tonne)	8.131		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.678	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.876	Bin 35 % (>50 mph, 6-12 kw/tonne)	3.874
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.171	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.818		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.536		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.411	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.487
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.943	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.601
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.545	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.133
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.191	Bin 40 % (>50 mph, >=30 kw/tonne)	0.061

California 2000 Urban Minor Arterial LOS B Driving (FC=16) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12									0.013													**0.013**
-11											0.013											**0.013**
-10																						
-9						0.013	0.013															**0.027**
-8				0.013	0.067	0.027	0.013															**0.121**
-7			0.013	0.027	0.040	0.121	0.027	0.067	0.027													**0.322**
-6			0.054	0.121	0.107	0.121	0.121	0.081	0.013	0.013												**0.631**
-5		0.013	0.201	0.362	0.349	0.403	0.215	0.201	0.121	0.081	0.013											**1.960**
-4		0.094	0.443	0.443	0.618	0.577	0.604	0.376	0.242	0.081	0.081	0.013										**3.571**
-3		0.403	0.456	0.295	0.712	0.940	0.832	0.832	0.537	0.215	0.107	0.081										**5.410**
-2		0.712	0.282	0.483	0.470	0.604	0.967	1.181	0.819	0.644	0.295	0.148	0.040									**6.645**
-1	0.040	0.993	0.188	0.362	0.483	0.752	1.638	2.161	2.121	1.826	0.819	0.175	0.188	0.067	0.040							**11.854**
0	6.833	1.047	0.094	0.524	0.537	1.504	4.336	6.108	6.806	4.873	2.591	1.047	0.215	0.188	0.161							**36.864**
1	0.201	0.524	0.228	0.537	0.658	1.034	2.698	3.302	3.141	1.960	0.698	0.215	0.027	0.054	0.027							**15.304**
2	0.081	0.712	0.389	0.591	0.899	1.128	1.450	1.477	0.792	0.268	0.067	0.013	0.027	0.013								**7.907**
3	0.013	0.712	0.336	0.550	0.886	1.195	0.805	0.349	0.188	0.013	0.027	0.027	0.013									**5.115**
4	0.013	0.483	0.376	0.483	0.644	0.322	0.175	0.067	0.054	0.027												**2.645**
5		0.201	0.376	0.268	0.188	0.094	0.040	0.013														**1.181**
6		0.067	0.094	0.054	0.013		0.013			0.013												**0.255**
7		0.040	0.027	0.027						0.013												**0.107**
8		0.013	0.013	0.013		0.013																**0.054**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.182**	**6.014**	**3.571**	**5.155**	**6.672**	**8.847**	**13.948**	**16.217**	**14.874**	**10.028**	**4.712**	**1.718**	**0.510**	**0.322**	**0.228**							**100.000**

Summary Statistics

Avg Speed (mph)	29.16	Time at Idle (%)	7.182	Avg Specific PKE (hp-sec/lb)	2.86
Min Speed (mph)	0.00	Time at Cruise (%)	56.545	Avg Total Specific Power (hp/lb)	0.0649
Max Speed (mph)	69.88	Time in Accel (%)	17.264	Avg Non-Zero Specific Power (hp/lb)	0.1396
Avg Non-Idle Speed (mph)	31.42	Time in Decel (%)	19.009	Max Specific Power (hp/lb)	1.2828
Avg Cruise Speed (mph)	35.48	Avg Trip Length (miles)	0.357	Spec Pwr Freq (%): 0 hp/lb	53.50
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	0.735	Spec Pwr Freq (%): >0-0.1 hp/lb	22.20
Max Acceleration (mph/sec)	7.75	# Stops per Mile	0.746	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.80
Avg Deceleration (mph/sec)	-1.63	# of 1-Sec Observations	7,449	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.36
Max Deceleration (mph/sec)	-12.35	# of Trips	169	Spec Pwr Freq (%): >0.3 hp/lb	5.14

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.051		
		Bin 0 % (braking)	15.467		
		Bin 1 % (idle)	8.571		
Bin 11 % (0-25 mph, <0 kw/tonne)	3.654	Bin 21 % (25-50 mph, <0 kw/tonne)	10.810		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.981	Bin 22 % (25-50 mph, 0-3 kw/tonne)	9.588	Bin 33 % (>50 mph, <6 kw/tonne)	1.346
Bin 13 % (0-25 mph, 3-6 kw/tonne)	2.363	Bin 23 % (25-50 mph, 3-6 kw/tonne)	10.398		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.239	Bin 24 % (25-50 mph, 6-9 kw/tonne)	8.475	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.278
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.882	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.591		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.393		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.978	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.893
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.679	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.385
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.632	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.028
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.261	Bin 40 % (>50 mph, >=30 kw/tonne)	0.110

California 2000 Urban Minor Arterial LOS C Driving (FC=16, LOS=C) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10					0.012	0.012	0.012															**0.036**
-9					0.012		0.012															**0.024**
-8						0.012	0.012	0.012	0.012													**0.048**
-7			0.036	0.036	0.036	0.012	0.012		0.012		0.012											**0.157**
-6		0.024	0.048	0.169	0.145	0.145	0.060	0.024		0.012												**0.627**
-5		0.060	0.193	0.422	0.470	0.253	0.229	0.084	0.024	0.012	0.012											**1.760**
-4		0.181	0.555	0.518	0.579	0.627	0.422	0.229	0.133	0.084	0.024											**3.351**
-3		0.542	0.603	0.542	0.723	0.916	0.675	0.434	0.229	0.121	0.096	0.024										**4.907**
-2	0.012	1.121	0.386	0.325	0.615	0.989	0.904	0.772	0.603	0.301	0.084	0.084	0.024									**6.221**
-1	0.012	1.844	0.338	0.313	0.446	1.374	1.953	2.098	1.664	0.952	0.313	0.133	0.048	0.060								**11.549**
0	10.512	2.797	0.579	0.518	0.940	2.074	4.858	6.293	5.425	2.954	0.856	0.518	0.012	0.241	0.121		0.012					**38.710**
1	0.386	1.712	0.470	0.434	1.025	1.977	2.942	2.640	2.230	0.856	0.205	0.060	0.108	0.084	0.012		0.012					**15.154**
2	0.048	1.145	0.482	0.844	1.109	1.543	1.181	0.772	0.362	0.181	0.036	0.048	0.024									**7.776**
3	0.024	1.037	0.530	0.952	0.940	0.808	0.494	0.157	0.084	0.012	0.024											**5.063**
4		0.699	0.506	0.530	0.579	0.386	0.145	0.036	0.012													**2.893**
5	0.012	0.193	0.374	0.277	0.133	0.084	0.048	0.024		0.012												**1.157**
6		0.133	0.096	0.060	0.060	0.036																**0.386**
7		0.048	0.012		0.012				0.012													**0.084**
8			0.012	0.012	0.012	0.012																**0.048**
9		0.012	0.012																			**0.024**
10		0.012																				**0.012**
11																						
12				0.012																		**0.012**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**11.007**	**11.561**	**5.232**	**5.967**	**7.848**	**11.260**	**13.960**	**13.574**	**10.802**	**5.497**	**1.664**	**0.868**	**0.217**	**0.386**	**0.133**		**0.024**					**100.000**

Summary Statistics

Avg Speed (mph)	23.68	Time at Idle (%)	11.007	Avg Specific PKE (hp-sec/lb)	2.96
Min Speed (mph)	0.00	Time at Cruise (%)	54.177	Avg Total Specific Power (hp/lb)	0.0560
Max Speed (mph)	78.50	Time in Accel (%)	17.589	Avg Non-Zero Specific Power (hp/lb)	0.1186
Avg Non-Idle Speed (mph)	26.61	Time in Decel (%)	17.227	Max Specific Power (hp/lb)	1.0841
Avg Cruise Speed (mph)	30.09	Avg Trip Length (miles)	0.348	Spec Pwr Freq (%): 0 hp/lb	52.78
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.881	Spec Pwr Freq (%): >0-0.1 hp/lb	25.76
Max Acceleration (mph/sec)	12.37	# Stops per Mile	1.466	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.49
Avg Deceleration (mph/sec)	-1.58	# of 1-Sec Observations	8,295	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.98
Max Deceleration (mph/sec)	-10.48	# of Trips	157	Spec Pwr Freq (%): >0.3 hp/lb	3.99

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.732		
		Bin 0 % (braking)	13.603		
		Bin 1 % (idle)	14.094		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.468	Bin 21 % (25-50 mph, <0 kw/tonne)	10.555		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.046	Bin 22 % (25-50 mph, 0-3 kw/tonne)	8.589	Bin 33 % (>50 mph, <6 kw/tonne)	0.713
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.502	Bin 23 % (25-50 mph, 3-6 kw/tonne)	9.376		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.392	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.537	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.651
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.777	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.190		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.256		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.301	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.406
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.536	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.209
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.442	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.160
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.172	Bin 40 % (>50 mph, >=30 kw/tonne)	0.025

California 2000 Urban Minor Arterial LOS D Driving (FC=16) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15						0.002																**0.002**
-14																						
-13						0.002																**0.002**
-12					0.002																	**0.002**
-11				0.002		0.002		0.002														**0.006**
-10						0.004			0.002													**0.006**
-9				0.004	0.006	0.008	0.002	0.004	0.002	0.002												**0.028**
-8			0.002	0.010	0.010	0.006	0.006		0.006													**0.040**
-7		0.006	0.016	0.042	0.026	0.030	0.024	0.008	0.004	0.002												**0.159**
-6		0.004	0.026	0.093	0.093	0.066	0.064	0.018	0.006	0.008	0.002	0.002										**0.382**
-5	0.002	0.024	0.141	0.213	0.213	0.183	0.125	0.090	0.018	0.006	0.004											**1.020**
-4	0.004	0.123	0.394	0.428	0.507	0.382	0.267	0.165	0.082	0.030	0.012	0.004										**2.399**
-3	0.002	0.513	0.533	0.487	0.525	0.627	0.555	0.370	0.191	0.074	0.026	0.012	0.002									**3.917**
-2	0.002	0.993	0.442	0.519	0.613	0.668	0.766	0.722	0.436	0.215	0.082	0.022	0.002									**5.484**
-1	0.010	2.047	0.432	0.541	0.607	0.782	1.209	1.581	1.558	1.060	0.497	0.157	0.022									**10.503**
0	17.972	3.382	0.448	0.752	0.999	1.611	2.821	5.277	5.687	4.008	2.274	1.090	0.105	0.016	0.010							**46.453**
1	0.259	1.842	0.384	0.776	1.005	1.490	2.091	2.632	2.194	1.243	0.523	0.157	0.028	0.012	0.012	0.014						**14.664**
2	0.062	1.184	0.467	0.857	1.102	1.168	1.104	0.724	0.346	0.125	0.040	0.010	0.006	0.004								**7.199**
3	0.018	1.102	0.597	0.768	0.770	0.549	0.336	0.155	0.072	0.026	0.008											**4.402**
4	0.010	0.668	0.541	0.386	0.362	0.221	0.103	0.036	0.026		0.002	0.002										**2.357**
5		0.139	0.227	0.139	0.093	0.060	0.024	0.002	0.002													**0.686**
6	0.002	0.030	0.084	0.030	0.008	0.010	0.004	0.002														**0.171**
7		0.028	0.026	0.006	0.002	0.002				0.002												**0.066**
8		0.014	0.010	0.004	0.002		0.002		0.002													**0.034**
9		0.004	0.004	0.002																		**0.010**
10		0.002	0.002	0.002																		**0.006**
11																						
12																						
13				0.002																		**0.002**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**18.344**	**12.106**	**4.778**	**6.063**	**6.946**	**7.875**	**9.504**	**11.788**	**10.636**	**6.801**	**3.471**	**1.456**	**0.165**	**0.032**	**0.022**	**0.014**						**100.000**

Summary Statistics

Avg Speed (mph)	22.06	Time at Idle (%)	18.344	Avg Specific PKE (hp-sec/lb)	5.14
Min Speed (mph)	0.00	Time at Cruise (%)	53.290	Avg Total Specific Power (hp/lb)	0.0493
Max Speed (mph)	77.02	Time in Accel (%)	14.907	Avg Non-Zero Specific Power (hp/lb)	0.1061
Avg Non-Idle Speed (mph)	27.02	Time in Decel (%)	13.459	Max Specific Power (hp/lb)	1.3847
Avg Cruise Speed (mph)	30.71	Avg Trip Length (miles)	0.639	Spec Pwr Freq (%): 0 hp/lb	53.48
Avg Acceleration (mph/sec)	1.26	Avg Trip Time (min)	1.738	Spec Pwr Freq (%): >0-0.1 hp/lb	26.87
Max Acceleration (mph/sec)	12.76	# Stops per Mile	1.523	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.61
Avg Deceleration (mph/sec)	-1.38	# of 1-Sec Observations	49,728	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.38
Max Deceleration (mph/sec)	-14.54	# of Trips	477	Spec Pwr Freq (%): >0.3 hp/lb	2.66

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.060		
		Bin 0 % (braking)	10.440		
		Bin 1 % (idle)	21.707		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.073	Bin 21 % (25-50 mph, <0 kw/tonne)	8.248		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.311	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.648	Bin 33 % (>50 mph, <6 kw/tonne)	0.922
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.639	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.982		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.062	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.964	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.381
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.272	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.964		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.374		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.573	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.542
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.222	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.110
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.353	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.059
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.128	Bin 40 % (>50 mph, >=30 kw/tonne)	0.028

California 2000 Urban Minor Arterial LOS E Driving (FC=16, LOS=E) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12								0.018														**0.018**
-11																						
-10					0.018	0.018																**0.036**
-9					0.036	0.018																**0.053**
-8				0.018	0.053		0.053	0.018														**0.142**
-7			0.018	0.036	0.018	0.018	0.018	0.053														**0.160**
-6		0.036	0.125	0.071	0.125	0.107	0.036	0.018	0.053													**0.569**
-5		0.071	0.125	0.356	0.267	0.196	0.107	0.036	0.018	0.018												**1.192**
-4		0.249	0.587	0.445	0.480	0.463	0.267	0.142	0.071	0.018	0.018											**2.740**
-3		0.836	0.818	0.640	0.640	0.605	0.445	0.267	0.107	0.089	0.053	0.018										**4.519**
-2	0.018	1.530	0.676	0.801	0.658	0.534	0.783	0.391	0.320	0.107	0.053	0.036										**5.906**
-1	0.053	2.846	0.587	0.890	0.961	0.996	1.601	1.548	0.801	0.320	0.213	0.036										**10.852**
0	28.696	4.537	0.516	0.907	1.210	1.067	2.081	3.113	2.918	1.014	0.249	0.142										**46.451**
1	0.480	2.562	0.391	0.996	1.050	0.996	1.637	1.743	1.032	0.374	0.267											**11.528**
2	0.071	1.477	0.534	0.765	0.801	1.174	0.872	0.516	0.267	0.089	0.036											**6.600**
3	0.018	1.316	0.391	0.943	0.587	0.569	0.445	0.213	0.036													**4.519**
4		1.067	0.694	0.534	0.480	0.231	0.071	0.018														**3.096**
5		0.285	0.391	0.302	0.125	0.071	0.036	0.018														**1.228**
6		0.036	0.125	0.053		0.018																**0.231**
7		0.125		0.018																		**0.142**
8			0.018																			**0.018**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**29.336**	**16.972**	**5.995**	**7.774**	**7.508**	**7.081**	**8.450**	**8.112**	**5.622**	**2.028**	**0.890**	**0.231**										**100.000**

Summary Statistics

Avg Speed (mph)	14.62	Time at Idle (%)	29.336	Avg Specific PKE (hp-sec/lb)	2.86
Min Speed (mph)	0.00	Time at Cruise (%)	39.602	Avg Total Specific Power (hp/lb)	0.0407
Max Speed (mph)	56.22	Time in Accel (%)	15.745	Avg Non-Zero Specific Power (hp/lb)	0.1046
Avg Non-Idle Speed (mph)	20.68	Time in Decel (%)	15.318	Max Specific Power (hp/lb)	0.8009
Avg Cruise Speed (mph)	23.11	Avg Trip Length (miles)	0.285	Spec Pwr Freq (%): 0 hp/lb	61.09
Avg Acceleration (mph/sec)	1.54	Avg Trip Time (min)	1.171	Spec Pwr Freq (%): >0-0.1 hp/lb	23.23
Max Acceleration (mph/sec)	7.82	# Stops per Mile	3.812	Spec Pwr Freq (%): >0.1-0.2 hp/lb	8.49
Avg Deceleration (mph/sec)	-1.66	# of 1-Sec Observations	5,621	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.47
Max Deceleration (mph/sec)	-11.99	# of Trips	80	Spec Pwr Freq (%): >0.3 hp/lb	2.72

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.763		
		Bin 0 % (braking)	12.200		
		Bin 1 % (idle)	34.236		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.338	Bin 21 % (25-50 mph, <0 kw/tonne)	6.407		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	7.923	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.916	Bin 33 % (>50 mph, <6 kw/tonne)	0.253
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.988	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.205		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.635	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.043	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.126
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.382	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.491		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.563		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.797	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.181
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.975	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.000
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.271	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.018
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.054	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Minor Arterial LOS F Driving (FC=16) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10							0.010															**0.010**
-9			0.019		0.010	0.010																**0.039**
-8				0.019	0.019	0.010	0.010	0.010	0.010													**0.077**
-7			0.029	0.048	0.029	0.067	0.010				0.010											**0.193**
-6		0.019	0.029	0.048	0.077	0.048	0.048	0.010	0.019	0.010												**0.308**
-5		0.029	0.173	0.289	0.231	0.164	0.087	0.048	0.019													**1.040**
-4		0.202	0.424	0.472	0.337	0.404	0.193	0.096	0.010	0.010												**2.147**
-3	0.010	0.674	0.818	0.462	0.462	0.424	0.404	0.212	0.135	0.029												**3.629**
-2	0.019	1.627	0.683	0.549	0.385	0.395	0.298	0.366	0.125	0.077	0.010											**4.534**
-1	0.039	3.591	0.732	0.645	0.549	0.606	0.886	1.069	0.568	0.221	0.077											**8.982**
0	37.139	6.142	0.818	0.751	0.857	0.886	1.348	2.676	2.840	0.674	0.183											**54.313**
1	0.404	3.312	0.645	0.683	0.722	0.789	1.213	1.550	0.789	0.241	0.029											**10.377**
2	0.077	1.887	0.683	0.789	0.606	0.905	0.886	0.414	0.116	0.010												**6.373**
3	0.010	1.328	0.683	0.683	0.626	0.529	0.241	0.029														**4.130**
4	0.019	0.828	0.626	0.481	0.385	0.183	0.058	0.019														**2.599**
5		0.298	0.279	0.154	0.087	0.010																**0.828**
6		0.096	0.106	0.048	0.010																	**0.260**
7		0.029	0.010	0.010		0.010																**0.058**
8		0.019	0.019		0.010																	**0.048**
9		0.010		0.010																		**0.019**
10			0.010	0.010																		**0.019**
11			0.010																			**0.010**
12				0.010																		**0.010**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**37.717**	**20.090**	**6.796**	**6.161**	**5.400**	**5.439**	**5.689**	**6.498**	**4.630**	**1.271**	**0.308**											**100.000**

Summary Statistics

Avg Speed (mph)	11.13	Time at Idle (%)	37.717	Avg Specific PKE (hp-sec/lb)	2.97
Min Speed (mph)	0.00	Time at Cruise (%)	36.090	Avg Total Specific Power (hp/lb)	0.0326
Max Speed (mph)	49.09	Time in Accel (%)	14.247	Avg Non-Zero Specific Power (hp/lb)	0.0859
Avg Non-Idle Speed (mph)	17.87	Time in Decel (%)	11.947	Max Specific Power (hp/lb)	0.9256
Avg Cruise Speed (mph)	19.40	Avg Trip Length (miles)	0.282	Spec Pwr Freq (%): 0 hp/lb	62.05
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	1.519	Spec Pwr Freq (%): >0-0.1 hp/lb	25.29
Max Acceleration (mph/sec)	11.69	# Stops per Mile	4.671	Spec Pwr Freq (%): >0.1-0.2 hp/lb	7.10
Avg Deceleration (mph/sec)	-1.46	# of 1-Sec Observations	10,388	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.89
Max Deceleration (mph/sec)	-9.92	# of Trips	114	Spec Pwr Freq (%): >0.3 hp/lb	1.67

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.728		
		Bin 0 % (braking)	9.247		
		Bin 1 % (idle)	44.170		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.410	Bin 21 % (25-50 mph, <0 kw/tonne)	4.234		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	8.994	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.920	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.728	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.845		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.540	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.959	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.000
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.791	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.918		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.356		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.278	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.506	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.000
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.078	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.029	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Collector LOS A-C Driving (FC=17) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16						0.001																**0.001**
-15																						
-14				0.001																		**0.001**
-13				0.001		0.001																**0.002**
-12					0.001	0.001																**0.002**
-11				0.001			0.001	0.001	0.001													**0.004**
-10							0.001															**0.001**
-9			0.002	0.002	0.002	0.003		0.002	0.002													**0.014**
-8			0.003	0.009	0.003	0.005	0.008	0.005	0.001	0.002	0.001											**0.038**
-7		0.003	0.010	0.021	0.024	0.024	0.020	0.008	0.009		0.001	0.001										**0.120**
-6		0.003	0.026	0.094	0.114	0.073	0.044	0.022	0.012	0.005	0.003	0.001										**0.398**
-5		0.017	0.218	0.472	0.379	0.249	0.119	0.057	0.017	0.011	0.003											**1.543**
-4	0.001	0.134	0.714	0.832	0.826	0.623	0.322	0.144	0.087	0.021	0.012	0.004										**3.720**
-3	0.002	0.624	0.856	0.753	1.034	0.936	0.647	0.316	0.148	0.085	0.020	0.011										**5.432**
-2	0.001	1.242	0.604	0.605	0.912	1.008	0.923	0.614	0.324	0.188	0.081	0.034	0.014									**6.549**
-1	0.003	1.742	0.503	0.609	0.841	1.374	1.615	1.354	1.020	0.604	0.447	0.126	0.060	0.011								**10.308**
0	9.484	2.082	0.540	0.703	1.316	4.228	5.798	5.273	3.289	1.998	1.459	0.619	0.397	0.094								**37.279**
1	0.302	1.412	0.625	0.938	1.618	2.554	2.846	2.076	1.424	0.857	0.415	0.127	0.058	0.009								**15.261**
2	0.148	1.613	1.026	1.604	1.668	1.501	0.964	0.529	0.254	0.121	0.052	0.014	0.003	0.001								**9.500**
3	0.069	1.499	1.146	1.360	1.211	0.681	0.314	0.115	0.045	0.019	0.008	0.004										**6.470**
4	0.023	0.646	0.696	0.531	0.348	0.159	0.048	0.035	0.012	0.003	0.003											**2.503**
5	0.007	0.117	0.212	0.130	0.066	0.041	0.025	0.007	0.003		0.001											**0.609**
6	0.004	0.029	0.061	0.026	0.020	0.012	0.007	0.004														**0.163**
7	0.002	0.010	0.010	0.010	0.003	0.002		0.001														**0.038**
8		0.007	0.007	0.001			0.002	0.001														**0.017**
9		0.004	0.001	0.002	0.001																	**0.009**
10		0.002	0.003	0.003																		**0.009**
11		0.001		0.002																		**0.003**
12		0.002	0.001																			**0.003**
13				0.002																		**0.002**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**10.047**	**11.191**	**7.265**	**8.710**	**10.388**	**13.477**	**13.702**	**10.565**	**6.648**	**3.914**	**2.506**	**0.942**	**0.532**	**0.114**								**100.000**

Summary Statistics

Avg Speed (mph)	22.26	Time at Idle (%)	10.047	Avg Specific PKE (hp-sec/lb)	3.63
Min Speed (mph)	0.00	Time at Cruise (%)	52.921	Avg Total Specific Power (hp/lb)	0.0543
Max Speed (mph)	67.32	Time in Accel (%)	19.141	Avg Non-Zero Specific Power (hp/lb)	0.1117
Avg Non-Idle Speed (mph)	24.74	Time in Decel (%)	17.892	Max Specific Power (hp/lb)	1.2221
Avg Cruise Speed (mph)	29.01	Avg Trip Length (miles)	0.413	Spec Pwr Freq (%): 0 hp/lb	51.37
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	1.113	Spec Pwr Freq (%): >0-0.1 hp/lb	26.16
Max Acceleration (mph/sec)	13.05	# Stops per Mile	1.288	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.77
Avg Deceleration (mph/sec)	-1.63	# of 1-Sec Observations	91,792	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.14
Max Deceleration (mph/sec)	-15.86	# of Trips	1,374	Spec Pwr Freq (%): >0.3 hp/lb	2.57

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.638		
		Bin 0 % (braking)	14.433		
		Bin 1 % (idle)	11.875		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.956	Bin 21 % (25-50 mph, <0 kw/tonne)	9.468		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	7.478	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.179	Bin 33 % (>50 mph, <6 kw/tonne)	0.879
Bin 13 % (0-25 mph, 3-6 kw/tonne)	5.874	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.263		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	5.013	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.003	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.917
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.421	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.968		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.907		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.050	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.480
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.214	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.148
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.298	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.038
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.119	Bin 40 % (>50 mph, >=30 kw/tonne)	0.020

California 2000 Urban Collector LOS D Driving (FC=17) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13										0.008												**0.008**
-12				0.008																		**0.008**
-11						0.008																**0.008**
-10						0.008																**0.008**
-9				0.008	0.016	0.008																**0.033**
-8				0.016		0.008	0.025	0.008														**0.057**
-7			0.016		0.025	0.033	0.008	0.008	0.025	0.008												**0.123**
-6			0.049	0.107	0.082	0.041	0.041	0.041		0.008												**0.370**
-5			0.230	0.443	0.304	0.197	0.074	0.057	0.008	0.016	0.008											**1.338**
-4		0.148	0.682	0.542	0.755	0.657	0.271	0.123	0.049	0.008												**3.235**
-3		0.706	0.797	0.673	0.977	0.640	0.501	0.296	0.189	0.049	0.008											**4.837**
-2		1.297	0.542	0.731	0.829	0.994	0.723	0.493	0.361	0.189	0.057											**6.216**
-1	0.008	2.266	0.460	0.870	1.100	1.338	1.511	0.936	0.797	0.698	0.213	0.016										**10.215**
0	15.306	4.434	0.649	1.445	1.683	3.055	3.564	3.769	2.808	1.494	0.846	0.328	0.189									**39.571**
1	0.386	1.921	0.854	1.371	1.560	2.102	2.299	1.577	1.281	0.698	0.238	0.082	0.008									**14.378**
2	0.148	1.741	0.903	1.462	1.692	1.412	0.747	0.558	0.238	0.123	0.066											**9.090**
3	0.016	1.568	0.977	1.281	1.084	0.698	0.361	0.181	0.066	0.041	0.008											**6.282**
4	0.008	0.764	0.739	0.599	0.484	0.205	0.123	0.049	0.008	0.016	0.008											**3.005**
5		0.222	0.287	0.140	0.131	0.033	0.016	0.008	0.008													**0.846**
6		0.049	0.057	0.049	0.033	0.008	0.008	0.008														**0.213**
7		0.033	0.033	0.008	0.008																	**0.082**
8		0.016	0.016		0.008																	**0.041**
9				0.008																		**0.008**
10			0.008	0.008																		**0.016**
11						0.008																**0.008**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**15.873**	**15.167**	**7.300**	**9.772**	**10.774**	**11.455**	**10.273**	**8.113**	**5.838**	**3.359**	**1.453**	**0.427**	**0.197**									**100.000**

Summary Statistics

Avg Speed (mph)	18.49	Time at Idle (%)	15.873	Avg Specific PKE (hp-sec/lb)	2.50
Min Speed (mph)	0.00	Time at Cruise (%)	48.456	Avg Total Specific Power (hp/lb)	0.0529
Max Speed (mph)	61.41	Time in Accel (%)	19.429	Avg Non-Zero Specific Power (hp/lb)	0.1118
Avg Non-Idle Speed (mph)	21.97	Time in Decel (%)	16.242	Max Specific Power (hp/lb)	1.3070
Avg Cruise Speed (mph)	24.91	Avg Trip Length (miles)	0.242	Spec Pwr Freq (%): 0 hp/lb	52.67
Avg Acceleration (mph/sec)	1.48	Avg Trip Time (min)	0.787	Spec Pwr Freq (%): >0-0.1 hp/lb	26.16
Max Acceleration (mph/sec)	10.63	# Stops per Mile	1.983	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.55
Avg Deceleration (mph/sec)	-1.60	# of 1-Sec Observations	12,178	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.43
Max Deceleration (mph/sec)	-12.83	# of Trips	258	Spec Pwr Freq (%): >0.3 hp/lb	3.19

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.607		
		Bin 0 % (braking)	12.852		
		Bin 1 % (idle)	20.134		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.087	Bin 21 % (25-50 mph, <0 kw/tonne)	7.131		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	9.312	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.487	Bin 33 % (>50 mph, <6 kw/tonne)	0.252
Bin 13 % (0-25 mph, 3-6 kw/tonne)	5.772	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.612		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	4.740	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.530	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.386
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.322	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.205		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.297		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.322	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.520
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.300	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.067
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.361	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.059
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.252	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Collector LOS E-F Driving (FC=17) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13						0.032																**0.032**
-12						0.064																**0.064**
-11																						
-10																						
-9			0.032																			**0.032**
-8				0.032	0.064																	**0.097**
-7			0.064		0.064	0.064			0.097													**0.290**
-6			0.129	0.129	0.161	0.032	0.032	0.032														**0.515**
-5			0.290	0.580	0.161	0.258	0.161	0.129														**1.578**
-4		0.547	0.708	0.901	0.547	0.354	0.386	0.129	0.064	0.032												**3.670**
-3		0.901	0.869	0.644	0.837	0.644	0.451	0.161	0.097	0.032												**4.636**
-2		2.222	0.934	0.869	0.708	0.547	0.386	0.515	0.193	0.193	0.032											**6.600**
-1	0.161	3.574	0.580	0.837	0.741	0.354	0.386	0.708	0.708	0.386	0.032											**8.467**
0	31.455	5.023	0.773	0.386	1.062	1.384	1.030	2.350	1.417	0.386	0.129	0.032										**45.428**
1	0.676	3.220	0.741	0.547	0.580	0.773	0.773	1.191	0.773	0.258	0.064	0.064										**9.659**
2	0.322	2.254	0.837	0.773	0.998	0.805	1.062	0.322	0.290	0.129	0.032											**7.824**
3	0.064	2.093	0.966	1.095	0.901	0.644	0.225	0.097	0.097													**6.182**
4		1.030	0.869	0.741	0.483	0.161	0.064															**3.348**
5		0.386	0.386	0.193	0.097	0.064																**1.127**
6		0.097	0.064	0.129		0.032																**0.322**
7			0.032																			**0.032**
8			0.064																			**0.064**
9		0.032																				**0.032**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**32.679**	**21.378**	**8.339**	**7.856**	**7.405**	**6.214**	**4.958**	**5.634**	**3.735**	**1.417**	**0.290**	**0.097**										**100.000**

Summary Statistics

Avg Speed (mph)	11.41	Time at Idle (%)	32.679	Avg Specific PKE (hp-sec/lb)	1.69
Min Speed (mph)	0.00	Time at Cruise (%)	31.262	Avg Total Specific Power (hp/lb)	0.0387
Max Speed (mph)	56.02	Time in Accel (%)	18.545	Avg Non-Zero Specific Power (hp/lb)	0.1027
Avg Non-Idle Speed (mph)	16.95	Time in Decel (%)	17.515	Max Specific Power (hp/lb)	0.6832
Avg Cruise Speed (mph)	18.28	Avg Trip Length (miles)	0.139	Spec Pwr Freq (%): 0 hp/lb	62.33
Avg Acceleration (mph/sec)	1.74	Avg Trip Time (min)	0.729	Spec Pwr Freq (%): >0-0.1 hp/lb	22.76
Max Acceleration (mph/sec)	9.37	# Stops per Mile	5.992	Spec Pwr Freq (%): >0.1-0.2 hp/lb	7.47
Avg Deceleration (mph/sec)	-1.91	# of 1-Sec Observations	3,106	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.83
Max Deceleration (mph/sec)	-13.14	# of Trips	71	Spec Pwr Freq (%): >0.3 hp/lb	2.61

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.344		
		Bin 0 % (braking)	14.234		
		Bin 1 % (idle)	38.979		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.830	Bin 21 % (25-50 mph, <0 kw/tonne)	3.921		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	8.962	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.998	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.283	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.339		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.965	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.549	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.033
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.933	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.384		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.933		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.241	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.054	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.132
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.198	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.033	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Local LOS A-C Driving (FC=19) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12				0.003		0.001																**0.004**
-11					0.003		0.001		0.001													**0.006**
-10																						
-9			0.003		0.001			0.001														**0.006**
-8			0.003	0.003	0.001		0.004	0.001														**0.012**
-7		0.004	0.003	0.008	0.008	0.012	0.003			0.001												**0.040**
-6		0.006	0.021	0.080	0.054	0.040	0.014	0.003	0.003													**0.220**
-5		0.019	0.200	0.417	0.307	0.148	0.052	0.017	0.006	0.001												**1.167**
-4		0.206	1.062	1.199	0.786	0.378	0.144	0.064	0.012	0.007	0.001											**3.859**
-3		1.126	1.583	1.458	1.522	0.801	0.305	0.113	0.061	0.023	0.007	0.001										**7.001**
-2		2.094	1.208	1.583	1.674	1.243	0.512	0.185	0.090	0.037	0.023	0.004										**8.654**
-1	0.004	2.595	0.952	1.407	1.797	2.085	1.191	0.475	0.229	0.108	0.090	0.059	0.014	0.003								**11.009**
0	6.268	2.530	1.115	1.870	3.665	6.903	4.746	1.684	0.573	0.365	0.340	0.260	0.113	0.077								**30.508**
1	0.417	2.033	1.431	2.387	3.442	3.461	1.562	0.608	0.280	0.163	0.080	0.033	0.004									**15.901**
2	0.438	2.877	2.353	3.134	2.294	0.909	0.349	0.167	0.075	0.033	0.006											**12.634**
3	0.249	2.170	1.689	1.463	0.798	0.280	0.108	0.036	0.019	0.006	0.001											**6.819**
4	0.054	0.505	0.537	0.309	0.189	0.090	0.032	0.010														**1.726**
5	0.007	0.080	0.110	0.075	0.028	0.014	0.004															**0.318**
6	0.004	0.015	0.025	0.012	0.006	0.004	0.001		0.001													**0.069**
7	0.004	0.010	0.006	0.001																		**0.021**
8	0.003	0.006	0.003		0.001																	**0.012**
9	0.001	0.001	0.001	0.003																		**0.007**
10		0.001																				**0.001**
11		0.001	0.003	0.001																		**0.006**
12			0.001																			**0.001**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.448**	**16.279**	**12.309**	**15.413**	**16.576**	**16.370**	**9.028**	**3.363**	**1.351**	**0.744**	**0.548**	**0.358**	**0.131**	**0.080**								**100.000**

Summary Statistics

Avg Speed (mph)	16.88	Time at Idle (%)	7.448	Avg Specific PKE (hp-sec/lb)	1.85
Min Speed (mph)	0.00	Time at Cruise (%)	50.708	Avg Total Specific Power (hp/lb)	0.0431
Max Speed (mph)	64.65	Time in Accel (%)	20.859	Avg Non-Zero Specific Power (hp/lb)	0.0890
Avg Non-Idle Speed (mph)	18.23	Time in Decel (%)	20.985	Max Specific Power (hp/lb)	1.0545
Avg Cruise Speed (mph)	21.25	Avg Trip Length (miles)	0.201	Spec Pwr Freq (%): 0 hp/lb	51.51
Avg Acceleration (mph/sec)	1.44	Avg Trip Time (min)	0.714	Spec Pwr Freq (%): >0-0.1 hp/lb	30.46
Max Acceleration (mph/sec)	12.45	# Stops per Mile	2.902	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.74
Avg Deceleration (mph/sec)	-1.68	# of 1-Sec Observations	72,405	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.29
Max Deceleration (mph/sec)	-11.82	# of Trips	1,690	Spec Pwr Freq (%): >0.3 hp/lb	1.01

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.827		
		Bin 0 % (braking)	16.582		
		Bin 1 % (idle)	8.990		
Bin 11 % (0-25 mph, <0 kw/tonne)	13.559	Bin 21 % (25-50 mph, <0 kw/tonne)	5.647		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	14.082	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.754	Bin 33 % (>50 mph, <6 kw/tonne)	0.250
Bin 13 % (0-25 mph, 3-6 kw/tonne)	12.044	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.320		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	8.005	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.688	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.363
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.494	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.438		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.819		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.259	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.204
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.371	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.030
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.076	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.003
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.018	Bin 40 % (>50 mph, >=30 kw/tonne)	0.004

California 2000 Urban Local LOS D-F Driving (FC=19) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13				0.011																		**0.011**
-12																						
-11																						
-10			0.011	0.011																		**0.022**
-9						0.011																**0.011**
-8			0.022			0.011																**0.033**
-7		0.011	0.011	0.022	0.076	0.011	0.022															**0.152**
-6		0.033	0.054	0.130	0.163	0.065	0.022															**0.467**
-5		0.065	0.380	0.630	0.369	0.217	0.098	0.011		0.011												**1.780**
-4		0.488	1.140	0.923	0.695	0.326	0.141	0.054	0.011													**3.778**
-3		1.444	1.520	1.520	1.053	0.608	0.239	0.065	0.011	0.011												**6.470**
-2		2.790	1.444	1.683	1.389	0.640	0.391	0.109	0.011	0.011												**8.467**
-1		4.114	1.075	1.726	1.976	1.324	0.662	0.315	0.109	0.011												**11.311**
0	13.016	5.656	1.715	2.280	3.419	3.843	2.518	0.564	0.239	0.065												**33.315**
1	0.478	3.376	1.791	2.898	2.768	2.063	0.803	0.326	0.239	0.054												**14.796**
2	0.488	3.430	2.366	2.681	1.509	0.695	0.152	0.043	0.011													**11.376**
3	0.185	2.160	1.520	1.075	0.619	0.130	0.033	0.011														**5.732**
4	0.065	0.651	0.467	0.250	0.119	0.011	0.011															**1.574**
5	0.043	0.098	0.119	0.119	0.011	0.011																**0.402**
6		0.087	0.054	0.033	0.011																	**0.185**
7	0.022	0.011	0.022	0.011																		**0.065**
8		0.054																				**0.054**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**14.297**	**24.468**	**13.710**	**16.001**	**14.177**	**9.965**	**5.091**	**1.498**	**0.630**	**0.163**												**100.000**

Summary Statistics

Avg Speed (mph)	12.31	Time at Idle (%)	14.297	Avg Specific PKE (hp-sec/lb)	0.96
Min Speed (mph)	0.00	Time at Cruise (%)	45.929	Avg Total Specific Power (hp/lb)	0.0336
Max Speed (mph)	44.69	Time in Accel (%)	18.585	Avg Non-Zero Specific Power (hp/lb)	0.0769
Avg Non-Idle Speed (mph)	14.36	Time in Decel (%)	21.190	Max Specific Power (hp/lb)	0.5874
Avg Cruise Speed (mph)	15.71	Avg Trip Length (miles)	0.098	Spec Pwr Freq (%): 0 hp/lb	56.26
Avg Acceleration (mph/sec)	1.45	Avg Trip Time (min)	0.478	Spec Pwr Freq (%): >0-0.1 hp/lb	30.24
Max Acceleration (mph/sec)	8.46	# Stops per Mile	5.906	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.70
Avg Deceleration (mph/sec)	-1.79	# of 1-Sec Observations	9,212	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.31
Max Deceleration (mph/sec)	-13.30	# of Trips	321	Spec Pwr Freq (%): >0.3 hp/lb	0.48

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.294		
		Bin 0 % (braking)	16.567		
		Bin 1 % (idle)	17.917		
Bin 11 % (0-25 mph, <0 kw/tonne)	14.903	Bin 21 % (25-50 mph, <0 kw/tonne)	2.666		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	17.985	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.238	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	12.158	Bin 23 % (25-50 mph, 3-6 kw/tonne)	1.980		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	6.231	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.642	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.000
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.306	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.215		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.597		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.551	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.023	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.000
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.023	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.000	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Freeway On-Ramp Driving SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13				0.006			0.006															**0.012**
-12																						
-11			0.006		0.006																	**0.012**
-10																						
-9			0.006	0.012			0.006		0.012		0.006											**0.041**
-8				0.017	0.012	0.006		0.006					0.006									**0.047**
-7			0.017	0.029	0.029	0.012	0.012	0.006	0.006													**0.111**
-6			0.029	0.047	0.076	0.041	0.029	0.017	0.017					0.006								**0.262**
-5		0.041	0.099	0.122	0.105	0.111	0.064	0.052	0.006	0.017												**0.618**
-4		0.105	0.221	0.233	0.210	0.221	0.198	0.047	0.047	0.012	0.006	0.006	0.006									**1.311**
-3		0.280	0.443	0.356	0.356	0.391	0.309	0.274	0.105	0.105	0.064	0.006										**2.687**
-2	0.006	0.682	0.437	0.420	0.530	0.542	0.501	0.530	0.431	0.251	0.111	0.070	0.017									**4.529**
-1		2.046	0.758	0.612	0.624	0.810	0.868	0.915	0.933	0.431	0.408	0.361	0.105	0.070	0.017							**8.958**
0	6.388	5.729	2.157	0.927	1.078	1.760	1.906	1.760	1.929	1.480	1.451	1.166	0.764	0.560	0.332	0.041	0.023	0.023				**29.475**
1	0.216	2.361	0.968	1.008	1.014	1.609	2.075	1.958	2.419	2.541	2.728	1.859	0.903	0.367	0.099	0.012	0.023					**22.160**
2	0.152	0.979	0.490	0.863	0.944	1.125	1.486	1.708	1.597	1.644	1.230	0.898	0.356	0.087	0.017							**13.575**
3	0.146	0.985	0.589	0.629	0.804	1.043	0.868	0.927	0.898	0.781	0.460	0.204	0.064	0.006								**8.405**
4	0.076	0.565	0.478	0.478	0.612	0.595	0.606	0.670	0.565	0.338	0.105	0.023	0.006									**5.117**
5	0.017	0.286	0.245	0.221	0.192	0.233	0.262	0.169	0.122	0.047												**1.795**
6	0.029	0.076	0.146	0.099	0.099	0.076	0.017	0.029	0.012													**0.583**
7	0.006	0.023	0.058	0.041	0.012	0.012				0.006	0.006											**0.163**
8		0.006	0.023	0.023	0.006							0.006										**0.064**
9		0.012	0.012		0.006			0.006														**0.035**
10		0.006	0.012																			**0.017**
11				0.006																		**0.006**
12									0.006													**0.006**
13			0.006	0.006																		**0.012**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.035**	**14.181**	**7.198**	**6.155**	**6.714**	**8.585**	**9.215**	**9.075**	**9.104**	**7.653**	**6.575**	**4.599**	**2.226**	**1.096**	**0.466**	**0.052**	**0.047**	**0.023**				**100.000**

Summary Statistics

Avg Speed (mph)	26.99	Time at Idle (%)	7.035	Avg Specific PKE (hp-sec/lb)	3.20
Min Speed (mph)	0.00	Time at Cruise (%)	52.393	Avg Total Specific Power (hp/lb)	0.1275
Max Speed (mph)	83.44	Time in Accel (%)	30.757	Avg Non-Zero Specific Power (hp/lb)	0.2037
Avg Non-Idle Speed (mph)	29.03	Time in Decel (%)	9.815	Max Specific Power (hp/lb)	2.0268
Avg Cruise Speed (mph)	29.04	Avg Trip Length (miles)	0.188	Spec Pwr Freq (%): 0 hp/lb	37.41
Avg Acceleration (mph/sec)	1.71	Avg Trip Time (min)	0.419	Spec Pwr Freq (%): >0-0.1 hp/lb	22.38
Max Acceleration (mph/sec)	13.21	# Stops per Mile	0.692	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.91
Avg Deceleration (mph/sec)	-1.32	# of 1-Sec Observations	17,157	Spec Pwr Freq (%): >0.2-0.3 hp/lb	11.16
Max Deceleration (mph/sec)	-12.86	# of Trips	683	Spec Pwr Freq (%): >0.3 hp/lb	16.15

EPA VSP (Vehicle Specific Power) Statistics

EPA Avg Veh Spec Pwr, VSP (kW/tonne) 7.656

		Bin 0 % (braking)	6.871		
		Bin 1 % (idle)	8.334		
Bin 11 % (0-25 mph, <0 kw/tonne)	7.691	Bin 21 % (25-50 mph, <0 kw/tonne)	5.445		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	12.729	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.841	Bin 33 % (>50 mph, <6 kw/tonne)	1.226
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.927	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.260		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.902	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.557	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.736
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.064	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.606		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.673		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	8.183	Bin 37 % (>50 mph, 12-18 kw/tonne)	3.096
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	5.967	Bin 38 % (>50 mph, 18-24 kw/tonne)	2.653
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	4.097	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.590
		Bin 30 % (25-50 mph, >=30 kw/tonne)	3.114	Bin 40 % (>50 mph, >=30 kw/tonne)	1.439

California 2000 Freeway Off-Ramp Driving SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14														0.005								**0.005**
-13																						
-12																						
-11																						
-10					0.005	0.005	0.005															**0.015**
-9					0.010	0.010	0.005	0.005			0.010											**0.040**
-8				0.010		0.015	0.030	0.005	0.010	0.015												**0.085**
-7			0.005	0.020	0.050	0.050	0.045	0.025	0.015	0.015	0.005	0.005										**0.234**
-6		0.005	0.040	0.154	0.209	0.174	0.144	0.089	0.085	0.050	0.020	0.005	0.010									**0.984**
-5		0.035	0.189	0.418	0.343	0.348	0.333	0.308	0.244	0.129	0.094	0.050	0.025	0.005								**2.520**
-4		0.154	0.661	0.587	0.621	0.656	0.636	0.656	0.522	0.373	0.323	0.169	0.060	0.035								**5.453**
-3		0.597	0.592	0.517	0.641	0.825	0.840	0.915	0.905	0.716	0.606	0.403	0.189	0.075	0.015							**7.834**
-2		1.074	0.437	0.467	0.587	0.815	0.885	0.949	1.183	1.307	1.104	0.731	0.457	0.085	0.035							**10.116**
-1		2.088	0.502	0.408	0.547	0.775	1.123	1.133	1.586	1.884	2.043	1.596	1.004	0.542	0.169	0.030						**15.430**
0	17.910	3.345	0.641	0.592	0.388	1.024	1.675	1.437	1.705	1.725	1.740	0.910	1.282	1.491	0.964	0.065						**36.894**
1	0.258	1.814	0.537	0.681	0.507	0.731	0.860	0.860	0.631	0.398	0.373	0.214	0.179	0.099								**8.142**
2	0.030	1.287	0.621	0.746	0.785	0.696	0.621	0.388	0.214	0.174	0.104	0.025	0.010									**5.702**
3		1.143	0.621	0.641	0.587	0.492	0.229	0.114	0.045	0.030	0.020	0.005										**3.927**
4	0.005	0.467	0.507	0.303	0.333	0.174	0.070	0.055														**1.914**
5		0.080	0.129	0.109	0.055	0.040	0.030					0.005										**0.447**
6		0.060	0.030	0.035	0.015	0.015		0.005					0.005									**0.164**
7	0.005	0.010	0.010	0.010		0.010																**0.045**
8		0.015	0.005	0.010			0.005															**0.035**
9		0.005																				**0.005**
10			0.005																			**0.005**
11																						
12			0.005																			**0.005**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**18.208**	**12.179**	**5.538**	**5.707**	**5.682**	**6.855**	**7.536**	**6.944**	**7.143**	**6.815**	**6.442**	**4.116**	**3.221**	**2.336**	**1.183**	**0.094**						**100.000**

Summary Statistics

Avg Speed (mph)	25.07	Time at Idle (%)	18.209	Avg Specific PKE (hp-sec/lb)	1.01
Min Speed (mph)	0.00	Time at Cruise (%)	40.274	Avg Total Specific Power (hp/lb)	0.0341
Max Speed (mph)	74.71	Time in Accel (%)	12.487	Avg Non-Zero Specific Power (hp/lb)	0.1122
Avg Non-Idle Speed (mph)	30.64	Time in Decel (%)	29.030	Max Specific Power (hp/lb)	1.4116
Avg Cruise Speed (mph)	32.82	Avg Trip Length (miles)	0.207	Spec Pwr Freq (%): 0 hp/lb	69.57
Avg Acceleration (mph/sec)	1.42	Avg Trip Time (min)	0.495	Spec Pwr Freq (%): >0-0.1 hp/lb	17.46
Max Acceleration (mph/sec)	11.98	# Stops per Mile	1.457	Spec Pwr Freq (%): >0.1-0.2 hp/lb	6.71
Avg Deceleration (mph/sec)	-1.89	# of 1-Sec Observations	20,117	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.70
Max Deceleration (mph/sec)	-14.15	# of Trips	678	Spec Pwr Freq (%): >0.3 hp/lb	2.56

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	-1.838		
		Bin 0 % (braking)	22.007		
		Bin 1 % (idle)	22.182		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.489	Bin 21 % (25-50 mph, <0 kw/tonne)	10.402		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.111	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.395	Bin 33 % (>50 mph, <6 kw/tonne)	5.695
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.318	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.696		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.397	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.089	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.120
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.672	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.852		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.042		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.248	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.831
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.003	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.700
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.340	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.206
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.149	Bin 40 % (>50 mph, >=30 kw/tonne)	0.057

California 2000 Freeway-to-Freeway Transition Ramp Driving SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11											0.014											**0.014**
-10																						
-9									0.014													**0.014**
-8						0.014		0.014														**0.028**
-7												0.028										**0.028**
-6				0.014		0.028		0.028									0.014					**0.083**
-5			0.014		0.014	0.014	0.042	0.028	0.069	0.055	0.014	0.028	0.014									**0.291**
-4		0.014	0.069		0.014	0.028	0.042	0.042	0.069	0.069	0.083	0.028	0.014	0.014								**0.484**
-3		0.069	0.028	0.055	0.055	0.042	0.055	0.069	0.111	0.138	0.097	0.166	0.111	0.042	0.014	0.014						**1.066**
-2		0.332	0.208	0.249	0.166	0.208	0.263	0.318	0.208	0.415	0.484	0.512	0.305	0.125	0.055							**3.848**
-1		2.727	0.969	0.568	0.457	0.484	0.554	0.568	0.706	1.190	2.063	2.173	2.076	1.343	1.024	0.457	0.014					**17.373**
0	2.852	7.309	2.395	1.274	0.664	0.595	0.540	1.260	1.647	3.378	5.274	5.939	6.160	5.717	5.191	2.326		0.028				**52.547**
1	0.055	3.156	0.941	0.623	0.457	0.568	0.609	0.983	1.232	1.495	2.353	2.173	1.717	1.495	0.872	0.235	0.014					**18.978**
2		0.554	0.166	0.194	0.180	0.166	0.401	0.194	0.291	0.388	0.540	0.401	0.277	0.249	0.138		0.014					**4.153**
3		0.014	0.014	0.069	0.028	0.042	0.055	0.125	0.069	0.083	0.069	0.042	0.055	0.014	0.014							**0.692**
4		0.028	0.014	0.014	0.042	0.014	0.014	0.014	0.014		0.014	0.014		0.014								**0.194**
5				0.028	0.028	0.028																**0.083**
6			0.014	0.014	0.028										0.014							**0.069**
7															0.014							**0.014**
8		0.014																				**0.014**
9			0.014																			**0.014**
10																						
11																						
12													0.014									**0.014**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.907**	**14.217**	**4.845**	**3.101**	**2.132**	**2.229**	**2.575**	**3.641**	**4.430**	**7.212**	**11.005**	**11.503**	**10.742**	**9.012**	**7.337**	**3.032**	**0.055**	**0.028**				**100.000**

Summary Statistics

Avg Speed (mph)	41.14	Time at Idle (%)	2.907	Avg Specific PKE (hp-sec/lb)	2.16
Min Speed (mph)	0.00	Time at Cruise (%)	76.744	Avg Total Specific Power (hp/lb)	0.0559
Max Speed (mph)	83.05	Time in Accel (%)	9.579	Avg Non-Zero Specific Power (hp/lb)	0.1134
Avg Non-Idle Speed (mph)	42.38	Time in Decel (%)	10.770	Max Specific Power (hp/lb)	3.1551
Avg Cruise Speed (mph)	40.43	Avg Trip Length (miles)	0.442	Spec Pwr Freq (%): 0 hp/lb	50.72
Avg Acceleration (mph/sec)	0.69	Avg Trip Time (min)	0.644	Spec Pwr Freq (%): >0-0.1 hp/lb	28.59
Max Acceleration (mph/sec)	12.32	# Stops per Mile	0.315	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.07
Avg Deceleration (mph/sec)	-0.76	# of 1-Sec Observations	7,224	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.50
Max Deceleration (mph/sec)	-11.09	# of Trips	187	Spec Pwr Freq (%): >0.3 hp/lb	4.13

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.477		
		Bin 0 % (braking)	3.297		
		Bin 1 % (idle)	4.633		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.086	Bin 21 % (25-50 mph, <0 kw/tonne)	4.562		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	13.145	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.203	Bin 33 % (>50 mph, <6 kw/tonne)	12.662
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.478	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.956		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.455	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.544	Bin 35 % (>50 mph, 6-12 kw/tonne)	11.553
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.242	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.942		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.284		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.064	Bin 37 % (>50 mph, 12-18 kw/tonne)	12.719
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.648	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.125
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.625	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.174
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.199	Bin 40 % (>50 mph, >=30 kw/tonne)	1.407

Sacramento 2004 Diamond-Downgrade On-Ramp Driving (D-D) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7					0.137																	**0.137**
-6			0.068	0.068		0.068																**0.205**
-5		0.137				0.068	0.068															**0.274**
-4			0.068			0.068																**0.137**
-3		0.205	0.137	0.068	0.068			0.068		0.068												**0.616**
-2		0.274		0.068	0.411	0.137	0.205	0.479	0.137	0.137	0.068											**1.916**
-1		0.342		0.068	0.205	0.068	1.369	0.548	0.342	0.205	0.274	0.342	0.205									**3.970**
0	3.217	0.274	0.068	0.342	0.205	0.274	2.943	1.574	0.890	1.780	1.985	2.875	3.559	0.890	0.068							**20.945**
1	0.411			0.342	0.411	0.342	2.806	2.259	2.464	4.449	6.229	5.886	3.285	0.411								**29.295**
2		0.274	0.205	0.274	0.753	0.684	2.533	3.559	4.244	4.791	4.107	2.053	1.095	0.137								**24.709**
3	0.068	0.616	0.274	0.342	1.164	1.437	1.232	1.985	1.985	0.753	0.479	0.411	0.068	0.137								**10.951**
4		0.479	0.548	0.479	1.164	1.027	0.821	0.274		0.068		0.068										**4.928**
5		0.342	0.479	0.274	0.274	0.137	0.137	0.068														**1.711**
6		0.068		0.068																		**0.137**
7			0.068																			**0.068**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.696**	**3.012**	**1.916**	**2.396**	**4.791**	**4.312**	**12.115**	**10.815**	**10.062**	**12.252**	**13.142**	**11.636**	**8.214**	**1.574**	**0.068**							**100.000**

Summary Statistics

Avg Speed (mph)	38.61	Time at Idle (%)	3.696	Avg Specific PKE (hp-sec/lb)	4.52
Min Speed (mph)	0.00	Time at Cruise (%)	46.680	Avg Total Specific Power (hp/lb)	0.1701
Max Speed (mph)	70.09	Time in Accel (%)	46.133	Avg Non-Zero Specific Power (hp/lb)	0.2126
Avg Non-Idle Speed (mph)	40.10	Time in Decel (%)	3.491	Max Specific Power (hp/lb)	0.7618
Avg Cruise Speed (mph)	44.01	Avg Trip Length (miles)	0.285	Spec Pwr Freq (%): 0 hp/lb	19.99
Avg Acceleration (mph/sec)	1.75	Avg Trip Time (min)	0.443	Spec Pwr Freq (%): >0-0.1 hp/lb	17.86
Max Acceleration (mph/sec)	6.69	# Stops per Mile	0.191	Spec Pwr Freq (%): >0.1-0.2 hp/lb	20.05
Avg Deceleration (mph/sec)	-1.24	# of 1-Sec Observations	1,461	Spec Pwr Freq (%): >0.2-0.3 hp/lb	21.90
Max Deceleration (mph/sec)	-7.03	# of Trips	55	Spec Pwr Freq (%): >0.3 hp/lb	20.19

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.964		
		Bin 0 % (braking)	1.565		
		Bin 1 % (idle)	4.267		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.782	Bin 21 % (25-50 mph, <0 kw/tonne)	3.627		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.209	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.414	Bin 33 % (>50 mph, <6 kw/tonne)	2.703
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.351	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.196		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.636	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.054	Bin 35 % (>50 mph, 6-12 kw/tonne)	6.259
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.992	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.397		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.983		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	14.509	Bin 37 % (>50 mph, 12-18 kw/tonne)	7.539
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	13.158	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.899
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.774	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.272
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.711	Bin 40 % (>50 mph, >=30 kw/tonne)	2.703

Sacramento 2004 Diamond-Level On-Ramp Driving (D-L) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9					0.010		0.010															**0.020**
-8																						
-7			0.010	0.031	0.031	0.010	0.020	0.010														**0.112**
-6			0.020	0.031	0.072	0.051	0.041	0.031														**0.245**
-5		0.020	0.051	0.163	0.123	0.051	0.072	0.041	0.051	0.010												**0.582**
-4		0.051	0.123	0.082	0.102	0.255	0.163	0.133	0.041	0.031												**0.981**
-3		0.102	0.112	0.102	0.082	0.204	0.286	0.123	0.112	0.061	0.061	0.010										**1.257**
-2		0.368	0.296	0.194	0.184	0.194	0.296	0.235	0.123	0.123	0.061	0.051	0.031									**2.155**
-1		1.134	0.163	0.174	0.215	0.327	0.521	0.930	0.593	0.603	0.358	0.235	0.235	0.143								**5.629**
0	1.859	1.900	0.276	0.368	0.419	0.715	1.645	2.871	3.157	3.146	3.463	3.412	2.227	1.195	0.153	0.010	0.010					**26.826**
1	0.123	1.032	0.184	0.398	0.449	0.899	1.767	3.310	5.057	6.252	6.752	5.333	2.656	0.654	0.102	0.082	0.010					**35.060**
2	0.031	0.276	0.204	0.347	0.715	1.103	1.583	2.135	2.411	2.298	1.788	1.348	0.817	0.143	0.020							**15.221**
3	0.031	0.337	0.347	0.490	0.879	0.991	1.113	1.134	0.817	0.541	0.398	0.296	0.072	0.041	0.010							**7.498**
4		0.296	0.276	0.347	0.552	0.541	0.429	0.215	0.163	0.051	0.020											**2.891**
5		0.245	0.215	0.266	0.123	0.092	0.031	0.020	0.010	0.010												**1.011**
6		0.123	0.163	0.061	0.031																	**0.378**
7		0.010	0.061	0.020																		**0.092**
8		0.020		0.010																		**0.031**
9		0.010																				**0.010**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.043**	**5.925**	**2.503**	**3.085**	**3.984**	**5.435**	**7.978**	**11.186**	**12.534**	**13.127**	**12.902**	**10.685**	**6.037**	**2.176**	**0.286**	**0.092**	**0.020**					**100.000**

Summary Statistics

Avg Speed (mph)	37.96	Time at Idle (%)	2.043	Avg Specific PKE (hp-sec/lb)	4.63
Min Speed (mph)	0.00	Time at Cruise (%)	61.651	Avg Total Specific Power (hp/lb)	0.1498
Max Speed (mph)	78.85	Time in Accel (%)	30.575	Avg Non-Zero Specific Power (hp/lb)	0.2016
Avg Non-Idle Speed (mph)	38.75	Time in Decel (%)	5.731	Max Specific Power (hp/lb)	0.7697
Avg Cruise Speed (mph)	40.91	Avg Trip Length (miles)	0.326	Spec Pwr Freq (%): 0 hp/lb	25.69
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.515	Spec Pwr Freq (%): >0-0.1 hp/lb	18.53
Max Acceleration (mph/sec)	8.63	# Stops per Mile	0.194	Spec Pwr Freq (%): >0.1-0.2 hp/lb	22.66
Avg Deceleration (mph/sec)	-1.30	# of 1-Sec Observations	9,789	Spec Pwr Freq (%): >0.2-0.3 hp/lb	16.95
Max Deceleration (mph/sec)	-9.04	# of Trips	317	Spec Pwr Freq (%): >0.3 hp/lb	16.17

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.366		
		Bin 0 % (braking)	4.075		
		Bin 1 % (idle)	2.650		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.808	Bin 21 % (25-50 mph, <0 kw/tonne)	3.199		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	3.758	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.558	Bin 33 % (>50 mph, <6 kw/tonne)	1.468
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.425	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.550		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.668	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.166	Bin 35 % (>50 mph, 6-12 kw/tonne)	4.878
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.594	Bin 25 % (25-50 mph, 9-12 kw/tonne)	8.351		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.262		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	14.802	Bin 37 % (>50 mph, 12-18 kw/tonne)	8.119
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	7.739	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.408
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	3.114	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.167
		Bin 30 % (25-50 mph, >=30 kw/tonne)	1.109	Bin 40 % (>50 mph, >=30 kw/tonne)	2.133

Sacramento 2004 Diamond-Upgrade On-Ramp Driving (D-U) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8					0.044																	**0.044**
-7				0.044			0.044															**0.088**
-6					0.044			0.044														**0.088**
-5			0.088	0.088	0.044	0.131	0.044															**0.394**
-4		0.044	0.044	0.175	0.219	0.088	0.219	0.088	0.044													**0.919**
-3		0.175	0.219	0.175	0.438	0.394	0.263	0.219														**1.883**
-2		0.657	0.306	0.219	0.219	0.394	0.306	0.482	0.263													**2.846**
-1		0.701	0.088	0.088	0.175	0.482	0.657	0.963	0.701	0.569	0.394	0.131	0.175									**5.123**
0	4.685	1.751	0.044	0.219	0.525	0.306	1.708	1.226	2.758	4.159	2.715	1.970	1.051	0.044								**23.161**
1	0.175	0.657	0.219	0.394	0.701	1.007	2.145	4.335	5.035	5.298	4.116	2.496	0.701	0.131								**27.408**
2		0.394	0.219	0.569	1.138	1.970	3.678	4.159	4.028	3.327	2.320	1.357	0.131									**23.292**
3		0.569	0.263	1.095	1.489	2.583	1.708	0.919	0.525	0.044	0.044											**9.238**
4		0.394	0.525	0.438	1.138	0.832	0.350	0.131														**3.809**
5		0.306	0.219	0.306	0.175	0.044																**1.051**
6		0.131	0.175	0.131	0.044																	**0.482**
7		0.044	0.131																			**0.175**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**4.860**	**5.823**	**2.539**	**3.940**	**6.392**	**8.231**	**11.121**	**12.566**	**13.354**	**13.398**	**9.588**	**5.954**	**2.058**	**0.175**								**100.000**

Summary Statistics

Avg Speed (mph)	32.89	Time at Idle (%)	4.860	Avg Specific PKE (hp-sec/lb)	5.26
Min Speed (mph)	0.00	Time at Cruise (%)	49.825	Avg Total Specific Power (hp/lb)	0.1865
Max Speed (mph)	65.58	Time in Accel (%)	38.879	Avg Non-Zero Specific Power (hp/lb)	0.2618
Avg Non-Idle Speed (mph)	34.57	Time in Decel (%)	6.436	Max Specific Power (hp/lb)	0.6163
Avg Cruise Speed (mph)	38.78	Avg Trip Length (miles)	0.258	Spec Pwr Freq (%): 0 hp/lb	28.77
Avg Acceleration (mph/sec)	1.73	Avg Trip Time (min)	0.470	Spec Pwr Freq (%): >0-0.1 hp/lb	7.53
Max Acceleration (mph/sec)	7.30	# Stops per Mile	0.096	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.49
Avg Deceleration (mph/sec)	-1.40	# of 1-Sec Observations	2,284	Spec Pwr Freq (%): >0.2-0.3 hp/lb	21.02
Max Deceleration (mph/sec)	-7.71	# of Trips	81	Spec Pwr Freq (%): >0.3 hp/lb	28.20

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.519		
		Bin 0 % (braking)	4.494		
		Bin 1 % (idle)	5.720		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.134	Bin 21 % (25-50 mph, <0 kw/tonne)	2.587		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	3.087	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.680	Bin 33 % (>50 mph, <6 kw/tonne)	0.590
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.498	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.904		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.134	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.630	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.769
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.542	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.311		
Bin 16 % (0-25 mph, >=12 kw/tonne)	5.765		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	16.841	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.406
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	17.976	Bin 38 % (>50 mph, 18-24 kw/tonne)	3.178
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	6.037	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.542
		Bin 30 % (25-50 mph, >=30 kw/tonne)	1.089	Bin 40 % (>50 mph, >=30 kw/tonne)	1.089

Sacramento 2004 Loop-Downgrade On-Ramp Driving (L-D) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8				0.024	0.024	0.048	0.024															**0.121**
-7			0.024					0.024														**0.048**
-6			0.048	0.048	0.121	0.048		0.024														**0.290**
-5			0.097	0.097	0.145	0.121	0.024															**0.483**
-4		0.072	0.072	0.072	0.097	0.121	0.072		0.024													**0.531**
-3		0.097	0.121	0.072	0.097	0.169	0.386	0.531	0.048	0.024												**1.546**
-2		0.266	0.242	0.072	0.169	0.411	1.498	1.159	0.411	0.024												**4.251**
-1		1.522	0.193	0.024	0.121	0.845	3.478	2.391	0.725	0.145		0.072										**9.517**
0	1.014	2.705	0.459	0.024	0.362	1.932	13.937	5.966	1.256	0.386	0.845	0.797	0.845	0.676	0.024							**31.232**
1	0.121	1.159	0.097		0.314	2.464	9.058	6.643	1.570	0.507	0.290	0.507	0.386	0.411								**23.527**
2		0.242	0.048	0.048	0.048	0.217	1.039	3.357	2.536	1.208	1.014	0.990	0.845	0.145								**11.739**
3	0.024	0.121	0.145	0.072	0.145	0.386	0.411	1.594	2.826	3.140	2.391	1.715	0.604									**13.575**
4		0.145	0.048	0.072	0.217	0.145	0.048	0.097	0.411	0.580	0.242	0.048										**2.053**
5		0.121	0.048	0.072	0.024		0.024	0.072	0.048		0.048											**0.459**
6		0.121	0.048	0.121	0.072	0.024		0.024		0.024												**0.435**
7		0.048	0.048	0.072	0.024																	**0.193**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**1.159**	**6.618**	**1.739**	**0.894**	**1.981**	**6.932**	**30.000**	**21.884**	**9.855**	**6.039**	**4.831**	**4.130**	**2.681**	**1.232**	**0.024**							**100.000**

Summary Statistics

Avg Speed (mph)	33.12	Time at Idle (%)	1.159	Avg Specific PKE (hp-sec/lb)	4.03
Min Speed (mph)	0.00	Time at Cruise (%)	62.343	Avg Total Specific Power (hp/lb)	0.1412
Max Speed (mph)	67.85	Time in Accel (%)	29.227	Avg Non-Zero Specific Power (hp/lb)	0.2007
Avg Non-Idle Speed (mph)	33.51	Time in Decel (%)	7.271	Max Specific Power (hp/lb)	1.1262
Avg Cruise Speed (mph)	30.68	Avg Trip Length (miles)	0.263	Spec Pwr Freq (%): 0 hp/lb	29.64
Avg Acceleration (mph/sec)	1.48	Avg Trip Time (min)	0.476	Spec Pwr Freq (%): >0-0.1 hp/lb	35.31
Max Acceleration (mph/sec)	7.24	# Stops per Mile	0.184	Spec Pwr Freq (%): >0.1-0.2 hp/lb	6.88
Avg Deceleration (mph/sec)	-1.25	# of 1-Sec Observations	4,140	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.09
Max Deceleration (mph/sec)	-8.38	# of Trips	145	Spec Pwr Freq (%): >0.3 hp/lb	22.08

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.796		
		Bin 0 % (braking)	3.830		
		Bin 1 % (idle)	1.777		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.631	Bin 21 % (25-50 mph, <0 kw/tonne)	13.242		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	3.755	Bin 22 % (25-50 mph, 0-3 kw/tonne)	16.996	Bin 33 % (>50 mph, <6 kw/tonne)	0.100
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.576	Bin 23 % (25-50 mph, 3-6 kw/tonne)	11.940		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.601	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.207	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.503
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.250	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.329		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.026		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.582	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.651
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	6.083	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.826
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	4.330	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.076
		Bin 30 % (25-50 mph, >=30 kw/tonne)	6.058	Bin 40 % (>50 mph, >=30 kw/tonne)	5.632

Sacramento 2004 Loop-Level On-Ramp Driving (L-L) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.044																		**0.044**
-8						0.044																**0.044**
-7					0.044																	**0.044**
-6				0.044	0.044	0.044	0.044															**0.176**
-5			0.088			0.088	0.044	0.044														**0.265**
-4		0.044	0.176	0.221	0.221	0.044	0.044		0.044	0.088	0.044											**0.926**
-3		0.176	0.265	0.044	0.088	0.265	0.088	0.221	0.176		0.044											**1.367**
-2		0.221	0.132	0.221	0.221	0.221	0.926	1.147	0.573	0.221	0.088	0.088	0.044									**4.102**
-1		1.720	0.485	0.265	0.265	0.794	1.588	2.250	0.662	0.485		0.132	0.132									**8.778**
0	1.103	6.661	1.412	0.353	1.147	1.191	8.161	7.190	1.985	4.235	2.161	1.279	1.191	1.147								**39.215**
1	0.044	1.809	0.309	0.353	0.662	1.676	5.249	4.940	1.853	1.456	1.147	1.853	1.632	0.353								**23.335**
2		0.265	0.309	0.088	0.309	0.573	0.838	2.867	2.117	1.367	1.191	0.926	0.353	0.044								**11.248**
3		0.441	0.221	0.265	0.485	0.176	0.221	0.662	1.412	1.632	1.412	0.618	0.176									**7.719**
4		0.221	0.132	0.309	0.088	0.176	0.221	0.132	0.132	0.176	0.132											**1.720**
5		0.088	0.088		0.044	0.132	0.044	0.044		0.044												**0.485**
6		0.088	0.044	0.088			0.044	0.088		0.044												**0.397**
7			0.044		0.044				0.044													**0.132**
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Totals	**1.147**	**11.734**	**3.705**	**2.294**	**3.661**	**5.426**	**17.512**	**19.585**	**8.999**	**9.749**	**6.220**	**4.896**	**3.529**	**1.544**								**100.000**

Summary Statistics

Avg Speed (mph)	32.36	Time at Idle (%)	1.147	Avg Specific PKE (hp-sec/lb)	4.41
Min Speed (mph)	0.00	Time at Cruise (%)	68.064	Avg Total Specific Power (hp/lb)	0.1147
Max Speed (mph)	66.71	Time in Accel (%)	23.688	Avg Non-Zero Specific Power (hp/lb)	0.1783
Avg Non-Idle Speed (mph)	32.74	Time in Decel (%)	7.102	Max Specific Power (hp/lb)	1.1909
Avg Cruise Speed (mph)	31.14	Avg Trip Length (miles)	0.345	Spec Pwr Freq (%): 0 hp/lb	35.69
Avg Acceleration (mph/sec)	1.27	Avg Trip Time (min)	0.640	Spec Pwr Freq (%): >0-0.1 hp/lb	29.91
Max Acceleration (mph/sec)	6.93	# Stops per Mile	0.147	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.03
Avg Deceleration (mph/sec)	-1.01	# of 1-Sec Observations	2,267	Spec Pwr Freq (%): >0.2-0.3 hp/lb	9.09
Max Deceleration (mph/sec)	-8.55	# of Trips	59	Spec Pwr Freq (%): >0.3 hp/lb	14.29

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	7.733		
		Bin 0 % (braking)	4.755		
		Bin 1 % (idle)	1.495		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.073	Bin 21 % (25-50 mph, <0 kw/tonne)	9.149		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	10.824	Bin 22 % (25-50 mph, 0-3 kw/tonne)	11.685	Bin 33 % (>50 mph, <6 kw/tonne)	0.544
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.812	Bin 23 % (25-50 mph, 3-6 kw/tonne)	9.692		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.906	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.159	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.038
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.951	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.027		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.495		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.703	Bin 37 % (>50 mph, 12-18 kw/tonne)	3.034
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	4.891	Bin 38 % (>50 mph, 18-24 kw/tonne)	3.442
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.808	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.449
		Bin 30 % (25-50 mph, >=30 kw/tonne)	3.442	Bin 40 % (>50 mph, >=30 kw/tonne)	2.627

Sacramento 2004 Loop-Upgrade On-Ramp Driving (L-U) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7																						
-6																						
-5																						
-4																						
-3		0.210						0.210														**0.419**
-2					0.210	0.629	1.048	1.258														**3.145**
-1					0.419	1.887	5.451	2.725	0.839	1.048												**12.369**
0		0.210		0.210	0.419	7.128	13.836	5.870	1.258	1.258	1.048	0.839										**32.075**
1				0.419	0.629	5.451	9.015	3.983	0.839	0.210		0.210										**20.755**
2				0.419	1.887	2.096	4.822	4.403	2.516	1.677	0.419											**18.239**
3		0.210	0.419	0.419	0.629	0.210	1.048	2.725	2.725	2.096	1.258											**11.740**
4			0.419						0.210	0.419	0.210											**1.258**
5																						
6																						
7																						
8																						
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19																						
20																						
Totals		**0.629**	**0.839**	**1.468**	**4.193**	**17.400**	**35.220**	**21.174**	**8.386**	**6.709**	**2.935**	**1.048**										**100.000**

Summary Statistics

Avg Speed (mph)	31.90	Time at Idle (%)	0.000	Avg Specific PKE (hp-sec/lb)	4.37
Min Speed (mph)	0.00	Time at Cruise (%)	65.199	Avg Total Specific Power (hp/lb)	0.1648
Max Speed (mph)	55.85	Time in Accel (%)	31.237	Avg Non-Zero Specific Power (hp/lb)	0.2381
Avg Non-Idle Speed (mph)	31.90	Time in Decel (%)	3.564	Max Specific Power (hp/lb)	0.7723
Avg Cruise Speed (mph)	31.10	Avg Trip Length (miles)	0.235	Spec Pwr Freq (%): 0 hp/lb	30.82
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.442	Spec Pwr Freq (%): >0-0.1 hp/lb	11.74
Max Acceleration (mph/sec)	4.11	# Stops per Mile	0.000	Spec Pwr Freq (%): >0.1-0.2 hp/lb	24.74
Avg Deceleration (mph/sec)	-0.81	# of 1-Sec Observations	477	Spec Pwr Freq (%): >0.2-0.3 hp/lb	12.58
Max Deceleration (mph/sec)	-3.08	# of Trips	18	Spec Pwr Freq (%): >0.3 hp/lb	20.13

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.234		
		Bin 0 % (braking)	0.436		
		Bin 1 % (idle)	0.000		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.654	Bin 21 % (25-50 mph, <0 kw/tonne)	7.407		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.089	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.190	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.961	Bin 23 % (25-50 mph, 3-6 kw/tonne)	10.458		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.704	Bin 24 % (25-50 mph, 6-9 kw/tonne)	17.429	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.307
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.614	Bin 25 % (25-50 mph, 9-12 kw/tonne)	10.893		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.743		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	10.893	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	10.022	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.218
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	5.882	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.218
		Bin 30 % (25-50 mph, >=30 kw/tonne)	5.229	Bin 40 % (>50 mph, >=30 kw/tonne)	0.654

Sacramento 2004 Ramp-Metered On-Ramp Driving (MON) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.035	0.035		0.035															**0.104**
-8				0.035	0.069	0.069	0.035															**0.208**
-7			0.069	0.139	0.139		0.069	0.035														**0.450**
-6			0.104	0.139	0.312	0.243	0.069	0.104														**0.970**
-5		0.069	0.347	0.416	0.416	0.312	0.312	0.069	0.069													**2.010**
-4		0.243	0.347	0.520	0.520	0.554	0.450	0.312	0.104	0.035												**3.084**
-3		0.450	0.658	0.416	0.450	0.866	0.728	0.450	0.243	0.069	0.069	0.035										**4.435**
-2		1.871	1.143	0.485	0.520	0.658	1.074	0.485	0.277	0.173	0.069	0.035										**6.791**
-1		6.480	0.520	0.347	0.243	0.485	1.629	1.559	0.589	0.728	0.173	0.104	0.035									**12.890**
0	2.564	11.920	1.005	0.554	0.312	0.658	3.812	2.911	1.836	1.525	0.866	0.520	0.901									**29.383**
1	0.450	5.301	0.347	0.277	0.243	0.520	1.525	1.802	1.490	1.386	0.901	0.485	0.277									**15.003**
2	0.069	1.040	0.243	0.243	0.520	1.213	1.490	1.351	0.970	0.970	0.728	0.520	0.035									**9.390**
3	0.069	0.832	0.243	0.277	0.901	1.455	1.490	1.005	0.554	0.312	0.208											**7.346**
4		0.728	0.312	0.277	0.832	0.693	0.277	0.173	0.139	0.035												**3.465**
5		0.554	0.277	0.520	0.173	0.104	0.035	0.035	0.069													**1.767**
6		0.658	0.416	0.450	0.243	0.035																**1.802**
7		0.139	0.416	0.173	0.035																	**0.762**
8		0.069		0.035																		**0.104**
9		0.035																				**0.035**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.153**	**30.388**	**6.445**	**5.336**	**5.960**	**7.866**	**13.028**	**10.291**	**6.341**	**5.232**	**3.015**	**1.698**	**1.247**									**100.000**

Summary Statistics

Avg Speed (mph)	21.32	Time at Idle (%)	3.153	Avg Specific PKE (hp-sec/lb)	4.63
Min Speed (mph)	0.00	Time at Cruise (%)	53.950	Avg Total Specific Power (hp/lb)	0.0883
Max Speed (mph)	61.97	Time in Accel (%)	24.809	Avg Non-Zero Specific Power (hp/lb)	0.1688
Avg Non-Idle Speed (mph)	22.02	Time in Decel (%)	18.087	Max Specific Power (hp/lb)	0.7886
Avg Cruise Speed (mph)	21.19	Avg Trip Length (miles)	0.311	Spec Pwr Freq (%): 0 hp/lb	47.68
Avg Acceleration (mph/sec)	1.83	Avg Trip Time (min)	0.875	Spec Pwr Freq (%): >0-0.1 hp/lb	24.01
Max Acceleration (mph/sec)	8.63	# Stops per Mile	1.346	Spec Pwr Freq (%): >0.1-0.2 hp/lb	8.18
Avg Deceleration (mph/sec)	-1.76	# of 1-Sec Observations	2,886	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.31
Max Deceleration (mph/sec)	-9.04	# of Trips	55	Spec Pwr Freq (%): >0.3 hp/lb	12.82

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.122		
		Bin 0 % (braking)	14.518		
		Bin 1 % (idle)	5.616		
Bin 11 % (0-25 mph, <0 kw/tonne)	14.129	Bin 21 % (25-50 mph, <0 kw/tonne)	6.605		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	15.931	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.698	Bin 33 % (>50 mph, <6 kw/tonne)	0.247
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.837	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.168		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.554	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.331	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.448
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.696	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.038		
Bin 16 % (0-25 mph, >=12 kw/tonne)	5.299		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.217	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.130
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	4.698	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.389
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.225	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.459
		Bin 30 % (25-50 mph, >=30 kw/tonne)	1.024	Bin 40 % (>50 mph, >=30 kw/tonne)	0.742

Sacramento 2004 Non-Metered On-Ramp Driving (MOF) SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8						0.006																**0.006**
-7					0.011	0.006	0.006	0.006														**0.029**
-6			0.011	0.017	0.029	0.011	0.017	0.011														**0.097**
-5		0.011	0.017	0.057	0.040	0.040	0.011	0.017	0.017	0.006												**0.217**
-4		0.017	0.063	0.029	0.051	0.103	0.068	0.034	0.023	0.023	0.006											**0.416**
-3		0.074	0.057	0.040	0.068	0.097	0.177	0.188	0.057	0.034	0.029											**0.821**
-2		0.097	0.091	0.108	0.154	0.205	0.548	0.610	0.240	0.086	0.040	0.034	0.023									**2.236**
-1		0.268	0.125	0.097	0.194	0.525	1.397	1.363	0.633	0.433	0.245	0.194	0.183	0.080								**5.738**
0	1.877	0.856	0.291	0.228	0.513	1.158	5.481	3.913	2.481	2.869	2.818	2.692	1.882	1.055	0.097	0.006	0.006					**28.223**
1	0.086	0.297	0.137	0.314	0.513	1.523	4.312	4.620	4.073	4.637	4.894	4.078	2.105	0.559	0.057	0.046	0.006					**32.255**
2	0.006	0.148	0.171	0.285	0.627	0.913	1.814	3.091	3.006	2.464	1.928	1.369	0.804	0.131	0.011							**16.769**
3	0.017	0.268	0.285	0.462	0.747	0.890	0.856	1.289	1.523	1.329	1.015	0.684	0.211	0.034	0.006							**9.617**
4		0.200	0.257	0.302	0.479	0.439	0.348	0.171	0.188	0.200	0.091	0.017										**2.692**
5		0.154	0.165	0.143	0.097	0.068	0.034	0.034	0.006	0.011	0.011											**0.724**
6		0.023	0.063	0.023			0.006	0.017		0.011												**0.143**
7			0.006		0.006				0.006													**0.017**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**1.985**	**2.413**	**1.740**	**2.105**	**3.531**	**5.983**	**15.075**	**15.366**	**12.252**	**12.104**	**11.077**	**9.069**	**5.208**	**1.859**	**0.171**	**0.051**	**0.011**					**100.000**

Summary Statistics

Avg Speed (mph)	38.06
Min Speed (mph)	0.00
Max Speed (mph)	78.85
Avg Non-Idle Speed (mph)	38.83
Avg Cruise Speed (mph)	39.59
Avg Acceleration (mph/sec)	1.44
Max Acceleration (mph/sec)	6.93
Avg Deceleration (mph/sec)	-1.01
Max Deceleration (mph/sec)	-7.71

Time at Idle (%)	1.985
Time at Cruise (%)	61.220
Time in Accel (%)	32.712
Time in Decel (%)	4.084
Avg Trip Length (miles)	0.299
Avg Trip Time (min)	0.471
# Stops per Mile	0.065
# of 1-Sec Observations	17,532
# of Trips	620

Avg Specific PKE (hp-sec/lb)	4.53
Avg Total Specific Power (hp/lb)	0.1602
Avg Non-Zero Specific Power (hp/lb)	0.2118
Max Specific Power (hp/lb)	1.1909
Spec Pwr Freq (%): 0 hp/lb	24.36
Spec Pwr Freq (%): >0-0.1 hp/lb	21.39
Spec Pwr Freq (%): >0.1-0.2 hp/lb	18.59
Spec Pwr Freq (%): >0.2-0.3 hp/lb	15.78
Spec Pwr Freq (%): >0.3 hp/lb	19.88

EPA VSP (Vehicle Specific Power) Statistics

EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.944
Bin 0 % (braking)	2.105
Bin 1 % (idle)	2.259
Bin 11 % (0-25 mph, <0 kw/tonne)	1.325
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.271
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.224
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.449
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.360
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.507
Bin 21 % (25-50 mph, <0 kw/tonne)	5.848
Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.444
Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.078
Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.510
Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.214
----------	0.000
Bin 27 % (25-50 mph, 12-18 kw/tonne)	13.139
Bin 28 % (25-50 mph, 18-24 kw/tonne)	9.331
Bin 29 % (25-50 mph, 24-30 kw/tonne)	3.938
Bin 30 % (25-50 mph, >=30 kw/tonne)	2.673
Bin 33 % (>50 mph, <6 kw/tonne)	1.177
Bin 35 % (>50 mph, 6-12 kw/tonne)	4.263
----------	0.000
Bin 37 % (>50 mph, 12-18 kw/tonne)	5.848
Bin 38 % (>50 mph, 18-24 kw/tonne)	5.162
Bin 39 % (>50 mph, 24-30 kw/tonne)	2.750
Bin 40 % (>50 mph, >=30 kw/tonne)	3.128

APPENDIX B

Driving Population SAFDs, VSP Distributions and Summary Statistics - Without Road Grade Compensation

California 2000 Rural Principal Arterial Interstate Driving (FC=01), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16															0.001							**0.001**
-15																						
-14																						
-13																						
-12																						
-11																	0.001					**0.001**
-10																						
-9															0.001							**0.001**
-8																0.001						**0.001**
-7														0.001			0.003	0.001				**0.005**
-6					0.004	0.003						0.001	0.001	0.001	0.001	0.004	0.001					**0.017**
-5			0.003	0.006	0.006	0.004	0.005	0.003		0.003		0.001	0.005	0.001	0.005	0.004	0.004	0.003	0.001			**0.054**
-4		0.001	0.005	0.019	0.023	0.008	0.006	0.008	0.005	0.001	0.004	0.003	0.003	0.004	0.005	0.011	0.005	0.005	0.001			**0.117**
-3		0.006	0.017	0.019	0.018	0.024	0.006	0.011	0.015	0.010	0.020	0.017	0.025	0.025	0.023	0.041	0.024	0.011	0.003			**0.317**
-2		0.019	0.027	0.014	0.010	0.018	0.009	0.004	0.006	0.018	0.025	0.064	0.068	0.083	0.098	0.119	0.094	0.031	0.010		0.001	**0.718**
-1		0.048	0.023	0.020	0.013	0.023	0.003	0.005	0.013	0.018	0.045	0.116	0.292	0.904	1.773	2.045	1.383	0.579	0.127	0.014		**7.444**
0	0.019	0.087	0.024	0.066	0.020	0.038	0.011	0.003	0.020	0.037	0.125	0.310	1.884	6.634	23.003	28.027	15.593	4.915	0.866	0.140	0.005	**81.828**
1	0.003	0.059	0.038	0.040	0.010	0.022	0.020	0.040	0.032	0.080	0.113	0.204	0.469	1.062	1.948	2.030	1.303	0.504	0.112	0.006	0.005	**8.099**
2	0.003	0.032	0.029	0.032	0.036	0.038	0.028	0.027	0.028	0.040	0.048	0.057	0.085	0.105	0.129	0.112	0.084	0.015	0.004			**0.932**
3	0.008	0.031	0.034	0.048	0.033	0.014	0.014	0.010	0.011	0.010	0.010	0.011	0.013	0.010	0.019	0.018	0.009	0.005			0.001	**0.311**
4		0.006	0.010	0.008	0.009	0.009	0.004	0.005	0.008	0.005	0.003		0.003	0.003	0.006	0.015	0.004	0.003				**0.099**
5		0.001	0.004	0.001	0.004	0.005	0.006	0.006	0.003	0.001	0.001			0.001		0.003	0.001	0.001				**0.040**
6					0.001	0.001	0.001										0.001					**0.005**
7														0.003	0.001	0.001	0.001					**0.006**
8													0.001		0.001							**0.003**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.032**	**0.291**	**0.214**	**0.274**	**0.187**	**0.207**	**0.115**	**0.121**	**0.142**	**0.223**	**0.395**	**0.784**	**2.849**	**8.837**	**27.016**	**32.431**	**18.512**	**6.072**	**1.124**	**0.161**	**0.013**	**100.000**

Summary Statistics

Avg Speed (mph)	72.84	Time at Idle (%)	0.032	Avg Specific PKE (hp-sec/lb)	47.91
Min Speed (mph)	0.00	Time at Cruise (%)	82.793	Avg Total Specific Power (hp/lb)	0.0446
Max Speed (mph)	104.72	Time in Accel (%)	8.825	Avg Non-Zero Specific Power (hp/lb)	0.0890
Avg Non-Idle Speed (mph)	72.87	Time in Decel (%)	8.350	Max Specific Power (hp/lb)	2.3333
Avg Cruise Speed (mph)	73.41	Avg Trip Length (miles)	21.742	Spec Pwr Freq (%): 0 hp/lb	49.89
Avg Acceleration (mph/sec)	0.34	Avg Trip Time (min)	17.909	Spec Pwr Freq (%): >0-0.1 hp/lb	35.09
Max Acceleration (mph/sec)	8.37	# Stops per Mile	0.003	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.13
Avg Deceleration (mph/sec)	-0.34	# of 1-Sec Observations	78,441	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.04
Max Deceleration (mph/sec)	-15.94	# of Trips	73	Spec Pwr Freq (%): >0.3 hp/lb	1.85

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	17.342		
		Bin 0 % (braking)	0.776		
		Bin 1 % (idle)	0.040		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.198	Bin 21 % (25-50 mph, <0 kw/tonne)	0.088		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.292	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.055	Bin 33 % (>50 mph, <6 kw/tonne)	3.910
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.124	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.050		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.084	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.064	Bin 35 % (>50 mph, 6-12 kw/tonne)	11.331
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.092	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.092		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.074		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.185	Bin 37 % (>50 mph, 12-18 kw/tonne)	37.168
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.094	Bin 38 % (>50 mph, 18-24 kw/tonne)	30.761
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.051	Bin 39 % (>50 mph, 24-30 kw/tonne)	10.247
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.047	Bin 40 % (>50 mph, >=30 kw/tonne)	4.178

alifornia 2000 Rural Other Principal Arterial LOS A-C Driving (FC=02), No Grade Compensation SAFD (9

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14								0.003														**0.003**
-13																						
-12																						
-11																						
-10																						
-9									0.003	0.006												**0.009**
-8					0.003		0.003	0.003	0.006													**0.015**
-7			0.003		0.006	0.012	0.012	0.012	0.003	0.006	0.003											**0.056**
-6			0.012	0.050	0.059	0.050	0.044	0.021	0.021	0.012	0.006	0.003										**0.276**
-5			0.053	0.103	0.091	0.126	0.112	0.076	0.047	0.024	0.018	0.018	0.009	0.003								**0.679**
-4		0.021	0.121	0.109	0.171	0.135	0.132	0.156	0.121	0.076	0.044	0.018	0.009	0.021								**1.132**
-3		0.103	0.147	0.103	0.082	0.109	0.153	0.215	0.168	0.115	0.091	0.068	0.035	0.009	0.006	0.009						**1.411**
-2		0.226	0.123	0.068	0.062	0.071	0.097	0.129	0.229	0.221	0.176	0.171	0.097	0.059	0.035	0.006		0.003		0.009		**1.782**
-1	0.003	0.412	0.047	0.032	0.050	0.076	0.085	0.135	0.368	0.823	0.850	1.276	2.026	1.429	0.809	0.447	0.118	0.029	0.015		0.003	**9.033**
0	2.632	0.326	0.032	0.041	0.050	0.068	0.088	0.221	1.385	1.991	3.134	7.389	20.015	18.292	8.507	4.631	0.767	0.088	0.009	0.006	0.003	**69.676**
1	0.059	0.247	0.029	0.053	0.094	0.085	0.168	0.306	0.676	0.982	0.917	1.550	2.141	1.517	0.832	0.303	0.074	0.024	0.012	0.015		**10.083**
2	0.024	0.203	0.059	0.076	0.082	0.191	0.276	0.379	0.262	0.191	0.262	0.265	0.171	0.094	0.041	0.038	0.018	0.003				**2.635**
3		0.300	0.156	0.212	0.215	0.215	0.185	0.135	0.106	0.085	0.068	0.059	0.044	0.024	0.012	0.003						**1.817**
4	0.018	0.126	0.179	0.150	0.162	0.132	0.094	0.062	0.050	0.018	0.012	0.009			0.006							**1.017**
5		0.009	0.065	0.062	0.047	0.038	0.041	0.018	0.012	0.009	0.003		0.006		0.003							**0.312**
6		0.006	0.009	0.015	0.006	0.006								0.003								**0.044**
7		0.006								0.003						0.003						**0.012**
8			0.003																			**0.003**
9			0.003								0.003											**0.006**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.735**	**1.985**	**1.041**	**1.073**	**1.179**	**1.314**	**1.491**	**1.870**	**3.455**	**4.561**	**5.587**	**10.824**	**24.552**	**21.450**	**10.250**	**5.440**	**0.976**	**0.147**	**0.035**	**0.029**	**0.006**	**100.000**

Summary Statistics

Avg Speed (mph)	55.04	Time at Idle (%)	2.735	Avg Specific PKE (hp-sec/lb)	14.56
Min Speed (mph)	0.00	Time at Cruise (%)	76.306	Avg Total Specific Power (hp/lb)	0.0514
Max Speed (mph)	98.36	Time in Accel (%)	10.721	Avg Non-Zero Specific Power (hp/lb)	0.1038
Avg Non-Idle Speed (mph)	56.59	Time in Decel (%)	10.239	Max Specific Power (hp/lb)	2.1165
Avg Cruise Speed (mph)	59.29	Avg Trip Length (miles)	4.333	Spec Pwr Freq (%): 0 hp/lb	50.50
Avg Acceleration (mph/sec)	0.63	Avg Trip Time (min)	4.724	Spec Pwr Freq (%): >0-0.1 hp/lb	32.29
Max Acceleration (mph/sec)	9.33	# Stops per Mile	0.092	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.17
Avg Deceleration (mph/sec)	-0.68	# of 1-Sec Observations	34,009	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.86
Max Deceleration (mph/sec)	-13.87	# of Trips	120	Spec Pwr Freq (%): >0.3 hp/lb	3.18

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	9.891		
		Bin 0 % (braking)	4.420		
		Bin 1 % (idle)	2.995		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.859	Bin 21 % (25-50 mph, <0 kw/tonne)	1.918		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.791	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.381	Bin 33 % (>50 mph, <6 kw/tonne)	9.139
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.561	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.024		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.434	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.892	Bin 35 % (>50 mph, 6-12 kw/tonne)	28.570
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.437	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.431		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.850		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.154	Bin 37 % (>50 mph, 12-18 kw/tonne)	27.593
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.891	Bin 38 % (>50 mph, 18-24 kw/tonne)	8.112
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.425	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.868
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.313	Bin 40 % (>50 mph, >=30 kw/tonne)	0.944

alifornia 2000 Rural Other Principal Arterial LOS D-F Driving (FC=02), No Grade Compensation SAFD (9

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.014	0.014					0.014												**0.041**
-8			0.014		0.014				0.014													**0.041**
-7		0.014		0.014		0.014	0.041	0.041	0.014													**0.136**
-6		0.014	0.041	0.055	0.041	0.027			0.014	0.027												**0.218**
-5		0.014	0.014		0.123	0.095	0.095	0.027	0.014	0.055	0.041	0.027			0.014	0.014						**0.532**
-4		0.027	0.027	0.055	0.055	0.109	0.109	0.082	0.068	0.041	0.068			0.014								**0.655**
-3		0.136	0.136	0.095	0.150	0.082	0.164	0.136	0.232	0.136	0.150	0.082	0.082	0.027	0.014							**1.623**
-2		0.218	0.041	0.136	0.109	0.259	0.177	0.423	0.232	0.355	0.327	0.382	0.082	0.041	0.014	0.041	0.041					**2.878**
-1		0.477	0.109	0.055	0.314	0.232	0.355	0.709	1.091	0.941	1.828	2.400	2.728	1.091	0.559	0.123		0.014				**13.025**
0	4.842	0.518	0.095	0.109	0.191	0.164	0.532	1.214	2.605	2.946	4.733	10.543	13.148	9.547	5.619	0.873		0.014				**57.692**
1	0.068	0.409	0.068	0.041	0.191	0.164	0.600	1.091	1.391	1.637	2.973	3.505	2.810	1.227	0.627	0.123	0.014					**16.939**
2		0.177	0.041	0.123	0.218	0.396	0.559	0.436	0.436	0.341	0.259	0.245	0.055	0.123	0.055	0.014	0.014					**3.492**
3	0.014	0.218	0.123	0.218	0.218	0.191	0.150	0.123	0.095	0.095	0.068	0.041	0.041	0.027	0.014	0.027						**1.664**
4		0.136	0.095	0.109	0.164	0.150	0.055	0.041			0.014		0.014	0.014								**0.791**
5		0.068	0.041	0.027	0.027	0.014																**0.177**
6						0.014				0.014												**0.027**
7		0.014	0.014							0.014				0.014								**0.055**
8												0.014										**0.014**
9																						
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12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**4.924**	**2.441**	**0.859**	**1.050**	**1.828**	**1.909**	**2.837**	**4.324**	**6.206**	**6.615**	**10.461**	**17.239**	**18.958**	**12.125**	**6.915**	**1.214**	**0.068**	**0.027**				**100.000**

Summary Statistics

Avg Speed (mph)	48.77	Time at Idle (%)	4.924	Avg Specific PKE (hp-sec/lb)	13.74
Min Speed (mph)	0.00	Time at Cruise (%)	73.432	Avg Total Specific Power (hp/lb)	0.0600
Max Speed (mph)	83.00	Time in Accel (%)	11.007	Avg Non-Zero Specific Power (hp/lb)	0.1156
Avg Non-Idle Speed (mph)	51.29	Time in Decel (%)	10.638	Max Specific Power (hp/lb)	1.9395
Avg Cruise Speed (mph)	52.99	Avg Trip Length (miles)	3.104	Spec Pwr Freq (%): 0 hp/lb	48.12
Avg Acceleration (mph/sec)	0.71	Avg Trip Time (min)	3.819	Spec Pwr Freq (%): >0-0.1 hp/lb	28.91
Max Acceleration (mph/sec)	7.54	# Stops per Mile	0.161	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.61
Avg Deceleration (mph/sec)	-0.79	# of 1-Sec Observations	7,332	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.17
Max Deceleration (mph/sec)	-9.18	# of Trips	32	Spec Pwr Freq (%): >0.3 hp/lb	3.19

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.093		
		Bin 0 % (braking)	4.247		
		Bin 1 % (idle)	5.480		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.452	Bin 21 % (25-50 mph, <0 kw/tonne)	4.671		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.192	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.384	Bin 33 % (>50 mph, <6 kw/tonne)	12.452
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.534	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.644		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.575	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.192	Bin 35 % (>50 mph, 6-12 kw/tonne)	20.589
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.603	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.945		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.712		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.027	Bin 37 % (>50 mph, 12-18 kw/tonne)	21.151
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.480	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.096
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.370	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.233
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.151	Bin 40 % (>50 mph, >=30 kw/tonne)	0.822

California 2000 Rural Minor Arterial Driving (FC=06), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9								0.010														**0.010**
-8			0.010	0.005		0.005	0.005		0.015				0.005									**0.044**
-7				0.005	0.005	0.015	0.005	0.010	0.005	0.010	0.005											**0.058**
-6		0.010	0.015	0.029	0.044	0.034	0.044	0.015		0.010	0.010											**0.209**
-5		0.010	0.058	0.112	0.131	0.126	0.131	0.082	0.039	0.005	0.015	0.005										**0.713**
-4	0.005	0.005	0.165	0.194	0.204	0.272	0.233	0.184	0.126	0.073	0.029	0.015	0.005	0.005								**1.514**
-3	0.005	0.155	0.262	0.238	0.277	0.286	0.277	0.388	0.277	0.238	0.180	0.102	0.019									**2.703**
-2		0.383	0.204	0.170	0.141	0.170	0.218	0.257	0.349	0.403	0.359	0.194	0.121		0.005	0.010						**2.984**
-1		0.742	0.184	0.165	0.170	0.204	0.335	0.485	0.805	1.645	1.980	2.038	1.203	0.388	0.044	0.005	0.005					**10.398**
0	4.013	1.538	0.286	0.272	0.286	0.374	1.038	1.480	1.917	2.586	5.464	14.392	20.278	5.769	0.442	0.053	0.010					**60.197**
1	0.102	0.684	0.126	0.146	0.204	0.281	0.529	0.631	1.077	1.727	2.518	2.130	1.359	0.359	0.049	0.019						**11.941**
2	0.049	0.514	0.136	0.189	0.233	0.320	0.446	0.524	0.577	0.500	0.330	0.155	0.029	0.010	0.010							**4.023**
3	0.015	0.374	0.233	0.286	0.335	0.354	0.374	0.238	0.180	0.087	0.053	0.029										**2.557**
4		0.359	0.209	0.272	0.281	0.218	0.150	0.102	0.087	0.024	0.015	0.005										**1.723**
5		0.092	0.189	0.102	0.087	0.063	0.053	0.024	0.010			0.005										**0.626**
6		0.039	0.049	0.019	0.029	0.005	0.010	0.005		0.005	0.010											**0.170**
7		0.005	0.015	0.024	0.010		0.005	0.005	0.005													**0.068**
8			0.005	0.010	0.005																	**0.019**
9				0.005																		**0.005**
10		0.005	0.005	0.005		0.005																**0.019**
11			0.005	0.005																		**0.010**
12			0.010																			**0.010**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**4.187**	**4.915**	**2.164**	**2.251**	**2.441**	**2.732**	**3.853**	**4.440**	**5.468**	**7.312**	**10.966**	**19.069**	**23.019**	**6.531**	**0.548**	**0.087**	**0.015**					**100.000**

Summary Statistics

Avg Speed (mph)	44.55	Time at Idle (%)	4.188	Avg Specific PKE (hp-sec/lb)	15.47
Min Speed (mph)	0.00	Time at Cruise (%)	74.992	Avg Total Specific Power (hp/lb)	0.0555
Max Speed (mph)	78.32	Time in Accel (%)	10.952	Avg Non-Zero Specific Power (hp/lb)	0.1115
Avg Non-Idle Speed (mph)	46.50	Time in Decel (%)	9.870	Max Specific Power (hp/lb)	1.2703
Avg Cruise Speed (mph)	50.29	Avg Trip Length (miles)	3.446	Spec Pwr Freq (%): 0 hp/lb	50.17
Avg Acceleration (mph/sec)	0.87	Avg Trip Time (min)	4.642	Spec Pwr Freq (%): >0-0.1 hp/lb	30.90
Max Acceleration (mph/sec)	12.20	# Stops per Mile	0.149	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.19
Avg Deceleration (mph/sec)	-0.87	# of 1-Sec Observations	20,609	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.57
Max Deceleration (mph/sec)	-9.12	# of Trips	74	Spec Pwr Freq (%): >0.3 hp/lb	4.17

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.724		
		Bin 0 % (braking)	6.725		
		Bin 1 % (idle)	5.050		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.084	Bin 21 % (25-50 mph, <0 kw/tonne)	4.373		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.834	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.550	Bin 33 % (>50 mph, <6 kw/tonne)	9.486
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.071	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.389		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.828	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.995	Bin 35 % (>50 mph, 6-12 kw/tonne)	28.688
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.881	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.362		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.544		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.789	Bin 37 % (>50 mph, 12-18 kw/tonne)	14.439
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.114	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.992
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.721	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.487
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.394	Bin 40 % (>50 mph, >=30 kw/tonne)	0.205

California 2000 Rural Major Collector Driving (FC=07), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14										0.003												**0.003**
-13																						
-12				0.001				0.001														**0.003**
-11						0.001		0.001			0.001	0.001										**0.005**
-10								0.001		0.003												**0.004**
-9				0.001	0.004	0.001	0.001	0.003		0.001												**0.012**
-8			0.005	0.003	0.004	0.007	0.001	0.007	0.003	0.005	0.001	0.001	0.001									**0.038**
-7			0.004	0.012	0.023	0.034	0.036	0.013	0.017	0.008	0.009	0.004	0.001									**0.162**
-6		0.001	0.016	0.074	0.113	0.090	0.061	0.055	0.040	0.027	0.004	0.008	0.003	0.001								**0.494**
-5		0.009	0.103	0.232	0.223	0.274	0.244	0.158	0.109	0.051	0.031	0.014	0.012	0.001								**1.461**
-4		0.053	0.321	0.338	0.371	0.421	0.403	0.362	0.278	0.203	0.109	0.042	0.013	0.008								**2.922**
-3	0.001	0.226	0.361	0.270	0.355	0.293	0.295	0.382	0.431	0.370	0.228	0.125	0.047	0.009	0.003							**3.396**
-2	0.001	0.417	0.262	0.199	0.190	0.215	0.275	0.374	0.458	0.546	0.503	0.296	0.139	0.023	0.012							**3.912**
-1	0.001	0.757	0.173	0.209	0.128	0.197	0.283	0.416	0.693	1.290	1.988	1.927	1.126	0.345	0.090	0.027	0.005					**9.656**
0	2.650	1.120	0.207	0.215	0.231	0.596	0.923	1.161	1.861	3.651	7.809	12.001	12.055	5.191	0.940	0.164	0.030					**50.805**
1	0.068	0.554	0.155	0.262	0.284	0.447	0.597	0.983	1.710	2.496	3.006	2.312	1.130	0.322	0.082	0.025	0.005					**14.439**
2	0.020	0.489	0.189	0.349	0.339	0.469	0.654	0.965	0.989	0.714	0.353	0.126	0.035	0.007	0.004	0.001						**5.704**
3	0.009	0.488	0.373	0.502	0.579	0.618	0.632	0.437	0.241	0.085	0.035	0.021	0.004									**4.023**
4	0.001	0.304	0.386	0.385	0.456	0.355	0.215	0.089	0.030	0.007	0.005	0.005	0.001									**2.238**
5	0.001	0.064	0.166	0.123	0.074	0.056	0.020	0.014	0.007	0.003	0.003	0.001										**0.531**
6		0.010	0.043	0.038	0.023	0.010	0.010	0.003	0.003	0.003												**0.143**
7		0.007	0.007	0.014	0.003	0.003				0.001												**0.034**
8		0.004	0.007	0.001		0.001																**0.013**
9			0.001																			**0.001**
10			0.001	0.001																		**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.753**	**4.502**	**2.779**	**3.229**	**3.401**	**4.088**	**4.651**	**5.424**	**6.871**	**9.467**	**14.087**	**16.885**	**14.568**	**5.907**	**1.130**	**0.218**	**0.040**					**100.000**

Summary Statistics

Avg Speed (mph)	42.85	Time at Idle (%)	2.753	Avg Specific PKE (hp-sec/lb)	15.98
Min Speed (mph)	0.00	Time at Cruise (%)	69.023	Avg Total Specific Power (hp/lb)	0.0671
Max Speed (mph)	81.81	Time in Accel (%)	14.222	Avg Non-Zero Specific Power (hp/lb)	0.1275
Avg Non-Idle Speed (mph)	44.07	Time in Decel (%)	14.002	Max Specific Power (hp/lb)	1.4474
Avg Cruise Speed (mph)	49.18	Avg Trip Length (miles)	2.836	Spec Pwr Freq (%): 0 hp/lb	47.38
Avg Acceleration (mph/sec)	1.02	Avg Trip Time (min)	3.971	Spec Pwr Freq (%): >0-0.1 hp/lb	28.36
Max Acceleration (mph/sec)	10.19	# Stops per Mile	0.189	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.40
Avg Deceleration (mph/sec)	-1.24	# of 1-Sec Observations	76,717	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.40
Max Deceleration (mph/sec)	-13.80	# of Trips	322	Spec Pwr Freq (%): >0.3 hp/lb	5.45

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	5.971		
		Bin 0 % (braking)	10.430		
		Bin 1 % (idle)	3.214		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.093	Bin 21 % (25-50 mph, <0 kw/tonne)	4.184		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.699	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.020	Bin 33 % (>50 mph, <6 kw/tonne)	8.832
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.583	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.962		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.327	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.259	Bin 35 % (>50 mph, 6-12 kw/tonne)	21.515
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.193	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.774		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.151		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.584	Bin 37 % (>50 mph, 12-18 kw/tonne)	12.846
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	3.318	Bin 38 % (>50 mph, 18-24 kw/tonne)	2.229
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.982	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.381
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.250	Bin 40 % (>50 mph, >=30 kw/tonne)	0.175

California 2000 Rural Minor Collector Driving (FC=08), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12						0.003																**0.003**
-11																						
-10						0.003																**0.003**
-9			0.005	0.003			0.003	0.005	0.003		0.005											**0.023**
-8				0.003	0.008	0.013	0.005	0.008	0.005			0.003										**0.043**
-7			0.003	0.010	0.023	0.033	0.013	0.018	0.015	0.008	0.003		0.003	0.003								**0.130**
-6		0.003	0.026	0.099	0.115	0.084	0.102	0.077	0.033	0.031	0.010	0.003		0.003								**0.584**
-5		0.010	0.128	0.283	0.276	0.291	0.296	0.217	0.102	0.074	0.028	0.020	0.005		0.003							**1.732**
-4		0.059	0.344	0.472	0.490	0.546	0.513	0.452	0.355	0.163	0.077	0.036	0.005	0.008	0.003	0.003						**3.523**
-3		0.260	0.454	0.365	0.513	0.546	0.459	0.531	0.485	0.406	0.242	0.122	0.028	0.003	0.008	0.003						**4.424**
-2	0.003	0.485	0.360	0.258	0.301	0.367	0.426	0.436	0.648	0.661	0.482	0.327	0.143	0.026	0.010	0.031	0.015					**4.977**
-1	0.005	0.824	0.168	0.232	0.270	0.441	0.661	0.770	1.199	1.595	1.990	1.561	0.645	0.245	0.110	0.036	0.048					**10.802**
0	2.265	0.906	0.181	0.237	0.342	1.074	1.916	2.271	3.100	4.832	6.677	10.526	6.314	2.021	0.497	0.242	0.133	0.003				**43.536**
1	0.107	0.645	0.181	0.286	0.408	0.730	0.947	1.309	1.949	2.602	2.531	1.717	0.625	0.189	0.128	0.066	0.041					**14.460**
2	0.059	0.653	0.278	0.370	0.556	0.740	0.941	1.143	1.105	0.755	0.337	0.094	0.048	0.026	0.010	0.003	0.005					**7.123**
3	0.041	0.681	0.569	0.671	0.765	0.783	0.735	0.549	0.227	0.099	0.043	0.028	0.018	0.018	0.005	0.010						**5.243**
4	0.013	0.253	0.475	0.472	0.526	0.431	0.237	0.079	0.033	0.020	0.005	0.010	0.003			0.003						**2.559**
5	0.003	0.077	0.191	0.151	0.079	0.054	0.038	0.023	0.015	0.005	0.003											**0.638**
6	0.003	0.010	0.046	0.043	0.018	0.015	0.005	0.005						0.003								**0.148**
7		0.003	0.008	0.005	0.008		0.003	0.003														**0.028**
8		0.003	0.005	0.005						0.003												**0.015**
9			0.003																			**0.003**
10																						
11																						
12			0.003																			**0.003**
13																						
14																						
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19																						
20																						
Totals	**2.498**	**4.870**	**3.426**	**3.965**	**4.697**	**6.154**	**7.299**	**7.893**	**9.274**	**11.253**	**12.432**	**14.448**	**7.837**	**2.541**	**0.773**	**0.395**	**0.242**	**0.003**				**100.000**

Summary Statistics

Avg Speed (mph)	38.90	Time at Idle (%)	2.498	Avg Specific PKE (hp-sec/lb)	11.52
Min Speed (mph)	0.00	Time at Cruise (%)	64.288	Avg Total Specific Power (hp/lb)	0.0720
Max Speed (mph)	82.79	Time in Accel (%)	16.690	Avg Non-Zero Specific Power (hp/lb)	0.1379
Avg Non-Idle Speed (mph)	39.90	Time in Decel (%)	16.524	Max Specific Power (hp/lb)	1.5482
Avg Cruise Speed (mph)	45.29	Avg Trip Length (miles)	1.729	Spec Pwr Freq (%): 0 hp/lb	47.80
Avg Acceleration (mph/sec)	1.18	Avg Trip Time (min)	2.667	Spec Pwr Freq (%): >0-0.1 hp/lb	26.28
Max Acceleration (mph/sec)	11.52	# Stops per Mile	0.290	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.42
Avg Deceleration (mph/sec)	-1.44	# of 1-Sec Observations	39,197	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.26
Max Deceleration (mph/sec)	-12.17	# of Trips	245	Spec Pwr Freq (%): >0.3 hp/lb	6.24

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	4.754		
		Bin 0 % (braking)	12.847		
		Bin 1 % (idle)	3.124		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.616	Bin 21 % (25-50 mph, <0 kw/tonne)	6.267		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.786	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.235	Bin 33 % (>50 mph, <6 kw/tonne)	7.186
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.987	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.797		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.774	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.414	Bin 35 % (>50 mph, 6-12 kw/tonne)	14.839
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.723	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.264		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.673		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.285	Bin 37 % (>50 mph, 12-18 kw/tonne)	7.833
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	3.779	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.504
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.960	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.424
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.331	Bin 40 % (>50 mph, >=30 kw/tonne)	0.354

California 2000 Rural Local Driving (FC=09), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12								0.008														**0.008**
-11																						
-10										0.008												**0.008**
-9						0.008																**0.008**
-8			0.008		0.008			0.008		0.008												**0.031**
-7			0.016	0.016	0.023	0.031	0.031	0.016	0.008						0.008							**0.148**
-6			0.023	0.047	0.086	0.070	0.055	0.031	0.023			0.008										**0.343**
-5		0.023	0.101	0.218	0.296	0.164	0.101	0.070	0.047	0.016	0.008											**1.045**
-4		0.078	0.624	0.881	0.515	0.320	0.234	0.242	0.164	0.109	0.039	0.016										**3.222**
-3		0.608	1.108	0.835	0.897	0.515	0.320	0.304	0.335	0.242	0.117	0.070	0.023	0.008								**5.382**
-2	0.008	1.092	0.593	0.671	1.076	0.655	0.273	0.265	0.312	0.445	0.289	0.086	0.039	0.031	0.008							**5.842**
-1		1.420	0.413	0.608	0.866	1.100	0.780	0.507	0.733	1.045	1.170	0.655	0.296	0.062	0.094	0.023						**9.774**
0	2.972	1.841	0.523	0.827	2.691	3.853	1.919	1.225	1.498	2.878	6.513	7.246	3.471	0.647	0.164	0.133						**38.401**
1	0.172	1.451	1.256	1.404	1.973	1.630	0.983	0.819	1.591	2.410	1.934	1.232	0.546	0.164	0.094	0.016						**17.676**
2	0.281	1.958	1.349	1.716	1.076	0.523	0.569	0.764	0.741	0.312	0.164	0.086	0.039	0.016	0.016							**9.610**
3	0.226	1.264	1.076	0.967	0.616	0.429	0.390	0.218	0.187	0.109	0.055	0.031										**5.569**
4	0.031	0.335	0.452	0.328	0.382	0.281	0.226	0.125	0.070	0.055												**2.285**
5	0.008	0.047	0.125	0.101	0.117	0.055	0.008	0.023	0.008													**0.491**
6	0.016	0.008	0.016	0.047	0.016	0.008	0.008		0.008													**0.125**
7		0.008	0.016	0.008																		**0.031**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.713**	**10.133**	**7.699**	**8.674**	**10.640**	**9.641**	**5.897**	**4.626**	**5.725**	**7.637**	**10.289**	**9.431**	**4.415**	**0.928**	**0.382**	**0.172**						**100.000**

Summary Statistics

Avg Speed (mph)	30.10	Time at Idle (%)	3.713	Avg Specific PKE (hp-sec/lb)	4.05
Min Speed (mph)	0.00	Time at Cruise (%)	61.412	Avg Total Specific Power (hp/lb)	0.0622
Max Speed (mph)	74.46	Time in Accel (%)	18.370	Avg Non-Zero Specific Power (hp/lb)	0.1147
Avg Non-Idle Speed (mph)	31.26	Time in Decel (%)	16.506	Max Specific Power (hp/lb)	1.0580
Avg Cruise Speed (mph)	36.63	Avg Trip Length (miles)	0.544	Spec Pwr Freq (%): 0 hp/lb	45.80
Avg Acceleration (mph/sec)	1.24	Avg Trip Time (min)	1.085	Spec Pwr Freq (%): >0-0.1 hp/lb	31.20
Max Acceleration (mph/sec)	7.18	# Stops per Mile	0.718	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.64
Avg Deceleration (mph/sec)	-1.49	# of 1-Sec Observations	12,820	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.55
Max Deceleration (mph/sec)	-12.02	# of Trips	197	Spec Pwr Freq (%): >0.3 hp/lb	3.80

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.805		
		Bin 0 % (braking)	12.881		
		Bin 1 % (idle)	4.072		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.449	Bin 21 % (25-50 mph, <0 kw/tonne)	5.118		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	10.663	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.349	Bin 33 % (>50 mph, <6 kw/tonne)	3.937
Bin 13 % (0-25 mph, 3-6 kw/tonne)	7.138	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.555		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	4.405	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.722	Bin 35 % (>50 mph, 6-12 kw/tonne)	10.394
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.885	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.367		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.925		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.015	Bin 37 % (>50 mph, 12-18 kw/tonne)	4.516
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.870	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.070
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.753	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.285
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.420	Bin 40 % (>50 mph, >=30 kw/tonne)	0.214

ifornia 2000 Urban Principal Arterial Interstate LOS A Driving (FC=11), No Grade Compensation SAFD

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11												0.002										**0.002**
-10															0.002							**0.002**
-9								0.002		0.002												**0.004**
-8					0.002	0.002								0.004								**0.008**
-7									0.002		0.002				0.002		0.004					**0.010**
-6				0.006	0.004	0.004	0.004		0.002		0.002	0.004	0.002	0.002	0.002							**0.032**
-5			0.008	0.014	0.012	0.008	0.008	0.006	0.006	0.008	0.004	0.008	0.002	0.002		0.004	0.002					**0.091**
-4		0.010	0.022	0.028	0.024	0.024	0.018	0.022	0.044	0.032	0.030	0.018	0.014	0.014	0.008	0.004	0.002	0.002				**0.313**
-3		0.024	0.044	0.046	0.056	0.063	0.050	0.044	0.050	0.050	0.077	0.075	0.067	0.042	0.022	0.022	0.004					**0.734**
-2		0.060	0.028	0.046	0.052	0.089	0.089	0.107	0.091	0.133	0.194	0.234	0.216	0.184	0.123	0.048	0.016	0.002				**1.712**
-1		0.192	0.117	0.117	0.099	0.103	0.190	0.163	0.202	0.367	0.706	1.287	2.172	2.392	2.198	1.144	0.335	0.050	0.010			**11.845**
0	0.395	0.301	0.165	0.155	0.135	0.155	0.391	0.230	0.206	0.690	1.771	5.218	10.692	16.067	18.291	10.395	2.309	0.405	0.044			**68.014**
1	0.018	0.202	0.103	0.125	0.117	0.159	0.258	0.240	0.294	0.569	1.275	1.880	2.612	2.896	2.158	1.170	0.256	0.030				**14.362**
2	0.006	0.083	0.060	0.085	0.069	0.121	0.137	0.121	0.117	0.202	0.254	0.272	0.226	0.161	0.077	0.054	0.010					**2.055**
3		0.060	0.024	0.036	0.060	0.065	0.058	0.077	0.069	0.042	0.020	0.022	0.022	0.014	0.012	0.014	0.002	0.002				**0.597**
4		0.020	0.018	0.024	0.014	0.010	0.008	0.004	0.002	0.002	0.004	0.006	0.006	0.012	0.006	0.002						**0.137**
5	0.002	0.010	0.014	0.002	0.002		0.002	0.002		0.002			0.004	0.008		0.004		0.002				**0.054**
6		0.002											0.004			0.004	0.002					**0.012**
7		0.002	0.002										0.002	0.002	0.002							**0.010**
8			0.002							0.002		0.002										**0.006**
9						0.002																**0.002**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.420**	**0.966**	**0.605**	**0.682**	**0.645**	**0.805**	**1.212**	**1.017**	**1.085**	**2.100**	**4.340**	**9.028**	**16.042**	**21.799**	**22.902**	**12.864**	**2.941**	**0.492**	**0.054**			**100.000**

Summary Statistics

Avg Speed (mph)	62.08	Time at Idle (%)	0.421	Avg Specific PKE (hp-sec/lb)	7.70
Min Speed (mph)	0.00	Time at Cruise (%)	76.386	Avg Total Specific Power (hp/lb)	0.0556
Max Speed (mph)	90.33	Time in Accel (%)	11.986	Avg Non-Zero Specific Power (hp/lb)	0.1071
Avg Non-Idle Speed (mph)	62.34	Time in Decel (%)	11.208	Max Specific Power (hp/lb)	1.9627
Avg Cruise Speed (mph)	62.83	Avg Trip Length (miles)	2.389	Spec Pwr Freq (%): 0 hp/lb	48.06
Avg Acceleration (mph/sec)	0.50	Avg Trip Time (min)	2.309	Spec Pwr Freq (%): >0-0.1 hp/lb	31.15
Max Acceleration (mph/sec)	8.62	# Stops per Mile	0.027	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.51
Avg Deceleration (mph/sec)	-0.52	# of 1-Sec Observations	50,419	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.69
Max Deceleration (mph/sec)	-10.73	# of Trips	364	Spec Pwr Freq (%): >0.3 hp/lb	2.58

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.545		
		Bin 0 % (braking)	1.848		
		Bin 1 % (idle)	0.565		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.809	Bin 21 % (25-50 mph, <0 kw/tonne)	1.480		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.953	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.757	Bin 33 % (>50 mph, <6 kw/tonne)	10.740
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.374	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.769		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.232	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.809	Bin 35 % (>50 mph, 6-12 kw/tonne)	22.190
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.132	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.799		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.142		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.235	Bin 37 % (>50 mph, 12-18 kw/tonne)	32.061
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.537	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.784
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.238	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.859
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.064	Bin 40 % (>50 mph, >=30 kw/tonne)	1.624

ifornia 2000 Urban Principal Arterial Interstate LOS B Driving (FC=11), No Grade Compensation SAFD

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7																						
-6												0.011	0.006	0.006								**0.023**
-5												0.017		0.006								**0.023**
-4					0.006	0.006		0.006	0.011	0.023		0.011	0.023	0.006	0.017	0.011						**0.120**
-3		0.006	0.011	0.006	0.006	0.011	0.006	0.017	0.034	0.034	0.063	0.040	0.040	0.040	0.017	0.029	0.006					**0.365**
-2		0.029	0.011	0.029	0.051	0.051	0.046	0.046	0.034	0.091	0.097	0.108	0.188	0.245	0.171	0.034	0.023					**1.255**
-1		0.063	0.011	0.017	0.029	0.017	0.074	0.063	0.114	0.217	0.525	1.283	1.979	2.777	3.000	1.546	0.405	0.051				**12.171**
0	0.262	0.063	0.006	0.040	0.057		0.057	0.029	0.114	0.599	1.819	6.023	11.093	19.676	20.646	10.363	1.871	0.154				**72.870**
1	0.006	0.040		0.029	0.029	0.006	0.017	0.029	0.103	0.257	0.616	1.392	2.201	3.097	2.886	1.009	0.314	0.040				**12.068**
2		0.017		0.011	0.011	0.029	0.029	0.023	0.046	0.080	0.103	0.137	0.165	0.097	0.080	0.046						**0.873**
3		0.011	0.006	0.011	0.006		0.011	0.017	0.017	0.023	0.017	0.023	0.006	0.006								**0.154**
4								0.006	0.017	0.006	0.006			0.006	0.006							**0.046**
5		0.006								0.006		0.006		0.006		0.006						**0.029**
6													0.006									**0.006**
7																						
8																						
9																						
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19																						
20																						
Totals	**0.268**	**0.234**	**0.046**	**0.143**	**0.194**	**0.120**	**0.240**	**0.234**	**0.490**	**1.335**	**3.245**	**9.051**	**15.707**	**25.967**	**26.822**	**13.043**	**2.618**	**0.245**				**100.000**

Summary Statistics

Avg Speed (mph)	64.81	Time at Idle (%)	0.268	Avg Specific PKE (hp-sec/lb)	7.24
Min Speed (mph)	0.00	Time at Cruise (%)	77.535	Avg Total Specific Power (hp/lb)	0.0479
Max Speed (mph)	86.47	Time in Accel (%)	10.654	Avg Non-Zero Specific Power (hp/lb)	0.0979
Avg Non-Idle Speed (mph)	64.99	Time in Decel (%)	11.543	Max Specific Power (hp/lb)	1.5836
Avg Cruise Speed (mph)	64.91	Avg Trip Length (miles)	2.721	Spec Pwr Freq (%): 0 hp/lb	51.05
Avg Acceleration (mph/sec)	0.40	Avg Trip Time (min)	2.519	Spec Pwr Freq (%): >0-0.1 hp/lb	30.84
Max Acceleration (mph/sec)	5.78	# Stops per Mile	0.010	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.62
Avg Deceleration (mph/sec)	-0.44	# of 1-Sec Observations	17,534	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.74
Max Deceleration (mph/sec)	-6.34	# of Trips	116	Spec Pwr Freq (%): >0.3 hp/lb	1.76

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.885		
		Bin 0 % (braking)	0.959		
		Bin 1 % (idle)	0.327		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.247	Bin 21 % (25-50 mph, <0 kw/tonne)	0.735		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.149	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.322	Bin 33 % (>50 mph, <6 kw/tonne)	12.338
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.063	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.500		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.034	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.494	Bin 35 % (>50 mph, 6-12 kw/tonne)	26.082
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.029	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.362		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.000		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.442	Bin 37 % (>50 mph, 12-18 kw/tonne)	33.735
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.207	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.632
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.080	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.685
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.052	Bin 40 % (>50 mph, >=30 kw/tonne)	1.527

ifornia 2000 Urban Principal Arterial Interstate LOS C Driving (FC=11), No Grade Compensation SAFD

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																	0.004					**0.004**
-8																		0.004				**0.004**
-7													0.007									**0.007**
-6			0.004		0.004					0.004	0.004	0.007										**0.022**
-5			0.004	0.007	0.007	0.007	0.011	0.007	0.007	0.007	0.007	0.004	0.011	0.011	0.015	0.011	0.004					**0.122**
-4		0.004	0.004	0.004	0.004	0.007	0.019	0.030	0.022	0.026	0.030	0.015	0.015	0.033	0.033	0.007	0.004	0.004				**0.259**
-3		0.004	0.019	0.015	0.004	0.019	0.019	0.019	0.030	0.052	0.048	0.063	0.081	0.059	0.056	0.026	0.007					**0.518**
-2		0.022	0.004	0.007	0.011	0.011	0.048	0.056	0.078	0.096	0.137	0.326	0.307	0.230	0.118	0.037	0.015	0.004				**1.507**
-1	0.004	0.067	0.011	0.022	0.019	0.063	0.070	0.100	0.141	0.285	0.881	1.766	2.355	2.625	2.651	1.052	0.126	0.037				**12.274**
0	0.074	0.081	0.004	0.052	0.067	0.126	0.067	0.107	0.348	0.485	2.407	6.946	11.152	15.755	23.767	8.412	0.915	0.037	0.004			**70.805**
1	0.007	0.044	0.022	0.011	0.007	0.030	0.052	0.048	0.107	0.211	0.977	2.473	2.881	2.747	2.540	0.789	0.093	0.015	0.004			**13.059**
2		0.015	0.004		0.007	0.026	0.007	0.015	0.030	0.089	0.096	0.133	0.185	0.200	0.122	0.007	0.022	0.011	0.004			**0.974**
3		0.007	0.007	0.004		0.007	0.007	0.011	0.022	0.011	0.026	0.041	0.041	0.044	0.041	0.011	0.007					**0.289**
4		0.004		0.004				0.004			0.004	0.011	0.007	0.007	0.004	0.015	0.007					**0.067**
5		0.007	0.004				0.004				0.004	0.007	0.004	0.011								**0.041**
6						0.004				0.004	0.004	0.004	0.004			0.011						**0.030**
7			0.004	0.004								0.007										**0.015**
8																0.004						**0.004**
9																						
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11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.085**	**0.255**	**0.089**	**0.130**	**0.130**	**0.300**	**0.304**	**0.396**	**0.785**	**1.270**	**4.625**	**11.804**	**17.051**	**21.723**	**29.347**	**10.382**	**1.203**	**0.111**	**0.011**			**100.000**

Summary Statistics

Avg Speed (mph)	63.76	Time at Idle (%)	0.085	Avg Specific PKE (hp-sec/lb)	6.03
Min Speed (mph)	0.00	Time at Cruise (%)	78.140	Avg Total Specific Power (hp/lb)	0.0516
Max Speed (mph)	91.73	Time in Accel (%)	10.486	Avg Non-Zero Specific Power (hp/lb)	0.1011
Avg Non-Idle Speed (mph)	63.81	Time in Decel (%)	11.289	Max Specific Power (hp/lb)	2.2518
Avg Cruise Speed (mph)	63.77	Avg Trip Length (miles)	2.071	Spec Pwr Freq (%): 0 hp/lb	49.03
Avg Acceleration (mph/sec)	0.42	Avg Trip Time (min)	1.949	Spec Pwr Freq (%): >0-0.1 hp/lb	32.31
Max Acceleration (mph/sec)	7.51	# Stops per Mile	0.011	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.80
Avg Deceleration (mph/sec)	-0.48	# of 1-Sec Observations	27,008	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.69
Max Deceleration (mph/sec)	-8.65	# of Trips	231	Spec Pwr Freq (%): >0.3 hp/lb	2.18

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.477		
		Bin 0 % (braking)	1.430		
		Bin 1 % (idle)	0.134		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.213	Bin 21 % (25-50 mph, <0 kw/tonne)	1.005		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.265	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.556	Bin 33 % (>50 mph, <6 kw/tonne)	12.828
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.064	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.642		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.022	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.560	Bin 35 % (>50 mph, 6-12 kw/tonne)	24.364
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.015	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.422		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.019		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.448	Bin 37 % (>50 mph, 12-18 kw/tonne)	35.351
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.172	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.066
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.075	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.746
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.052	Bin 40 % (>50 mph, >=30 kw/tonne)	1.550

ifornia 2000 Urban Principal Arterial Interstate LOS D Driving (FC=11), No Grade Compensation SAFD

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11											0.005											**0.005**
-10																						
-9				0.005																		**0.005**
-8											0.005	0.005										**0.010**
-7								0.005	0.015							0.005						**0.025**
-6			0.005					0.005	0.005			0.010		0.005								**0.030**
-5		0.005		0.020	0.015			0.005	0.010		0.005	0.010	0.020	0.010								**0.098**
-4		0.005	0.030	0.025	0.025	0.039	0.020	0.034	0.025	0.005	0.005	0.005	0.005	0.020								**0.241**
-3		0.044	0.054	0.049	0.054	0.039	0.044	0.054	0.059	0.084	0.030	0.044	0.054	0.015	0.039	0.010	0.005					**0.679**
-2		0.098	0.094	0.118	0.143	0.079	0.123	0.133	0.177	0.212	0.182	0.162	0.172	0.187	0.118	0.030	0.005					**2.033**
-1		0.231	0.084	0.202	0.286	0.310	0.369	0.374	0.487	0.724	1.068	1.162	1.551	3.087	1.364	0.369	0.044					**11.713**
0	0.862	0.276	0.158	0.359	0.522	0.542	0.596	0.369	1.039	2.782	4.003	5.372	9.700	22.590	14.077	3.245	0.153					**66.642**
1	0.015	0.177	0.158	0.222	0.241	0.369	0.443	0.551	0.753	1.157	1.645	1.940	2.334	3.806	1.379	0.305	0.020					**15.515**
2	0.010	0.094	0.079	0.217	0.148	0.084	0.128	0.148	0.143	0.202	0.310	0.231	0.231	0.192	0.074	0.020						**2.309**
3	0.005	0.059	0.054	0.039	0.010	0.015	0.010	0.025	0.034	0.039	0.034	0.034	0.015	0.030	0.020	0.010						**0.433**
4		0.020	0.005	0.005	0.005		0.010	0.015	0.015		0.010		0.005	0.010	0.005							**0.103**
5		0.020	0.005		0.010		0.015	0.010			0.005		0.010			0.005						**0.079**
6		0.015	0.010	0.010		0.010	0.005	0.005				0.005	0.005									**0.064**
7												0.005										**0.005**
8										0.005				0.005								**0.010**
9																						
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20																						
Totals	**0.891**	**1.044**	**0.734**	**1.270**	**1.457**	**1.487**	**1.763**	**1.733**	**2.762**	**5.209**	**7.307**	**8.986**	**14.101**	**29.956**	**17.075**	**3.998**	**0.226**					**100.000**

Summary Statistics

Avg Speed (mph)	57.18	Time at Idle (%)	0.891	Avg Specific PKE (hp-sec/lb)	3.77
Min Speed (mph)	0.00	Time at Cruise (%)	78.735	Avg Total Specific Power (hp/lb)	0.0545
Max Speed (mph)	80.82	Time in Accel (%)	10.832	Avg Non-Zero Specific Power (hp/lb)	0.1029
Avg Non-Idle Speed (mph)	57.70	Time in Decel (%)	9.542	Max Specific Power (hp/lb)	2.0615
Avg Cruise Speed (mph)	57.79	Avg Trip Length (miles)	1.101	Spec Pwr Freq (%): 0 hp/lb	47.10
Avg Acceleration (mph/sec)	0.51	Avg Trip Time (min)	1.155	Spec Pwr Freq (%): >0-0.1 hp/lb	32.76
Max Acceleration (mph/sec)	7.83	# Stops per Mile	0.056	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.82
Avg Deceleration (mph/sec)	-0.53	# of 1-Sec Observations	20,310	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.92
Max Deceleration (mph/sec)	-10.94	# of Trips	293	Spec Pwr Freq (%): >0.3 hp/lb	2.40

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	10.894		
		Bin 0 % (braking)	1.744		
		Bin 1 % (idle)	1.139		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.554	Bin 21 % (25-50 mph, <0 kw/tonne)	2.818		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.469	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.659	Bin 33 % (>50 mph, <6 kw/tonne)	10.022
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.749	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.638		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.495	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.858	Bin 35 % (>50 mph, 6-12 kw/tonne)	22.686
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.140	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.008		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.060		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.103	Bin 37 % (>50 mph, 12-18 kw/tonne)	29.685
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.510	Bin 38 % (>50 mph, 18-24 kw/tonne)	11.545
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.165	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.813
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.135	Bin 40 % (>50 mph, >=30 kw/tonne)	1.009

ifornia 2000 Urban Principal Arterial Interstate LOS E Driving (FC=11), No Grade Compensation SAFD

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17											0.005											**0.005**
-16																						
-15																						
-14																						
-13																						
-12																						
-11														0.005								**0.005**
-10																						
-9													0.005									**0.005**
-8																						
-7				0.005	0.005				0.005		0.005											**0.021**
-6				0.005	0.010	0.021	0.005		0.005	0.010	0.010	0.005										**0.072**
-5			0.010	0.005	0.026	0.015	0.015	0.010	0.015	0.021	0.010	0.005	0.015	0.005								**0.154**
-4		0.026	0.031	0.062	0.051	0.062	0.036	0.021	0.015	0.026	0.026	0.046	0.026	0.026	0.010							**0.463**
-3		0.087	0.087	0.113	0.113	0.093	0.067	0.077	0.067	0.062	0.077	0.077	0.087	0.093	0.041	0.005						**1.147**
-2		0.154	0.247	0.386	0.401	0.273	0.314	0.201	0.129	0.093	0.216	0.406	0.314	0.159	0.062	0.015						**3.368**
-1	0.005	0.401	0.648	1.085	1.028	1.044	0.638	0.761	0.540	0.463	0.802	2.103	2.751	1.738	0.293	0.046						**14.347**
0	0.175	0.879	1.219	1.959	2.062	1.897	1.543	1.687	1.136	1.471	2.648	9.564	16.440	10.819	0.931	0.324	0.026					**54.780**
1	0.026	0.586	0.812	1.095	0.998	1.111	1.070	1.275	1.003	1.142	2.000	3.574	3.949	1.815	0.144	0.041						**20.641**
2		0.190	0.314	0.442	0.375	0.324	0.293	0.309	0.375	0.262	0.309	0.432	0.278	0.098	0.026							**4.026**
3		0.067	0.067	0.113	0.087	0.036	0.031	0.051	0.041	0.067	0.036	0.021	0.010	0.031								**0.658**
4		0.021	0.026	0.005	0.021	0.026	0.026	0.010	0.005	0.026	0.036	0.010										**0.211**
5		0.015	0.005	0.010	0.005			0.010														**0.046**
6		0.005	0.005		0.005																	**0.015**
7							0.005				0.005											**0.010**
8										0.005												**0.005**
9		0.005																				**0.005**
10												0.010										**0.010**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18								0.005														**0.005**
19																						
20																						
Totals	**0.206**	**2.437**	**3.471**	**5.286**	**5.188**	**4.900**	**4.042**	**4.417**	**3.337**	**3.646**	**6.186**	**16.254**	**23.875**	**14.789**	**1.507**	**0.432**	**0.026**					**100.000**

Summary Statistics

Avg Speed (mph)	46.61	Time at Idle (%)	0.206	Avg Specific PKE (hp-sec/lb)	4.04
Min Speed (mph)	0.00	Time at Cruise (%)	78.783	Avg Total Specific Power (hp/lb)	0.0575
Max Speed (mph)	78.10	Time in Accel (%)	10.943	Avg Non-Zero Specific Power (hp/lb)	0.1051
Avg Non-Idle Speed (mph)	46.70	Time in Decel (%)	10.068	Max Specific Power (hp/lb)	3.1457
Avg Cruise Speed (mph)	46.29	Avg Trip Length (miles)	0.909	Spec Pwr Freq (%): 0 hp/lb	45.27
Avg Acceleration (mph/sec)	0.65	Avg Trip Time (min)	1.170	Spec Pwr Freq (%): >0-0.1 hp/lb	32.77
Max Acceleration (mph/sec)	17.70	# Stops per Mile	0.064	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.75
Avg Deceleration (mph/sec)	-0.71	# of 1-Sec Observations	19,447	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.63
Max Deceleration (mph/sec)	-17.33	# of Trips	277	Spec Pwr Freq (%): >0.3 hp/lb	2.58

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	7.769		
		Bin 0 % (braking)	3.026		
		Bin 1 % (idle)	0.386		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.686	Bin 21 % (25-50 mph, <0 kw/tonne)	3.839		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	7.319	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.801	Bin 33 % (>50 mph, <6 kw/tonne)	11.116
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.020	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.026		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.257	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.973	Bin 35 % (>50 mph, 6-12 kw/tonne)	20.762
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.402	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.394		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.188		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.619	Bin 37 % (>50 mph, 12-18 kw/tonne)	19.504
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.908	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.067
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.224	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.664
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.151	Bin 40 % (>50 mph, >=30 kw/tonne)	0.668

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ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13								0.002														**0.002**
-12																						
-11																						
-10						0.002																**0.002**
-9			0.002	0.004	0.002	0.002	0.002	0.002	0.002		0.002	0.002										**0.022**
-8			0.002	0.004	0.004	0.002	0.011		0.002	0.004		0.004	0.002									**0.037**
-7			0.002	0.007	0.011	0.009	0.007	0.009	0.007	0.007	0.002	0.002	0.002									**0.063**
-6		0.009	0.011	0.022	0.015	0.033	0.015	0.007	0.013		0.004	0.002	0.002	0.002								**0.136**
-5		0.007	0.046	0.048	0.046	0.039	0.044	0.028	0.017	0.013	0.017	0.004	0.002									**0.313**
-4		0.063	0.074	0.103	0.092	0.103	0.061	0.050	0.046	0.031	0.022	0.013	0.004									**0.663**
-3		0.186	0.286	0.247	0.212	0.232	0.164	0.142	0.125	0.090	0.048	0.046	0.026	0.009								**1.813**
-2	0.007	0.787	0.894	0.862	0.783	0.612	0.553	0.381	0.289	0.227	0.133	0.079	0.037	0.024								**5.668**
-1	0.011	3.153	2.644	2.266	2.036	2.018	1.513	1.211	0.800	0.573	0.553	0.286	0.140	0.083	0.028							**17.317**
0	2.467	7.437	5.581	4.645	3.969	4.085	3.464	2.528	2.106	1.975	1.784	1.032	0.450	0.227	0.024							**41.774**
1	0.092	3.851	2.965	2.583	2.644	2.690	2.311	1.962	1.612	1.292	1.058	0.485	0.188	0.052	0.007							**23.792**
2	0.007	1.061	0.969	1.091	0.905	0.770	0.595	0.400	0.230	0.129	0.092	0.046	0.013									**6.307**
3		0.321	0.300	0.245	0.203	0.122	0.101	0.066	0.037	0.024	0.011	0.002										**1.432**
4		0.070	0.083	0.074	0.052	0.035	0.015	0.033	0.017	0.007	0.002											**0.389**
5		0.020	0.026	0.022	0.017	0.011	0.011	0.015	0.007	0.011	0.004											**0.144**
6	0.002	0.024	0.022	0.011	0.011	0.007	0.002	0.002														**0.081**
7		0.007	0.002	0.004		0.002	0.002															**0.017**
8			0.002	0.007		0.002			0.002													**0.013**
9				0.002		0.002			0.002													**0.007**
10																						
11					0.002																	**0.002**
12																						
13						0.004																**0.004**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.585**	**16.996**	**13.912**	**12.246**	**11.006**	**10.783**	**8.872**	**6.838**	**5.314**	**4.382**	**3.735**	**2.005**	**0.868**	**0.398**	**0.059**							**100.000**

Summary Statistics

Avg Speed (mph)	21.74	Time at Idle (%)	2.585	Avg Specific PKE (hp-sec/lb)	12.20
Min Speed (mph)	0.00	Time at Cruise (%)	79.816	Avg Total Specific Power (hp/lb)	0.0395
Max Speed (mph)	70.60	Time in Accel (%)	8.636	Avg Non-Zero Specific Power (hp/lb)	0.0739
Avg Non-Idle Speed (mph)	22.32	Time in Decel (%)	8.964	Max Specific Power (hp/lb)	1.7925
Avg Cruise Speed (mph)	22.40	Avg Trip Length (miles)	1.866	Spec Pwr Freq (%): 0 hp/lb	46.54
Avg Acceleration (mph/sec)	0.86	Avg Trip Time (min)	5.150	Spec Pwr Freq (%): >0-0.1 hp/lb	39.12
Max Acceleration (mph/sec)	13.48	# Stops per Mile	0.829	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.50
Avg Deceleration (mph/sec)	-0.95	# of 1-Sec Observations	45,729	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.84
Max Deceleration (mph/sec)	-13.28	# of Trips	148	Spec Pwr Freq (%): >0.3 hp/lb	1.00

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.132		
		Bin 0 % (braking)	5.116		
		Bin 1 % (idle)	4.458		
Bin 11 % (0-25 mph, <0 kw/tonne)	17.237	Bin 21 % (25-50 mph, <0 kw/tonne)	6.827		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	25.392	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.928	Bin 33 % (>50 mph, <6 kw/tonne)	1.384
Bin 13 % (0-25 mph, 3-6 kw/tonne)	7.720	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.695		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.021	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.213	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.654
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.987	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.736		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.507		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.416	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.233
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.575	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.483
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.145	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.108
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.136	Bin 40 % (>50 mph, >=30 kw/tonne)	0.029

ornia 2000 Urban Prin Art Other Fwys & Expwys LOS A Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14														0.001								**0.001**
-13											0.001											**0.001**
-12																						
-11					0.001																	**0.001**
-10					0.002	0.001		0.002						0.001								**0.007**
-9			0.001		0.001	0.001		0.001			0.001					0.001						**0.007**
-8			0.001	0.003		0.001	0.002	0.002	0.003		0.001	0.001	0.001									**0.017**
-7		0.001	0.002	0.002	0.006	0.003	0.006	0.002	0.001	0.002	0.001		0.001		0.001							**0.030**
-6			0.008	0.011	0.015	0.014	0.016	0.015	0.007	0.003	0.003	0.002	0.002	0.002								**0.100**
-5		0.005	0.022	0.040	0.053	0.063	0.047	0.039	0.038	0.021	0.008	0.008	0.005	0.001	0.001			0.001				**0.350**
-4		0.017	0.079	0.102	0.096	0.094	0.081	0.093	0.050	0.049	0.031	0.011	0.015	0.007	0.002	0.002	0.002					**0.733**
-3	0.001	0.077	0.134	0.094	0.121	0.128	0.180	0.128	0.140	0.093	0.079	0.070	0.047	0.029	0.022	0.013	0.003					**1.358**
-2		0.246	0.109	0.102	0.124	0.150	0.172	0.244	0.279	0.251	0.211	0.174	0.174	0.136	0.073	0.032	0.009					**2.486**
-1		0.650	0.150	0.085	0.129	0.184	0.276	0.439	0.558	0.852	0.841	0.979	1.277	1.624	1.580	0.752	0.174	0.031				**10.581**
0	5.566	1.540	0.157	0.090	0.145	0.295	0.451	0.800	1.423	2.542	2.615	3.166	7.400	14.400	16.971	7.711	1.531	0.160	0.010			**66.976**
1	0.060	0.547	0.106	0.124	0.199	0.322	0.401	0.696	0.981	1.201	1.151	1.205	1.561	1.723	1.470	0.672	0.135	0.032				**12.587**
2	0.008	0.220	0.061	0.081	0.173	0.222	0.324	0.317	0.278	0.226	0.199	0.195	0.176	0.117	0.057	0.031	0.002	0.001				**2.689**
3	0.002	0.187	0.074	0.116	0.159	0.192	0.135	0.120	0.077	0.058	0.044	0.023	0.013	0.014	0.010	0.006	0.003					**1.233**
4	0.002	0.120	0.092	0.098	0.084	0.047	0.038	0.022	0.023	0.014	0.014	0.007	0.005	0.005	0.003							**0.573**
5		0.032	0.063	0.037	0.017	0.009	0.005	0.006	0.008	0.002	0.005				0.002	0.001						**0.187**
6		0.009	0.017	0.014	0.003	0.003	0.003	0.001				0.002	0.001									**0.055**
7		0.005	0.007	0.002			0.001								0.003							**0.018**
8		0.001	0.001	0.001		0.001		0.001				0.001										**0.007**
9			0.001			0.001																**0.002**
10																						
11				0.001																		**0.001**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**5.640**	**3.657**	**1.086**	**1.004**	**1.329**	**1.734**	**2.138**	**2.929**	**3.867**	**5.314**	**5.205**	**5.845**	**10.677**	**18.059**	**20.197**	**9.222**	**1.861**	**0.226**	**0.010**			**100.000**

Summary Statistics

Avg Speed (mph)	53.35	Time at Idle (%)	5.640	Avg Specific PKE (hp-sec/lb)	8.46
Min Speed (mph)	0.00	Time at Cruise (%)	73.486	Avg Total Specific Power (hp/lb)	0.0500
Max Speed (mph)	88.19	Time in Accel (%)	10.346	Avg Non-Zero Specific Power (hp/lb)	0.1017
Avg Non-Idle Speed (mph)	56.54	Time in Decel (%)	10.528	Max Specific Power (hp/lb)	2.2034
Avg Cruise Speed (mph)	58.22	Avg Trip Length (miles)	2.508	Spec Pwr Freq (%): 0 hp/lb	50.85
Avg Acceleration (mph/sec)	0.60	Avg Trip Time (min)	2.821	Spec Pwr Freq (%): >0-0.1 hp/lb	31.13
Max Acceleration (mph/sec)	11.05	# Stops per Mile	0.145	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.16
Avg Deceleration (mph/sec)	-0.65	# of 1-Sec Observations	87,328	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.28
Max Deceleration (mph/sec)	-13.97	# of Trips	516	Spec Pwr Freq (%): >0.3 hp/lb	2.59

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	10.085		
		Bin 0 % (braking)	3.650		
		Bin 1 % (idle)	6.696		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.628	Bin 21 % (25-50 mph, <0 kw/tonne)	2.966		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.812	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.958	Bin 33 % (>50 mph, <6 kw/tonne)	7.575
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.655	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.509		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.457	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.674	Bin 35 % (>50 mph, 6-12 kw/tonne)	16.871
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.372	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.190		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.566		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.378	Bin 37 % (>50 mph, 12-18 kw/tonne)	28.010
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.896	Bin 38 % (>50 mph, 18-24 kw/tonne)	11.761
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.274	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.848
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.164	Bin 40 % (>50 mph, >=30 kw/tonne)	1.091

ornia 2000 Urban Prin Art Other Fwys & Expwys LOS B Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																0.003						**0.003**
-12																						
-11																						
-10																						
-9																						
-8																	0.003					**0.003**
-7											0.003											**0.003**
-6				0.005	0.005		0.005		0.008	0.008	0.003	0.005										**0.041**
-5			0.003		0.003	0.011	0.005	0.003	0.005	0.005	0.011	0.014	0.008	0.008	0.005							**0.082**
-4			0.003	0.003	0.003	0.005	0.008	0.014	0.022	0.022	0.019	0.030	0.030	0.011	0.014	0.005						**0.188**
-3		0.005	0.008	0.008	0.014		0.005	0.014	0.019	0.014	0.035	0.071	0.057	0.041	0.019	0.005	0.008					**0.324**
-2		0.003		0.011	0.014	0.014	0.008	0.016	0.046	0.090	0.109	0.169	0.239	0.269	0.150	0.030		0.005				**1.173**
-1		0.024	0.041	0.041	0.044	0.022	0.024	0.016	0.101	0.147	0.397	1.116	1.986	3.205	2.634	1.167	0.220	0.003				**11.188**
0	0.033	0.041	0.057	0.101	0.144	0.035	0.046	0.033	0.139	0.269	0.890	3.967	10.072	24.650	22.308	10.402	1.744	0.044				**74.974**
1		0.038	0.038	0.060	0.046	0.016	0.024	0.052	0.101	0.169	0.433	1.083	2.079	3.243	2.457	0.977	0.147	0.003				**10.965**
2		0.008	0.011	0.014	0.019	0.011	0.003	0.033	0.063	0.073	0.076	0.133	0.185	0.139	0.068	0.016	0.003					**0.854**
3				0.003		0.005	0.003	0.005	0.008	0.019	0.024	0.022	0.033	0.019	0.005	0.005						**0.152**
4		0.003	0.003					0.003	0.003		0.003	0.003				0.003						**0.019**
5			0.003	0.003	0.003				0.003				0.003	0.005			0.003					**0.022**
6			0.003								0.003											**0.005**
7					0.003																	**0.003**
8																						
9																						
10															0.003							**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.033**	**0.122**	**0.169**	**0.248**	**0.297**	**0.120**	**0.133**	**0.188**	**0.517**	**0.816**	**2.005**	**6.612**	**14.692**	**31.591**	**27.662**	**12.614**	**2.128**	**0.054**				**100.000**

Summary Statistics

Avg Speed (mph)	65.42	Time at Idle (%)	0.033	Avg Specific PKE (hp-sec/lb)	8.36
Min Speed (mph)	0.00	Time at Cruise (%)	78.974	Avg Total Specific Power (hp/lb)	0.0455
Max Speed (mph)	85.06	Time in Accel (%)	9.964	Avg Non-Zero Specific Power (hp/lb)	0.0923
Avg Non-Idle Speed (mph)	65.44	Time in Decel (%)	11.030	Max Specific Power (hp/lb)	2.7926
Avg Cruise Speed (mph)	65.57	Avg Trip Length (miles)	3.339	Spec Pwr Freq (%): 0 hp/lb	50.70
Avg Acceleration (mph/sec)	0.38	Avg Trip Time (min)	3.063	Spec Pwr Freq (%): >0-0.1 hp/lb	32.74
Max Acceleration (mph/sec)	9.70	# Stops per Mile	0.002	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.52
Avg Deceleration (mph/sec)	-0.43	# of 1-Sec Observations	36,754	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.47
Max Deceleration (mph/sec)	-13.14	# of Trips	200	Spec Pwr Freq (%): >0.3 hp/lb	1.57

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	13.009		
		Bin 0 % (braking)	1.010		
		Bin 1 % (idle)	0.044		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.235	Bin 21 % (25-50 mph, <0 kw/tonne)	0.531		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.421	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.233	Bin 33 % (>50 mph, <6 kw/tonne)	10.844
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.109	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.208		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.038	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.268	Bin 35 % (>50 mph, 6-12 kw/tonne)	25.141
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.008	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.249		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.022		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.326	Bin 37 % (>50 mph, 12-18 kw/tonne)	37.958
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.186	Bin 38 % (>50 mph, 18-24 kw/tonne)	16.576
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.025	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.388
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.038	Bin 40 % (>50 mph, >=30 kw/tonne)	1.144

ɔrnia 2000 Urban Prin Art Other Fwys & Expwys LOS C Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																		0.003				**0.003**
-10																				0.003		**0.003**
-9					0.003				0.003													**0.006**
-8							0.009					0.003	0.003	0.003	0.009	0.015	0.003					**0.046**
-7									0.003		0.006			0.012		0.003		0.003				**0.027**
-6			0.006	0.003	0.006	0.009	0.006		0.006	0.012	0.006	0.015	0.012	0.006	0.009	0.003						**0.101**
-5			0.003	0.006	0.003		0.009	0.015	0.018	0.021	0.031	0.018	0.009	0.015	0.012	0.006	0.003	0.003				**0.174**
-4		0.003	0.006	0.015	0.024	0.027	0.021	0.034	0.027	0.037	0.058	0.027	0.040	0.031	0.018	0.015						**0.384**
-3		0.006	0.018	0.012	0.015	0.012	0.043	0.037	0.067	0.064	0.070	0.107	0.064	0.052	0.064	0.037	0.012	0.003		0.003		**0.686**
-2		0.024	0.018	0.018	0.018	0.043	0.024	0.058	0.076	0.131	0.180	0.268	0.296	0.253	0.168	0.070	0.024	0.006	0.003			**1.681**
-1		0.052	0.052	0.040	0.082	0.073	0.110	0.113	0.226	0.308	0.668	1.461	2.554	3.109	2.377	0.802	0.131	0.034	0.003			**12.195**
0	0.085	0.043	0.031	0.049	0.052	0.049	0.159	0.171	0.378	0.671	2.359	5.620	13.208	20.946	19.896	5.422	0.818	0.119			0.003	**70.078**
1	0.003	0.021	0.021	0.027	0.064	0.085	0.082	0.088	0.204	0.452	0.921	1.657	2.834	3.082	2.468	0.729	0.131	0.049				**12.921**
2		0.003	0.018	0.012	0.037	0.037	0.052	0.043	0.064	0.052	0.110	0.217	0.207	0.235	0.131	0.034	0.018	0.006				**1.275**
3		0.012	0.012	0.015	0.009	0.012	0.003	0.021	0.012	0.003	0.027	0.027	0.037	0.052	0.021	0.009	0.006					**0.281**
4		0.003		0.006	0.003			0.003	0.003		0.006	0.009	0.006	0.012	0.006	0.015		0.003				**0.076**
5								0.003	0.003	0.003	0.003	0.003	0.003		0.006		0.003					**0.027**
6														0.003	0.003							**0.006**
7		0.003								0.003	0.003							0.003				**0.012**
8															0.003	0.003						**0.006**
9													0.003									**0.003**
10																						
11													0.003									**0.003**
12																		0.003				**0.003**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.088**	**0.171**	**0.186**	**0.204**	**0.317**	**0.348**	**0.519**	**0.586**	**1.092**	**1.757**	**4.449**	**9.434**	**19.280**	**27.811**	**25.193**	**7.164**	**1.150**	**0.235**	**0.006**	**0.006**	**0.003**	**100.000**

Summary Statistics

Avg Speed (mph)	62.98	Time at Idle (%)	0.089	Avg Specific PKE (hp-sec/lb)	6.38
Min Speed (mph)	0.00	Time at Cruise (%)	76.802	Avg Total Specific Power (hp/lb)	0.0512
Max Speed (mph)	97.70	Time in Accel (%)	10.987	Avg Non-Zero Specific Power (hp/lb)	0.1028
Avg Non-Idle Speed (mph)	63.04	Time in Decel (%)	12.122	Max Specific Power (hp/lb)	4.3445
Avg Cruise Speed (mph)	63.02	Avg Trip Length (miles)	2.180	Spec Pwr Freq (%): 0 hp/lb	50.23
Avg Acceleration (mph/sec)	0.43	Avg Trip Time (min)	2.077	Spec Pwr Freq (%): >0-0.1 hp/lb	31.21
Max Acceleration (mph/sec)	12.12	# Stops per Mile	0.009	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.63
Avg Deceleration (mph/sec)	-0.53	# of 1-Sec Observations	32,775	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.69
Max Deceleration (mph/sec)	-11.00	# of Trips	263	Spec Pwr Freq (%): >0.3 hp/lb	2.24

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.884		
		Bin 0 % (braking)	2.095		
		Bin 1 % (idle)	0.108		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.360	Bin 21 % (25-50 mph, <0 kw/tonne)	1.147		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	0.203	Bin 22 % (25-50 mph, 0-3 kw/tonne)	0.686	Bin 33 % (>50 mph, <6 kw/tonne)	12.617
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.129	Bin 23 % (25-50 mph, 3-6 kw/tonne)	0.797		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.080	Bin 24 % (25-50 mph, 6-9 kw/tonne)	0.815	Bin 35 % (>50 mph, 6-12 kw/tonne)	26.129
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.058	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.692		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.019		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.818	Bin 37 % (>50 mph, 12-18 kw/tonne)	33.815
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.218	Bin 38 % (>50 mph, 18-24 kw/tonne)	13.841
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.046	Bin 39 % (>50 mph, 24-30 kw/tonne)	3.642
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.037	Bin 40 % (>50 mph, >=30 kw/tonne)	1.649

ɔrnia 2000 Urban Prin Art Other Fwys & Expwys LOS D Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14															0.003							**0.003**
-13									0.003													**0.003**
-12								0.003				0.003										**0.007**
-11														0.003								**0.003**
-10					0.003	0.003					0.003											**0.010**
-9									0.003			0.003	0.003	0.007								**0.017**
-8							0.003		0.003	0.003	0.003			0.003								**0.017**
-7		0.003	0.007	0.010	0.007	0.017	0.003	0.007	0.007		0.010	0.010	0.003	0.003								**0.087**
-6			0.013	0.007	0.003	0.007	0.010	0.013	0.024	0.010	0.010	0.010		0.003	0.003							**0.114**
-5		0.003	0.007	0.020	0.010	0.017	0.020	0.034	0.047	0.027	0.017	0.020	0.013	0.003								**0.239**
-4		0.010	0.024	0.024	0.040	0.044	0.050	0.044	0.057	0.091	0.037	0.037	0.024	0.003	0.003	0.003						**0.491**
-3	0.007	0.044	0.040	0.054	0.081	0.108	0.108	0.091	0.094	0.128	0.145	0.118	0.081	0.044	0.007	0.007						**1.153**
-2		0.141	0.175	0.202	0.155	0.188	0.222	0.319	0.346	0.343	0.356	0.303	0.218	0.138	0.047							**3.153**
-1		0.363	0.259	0.360	0.333	0.333	0.635	0.803	0.800	1.035	1.546	2.023	2.255	2.020	0.827	0.067	0.013					**13.673**
0	1.445	0.676	0.460	0.860	0.528	0.629	1.133	1.721	2.148	3.119	4.561	8.104	12.285	12.107	7.919	0.403	0.017					**58.116**
1	0.020	0.410	0.410	0.356	0.343	0.524	0.790	1.166	1.328	1.593	2.568	2.894	2.968	2.561	0.844	0.067	0.003					**18.846**
2	0.007	0.101	0.097	0.141	0.158	0.245	0.255	0.299	0.306	0.306	0.296	0.316	0.266	0.134	0.047	0.013						**2.988**
3	0.003	0.074	0.013	0.030	0.040	0.057	0.057	0.067	0.057	0.064	0.074	0.050	0.030	0.020	0.010	0.003						**0.652**
4		0.044	0.024	0.020	0.020	0.013	0.010	0.027	0.020	0.024	0.013	0.017	0.010	0.010								**0.252**
5		0.013	0.030	0.027	0.010	0.007	0.003	0.013	0.010	0.007	0.007	0.003										**0.131**
6			0.003			0.003			0.007	0.007												**0.020**
7											0.003											**0.003**
8												0.003		0.003								**0.007**
9			0.003	0.003								0.003										**0.010**
10																						
11			0.003																			**0.003**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**1.482**	**1.882**	**1.570**	**2.114**	**1.731**	**2.195**	**3.301**	**4.608**	**5.260**	**6.756**	**9.650**	**13.919**	**18.157**	**17.065**	**9.711**	**0.565**	**0.034**					**100.000**

Summary Statistics

Avg Speed (mph)	50.90	Time at Idle (%)	1.482	Avg Specific PKE (hp-sec/lb)	4.88
Min Speed (mph)	0.00	Time at Cruise (%)	77.544	Avg Total Specific Power (hp/lb)	0.0578
Max Speed (mph)	79.27	Time in Accel (%)	10.501	Avg Non-Zero Specific Power (hp/lb)	0.1108
Avg Non-Idle Speed (mph)	51.67	Time in Decel (%)	10.474	Max Specific Power (hp/lb)	2.2659
Avg Cruise Speed (mph)	51.57	Avg Trip Length (miles)	1.195	Spec Pwr Freq (%): 0 hp/lb	47.89
Avg Acceleration (mph/sec)	0.61	Avg Trip Time (min)	1.409	Spec Pwr Freq (%): >0-0.1 hp/lb	30.25
Max Acceleration (mph/sec)	10.82	# Stops per Mile	0.062	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.12
Avg Deceleration (mph/sec)	-0.70	# of 1-Sec Observations	29,751	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.93
Max Deceleration (mph/sec)	-13.60	# of Trips	352	Spec Pwr Freq (%): >0.3 hp/lb	2.81

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.557		
		Bin 0 % (braking)	3.310		
		Bin 1 % (idle)	1.799		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.432	Bin 21 % (25-50 mph, <0 kw/tonne)	4.646		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.905	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.340	Bin 33 % (>50 mph, <6 kw/tonne)	11.650
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.969	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.208		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.510	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.102	Bin 35 % (>50 mph, 6-12 kw/tonne)	19.759
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.191	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.153		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.184		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.140	Bin 37 % (>50 mph, 12-18 kw/tonne)	21.599
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.993	Bin 38 % (>50 mph, 18-24 kw/tonne)	7.677
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.245	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.048
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.214	Bin 40 % (>50 mph, >=30 kw/tonne)	0.925

ornia 2000 Urban Prin Art Other Fwys & Expwys LOS E Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11			0.005																			**0.005**
-10						0.005																**0.005**
-9					0.005																	**0.005**
-8					0.010			0.015	0.005													**0.030**
-7			0.005		0.005	0.005	0.005		0.010	0.010	0.005	0.005										**0.050**
-6				0.020	0.020	0.020	0.025	0.015	0.015	0.025	0.010	0.005	0.005		0.005							**0.166**
-5		0.010	0.010	0.040	0.045	0.040	0.045	0.020	0.005	0.020	0.015	0.020	0.005	0.005								**0.283**
-4		0.015	0.071	0.081	0.081	0.096	0.050	0.020	0.050	0.040	0.040	0.040	0.020	0.015								**0.621**
-3		0.076	0.141	0.161	0.242	0.177	0.166	0.166	0.111	0.061	0.131	0.096	0.045	0.035	0.020							**1.630**
-2		0.177	0.298	0.399	0.363	0.525	0.494	0.388	0.257	0.212	0.277	0.323	0.247	0.116	0.040	0.005						**4.122**
-1		0.631	0.636	0.787	1.281	1.645	1.609	1.201	0.933	0.711	0.893	1.927	2.200	1.226	0.378	0.045	0.015					**16.119**
0	0.187	0.994	0.843	1.297	2.396	2.835	3.163	3.113	2.704	2.588	3.799	6.110	8.718	6.644	2.714	0.277	0.010					**48.393**
1	0.005	0.626	0.595	0.928	1.544	1.821	2.124	2.190	2.063	1.902	2.074	2.487	2.704	1.307	0.267	0.030	0.005					**22.673**
2	0.005	0.283	0.353	0.399	0.600	0.535	0.469	0.434	0.348	0.298	0.368	0.358	0.222	0.076	0.015							**4.763**
3		0.071	0.141	0.131	0.076	0.091	0.055	0.061	0.050	0.025	0.040	0.076	0.050	0.020	0.005							**0.893**
4		0.005	0.030	0.030	0.025	0.010		0.005	0.005	0.015	0.005	0.005	0.005	0.005								**0.146**
5		0.005	0.010	0.005	0.005				0.005				0.010									**0.040**
6			0.005	0.005	0.005	0.005	0.010		0.005													**0.035**
7		0.005	0.005	0.005										0.005								**0.020**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**0.197**	**2.896**	**3.148**	**4.288**	**6.705**	**7.810**	**8.219**	**7.628**	**6.569**	**5.908**	**7.659**	**11.453**	**14.232**	**9.455**	**3.446**	**0.358**	**0.030**					**100.000**

Summary Statistics

Avg Speed (mph)	42.33	Time at Idle (%)	0.197	Avg Specific PKE (hp-sec/lb)	4.31
Min Speed (mph)	0.00	Time at Cruise (%)	78.815	Avg Total Specific Power (hp/lb)	0.0579
Max Speed (mph)	79.39	Time in Accel (%)	10.206	Avg Non-Zero Specific Power (hp/lb)	0.1067
Avg Non-Idle Speed (mph)	42.41	Time in Decel (%)	10.782	Max Specific Power (hp/lb)	1.7083
Avg Cruise Speed (mph)	42.14	Avg Trip Length (miles)	0.876	Spec Pwr Freq (%): 0 hp/lb	45.77
Avg Acceleration (mph/sec)	0.71	Avg Trip Time (min)	1.242	Spec Pwr Freq (%): >0-0.1 hp/lb	31.66
Max Acceleration (mph/sec)	7.27	# Stops per Mile	0.077	Spec Pwr Freq (%): >0.1-0.2 hp/lb	15.42
Avg Deceleration (mph/sec)	-0.84	# of 1-Sec Observations	19,821	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.69
Max Deceleration (mph/sec)	-10.93	# of Trips	266	Spec Pwr Freq (%): >0.3 hp/lb	2.46

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.423		
		Bin 0 % (braking)	4.337		
		Bin 1 % (idle)	0.378		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.300	Bin 21 % (25-50 mph, <0 kw/tonne)	6.786		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.561	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.339	Bin 33 % (>50 mph, <6 kw/tonne)	9.338
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.401	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.993		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.718	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.395	Bin 35 % (>50 mph, 6-12 kw/tonne)	13.163
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.629	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.521		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.215		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.383	Bin 37 % (>50 mph, 12-18 kw/tonne)	13.526
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.823	Bin 38 % (>50 mph, 18-24 kw/tonne)	4.720
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.246	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.417
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.082	Bin 40 % (>50 mph, >=30 kw/tonne)	0.731

ornia 2000 Urban Prin Art Other Fwys & Expwys LOS F Driving (FC=12), No Grade Compensation SAFI

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10								0.003														**0.003**
-9							0.003															**0.003**
-8				0.003	0.005	0.008	0.003	0.005	0.005		0.003		0.003									**0.035**
-7			0.005	0.008	0.008		0.011	0.008	0.003	0.005	0.003											**0.052**
-6		0.011	0.022	0.019	0.025	0.005	0.005	0.008		0.005		0.005										**0.106**
-5		0.027	0.046	0.052	0.054	0.016	0.014	0.014	0.016	0.016	0.005	0.003										**0.264**
-4		0.041	0.131	0.139	0.098	0.117	0.079	0.033	0.022	0.027	0.022	0.022	0.016									**0.746**
-3		0.218	0.343	0.305	0.300	0.245	0.163	0.133	0.074	0.044	0.057	0.022	0.025	0.005								**1.933**
-2		0.812	0.831	0.880	0.713	0.517	0.422	0.340	0.261	0.144	0.068	0.046	0.016	0.030	0.005							**5.087**
-1	0.003	3.290	2.353	2.511	2.271	1.661	1.465	0.812	0.626	0.449	0.327	0.231	0.144	0.084	0.027							**16.255**
0	3.567	9.354	5.520	5.504	4.371	3.690	3.287	2.157	1.310	1.348	1.348	0.678	0.389	0.291	0.052							**42.865**
1	0.125	3.989	2.903	3.208	2.990	2.489	2.421	1.582	1.261	1.018	0.629	0.411	0.261	0.079	0.011							**23.378**
2	0.005	1.400	1.114	1.122	0.929	0.866	0.618	0.406	0.240	0.163	0.090	0.057	0.016	0.005								**7.031**
3	0.005	0.368	0.373	0.332	0.245	0.136	0.082	0.038	0.033	0.027	0.014	0.016	0.005									**1.675**
4	0.003	0.090	0.079	0.071	0.038	0.030	0.027	0.016	0.003	0.005	0.008	0.005										**0.376**
5		0.033	0.027	0.030	0.019	0.005	0.005	0.003	0.003		0.003											**0.128**
6		0.014	0.008	0.003		0.003																**0.027**
7		0.003	0.003	0.005	0.003		0.003			0.003												**0.019**
8		0.008	0.003																			**0.011**
9				0.003																		**0.003**
10				0.003																		**0.003**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.709**	**19.656**	**13.760**	**14.196**	**12.069**	**9.790**	**8.608**	**5.558**	**3.856**	**3.257**	**2.576**	**1.498**	**0.877**	**0.496**	**0.095**							**100.000**

Summary Statistics

Avg Speed (mph)	19.67	Time at Idle (%)	3.709	Avg Specific PKE (hp-sec/lb)	9.29
Min Speed (mph)	0.00	Time at Cruise (%)	78.196	Avg Total Specific Power (hp/lb)	0.0379
Max Speed (mph)	72.42	Time in Accel (%)	9.610	Avg Non-Zero Specific Power (hp/lb)	0.0703
Avg Non-Idle Speed (mph)	20.43	Time in Decel (%)	8.485	Max Specific Power (hp/lb)	1.2901
Avg Cruise Speed (mph)	20.33	Avg Trip Length (miles)	1.338	Spec Pwr Freq (%): 0 hp/lb	46.04
Avg Acceleration (mph/sec)	0.87	Avg Trip Time (min)	4.080	Spec Pwr Freq (%): >0-0.1 hp/lb	40.24
Max Acceleration (mph/sec)	10.14	# Stops per Mile	1.126	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.08
Avg Deceleration (mph/sec)	-0.93	# of 1-Sec Observations	36,722	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.74
Max Deceleration (mph/sec)	-10.47	# of Trips	150	Spec Pwr Freq (%): >0.3 hp/lb	0.91

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.026		
		Bin 0 % (braking)	4.979		
		Bin 1 % (idle)	6.163		
Bin 11 % (0-25 mph, <0 kw/tonne)	17.568	Bin 21 % (25-50 mph, <0 kw/tonne)	5.515		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	28.076	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.192	Bin 33 % (>50 mph, <6 kw/tonne)	0.995
Bin 13 % (0-25 mph, 3-6 kw/tonne)	8.657	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.946		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.117	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.378	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.118
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.148	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.311		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.489		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.866	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.913
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.599	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.561
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.140	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.101
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.085	Bin 40 % (>50 mph, >=30 kw/tonne)	0.082

California 2000 Urban Other Principal Arterial LOS A Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17						0.000																**0.000**
-16																						
-15					0.000																	**0.000**
-14																						
-13																						
-12					0.001				0.000													**0.001**
-11			0.001		0.001	0.002		0.000	0.000			0.000										**0.005**
-10			0.000		0.001	0.001		0.001		0.000												**0.005**
-9			0.000	0.001	0.001	0.003	0.002			0.001												**0.009**
-8			0.004	0.006	0.007	0.006	0.008	0.003	0.001	0.001	0.000	0.000		0.000								**0.039**
-7		0.002	0.007	0.017	0.020	0.018	0.014	0.012	0.006	0.003		0.000	0.000	0.000								**0.100**
-6		0.007	0.020	0.054	0.072	0.059	0.035	0.024	0.013	0.004	0.002	0.000	0.000	0.000								**0.292**
-5		0.011	0.112	0.212	0.206	0.196	0.123	0.076	0.035	0.020	0.007	0.002	0.000	0.001								**1.001**
-4		0.099	0.384	0.440	0.444	0.388	0.292	0.187	0.107	0.058	0.014	0.006	0.001	0.001	0.001							**2.423**
-3	0.000	0.445	0.553	0.512	0.580	0.573	0.550	0.391	0.243	0.119	0.060	0.016	0.004	0.000	0.001	0.000						**4.049**
-2	0.001	0.994	0.431	0.430	0.518	0.649	0.704	0.700	0.532	0.309	0.156	0.063	0.020	0.006	0.004							**5.517**
-1	0.003	1.575	0.261	0.383	0.503	0.758	1.098	1.498	1.609	1.412	0.816	0.438	0.231	0.090	0.052	0.010	0.001					**10.737**
0	17.545	2.121	0.311	0.490	0.751	1.275	2.630	4.053	5.070	4.765	3.003	2.068	2.343	0.883	0.427	0.112	0.004					**47.852**
1	0.274	1.166	0.275	0.559	0.823	1.225	1.799	2.321	2.197	1.650	0.912	0.446	0.208	0.106	0.057	0.007	0.000					**14.024**
2	0.064	0.946	0.359	0.683	0.876	1.025	1.004	0.742	0.482	0.237	0.097	0.041	0.015	0.009	0.004	0.001	0.000					**6.585**
3	0.013	0.948	0.519	0.659	0.752	0.619	0.383	0.215	0.102	0.035	0.010	0.007	0.004	0.003	0.001							**4.270**
4	0.007	0.612	0.501	0.377	0.294	0.198	0.101	0.035	0.013	0.007	0.004	0.002				0.000						**2.151**
5	0.004	0.154	0.219	0.133	0.087	0.043	0.020	0.014	0.008	0.004	0.000		0.000									**0.687**
6	0.000	0.030	0.053	0.040	0.014	0.010	0.003	0.001		0.000			0.000	0.000								**0.154**
7	0.000	0.015	0.021	0.009	0.006	0.003			0.000				0.000									**0.056**
8	0.001	0.009	0.007	0.003	0.002	0.002		0.001		0.000			0.000									**0.026**
9		0.002	0.002	0.001	0.001	0.000	0.000															**0.008**
10		0.002	0.001																			**0.003**
11		0.000	0.001																			**0.001**
12			0.000		0.000																	**0.001**
13			0.000																			**0.000**
14																						
15																						
16																						
17		0.000																				**0.000**
18																						
19																						
20																						
Totals	**17.914**	**9.140**	**4.046**	**5.010**	**5.962**	**7.053**	**8.765**	**10.275**	**10.419**	**8.627**	**5.082**	**3.090**	**2.829**	**1.101**	**0.548**	**0.132**	**0.006**					**100.000**

Summary Statistics

Avg Speed (mph)	25.78	Time at Idle (%)	17.914	Avg Specific PKE (hp-sec/lb)	6.88
Min Speed (mph)	0.00	Time at Cruise (%)	54.030	Avg Total Specific Power (hp/lb)	0.0508
Max Speed (mph)	81.47	Time in Accel (%)	14.231	Avg Non-Zero Specific Power (hp/lb)	0.1137
Avg Non-Idle Speed (mph)	31.41	Time in Decel (%)	13.826	Max Specific Power (hp/lb)	1.8154
Avg Cruise Speed (mph)	36.02	Avg Trip Length (miles)	0.969	Spec Pwr Freq (%): 0 hp/lb	55.30
Avg Acceleration (mph/sec)	1.23	Avg Trip Time (min)	2.256	Spec Pwr Freq (%): >0-0.1 hp/lb	24.92
Max Acceleration (mph/sec)	17.32	# Stops per Mile	1.216	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.43
Avg Deceleration (mph/sec)	-1.34	# of 1-Sec Observations	204,543	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.46
Max Deceleration (mph/sec)	-16.62	# of Trips	1,511	Spec Pwr Freq (%): >0.3 hp/lb	2.89

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.718		
		Bin 0 % (braking)	10.489		
		Bin 1 % (idle)	20.576		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.607	Bin 21 % (25-50 mph, <0 kw/tonne)	7.641		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	4.385	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.563	Bin 33 % (>50 mph, <6 kw/tonne)	2.227
Bin 13 % (0-25 mph, 3-6 kw/tonne)	2.958	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.964		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.554	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.913	Bin 35 % (>50 mph, 6-12 kw/tonne)	4.309
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.923	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.708		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.205		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.667	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.464
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.507	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.592
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.379	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.154
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.135	Bin 40 % (>50 mph, >=30 kw/tonne)	0.082

California 2000 Urban Other Principal Arterial LOS B Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10						0.012	0.012	0.012														**0.037**
-9						0.012			0.012													**0.024**
-8					0.024	0.012				0.012												**0.049**
-7				0.061	0.012	0.037	0.024	0.012		0.012												**0.159**
-6			0.049	0.024	0.073	0.085	0.073	0.012	0.012		0.012											**0.342**
-5		0.049	0.110	0.134	0.073	0.207	0.171	0.122	0.024	0.012	0.012											**0.915**
-4		0.024	0.146	0.232	0.488	0.342	0.427	0.256	0.171	0.098	0.037	0.012										**2.233**
-3		0.220	0.281	0.268	0.378	0.696	0.635	0.769	0.415	0.183	0.122	0.012	0.012									**3.991**
-2		0.366	0.122	0.330	0.342	0.488	1.001	1.184	0.866	0.391	0.183	0.061	0.122	0.061	0.098							**5.614**
-1	0.012	0.464	0.085	0.354	0.427	0.659	1.513	3.039	2.502	1.538	0.744	0.696	0.378	0.464	0.378	0.073						**13.327**
0	3.307	0.635	0.134	0.464	0.403	1.306	3.661	7.762	9.434	5.004	2.392	1.635	0.647	2.392	1.587	0.659	0.073					**41.494**
1	0.146	0.415	0.195	0.342	0.464	1.196	3.381	5.126	3.454	1.770	0.879	0.500	0.195	0.305	0.415	0.012						**18.794**
2	0.037	0.403	0.085	0.427	0.610	1.135	1.648	1.391	0.866	0.378	0.232	0.061	0.037	0.024								**7.335**
3		0.415	0.220	0.391	0.561	0.757	0.500	0.159	0.146	0.098	0.049	0.049	0.012									**3.356**
4		0.232	0.195	0.183	0.330	0.268	0.134	0.024	0.024													**1.391**
5		0.110	0.110	0.146	0.146	0.049	0.049	0.024														**0.635**
6		0.037	0.110	0.037		0.012																**0.195**
7		0.012	0.037		0.012																	**0.061**
8		0.012		0.012	0.012																	**0.037**
9																						
10			0.012																			**0.012**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.503**	**3.393**	**1.892**	**3.405**	**4.357**	**7.274**	**13.229**	**19.893**	**17.928**	**9.495**	**4.662**	**3.027**	**1.403**	**3.246**	**2.477**	**0.744**	**0.073**					**100.000**

Summary Statistics

Avg Speed (mph)	35.15	Time at Idle (%)	3.503	Avg Specific PKE (hp-sec/lb)	3.16
Min Speed (mph)	0.00	Time at Cruise (%)	67.928	Avg Total Specific Power (hp/lb)	0.0632
Max Speed (mph)	78.01	Time in Accel (%)	13.913	Avg Non-Zero Specific Power (hp/lb)	0.1256
Avg Non-Idle Speed (mph)	36.42	Time in Decel (%)	14.657	Max Specific Power (hp/lb)	0.7077
Avg Cruise Speed (mph)	39.01	Avg Trip Length (miles)	0.488	Spec Pwr Freq (%): 0 hp/lb	49.65
Avg Acceleration (mph/sec)	1.10	Avg Trip Time (min)	0.833	Spec Pwr Freq (%): >0-0.1 hp/lb	25.84
Max Acceleration (mph/sec)	10.31	# Stops per Mile	0.388	Spec Pwr Freq (%): >0.1-0.2 hp/lb	14.06
Avg Deceleration (mph/sec)	-1.26	# of 1-Sec Observations	8,194	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.57
Max Deceleration (mph/sec)	-10.40	# of Trips	164	Spec Pwr Freq (%): >0.3 hp/lb	3.89

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.851		
		Bin 0 % (braking)	10.423		
		Bin 1 % (idle)	4.533		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.329	Bin 21 % (25-50 mph, <0 kw/tonne)	11.270		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.267	Bin 22 % (25-50 mph, 0-3 kw/tonne)	9.900	Bin 33 % (>50 mph, <6 kw/tonne)	3.238
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.432	Bin 23 % (25-50 mph, 3-6 kw/tonne)	12.391		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.507	Bin 24 % (25-50 mph, 6-9 kw/tonne)	11.382	Bin 35 % (>50 mph, 6-12 kw/tonne)	3.026
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.295	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.223		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.055		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.750	Bin 37 % (>50 mph, 12-18 kw/tonne)	3.661
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.055	Bin 38 % (>50 mph, 18-24 kw/tonne)	1.918
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.486	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.399
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.224	Bin 40 % (>50 mph, >=30 kw/tonne)	0.237

California 2000 Urban Other Principal Arterial LOS C Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9			0.011			0.011				0.011												**0.034**
-8			0.023	0.011	0.011	0.034	0.023	0.011														**0.115**
-7			0.011	0.057	0.057	0.034	0.034	0.011	0.011	0.011												**0.230**
-6			0.023	0.069	0.092	0.092	0.057	0.046	0.034													**0.414**
-5		0.023	0.138	0.310	0.287	0.218	0.207	0.103	0.057	0.023	0.023	0.011										**1.402**
-4		0.138	0.333	0.506	0.586	0.552	0.310	0.287	0.069	0.069	0.011	0.034										**2.896**
-3	0.011	0.391	0.563	0.529	0.724	0.862	0.735	0.483	0.322	0.092	0.069	0.046										**4.826**
-2		0.919	0.517	0.609	0.701	1.092	1.092	0.735	0.689	0.264	0.057	0.057	0.046	0.023	0.011							**6.814**
-1	0.011	1.482	0.276	0.529	0.770	1.471	2.229	2.126	1.942	0.919	0.448	0.264	0.299	0.184	0.080							**13.030**
0	7.641	1.942	0.322	0.724	1.046	2.287	3.596	5.469	4.918	2.528	1.574	1.126	1.252	0.839	0.230	0.184						**35.677**
1	0.218	1.057	0.356	0.597	0.965	2.378	2.964	2.700	2.218	1.413	0.586	0.540	0.414	0.241	0.138	0.034						**16.822**
2	0.011	0.919	0.345	0.735	1.023	1.735	1.551	1.034	0.666	0.253	0.103	0.069	0.069									**8.514**
3	0.011	0.850	0.471	0.643	0.931	0.885	0.540	0.356	0.126	0.080	0.034	0.011	0.011									**4.952**
4	0.023	0.620	0.471	0.448	0.517	0.345	0.230	0.080	0.023													**2.758**
5		0.207	0.276	0.230	0.172	0.069	0.023	0.023	0.011	0.011												**1.023**
6		0.046	0.126	0.069	0.023	0.011	0.011															**0.287**
7		0.034	0.034	0.023	0.034																	**0.126**
8			0.046					0.011														**0.057**
9			0.023																			**0.023**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.928**	**8.629**	**4.366**	**6.090**	**7.940**	**12.076**	**13.605**	**13.478**	**11.088**	**5.676**	**2.907**	**2.160**	**2.091**	**1.287**	**0.460**	**0.218**						**100.000**

Summary Statistics

Avg Speed (mph)	27.20	Time at Idle (%)	7.928	Avg Specific PKE (hp-sec/lb)	3.05
Min Speed (mph)	0.00	Time at Cruise (%)	56.268	Avg Total Specific Power (hp/lb)	0.0642
Max Speed (mph)	74.53	Time in Accel (%)	18.522	Avg Non-Zero Specific Power (hp/lb)	0.1318
Avg Non-Idle Speed (mph)	29.54	Time in Decel (%)	17.281	Max Specific Power (hp/lb)	1.3086
Avg Cruise Speed (mph)	32.99	Avg Trip Length (miles)	0.359	Spec Pwr Freq (%): 0 hp/lb	51.26
Avg Acceleration (mph/sec)	1.39	Avg Trip Time (min)	0.793	Spec Pwr Freq (%): >0-0.1 hp/lb	24.00
Max Acceleration (mph/sec)	9.27	# Stops per Mile	1.080	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.14
Avg Deceleration (mph/sec)	-1.53	# of 1-Sec Observations	8,703	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.01
Max Deceleration (mph/sec)	-9.28	# of Trips	183	Spec Pwr Freq (%): >0.3 hp/lb	4.58

EPA VSP (Vehicle Specific Power) Statistics

EPA Avg Veh Spec Pwr, VSP (kW/tonne) 2.687

		Bin 0 % (braking)	12.981		
		Bin 1 % (idle)	10.258		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.962	Bin 21 % (25-50 mph, <0 kw/tonne)	10.458		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	5.270	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.324	Bin 33 % (>50 mph, <6 kw/tonne)	1.585
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.275	Bin 23 % (25-50 mph, 3-6 kw/tonne)	7.840		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.923	Bin 24 % (25-50 mph, 6-9 kw/tonne)	7.817	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.937
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.207	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.883		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.322		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	5.434	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.136
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.066	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.986
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.657	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.282
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.258	Bin 40 % (>50 mph, >=30 kw/tonne)	0.141

California 2000 Urban Other Principal Arterial LOS D Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14				0.001					0.001													**0.002**
-13							0.001			0.001												**0.002**
-12																						
-11			0.001	0.003	0.001	0.001	0.002	0.003														**0.010**
-10				0.003	0.004	0.002	0.002	0.001														**0.011**
-9			0.001	0.005	0.004	0.005	0.002	0.005			0.001											**0.022**
-8			0.005	0.007	0.014	0.011	0.005	0.003	0.001	0.001												**0.047**
-7		0.002	0.009	0.018	0.028	0.021	0.020	0.006	0.004		0.002											**0.111**
-6		0.003	0.024	0.058	0.069	0.056	0.041	0.020	0.010	0.006	0.001		0.001									**0.288**
-5		0.016	0.105	0.160	0.167	0.145	0.085	0.054	0.018	0.010	0.007		0.001	0.002								**0.770**
-4	0.002	0.112	0.308	0.371	0.391	0.338	0.288	0.146	0.073	0.026	0.012	0.003	0.001	0.001								**2.071**
-3	0.002	0.437	0.541	0.529	0.605	0.545	0.437	0.324	0.179	0.092	0.019	0.010	0.004									**3.724**
-2	0.003	1.035	0.513	0.520	0.649	0.659	0.675	0.618	0.428	0.213	0.097	0.018	0.008	0.004								**5.439**
-1	0.008	1.835	0.445	0.595	0.771	1.092	1.456	1.577	1.550	1.153	0.601	0.231	0.044	0.011	0.001							**11.370**
0	19.880	3.006	0.443	0.773	1.111	2.090	3.616	4.365	4.482	3.798	2.112	0.879	0.176	0.051	0.005							**46.787**
1	0.223	1.563	0.411	0.836	1.247	1.941	2.395	2.478	2.116	1.486	0.628	0.215	0.037	0.009	0.001							**15.586**
2	0.030	1.115	0.446	0.796	1.138	1.160	0.970	0.721	0.439	0.202	0.066	0.010	0.004									**7.097**
3	0.010	0.970	0.461	0.691	0.649	0.496	0.313	0.144	0.067	0.018	0.003	0.005	0.002	0.001								**3.829**
4	0.004	0.600	0.497	0.350	0.235	0.146	0.082	0.029	0.018	0.005	0.002	0.003										**1.972**
5	0.003	0.132	0.193	0.132	0.060	0.037	0.017	0.007	0.001	0.002	0.002											**0.586**
6	0.001	0.049	0.060	0.027	0.014	0.005	0.004	0.002		0.001			0.001									**0.164**
7	0.001	0.026	0.023	0.013	0.008	0.004	0.002	0.002					0.001									**0.079**
8		0.008	0.008	0.003	0.002	0.002			0.001													**0.024**
9		0.003	0.004																			**0.006**
10		0.003		0.001																		**0.004**
11						0.001																**0.001**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**20.166**	**10.914**	**4.497**	**5.892**	**7.164**	**8.755**	**10.412**	**10.504**	**9.388**	**7.015**	**3.552**	**1.375**	**0.278**	**0.079**	**0.007**							**100.000**

Summary Statistics

Avg Speed (mph)	21.72	Time at Idle (%)	20.166	Avg Specific PKE (hp-sec/lb)	6.87
Min Speed (mph)	0.00	Time at Cruise (%)	53.529	Avg Total Specific Power (hp/lb)	0.0476
Max Speed (mph)	69.33	Time in Accel (%)	13.759	Avg Non-Zero Specific Power (hp/lb)	0.1030
Avg Non-Idle Speed (mph)	27.21	Time in Decel (%)	12.546	Max Specific Power (hp/lb)	1.9092
Avg Cruise Speed (mph)	30.60	Avg Trip Length (miles)	0.871	Spec Pwr Freq (%): 0 hp/lb	53.84
Avg Acceleration (mph/sec)	1.20	Avg Trip Time (min)	2.407	Spec Pwr Freq (%): >0-0.1 hp/lb	27.26
Max Acceleration (mph/sec)	11.21	# Stops per Mile	1.484	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.83
Avg Deceleration (mph/sec)	-1.31	# of 1-Sec Observations	109,307	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.79
Max Deceleration (mph/sec)	-13.74	# of Trips	757	Spec Pwr Freq (%): >0.3 hp/lb	2.28

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.114		
		Bin 0 % (braking)	9.500		
		Bin 1 % (idle)	23.584		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.217	Bin 21 % (25-50 mph, <0 kw/tonne)	8.030		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	5.868	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.610	Bin 33 % (>50 mph, <6 kw/tonne)	1.028
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.878	Bin 23 % (25-50 mph, 3-6 kw/tonne)	8.394		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.126	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.982	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.320
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.143	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.789		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.873		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.301	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.547
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.199	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.154
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.291	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.037
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.108	Bin 40 % (>50 mph, >=30 kw/tonne)	0.020

California 2000 Urban Other Principal Arterial LOS E Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11				0.014			0.014															**0.029**
-10					0.014																	**0.014**
-9					0.014				0.014													**0.029**
-8							0.014															**0.014**
-7			0.014	0.029	0.014	0.058	0.029			0.014												**0.159**
-6		0.029	0.058	0.058	0.101	0.072	0.029	0.014	0.014	0.014												**0.390**
-5		0.029	0.217	0.217	0.188	0.159	0.145	0.116	0.029	0.014												**1.113**
-4		0.159	0.448	0.549	0.592	0.405	0.231	0.159	0.058	0.014	0.014											**2.630**
-3	0.014	0.723	0.853	0.723	0.766	0.607	0.607	0.246	0.145	0.072												**4.754**
-2		1.329	0.347	0.448	0.650	0.723	0.853	0.824	0.434	0.217	0.087	0.029										**5.939**
-1	0.058	2.355	0.246	0.535	0.578	0.896	1.416	1.676	1.647	1.040	0.231	0.072										**10.751**
0	26.156	3.902	0.217	0.780	0.954	1.185	2.587	2.948	2.572	2.717	0.824	0.231										**45.072**
1	0.390	1.951	0.419	0.968	1.127	1.243	1.893	1.879	1.734	1.185	0.347	0.043										**13.179**
2	0.014	1.373	0.535	0.867	1.185	1.185	1.040	0.882	0.275	0.116	0.014											**7.486**
3	0.014	1.402	0.564	0.838	0.665	0.535	0.405	0.159	0.058													**4.639**
4		0.795	0.419	0.491	0.246	0.202	0.130	0.014														**2.298**
5		0.289	0.318	0.202	0.116	0.058			0.014													**0.997**
6		0.029	0.130	0.058	0.029	0.014	0.014															**0.275**
7	0.014	0.029	0.043	0.014																		**0.101**
8		0.029	0.029	0.014	0.014																	**0.087**
9		0.029																				**0.029**
10			0.014																			**0.014**
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**26.662**	**14.451**	**4.870**	**6.806**	**7.254**	**7.341**	**9.408**	**8.916**	**6.994**	**5.405**	**1.517**	**0.376**										**100.000**

Summary Statistics

Avg Speed (mph)	17.26	Time at Idle (%)	26.662	Avg Specific PKE (hp-sec/lb)	3.15
Min Speed (mph)	0.00	Time at Cruise (%)	42.399	Avg Total Specific Power (hp/lb)	0.0451
Max Speed (mph)	56.33	Time in Accel (%)	15.882	Avg Non-Zero Specific Power (hp/lb)	0.1064
Avg Non-Idle Speed (mph)	23.53	Time in Decel (%)	15.058	Max Specific Power (hp/lb)	0.8155
Avg Cruise Speed (mph)	26.98	Avg Trip Length (miles)	0.335	Spec Pwr Freq (%): 0 hp/lb	57.64
Avg Acceleration (mph/sec)	1.42	Avg Trip Time (min)	1.165	Spec Pwr Freq (%): >0-0.1 hp/lb	23.92
Max Acceleration (mph/sec)	10.04	# Stops per Mile	2.773	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.77
Avg Deceleration (mph/sec)	-1.57	# of 1-Sec Observations	6,920	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.25
Max Deceleration (mph/sec)	-11.42	# of Trips	99	Spec Pwr Freq (%): >0.3 hp/lb	2.43

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.254		
		Bin 0 % (braking)	12.242		
		Bin 1 % (idle)	32.151		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.278	Bin 21 % (25-50 mph, <0 kw/tonne)	7.829		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.143	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.618	Bin 33 % (>50 mph, <6 kw/tonne)	0.235
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.929	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.102		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.196	Bin 24 % (25-50 mph, 6-9 kw/tonne)	4.633	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.279
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.419	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.856		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.360		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.193	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.161
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.012	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.029
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.308	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.029	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Other Principal Arterial LOS F Driving (FC=14), No Grade Compensation SAFD (%

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11					0.004		0.004															**0.009**
-10				0.009	0.004																	**0.013**
-9			0.004			0.004	0.004			0.004												**0.018**
-8			0.013	0.031	0.004		0.004															**0.053**
-7			0.013	0.026	0.035	0.018	0.004	0.013														**0.110**
-6		0.018	0.031	0.093	0.075	0.053	0.018															**0.286**
-5		0.018	0.167	0.163	0.181	0.145	0.048	0.031	0.013													**0.767**
-4		0.150	0.286	0.300	0.269	0.220	0.119	0.062	0.026	0.013	0.004	0.004										**1.454**
-3	0.004	0.586	0.551	0.560	0.370	0.348	0.251	0.132	0.044	0.018	0.004											**2.869**
-2	0.013	1.490	0.846	0.564	0.449	0.449	0.427	0.185	0.075	0.040	0.022	0.009										**4.570**
-1	0.004	4.226	0.930	1.088	0.842	0.692	0.701	0.665	0.348	0.154	0.084	0.044	0.026	0.026	0.004							**9.836**
0	37.974	8.655	1.454	1.481	1.172	1.040	1.397	1.432	0.771	0.361	0.123	0.066	0.449	0.278	0.022							**56.676**
1	0.317	3.843	0.899	1.163	1.291	1.326	1.036	0.683	0.383	0.137	0.075	0.040	0.079	0.048								**11.321**
2	0.071	1.727	0.784	0.925	0.842	0.696	0.449	0.229	0.110	0.009	0.009	0.004	0.004									**5.861**
3	0.031	1.199	0.639	0.533	0.423	0.251	0.106	0.071	0.013	0.009												**3.274**
4	0.026	0.643	0.410	0.278	0.159	0.097	0.062	0.018	0.004	0.004		0.004										**1.705**
5	0.004	0.207	0.273	0.137	0.062	0.026	0.022	0.009	0.009													**0.749**
6		0.101	0.115	0.044	0.026			0.009			0.004											**0.300**
7		0.022	0.018	0.013	0.004		0.004															**0.062**
8		0.009	0.013	0.009	0.004				0.004													**0.040**
9		0.009				0.004																**0.013**
10			0.009																			**0.009**
11				0.004																		**0.004**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**38.445**	**22.902**	**7.456**	**7.421**	**6.218**	**5.372**	**4.658**	**3.539**	**1.802**	**0.749**	**0.326**	**0.172**	**0.560**	**0.353**	**0.026**							**100.000**

Summary Statistics

Avg Speed (mph)	9.55	Time at Idle (%)	38.445	Avg Specific PKE (hp-sec/lb)	3.06
Min Speed (mph)	0.00	Time at Cruise (%)	39.353	Avg Total Specific Power (hp/lb)	0.0277
Max Speed (mph)	68.47	Time in Accel (%)	12.013	Avg Non-Zero Specific Power (hp/lb)	0.0725
Avg Non-Idle Speed (mph)	15.51	Time in Decel (%)	10.189	Max Specific Power (hp/lb)	1.5007
Avg Cruise Speed (mph)	15.62	Avg Trip Length (miles)	0.292	Spec Pwr Freq (%): 0 hp/lb	61.77
Avg Acceleration (mph/sec)	1.24	Avg Trip Time (min)	1.836	Spec Pwr Freq (%): >0-0.1 hp/lb	27.65
Max Acceleration (mph/sec)	11.15	# Stops per Mile	5.183	Spec Pwr Freq (%): >0.1-0.2 hp/lb	6.79
Avg Deceleration (mph/sec)	-1.28	# of 1-Sec Observations	22,692	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.47
Max Deceleration (mph/sec)	-11.11	# of Trips	206	Spec Pwr Freq (%): >0.3 hp/lb	1.33

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.770		
		Bin 0 % (braking)	7.525		
		Bin 1 % (idle)	46.327		
Bin 11 % (0-25 mph, <0 kw/tonne)	10.407	Bin 21 % (25-50 mph, <0 kw/tonne)	2.824		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	11.790	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.886	Bin 33 % (>50 mph, <6 kw/tonne)	0.214
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.936	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.184		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.997	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.806	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.516
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.525	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.250		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.517		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.214	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.369
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.374	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.111
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.111	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.036
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.076	Bin 40 % (>50 mph, >=30 kw/tonne)	0.009

California 2000 Urban Minor Arterial LOS A Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17												0.001										**0.001**
-16																						
-15																						
-14				0.001																		**0.001**
-13					0.001																	**0.001**
-12						0.001		0.001														**0.002**
-11				0.001	0.002	0.002	0.002		0.001													**0.007**
-10			0.001	0.001		0.003	0.001	0.001	0.001													**0.007**
-9			0.001	0.002	0.003	0.002	0.003	0.001														**0.012**
-8			0.002	0.009	0.009	0.008	0.004	0.002	0.002	0.002	0.001	0.001	0.001		0.001							**0.041**
-7		0.001	0.010	0.020	0.018	0.024	0.013	0.008	0.003	0.001	0.002	0.001										**0.100**
-6		0.005	0.027	0.069	0.105	0.064	0.048	0.029	0.017	0.006	0.003	0.001	0.001			0.001						**0.376**
-5		0.016	0.140	0.298	0.293	0.239	0.155	0.079	0.040	0.019	0.009	0.003	0.001	0.001								**1.292**
-4	0.001	0.105	0.447	0.510	0.511	0.503	0.371	0.232	0.129	0.059	0.027	0.012	0.003									**2.910**
-3	0.001	0.456	0.582	0.496	0.618	0.620	0.600	0.441	0.273	0.148	0.074	0.026	0.013	0.002	0.001	0.001						**4.352**
-2	0.004	0.944	0.349	0.366	0.456	0.638	0.760	0.707	0.519	0.336	0.161	0.087	0.031	0.007	0.001	0.001						**5.367**
-1	0.003	1.472	0.253	0.370	0.492	0.758	1.216	1.594	1.615	1.293	0.878	0.461	0.208	0.066	0.018	0.001						**10.700**
0	12.749	1.937	0.279	0.508	0.762	1.625	3.321	4.972	5.697	4.319	3.625	2.153	1.881	0.723	0.381	0.119						**45.051**
1	0.249	1.092	0.304	0.610	0.778	1.375	2.189	2.498	2.123	1.574	0.939	0.498	0.206	0.053	0.018	0.002						**14.508**
2	0.076	0.977	0.453	0.764	0.915	1.128	1.125	0.850	0.512	0.263	0.133	0.045	0.012	0.002	0.001							**7.256**
3	0.015	0.943	0.559	0.780	0.889	0.706	0.451	0.233	0.127	0.043	0.015	0.006	0.003									**4.770**
4	0.005	0.581	0.502	0.419	0.367	0.242	0.119	0.061	0.019	0.009	0.002	0.001		0.001	0.001	0.001						**2.328**
5	0.002	0.136	0.218	0.146	0.082	0.041	0.021	0.008	0.004	0.001		0.001	0.001									**0.659**
6	0.001	0.040	0.061	0.038	0.016	0.005	0.005	0.001	0.001		0.001											**0.169**
7	0.001	0.015	0.014	0.004	0.004	0.002	0.001		0.001													**0.042**
8	0.001	0.008	0.012	0.001	0.003	0.001	0.001	0.002														**0.028**
9		0.005	0.003	0.001	0.001	0.003																**0.013**
10		0.001	0.003	0.001	0.001																	**0.005**
11			0.001																			**0.001**
12				0.001																		**0.001**
13			0.001	0.001																		**0.001**
14				0.001																		**0.001**
15				0.001																		**0.001**
16																						
17																						
18																						
19																						
20																						
Totals	**13.108**	**8.735**	**4.222**	**5.416**	**6.324**	**7.991**	**10.404**	**11.716**	**11.086**	**8.074**	**5.871**	**3.297**	**2.359**	**0.854**	**0.420**	**0.124**						**100.000**

Summary Statistics

Avg Speed (mph)	27.17	Time at Idle (%)	13.108	Avg Specific PKE (hp-sec/lb)	6.68
Min Speed (mph)	0.00	Time at Cruise (%)	56.685	Avg Total Specific Power (hp/lb)	0.0551
Max Speed (mph)	77.35	Time in Accel (%)	15.451	Avg Non-Zero Specific Power (hp/lb)	0.1173
Avg Non-Idle Speed (mph)	31.27	Time in Decel (%)	14.756	Max Specific Power (hp/lb)	1.3534
Avg Cruise Speed (mph)	35.90	Avg Trip Length (miles)	0.916	Spec Pwr Freq (%): 0 hp/lb	53.01
Avg Acceleration (mph/sec)	1.26	Avg Trip Time (min)	2.022	Spec Pwr Freq (%): >0-0.1 hp/lb	25.83
Max Acceleration (mph/sec)	14.70	# Stops per Mile	0.997	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.91
Avg Deceleration (mph/sec)	-1.42	# of 1-Sec Observations	171,745	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.91
Max Deceleration (mph/sec)	-17.06	# of Trips	1,416	Spec Pwr Freq (%): >0.3 hp/lb	3.34

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.774		
		Bin 0 % (braking)	11.638		
		Bin 1 % (idle)	15.143		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.345	Bin 21 % (25-50 mph, <0 kw/tonne)	7.912		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	4.689	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.621	Bin 33 % (>50 mph, <6 kw/tonne)	2.263
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.168	Bin 23 % (25-50 mph, 3-6 kw/tonne)	9.060		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.652	Bin 24 % (25-50 mph, 6-9 kw/tonne)	7.447	Bin 35 % (>50 mph, 6-12 kw/tonne)	4.119
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.155	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.844		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.475		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.931	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.459
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.672	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.583
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.506	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.117
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.156	Bin 40 % (>50 mph, >=30 kw/tonne)	0.048

California 2000 Urban Minor Arterial LOS B Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12									0.013													**0.013**
-11											0.013											**0.013**
-10																						
-9						0.013	0.013															**0.027**
-8				0.013	0.067	0.027	0.013															**0.121**
-7			0.013	0.027	0.040	0.121	0.027	0.067	0.027													**0.322**
-6			0.054	0.121	0.107	0.121	0.121	0.081	0.013	0.013												**0.631**
-5		0.013	0.201	0.362	0.349	0.403	0.215	0.201	0.121	0.081	0.013											**1.960**
-4		0.094	0.443	0.443	0.618	0.577	0.604	0.376	0.242	0.081	0.081	0.013										**3.571**
-3		0.403	0.456	0.295	0.712	0.940	0.832	0.832	0.537	0.215	0.107	0.081										**5.410**
-2		0.712	0.282	0.483	0.470	0.604	0.967	1.181	0.819	0.644	0.295	0.148	0.040									**6.645**
-1	0.040	0.993	0.188	0.362	0.483	0.752	1.638	2.161	2.121	1.826	0.819	0.175	0.188	0.067	0.040							**11.854**
0	6.833	1.047	0.094	0.524	0.537	1.504	4.336	6.108	6.806	4.873	2.591	1.047	0.215	0.188	0.161							**36.864**
1	0.201	0.524	0.228	0.537	0.658	1.034	2.698	3.302	3.141	1.960	0.698	0.215	0.027	0.054	0.027							**15.304**
2	0.081	0.712	0.389	0.591	0.899	1.128	1.450	1.477	0.792	0.268	0.067	0.013	0.027	0.013								**7.907**
3	0.013	0.712	0.336	0.550	0.886	1.195	0.805	0.349	0.188	0.013	0.027	0.027	0.013									**5.115**
4	0.013	0.483	0.376	0.483	0.644	0.322	0.175	0.067	0.054	0.027												**2.645**
5		0.201	0.376	0.268	0.188	0.094	0.040	0.013														**1.181**
6		0.067	0.094	0.054	0.013		0.013			0.013												**0.255**
7		0.040	0.027	0.027						0.013												**0.107**
8		0.013	0.013	0.013		0.013																**0.054**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.182**	**6.014**	**3.571**	**5.155**	**6.672**	**8.847**	**13.948**	**16.217**	**14.874**	**10.028**	**4.712**	**1.718**	**0.510**	**0.322**	**0.228**							**100.000**

Summary Statistics

Avg Speed (mph)	29.16	Time at Idle (%)	7.182	Avg Specific PKE (hp-sec/lb)	2.86
Min Speed (mph)	0.00	Time at Cruise (%)	56.545	Avg Total Specific Power (hp/lb)	0.0649
Max Speed (mph)	69.88	Time in Accel (%)	17.264	Avg Non-Zero Specific Power (hp/lb)	0.1396
Avg Non-Idle Speed (mph)	31.42	Time in Decel (%)	19.009	Max Specific Power (hp/lb)	1.2941
Avg Cruise Speed (mph)	35.48	Avg Trip Length (miles)	0.357	Spec Pwr Freq (%): 0 hp/lb	53.50
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	0.735	Spec Pwr Freq (%): >0-0.1 hp/lb	22.19
Max Acceleration (mph/sec)	7.75	# Stops per Mile	0.746	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.96
Avg Deceleration (mph/sec)	-1.63	# of 1-Sec Observations	7,449	Spec Pwr Freq (%): >0.2-0.3 hp/lb	7.28
Max Deceleration (mph/sec)	-12.35	# of Trips	169	Spec Pwr Freq (%): >0.3 hp/lb	5.07

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.078		
		Bin 0 % (braking)	15.467		
		Bin 1 % (idle)	8.571		
Bin 11 % (0-25 mph, <0 kw/tonne)	3.723	Bin 21 % (25-50 mph, <0 kw/tonne)	10.714		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	3.091	Bin 22 % (25-50 mph, 0-3 kw/tonne)	9.341	Bin 33 % (>50 mph, <6 kw/tonne)	1.374
Bin 13 % (0-25 mph, 3-6 kw/tonne)	2.143	Bin 23 % (25-50 mph, 3-6 kw/tonne)	10.783		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.198	Bin 24 % (25-50 mph, 6-9 kw/tonne)	8.365	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.332
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.978	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.659		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.379	----------	0.000	----------	0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	7.280	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.962
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	2.404	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.206
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.646	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.069
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.220	Bin 40 % (>50 mph, >=30 kw/tonne)	0.096

California 2000 Urban Minor Arterial LOS C Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10					0.012	0.012	0.012															**0.036**
-9					0.012		0.012															**0.024**
-8						0.012	0.012	0.012	0.012													**0.048**
-7			0.036	0.036	0.036	0.012	0.012		0.012		0.012											**0.157**
-6		0.024	0.048	0.169	0.145	0.145	0.060	0.024		0.012												**0.627**
-5		0.060	0.193	0.422	0.470	0.253	0.229	0.084	0.024	0.012	0.012											**1.760**
-4		0.181	0.555	0.518	0.579	0.627	0.422	0.229	0.133	0.084	0.024											**3.351**
-3		0.542	0.603	0.542	0.723	0.916	0.675	0.434	0.229	0.121	0.096	0.024										**4.907**
-2	0.012	1.121	0.386	0.325	0.615	0.989	0.904	0.772	0.603	0.301	0.084	0.084	0.024									**6.221**
-1	0.012	1.844	0.338	0.313	0.446	1.374	1.953	2.098	1.664	0.952	0.313	0.133	0.048	0.060								**11.549**
0	10.512	2.797	0.579	0.518	0.940	2.074	4.858	6.293	5.425	2.954	0.856	0.518	0.012	0.241	0.121		0.012					**38.710**
1	0.386	1.712	0.470	0.434	1.025	1.977	2.942	2.640	2.230	0.856	0.205	0.060	0.108	0.084	0.012		0.012					**15.154**
2	0.048	1.145	0.482	0.844	1.109	1.543	1.181	0.772	0.362	0.181	0.036	0.048	0.024									**7.776**
3	0.024	1.037	0.530	0.952	0.940	0.808	0.494	0.157	0.084	0.012	0.024											**5.063**
4		0.699	0.506	0.530	0.579	0.386	0.145	0.036	0.012													**2.893**
5	0.012	0.193	0.374	0.277	0.133	0.084	0.048	0.024		0.012												**1.157**
6		0.133	0.096	0.060	0.060	0.036																**0.386**
7		0.048	0.012		0.012				0.012													**0.084**
8			0.012	0.012	0.012	0.012																**0.048**
9		0.012	0.012																			**0.024**
10		0.012																				**0.012**
11																						
12				0.012																		**0.012**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**11.007**	**11.561**	**5.232**	**5.967**	**7.848**	**11.260**	**13.960**	**13.574**	**10.802**	**5.497**	**1.664**	**0.868**	**0.217**	**0.386**	**0.133**		**0.024**					**100.000**

Summary Statistics

Avg Speed (mph)	23.68	Time at Idle (%)	11.007	Avg Specific PKE (hp-sec/lb)	2.98
Min Speed (mph)	0.00	Time at Cruise (%)	54.177	Avg Total Specific Power (hp/lb)	0.0565
Max Speed (mph)	78.50	Time in Accel (%)	17.589	Avg Non-Zero Specific Power (hp/lb)	0.1196
Avg Non-Idle Speed (mph)	26.61	Time in Decel (%)	17.227	Max Specific Power (hp/lb)	1.1809
Avg Cruise Speed (mph)	30.09	Avg Trip Length (miles)	0.348	Spec Pwr Freq (%): 0 hp/lb	52.78
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.881	Spec Pwr Freq (%): >0-0.1 hp/lb	25.57
Max Acceleration (mph/sec)	12.37	# Stops per Mile	1.466	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.92
Avg Deceleration (mph/sec)	-1.58	# of 1-Sec Observations	8,295	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.91
Max Deceleration (mph/sec)	-10.48	# of Trips	157	Spec Pwr Freq (%): >0.3 hp/lb	3.82

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.798		
		Bin 0 % (braking)	13.603		
		Bin 1 % (idle)	14.094		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.345	Bin 21 % (25-50 mph, <0 kw/tonne)	10.064		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.292	Bin 22 % (25-50 mph, 0-3 kw/tonne)	8.467	Bin 33 % (>50 mph, <6 kw/tonne)	0.627
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.441	Bin 23 % (25-50 mph, 3-6 kw/tonne)	9.486		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.355	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.980	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.725
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.679	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.497		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.330		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.227	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.430
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.438	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.184
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.369	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.172
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.172	Bin 40 % (>50 mph, >=30 kw/tonne)	0.025

California 2000 Urban Minor Arterial LOS D Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15						0.002																**0.002**
-14																						
-13						0.002																**0.002**
-12					0.002																	**0.002**
-11				0.002		0.002		0.002														**0.006**
-10						0.004			0.002													**0.006**
-9				0.004	0.006	0.008	0.002	0.004	0.002	0.002												**0.028**
-8			0.002	0.010	0.010	0.006	0.006		0.006													**0.040**
-7		0.006	0.016	0.042	0.026	0.030	0.024	0.008	0.004	0.002												**0.159**
-6		0.004	0.026	0.093	0.093	0.066	0.064	0.018	0.006	0.008	0.002	0.002										**0.382**
-5	0.002	0.024	0.141	0.213	0.213	0.183	0.125	0.090	0.018	0.006	0.004											**1.020**
-4	0.004	0.123	0.394	0.428	0.507	0.382	0.267	0.165	0.082	0.030	0.012	0.004										**2.399**
-3	0.002	0.513	0.533	0.487	0.525	0.627	0.555	0.370	0.191	0.074	0.026	0.012	0.002									**3.917**
-2	0.002	0.993	0.442	0.519	0.613	0.668	0.766	0.722	0.436	0.215	0.082	0.022	0.002									**5.484**
-1	0.010	2.047	0.432	0.541	0.607	0.782	1.209	1.581	1.558	1.060	0.497	0.157	0.022									**10.503**
0	17.972	3.382	0.448	0.752	0.999	1.611	2.821	5.277	5.687	4.008	2.274	1.090	0.105	0.016	0.010							**46.453**
1	0.259	1.842	0.384	0.776	1.005	1.490	2.091	2.632	2.194	1.243	0.523	0.157	0.028	0.012	0.012	0.014						**14.664**
2	0.062	1.184	0.467	0.857	1.102	1.168	1.104	0.724	0.346	0.125	0.040	0.010	0.006	0.004								**7.199**
3	0.018	1.102	0.597	0.768	0.770	0.549	0.336	0.155	0.072	0.026	0.008											**4.402**
4	0.010	0.668	0.541	0.386	0.362	0.221	0.103	0.036	0.026		0.002	0.002										**2.357**
5		0.139	0.227	0.139	0.093	0.060	0.024	0.002	0.002													**0.686**
6	0.002	0.030	0.084	0.030	0.008	0.010	0.004	0.002														**0.171**
7		0.028	0.026	0.006	0.002	0.002				0.002												**0.066**
8		0.014	0.010	0.004	0.002		0.002		0.002													**0.034**
9		0.004	0.004	0.002																		**0.010**
10		0.002	0.002	0.002																		**0.006**
11																						
12																						
13				0.002																		**0.002**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**18.344**	**12.106**	**4.778**	**6.063**	**6.946**	**7.875**	**9.504**	**11.788**	**10.636**	**6.801**	**3.471**	**1.456**	**0.165**	**0.032**	**0.022**	**0.014**						**100.000**

Summary Statistics

Avg Speed (mph)	22.06	Time at Idle (%)	18.344	Avg Specific PKE (hp-sec/lb)	5.08
Min Speed (mph)	0.00	Time at Cruise (%)	53.290	Avg Total Specific Power (hp/lb)	0.0487
Max Speed (mph)	77.02	Time in Accel (%)	14.907	Avg Non-Zero Specific Power (hp/lb)	0.1048
Avg Non-Idle Speed (mph)	27.02	Time in Decel (%)	13.459	Max Specific Power (hp/lb)	1.3847
Avg Cruise Speed (mph)	30.71	Avg Trip Length (miles)	0.639	Spec Pwr Freq (%): 0 hp/lb	53.48
Avg Acceleration (mph/sec)	1.26	Avg Trip Time (min)	1.738	Spec Pwr Freq (%): >0-0.1 hp/lb	27.33
Max Acceleration (mph/sec)	12.76	# Stops per Mile	1.523	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.63
Avg Deceleration (mph/sec)	-1.38	# of 1-Sec Observations	49,728	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.06
Max Deceleration (mph/sec)	-14.54	# of Trips	477	Spec Pwr Freq (%): >0.3 hp/lb	2.50

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	2.082		
		Bin 0 % (braking)	10.440		
		Bin 1 % (idle)	21.707		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.026	Bin 21 % (25-50 mph, <0 kw/tonne)	7.419		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.406	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.029	Bin 33 % (>50 mph, <6 kw/tonne)	0.900
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.748	Bin 23 % (25-50 mph, 3-6 kw/tonne)	8.873		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	3.011	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.983	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.417
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.262	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.948		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.276		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	4.292	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.548
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.137	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.106
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.284	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.043
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.116	Bin 40 % (>50 mph, >=30 kw/tonne)	0.028

California 2000 Urban Minor Arterial LOS E Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12								0.018														**0.018**
-11																						
-10					0.018	0.018																**0.036**
-9					0.036	0.018																**0.053**
-8				0.018	0.053		0.053	0.018														**0.142**
-7			0.018	0.036	0.018	0.018	0.018	0.053														**0.160**
-6		0.036	0.125	0.071	0.125	0.107	0.036	0.018	0.053													**0.569**
-5		0.071	0.125	0.356	0.267	0.196	0.107	0.036	0.018	0.018												**1.192**
-4		0.249	0.587	0.445	0.480	0.463	0.267	0.142	0.071	0.018	0.018											**2.740**
-3		0.836	0.818	0.640	0.640	0.605	0.445	0.267	0.107	0.089	0.053	0.018										**4.519**
-2	0.018	1.530	0.676	0.801	0.658	0.534	0.783	0.391	0.320	0.107	0.053	0.036										**5.906**
-1	0.053	2.846	0.587	0.890	0.961	0.996	1.601	1.548	0.801	0.320	0.213	0.036										**10.852**
0	28.696	4.537	0.516	0.907	1.210	1.067	2.081	3.113	2.918	1.014	0.249	0.142										**46.451**
1	0.480	2.562	0.391	0.996	1.050	0.996	1.637	1.743	1.032	0.374	0.267											**11.528**
2	0.071	1.477	0.534	0.765	0.801	1.174	0.872	0.516	0.267	0.089	0.036											**6.600**
3	0.018	1.316	0.391	0.943	0.587	0.569	0.445	0.213	0.036													**4.519**
4		1.067	0.694	0.534	0.480	0.231	0.071	0.018														**3.096**
5		0.285	0.391	0.302	0.125	0.071	0.036	0.018														**1.228**
6		0.036	0.125	0.053		0.018																**0.231**
7		0.125		0.018																		**0.142**
8			0.018																			**0.018**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**29.336**	**16.972**	**5.995**	**7.774**	**7.508**	**7.081**	**8.450**	**8.112**	**5.622**	**2.028**	**0.890**	**0.231**										**100.000**

Summary Statistics

Avg Speed (mph)	14.62	Time at Idle (%)	29.336	Avg Specific PKE (hp-sec/lb)	2.91
Min Speed (mph)	0.00	Time at Cruise (%)	39.602	Avg Total Specific Power (hp/lb)	0.0414
Max Speed (mph)	56.22	Time in Accel (%)	15.745	Avg Non-Zero Specific Power (hp/lb)	0.1065
Avg Non-Idle Speed (mph)	20.68	Time in Decel (%)	15.318	Max Specific Power (hp/lb)	0.7482
Avg Cruise Speed (mph)	23.11	Avg Trip Length (miles)	0.285	Spec Pwr Freq (%): 0 hp/lb	61.09
Avg Acceleration (mph/sec)	1.54	Avg Trip Time (min)	1.171	Spec Pwr Freq (%): >0-0.1 hp/lb	22.90
Max Acceleration (mph/sec)	7.82	# Stops per Mile	3.812	Spec Pwr Freq (%): >0.1-0.2 hp/lb	8.72
Avg Deceleration (mph/sec)	-1.66	# of 1-Sec Observations	5,621	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.48
Max Deceleration (mph/sec)	-11.99	# of Trips	80	Spec Pwr Freq (%): >0.3 hp/lb	2.81

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.861		
		Bin 0 % (braking)	12.200		
		Bin 1 % (idle)	34.236		
Bin 11 % (0-25 mph, <0 kw/tonne)	7.995	Bin 21 % (25-50 mph, <0 kw/tonne)	6.154		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	8.121	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.862	Bin 33 % (>50 mph, <6 kw/tonne)	0.235
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.025	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.530		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.779	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.898	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.181
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.292	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.473		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.617		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.852	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.126
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.993	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.018
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.307	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.018
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.090	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Minor Arterial LOS F Driving (FC=16), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10							0.010															**0.010**
-9			0.019		0.010	0.010																**0.039**
-8				0.019	0.019	0.010	0.010	0.010	0.010													**0.077**
-7			0.029	0.048	0.029	0.067	0.010				0.010											**0.193**
-6		0.019	0.029	0.048	0.077	0.048	0.048	0.010	0.019	0.010												**0.308**
-5		0.029	0.173	0.289	0.231	0.164	0.087	0.048	0.019													**1.040**
-4		0.202	0.424	0.472	0.337	0.404	0.193	0.096	0.010	0.010												**2.147**
-3	0.010	0.674	0.818	0.462	0.462	0.424	0.404	0.212	0.135	0.029												**3.629**
-2	0.019	1.627	0.683	0.549	0.385	0.395	0.298	0.366	0.125	0.077	0.010											**4.534**
-1	0.039	3.591	0.732	0.645	0.549	0.606	0.886	1.069	0.568	0.221	0.077											**8.982**
0	37.139	6.142	0.818	0.751	0.857	0.886	1.348	2.676	2.840	0.674	0.183											**54.313**
1	0.404	3.312	0.645	0.683	0.722	0.789	1.213	1.550	0.789	0.241	0.029											**10.377**
2	0.077	1.887	0.683	0.789	0.606	0.905	0.886	0.414	0.116	0.010												**6.373**
3	0.010	1.328	0.683	0.683	0.626	0.529	0.241	0.029														**4.130**
4	0.019	0.828	0.626	0.481	0.385	0.183	0.058	0.019														**2.599**
5		0.298	0.279	0.154	0.087	0.010																**0.828**
6		0.096	0.106	0.048	0.010																	**0.260**
7		0.029	0.010	0.010		0.010																**0.058**
8		0.019	0.019		0.010																	**0.048**
9		0.010		0.010																		**0.019**
10			0.010	0.010																		**0.019**
11			0.010																			**0.010**
12				0.010																		**0.010**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**37.717**	**20.090**	**6.796**	**6.161**	**5.400**	**5.439**	**5.689**	**6.498**	**4.630**	**1.271**	**0.308**											**100.000**

Summary Statistics

Avg Speed (mph)	11.13	Time at Idle (%)	37.717	Avg Specific PKE (hp-sec/lb)	3.04
Min Speed (mph)	0.00	Time at Cruise (%)	36.090	Avg Total Specific Power (hp/lb)	0.0333
Max Speed (mph)	49.09	Time in Accel (%)	14.247	Avg Non-Zero Specific Power (hp/lb)	0.0878
Avg Non-Idle Speed (mph)	17.87	Time in Decel (%)	11.947	Max Specific Power (hp/lb)	0.9256
Avg Cruise Speed (mph)	19.40	Avg Trip Length (miles)	0.282	Spec Pwr Freq (%): 0 hp/lb	62.05
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	1.519	Spec Pwr Freq (%): >0-0.1 hp/lb	25.13
Max Acceleration (mph/sec)	11.69	# Stops per Mile	4.671	Spec Pwr Freq (%): >0.1-0.2 hp/lb	7.14
Avg Deceleration (mph/sec)	-1.46	# of 1-Sec Observations	10,388	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.00
Max Deceleration (mph/sec)	-9.92	# of Trips	114	Spec Pwr Freq (%): >0.3 hp/lb	1.68

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.837		
		Bin 0 % (braking)	9.247		
		Bin 1 % (idle)	44.170		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.157	Bin 21 % (25-50 mph, <0 kw/tonne)	3.777		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	9.101	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.969	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.786	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.078		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.550	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.988	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.000
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.859	Bin 25 % (25-50 mph, 9-12 kw/tonne)	2.025		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.365		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.287	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.535	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.000
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.088	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.020	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Collector LOS A-C Driving (FC=17), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16						0.001																**0.001**
-15																						
-14				0.001																		**0.001**
-13				0.001		0.001																**0.002**
-12					0.001	0.001																**0.002**
-11				0.001			0.001	0.001	0.001													**0.004**
-10							0.001															**0.001**
-9			0.002	0.002	0.002	0.003		0.002	0.002													**0.014**
-8			0.003	0.009	0.003	0.005	0.008	0.005	0.001	0.002	0.001											**0.038**
-7		0.003	0.010	0.021	0.024	0.024	0.020	0.008	0.009		0.001	0.001										**0.120**
-6		0.003	0.026	0.094	0.114	0.073	0.044	0.022	0.012	0.005	0.003	0.001										**0.398**
-5		0.017	0.218	0.472	0.379	0.249	0.119	0.057	0.017	0.011	0.003											**1.543**
-4	0.001	0.134	0.714	0.832	0.826	0.623	0.322	0.144	0.087	0.021	0.012	0.004										**3.720**
-3	0.002	0.624	0.856	0.753	1.034	0.936	0.647	0.316	0.148	0.085	0.020	0.011										**5.432**
-2	0.001	1.242	0.604	0.605	0.912	1.008	0.923	0.614	0.324	0.188	0.081	0.034	0.014									**6.549**
-1	0.003	1.742	0.503	0.609	0.841	1.374	1.615	1.354	1.020	0.604	0.447	0.126	0.060	0.011								**10.308**
0	9.484	2.082	0.540	0.703	1.316	4.228	5.798	5.273	3.289	1.998	1.459	0.619	0.397	0.094								**37.279**
1	0.302	1.412	0.625	0.938	1.618	2.554	2.846	2.076	1.424	0.857	0.415	0.127	0.058	0.009								**15.261**
2	0.148	1.613	1.026	1.604	1.668	1.501	0.964	0.529	0.254	0.121	0.052	0.014	0.003	0.001								**9.500**
3	0.069	1.499	1.146	1.360	1.211	0.681	0.314	0.115	0.045	0.019	0.008	0.004										**6.470**
4	0.023	0.646	0.696	0.531	0.348	0.159	0.048	0.035	0.012	0.003	0.003											**2.503**
5	0.007	0.117	0.212	0.130	0.066	0.041	0.025	0.007	0.003		0.001											**0.609**
6	0.004	0.029	0.061	0.026	0.020	0.012	0.007	0.004														**0.163**
7	0.002	0.010	0.010	0.010	0.003	0.002		0.001														**0.038**
8		0.007	0.007	0.001			0.002	0.001														**0.017**
9		0.004	0.001	0.002	0.001																	**0.009**
10		0.002	0.003	0.003																		**0.009**
11		0.001		0.002																		**0.003**
12		0.002	0.001																			**0.003**
13				0.002																		**0.002**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**10.047**	**11.191**	**7.265**	**8.710**	**10.388**	**13.477**	**13.702**	**10.565**	**6.648**	**3.914**	**2.506**	**0.942**	**0.532**	**0.114**								**100.000**

Summary Statistics

Avg Speed (mph)	22.26	Time at Idle (%)	10.047	Avg Specific PKE (hp-sec/lb)	3.53
Min Speed (mph)	0.00	Time at Cruise (%)	52.921	Avg Total Specific Power (hp/lb)	0.0529
Max Speed (mph)	67.32	Time in Accel (%)	19.141	Avg Non-Zero Specific Power (hp/lb)	0.1087
Avg Non-Idle Speed (mph)	24.74	Time in Decel (%)	17.892	Max Specific Power (hp/lb)	1.3131
Avg Cruise Speed (mph)	29.01	Avg Trip Length (miles)	0.413	Spec Pwr Freq (%): 0 hp/lb	51.37
Avg Acceleration (mph/sec)	1.41	Avg Trip Time (min)	1.113	Spec Pwr Freq (%): >0-0.1 hp/lb	27.28
Max Acceleration (mph/sec)	13.05	# Stops per Mile	1.288	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.65
Avg Deceleration (mph/sec)	-1.63	# of 1-Sec Observations	91,792	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.54
Max Deceleration (mph/sec)	-15.86	# of Trips	1,374	Spec Pwr Freq (%): >0.3 hp/lb	2.15

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.716		
		Bin 0 % (braking)	14.433		
		Bin 1 % (idle)	11.875		
Bin 11 % (0-25 mph, <0 kw/tonne)	6.740	Bin 21 % (25-50 mph, <0 kw/tonne)	7.421		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	7.661	Bin 22 % (25-50 mph, 0-3 kw/tonne)	8.571	Bin 33 % (>50 mph, <6 kw/tonne)	0.739
Bin 13 % (0-25 mph, 3-6 kw/tonne)	6.073	Bin 23 % (25-50 mph, 3-6 kw/tonne)	8.960		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	5.130	Bin 24 % (25-50 mph, 6-9 kw/tonne)	6.184	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.073
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.349	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.855		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.695		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	3.315	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.508
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.927	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.111
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.220	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.034
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.111	Bin 40 % (>50 mph, >=30 kw/tonne)	0.018

California 2000 Urban Collector LOS D Driving (FC=17), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13										0.008												**0.008**
-12				0.008																		**0.008**
-11						0.008																**0.008**
-10						0.008																**0.008**
-9				0.008	0.016	0.008																**0.033**
-8				0.016		0.008	0.025	0.008														**0.057**
-7			0.016		0.025	0.033	0.008	0.008	0.025	0.008												**0.123**
-6			0.049	0.107	0.082	0.041	0.041	0.041		0.008												**0.370**
-5			0.230	0.443	0.304	0.197	0.074	0.057	0.008	0.016	0.008											**1.338**
-4		0.148	0.682	0.542	0.755	0.657	0.271	0.123	0.049	0.008												**3.235**
-3		0.706	0.797	0.673	0.977	0.640	0.501	0.296	0.189	0.049	0.008											**4.837**
-2		1.297	0.542	0.731	0.829	0.994	0.723	0.493	0.361	0.189	0.057											**6.216**
-1	0.008	2.266	0.460	0.870	1.100	1.338	1.511	0.936	0.797	0.698	0.213	0.016										**10.215**
0	15.306	4.434	0.649	1.445	1.683	3.055	3.564	3.769	2.808	1.494	0.846	0.328	0.189									**39.571**
1	0.386	1.921	0.854	1.371	1.560	2.102	2.299	1.577	1.281	0.698	0.238	0.082	0.008									**14.378**
2	0.148	1.741	0.903	1.462	1.692	1.412	0.747	0.558	0.238	0.123	0.066											**9.090**
3	0.016	1.568	0.977	1.281	1.084	0.698	0.361	0.181	0.066	0.041	0.008											**6.282**
4	0.008	0.764	0.739	0.599	0.484	0.205	0.123	0.049	0.008	0.016	0.008											**3.005**
5		0.222	0.287	0.140	0.131	0.033	0.016	0.008	0.008													**0.846**
6		0.049	0.057	0.049	0.033	0.008	0.008	0.008														**0.213**
7		0.033	0.033	0.008	0.008																	**0.082**
8		0.016	0.016		0.008																	**0.041**
9				0.008																		**0.008**
10			0.008	0.008																		**0.016**
11						0.008																**0.008**
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**15.873**	**15.167**	**7.300**	**9.772**	**10.774**	**11.455**	**10.273**	**8.113**	**5.838**	**3.359**	**1.453**	**0.427**	**0.197**									**100.000**

Summary Statistics

Avg Speed (mph)	18.49	Time at Idle (%)	15.873	Avg Specific PKE (hp-sec/lb)	2.41
Min Speed (mph)	0.00	Time at Cruise (%)	48.456	Avg Total Specific Power (hp/lb)	0.0511
Max Speed (mph)	61.41	Time in Accel (%)	19.429	Avg Non-Zero Specific Power (hp/lb)	0.1079
Avg Non-Idle Speed (mph)	21.97	Time in Decel (%)	16.242	Max Specific Power (hp/lb)	1.3323
Avg Cruise Speed (mph)	24.91	Avg Trip Length (miles)	0.242	Spec Pwr Freq (%): 0 hp/lb	52.67
Avg Acceleration (mph/sec)	1.48	Avg Trip Time (min)	0.787	Spec Pwr Freq (%): >0-0.1 hp/lb	27.21
Max Acceleration (mph/sec)	10.63	# Stops per Mile	1.983	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.19
Avg Deceleration (mph/sec)	-1.60	# of 1-Sec Observations	12,178	Spec Pwr Freq (%): >0.2-0.3 hp/lb	5.11
Max Deceleration (mph/sec)	-12.83	# of Trips	258	Spec Pwr Freq (%): >0.3 hp/lb	2.82

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	1.555		
		Bin 0 % (braking)	12.852		
		Bin 1 % (idle)	20.134		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.037	Bin 21 % (25-50 mph, <0 kw/tonne)	6.342		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	9.430	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.074	Bin 33 % (>50 mph, <6 kw/tonne)	0.319
Bin 13 % (0-25 mph, 3-6 kw/tonne)	5.982	Bin 23 % (25-50 mph, 3-6 kw/tonne)	6.284		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	4.790	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.008	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.596
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.205	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.171		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.087		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.777	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.277
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.091	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.092
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.294	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.159	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Collector LOS E-F Driving (FC=17), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13						0.032																**0.032**
-12						0.064																**0.064**
-11																						
-10																						
-9			0.032																			**0.032**
-8				0.032	0.064																	**0.097**
-7			0.064		0.064	0.064			0.097													**0.290**
-6			0.129	0.129	0.161	0.032	0.032	0.032														**0.515**
-5			0.290	0.580	0.161	0.258	0.161	0.129														**1.578**
-4		0.547	0.708	0.901	0.547	0.354	0.386	0.129	0.064	0.032												**3.670**
-3		0.901	0.869	0.644	0.837	0.644	0.451	0.161	0.097	0.032												**4.636**
-2		2.222	0.934	0.869	0.708	0.547	0.386	0.515	0.193	0.193	0.032											**6.600**
-1	0.161	3.574	0.580	0.837	0.741	0.354	0.386	0.708	0.708	0.386	0.032											**8.467**
0	31.455	5.023	0.773	0.386	1.062	1.384	1.030	2.350	1.417	0.386	0.129	0.032										**45.428**
1	0.676	3.220	0.741	0.547	0.580	0.773	0.773	1.191	0.773	0.258	0.064	0.064										**9.659**
2	0.322	2.254	0.837	0.773	0.998	0.805	1.062	0.322	0.290	0.129	0.032											**7.824**
3	0.064	2.093	0.966	1.095	0.901	0.644	0.225	0.097	0.097													**6.182**
4		1.030	0.869	0.741	0.483	0.161	0.064															**3.348**
5		0.386	0.386	0.193	0.097	0.064																**1.127**
6		0.097	0.064	0.129		0.032																**0.322**
7			0.032																			**0.032**
8			0.064																			**0.064**
9		0.032																				**0.032**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**32.679**	**21.378**	**8.339**	**7.856**	**7.405**	**6.214**	**4.958**	**5.634**	**3.735**	**1.417**	**0.290**	**0.097**										**100.000**

Summary Statistics

Avg Speed (mph)	11.41	Time at Idle (%)	32.679	Avg Specific PKE (hp-sec/lb)	1.74
Min Speed (mph)	0.00	Time at Cruise (%)	31.262	Avg Total Specific Power (hp/lb)	0.0397
Max Speed (mph)	56.02	Time in Accel (%)	18.545	Avg Non-Zero Specific Power (hp/lb)	0.1054
Avg Non-Idle Speed (mph)	16.95	Time in Decel (%)	17.515	Max Specific Power (hp/lb)	0.6832
Avg Cruise Speed (mph)	18.28	Avg Trip Length (miles)	0.139	Spec Pwr Freq (%): 0 hp/lb	62.33
Avg Acceleration (mph/sec)	1.74	Avg Trip Time (min)	0.729	Spec Pwr Freq (%): >0-0.1 hp/lb	22.50
Max Acceleration (mph/sec)	9.37	# Stops per Mile	5.992	Spec Pwr Freq (%): >0.1-0.2 hp/lb	7.60
Avg Deceleration (mph/sec)	-1.91	# of 1-Sec Observations	3,106	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.86
Max Deceleration (mph/sec)	-13.14	# of Trips	71	Spec Pwr Freq (%): >0.3 hp/lb	2.70

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.523		
		Bin 0 % (braking)	14.234		
		Bin 1 % (idle)	38.979		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.237	Bin 21 % (25-50 mph, <0 kw/tonne)	3.229		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	9.061	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.998	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.679	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.669		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.933	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.845	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.033
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.998	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.483		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.998		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.241	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.054	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.132
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.165	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.033	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Local LOS A-C Driving (FC=19), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12				0.003		0.001																**0.004**
-11					0.003		0.001		0.001													**0.006**
-10																						
-9			0.003		0.001			0.001														**0.006**
-8			0.003	0.003	0.001		0.004	0.001														**0.012**
-7		0.004	0.003	0.008	0.008	0.012	0.003			0.001												**0.040**
-6		0.006	0.021	0.080	0.054	0.040	0.014	0.003	0.003													**0.220**
-5		0.019	0.200	0.417	0.307	0.148	0.052	0.017	0.006	0.001												**1.167**
-4		0.206	1.062	1.199	0.786	0.378	0.144	0.064	0.012	0.007	0.001											**3.859**
-3		1.126	1.583	1.458	1.522	0.801	0.305	0.113	0.061	0.023	0.007	0.001										**7.001**
-2		2.094	1.208	1.583	1.674	1.243	0.512	0.185	0.090	0.037	0.023	0.004										**8.654**
-1	0.004	2.595	0.952	1.407	1.797	2.085	1.191	0.475	0.229	0.108	0.090	0.059	0.014	0.003								**11.009**
0	6.268	2.530	1.115	1.870	3.665	6.903	4.746	1.684	0.573	0.365	0.340	0.260	0.113	0.077								**30.508**
1	0.417	2.033	1.431	2.387	3.442	3.461	1.562	0.608	0.280	0.163	0.080	0.033	0.004									**15.901**
2	0.438	2.877	2.353	3.134	2.294	0.909	0.349	0.167	0.075	0.033	0.006											**12.634**
3	0.249	2.170	1.689	1.463	0.798	0.280	0.108	0.036	0.019	0.006	0.001											**6.819**
4	0.054	0.505	0.537	0.309	0.189	0.090	0.032	0.010														**1.726**
5	0.007	0.080	0.110	0.075	0.028	0.014	0.004															**0.318**
6	0.004	0.015	0.025	0.012	0.006	0.004	0.001		0.001													**0.069**
7	0.004	0.010	0.006	0.001																		**0.021**
8	0.003	0.006	0.003		0.001																	**0.012**
9	0.001	0.001	0.001	0.003																		**0.007**
10		0.001																				**0.001**
11		0.001	0.003	0.001																		**0.006**
12			0.001																			**0.001**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.448**	**16.279**	**12.309**	**15.413**	**16.576**	**16.370**	**9.028**	**3.363**	**1.351**	**0.744**	**0.548**	**0.358**	**0.131**	**0.080**								**100.000**

Summary Statistics

Avg Speed (mph)	16.88	Time at Idle (%)	7.448	Avg Specific PKE (hp-sec/lb)	1.81
Min Speed (mph)	0.00	Time at Cruise (%)	50.708	Avg Total Specific Power (hp/lb)	0.0422
Max Speed (mph)	64.65	Time in Accel (%)	20.859	Avg Non-Zero Specific Power (hp/lb)	0.0871
Avg Non-Idle Speed (mph)	18.23	Time in Decel (%)	20.985	Max Specific Power (hp/lb)	1.0545
Avg Cruise Speed (mph)	21.25	Avg Trip Length (miles)	0.201	Spec Pwr Freq (%): 0 hp/lb	51.51
Avg Acceleration (mph/sec)	1.44	Avg Trip Time (min)	0.714	Spec Pwr Freq (%): >0-0.1 hp/lb	31.60
Max Acceleration (mph/sec)	12.45	# Stops per Mile	2.902	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.26
Avg Deceleration (mph/sec)	-1.68	# of 1-Sec Observations	72,405	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.73
Max Deceleration (mph/sec)	-11.82	# of Trips	1,690	Spec Pwr Freq (%): >0.3 hp/lb	0.90

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.889		
		Bin 0 % (braking)	16.582		
		Bin 1 % (idle)	8.990		
Bin 11 % (0-25 mph, <0 kw/tonne)	12.739	Bin 21 % (25-50 mph, <0 kw/tonne)	4.357		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	15.297	Bin 22 % (25-50 mph, 0-3 kw/tonne)	5.872	Bin 33 % (>50 mph, <6 kw/tonne)	0.223
Bin 13 % (0-25 mph, 3-6 kw/tonne)	12.524	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.147		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	7.905	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.619	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.400
Bin 15 % (0-25 mph, 9-12 kw/tonne)	3.079	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.136		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.461		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	1.030	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.215
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.317	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.014
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.074	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.001
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.021	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Urban Local LOS D-F Driving (FC=19), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13				0.011																		**0.011**
-12																						
-11																						
-10			0.011	0.011																		**0.022**
-9						0.011																**0.011**
-8			0.022			0.011																**0.033**
-7		0.011	0.011	0.022	0.076	0.011	0.022															**0.152**
-6		0.033	0.054	0.130	0.163	0.065	0.022															**0.467**
-5		0.065	0.380	0.630	0.369	0.217	0.098	0.011		0.011												**1.780**
-4		0.488	1.140	0.923	0.695	0.326	0.141	0.054	0.011													**3.778**
-3		1.444	1.520	1.520	1.053	0.608	0.239	0.065	0.011	0.011												**6.470**
-2		2.790	1.444	1.683	1.389	0.640	0.391	0.109	0.011	0.011												**8.467**
-1		4.114	1.075	1.726	1.976	1.324	0.662	0.315	0.109	0.011												**11.311**
0	13.016	5.656	1.715	2.280	3.419	3.843	2.518	0.564	0.239	0.065												**33.315**
1	0.478	3.376	1.791	2.898	2.768	2.063	0.803	0.326	0.239	0.054												**14.796**
2	0.488	3.430	2.366	2.681	1.509	0.695	0.152	0.043	0.011													**11.376**
3	0.185	2.160	1.520	1.075	0.619	0.130	0.033	0.011														**5.732**
4	0.065	0.651	0.467	0.250	0.119	0.011	0.011															**1.574**
5	0.043	0.098	0.119	0.119	0.011	0.011																**0.402**
6		0.087	0.054	0.033	0.011																	**0.185**
7	0.022	0.011	0.022	0.011																		**0.065**
8		0.054																				**0.054**
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**14.297**	**24.468**	**13.710**	**16.001**	**14.177**	**9.965**	**5.091**	**1.498**	**0.630**	**0.163**												**100.000**

Summary Statistics

Avg Speed (mph)	12.31	Time at Idle (%)	14.297	Avg Specific PKE (hp-sec/lb)	0.92
Min Speed (mph)	0.00	Time at Cruise (%)	45.929	Avg Total Specific Power (hp/lb)	0.0320
Max Speed (mph)	44.69	Time in Accel (%)	18.585	Avg Non-Zero Specific Power (hp/lb)	0.0733
Avg Non-Idle Speed (mph)	14.36	Time in Decel (%)	21.190	Max Specific Power (hp/lb)	0.5874
Avg Cruise Speed (mph)	15.71	Avg Trip Length (miles)	0.098	Spec Pwr Freq (%): 0 hp/lb	56.26
Avg Acceleration (mph/sec)	1.45	Avg Trip Time (min)	0.478	Spec Pwr Freq (%): >0-0.1 hp/lb	31.57
Max Acceleration (mph/sec)	8.46	# Stops per Mile	5.906	Spec Pwr Freq (%): >0.1-0.2 hp/lb	9.76
Avg Deceleration (mph/sec)	-1.79	# of 1-Sec Observations	9,212	Spec Pwr Freq (%): >0.2-0.3 hp/lb	2.01
Max Deceleration (mph/sec)	-13.30	# of Trips	321	Spec Pwr Freq (%): >0.3 hp/lb	0.40

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	0.195		
		Bin 0 % (braking)	16.567		
		Bin 1 % (idle)	17.917		
Bin 11 % (0-25 mph, <0 kw/tonne)	15.285	Bin 21 % (25-50 mph, <0 kw/tonne)	2.306		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	18.592	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.958	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	11.900	Bin 23 % (25-50 mph, 3-6 kw/tonne)	2.553		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	6.017	Bin 24 % (25-50 mph, 6-9 kw/tonne)	1.338	Bin 35 % (>50 mph, 6-12 kw/tonne)	0.000
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.250	Bin 25 % (25-50 mph, 9-12 kw/tonne)	0.697		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.136		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	0.427	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.023	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.000
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.034	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.000
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.000	Bin 40 % (>50 mph, >=30 kw/tonne)	0.000

California 2000 Freeway On-Ramp Driving, No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13				0.006			0.006															**0.012**
-12																						
-11			0.006		0.006																	**0.012**
-10																						
-9			0.006	0.012			0.006		0.012		0.006											**0.041**
-8				0.017	0.012	0.006		0.006					0.006									**0.047**
-7			0.017	0.029	0.029	0.012	0.012	0.006	0.006													**0.111**
-6			0.029	0.047	0.076	0.041	0.029	0.017	0.017					0.006								**0.262**
-5		0.041	0.099	0.122	0.105	0.111	0.064	0.052	0.006	0.017												**0.618**
-4		0.105	0.221	0.233	0.210	0.221	0.198	0.047	0.047	0.012	0.006	0.006	0.006									**1.311**
-3		0.280	0.443	0.356	0.356	0.391	0.309	0.274	0.105	0.105	0.064	0.006										**2.687**
-2	0.006	0.682	0.437	0.420	0.530	0.542	0.501	0.530	0.431	0.251	0.111	0.070	0.017									**4.529**
-1		2.046	0.758	0.612	0.624	0.810	0.868	0.915	0.933	0.431	0.408	0.361	0.105	0.070	0.017							**8.958**
0	6.388	5.729	2.157	0.927	1.078	1.760	1.906	1.760	1.929	1.480	1.451	1.166	0.764	0.560	0.332	0.041	0.023	0.023				**29.475**
1	0.216	2.361	0.968	1.008	1.014	1.609	2.075	1.958	2.419	2.541	2.728	1.859	0.903	0.367	0.099	0.012	0.023					**22.160**
2	0.152	0.979	0.490	0.863	0.944	1.125	1.486	1.708	1.597	1.644	1.230	0.898	0.356	0.087	0.017							**13.575**
3	0.146	0.985	0.589	0.629	0.804	1.043	0.868	0.927	0.898	0.781	0.460	0.204	0.064	0.006								**8.405**
4	0.076	0.565	0.478	0.478	0.612	0.595	0.606	0.670	0.565	0.338	0.105	0.023	0.006									**5.117**
5	0.017	0.286	0.245	0.221	0.192	0.233	0.262	0.169	0.122	0.047												**1.795**
6	0.029	0.076	0.146	0.099	0.099	0.076	0.017	0.029	0.012													**0.583**
7	0.006	0.023	0.058	0.041	0.012	0.012				0.006	0.006											**0.163**
8		0.006	0.023	0.023	0.006							0.006										**0.064**
9		0.012	0.012		0.006			0.006														**0.035**
10		0.006	0.012																			**0.017**
11				0.006																		**0.006**
12									0.006													**0.006**
13			0.006	0.006																		**0.012**
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**7.035**	**14.181**	**7.198**	**6.155**	**6.714**	**8.585**	**9.215**	**9.075**	**9.104**	**7.653**	**6.575**	**4.599**	**2.226**	**1.096**	**0.466**	**0.052**	**0.047**	**0.023**				**100.000**

Summary Statistics

Avg Speed (mph)	26.99	Time at Idle (%)	7.035	Avg Specific PKE (hp-sec/lb)	3.17
Min Speed (mph)	0.00	Time at Cruise (%)	52.393	Avg Total Specific Power (hp/lb)	0.1262
Max Speed (mph)	83.44	Time in Accel (%)	30.757	Avg Non-Zero Specific Power (hp/lb)	0.2017
Avg Non-Idle Speed (mph)	29.03	Time in Decel (%)	9.815	Max Specific Power (hp/lb)	2.0402
Avg Cruise Speed (mph)	29.04	Avg Trip Length (miles)	0.188	Spec Pwr Freq (%): 0 hp/lb	37.41
Avg Acceleration (mph/sec)	1.71	Avg Trip Time (min)	0.419	Spec Pwr Freq (%): >0-0.1 hp/lb	22.86
Max Acceleration (mph/sec)	13.21	# Stops per Mile	0.692	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.36
Avg Deceleration (mph/sec)	-1.32	# of 1-Sec Observations	17,157	Spec Pwr Freq (%): >0.2-0.3 hp/lb	10.70
Max Deceleration (mph/sec)	-12.86	# of Trips	683	Spec Pwr Freq (%): >0.3 hp/lb	15.67

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	7.676		
		Bin 0 % (braking)	6.871		
		Bin 1 % (idle)	8.334		
Bin 11 % (0-25 mph, <0 kw/tonne)	7.424	Bin 21 % (25-50 mph, <0 kw/tonne)	4.929		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	12.699	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.144	Bin 33 % (>50 mph, <6 kw/tonne)	1.244
Bin 13 % (0-25 mph, 3-6 kw/tonne)	4.231	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.727		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.902	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.903	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.876
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.040	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.000		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.691		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	7.800	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.938
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	5.840	Bin 38 % (>50 mph, 18-24 kw/tonne)	2.598
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	3.509	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.669
		Bin 30 % (25-50 mph, >=30 kw/tonne)	3.217	Bin 40 % (>50 mph, >=30 kw/tonne)	1.414

California 2000 Freeway Off-Ramp Driving, No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14														0.005								**0.005**
-13																						
-12																						
-11																						
-10					0.005	0.005	0.005															**0.015**
-9					0.010	0.010	0.005	0.005			0.010											**0.040**
-8				0.010		0.015	0.030	0.005	0.010	0.015												**0.085**
-7			0.005	0.020	0.050	0.050	0.045	0.025	0.015	0.015	0.005	0.005										**0.234**
-6		0.005	0.040	0.154	0.209	0.174	0.144	0.089	0.085	0.050	0.020	0.005	0.010									**0.984**
-5		0.035	0.189	0.418	0.343	0.348	0.333	0.308	0.244	0.129	0.094	0.050	0.025	0.005								**2.520**
-4		0.154	0.661	0.587	0.621	0.656	0.636	0.656	0.522	0.373	0.323	0.169	0.060	0.035								**5.453**
-3		0.597	0.592	0.517	0.641	0.825	0.840	0.915	0.905	0.716	0.606	0.403	0.189	0.075	0.015							**7.834**
-2		1.074	0.437	0.467	0.587	0.815	0.885	0.949	1.183	1.307	1.104	0.731	0.457	0.085	0.035							**10.116**
-1		2.088	0.502	0.408	0.547	0.775	1.123	1.133	1.586	1.884	2.043	1.596	1.004	0.542	0.169	0.030						**15.430**
0	17.910	3.345	0.641	0.592	0.388	1.024	1.675	1.437	1.705	1.725	1.740	0.910	1.282	1.491	0.964	0.065						**36.894**
1	0.258	1.814	0.537	0.681	0.507	0.731	0.860	0.860	0.631	0.398	0.373	0.214	0.179	0.099								**8.142**
2	0.030	1.287	0.621	0.746	0.785	0.696	0.621	0.388	0.214	0.174	0.104	0.025	0.010									**5.702**
3		1.143	0.621	0.641	0.587	0.492	0.229	0.114	0.045	0.030	0.020	0.005										**3.927**
4	0.005	0.467	0.507	0.303	0.333	0.174	0.070	0.055														**1.914**
5		0.080	0.129	0.109	0.055	0.040	0.030					0.005										**0.447**
6		0.060	0.030	0.035	0.015	0.015		0.005					0.005									**0.164**
7	0.005	0.010	0.010	0.010		0.010																**0.045**
8		0.015	0.005	0.010			0.005															**0.035**
9		0.005																				**0.005**
10			0.005																			**0.005**
11																						
12			0.005																			**0.005**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**18.208**	**12.179**	**5.538**	**5.707**	**5.682**	**6.855**	**7.536**	**6.944**	**7.143**	**6.815**	**6.442**	**4.116**	**3.221**	**2.336**	**1.183**	**0.094**						**100.000**

Summary Statistics

Avg Speed (mph)	25.07	Time at Idle (%)	18.209	Avg Specific PKE (hp-sec/lb)	0.97
Min Speed (mph)	0.00	Time at Cruise (%)	40.274	Avg Total Specific Power (hp/lb)	0.0326
Max Speed (mph)	74.71	Time in Accel (%)	12.487	Avg Non-Zero Specific Power (hp/lb)	0.1071
Avg Non-Idle Speed (mph)	30.64	Time in Decel (%)	29.030	Max Specific Power (hp/lb)	1.4267
Avg Cruise Speed (mph)	32.82	Avg Trip Length (miles)	0.207	Spec Pwr Freq (%): 0 hp/lb	69.57
Avg Acceleration (mph/sec)	1.42	Avg Trip Time (min)	0.495	Spec Pwr Freq (%): >0-0.1 hp/lb	18.13
Max Acceleration (mph/sec)	11.98	# Stops per Mile	1.457	Spec Pwr Freq (%): >0.1-0.2 hp/lb	6.65
Avg Deceleration (mph/sec)	-1.89	# of 1-Sec Observations	20,117	Spec Pwr Freq (%): >0.2-0.3 hp/lb	3.43
Max Deceleration (mph/sec)	-14.15	# of Trips	678	Spec Pwr Freq (%): >0.3 hp/lb	2.22

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	-1.848		
		Bin 0 % (braking)	22.007		
		Bin 1 % (idle)	22.182		
Bin 11 % (0-25 mph, <0 kw/tonne)	5.793	Bin 21 % (25-50 mph, <0 kw/tonne)	9.538		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	6.024	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.894	Bin 33 % (>50 mph, <6 kw/tonne)	5.607
Bin 13 % (0-25 mph, 3-6 kw/tonne)	3.241	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.436		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.325	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.274	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.217
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.734	Bin 25 % (25-50 mph, 9-12 kw/tonne)	1.729		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.914		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.037	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.104
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	0.844	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.489
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.298	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.154
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.124	Bin 40 % (>50 mph, >=30 kw/tonne)	0.036

California 2000 Freeway-to-Freeway Transition Ramp Driving, No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11											0.014											**0.014**
-10																						
-9									0.014													**0.014**
-8						0.014		0.014														**0.028**
-7												0.028										**0.028**
-6				0.014		0.028		0.028									0.014					**0.083**
-5			0.014		0.014	0.014	0.042	0.028	0.069	0.055	0.014	0.028	0.014									**0.291**
-4		0.014	0.069		0.014	0.028	0.042	0.042	0.069	0.069	0.083	0.028	0.014	0.014								**0.484**
-3		0.069	0.028	0.055	0.055	0.042	0.055	0.069	0.111	0.138	0.097	0.166	0.111	0.042	0.014	0.014						**1.066**
-2		0.332	0.208	0.249	0.166	0.208	0.263	0.318	0.208	0.415	0.484	0.512	0.305	0.125	0.055							**3.848**
-1		2.727	0.969	0.568	0.457	0.484	0.554	0.568	0.706	1.190	2.063	2.173	2.076	1.343	1.024	0.457	0.014					**17.373**
0	2.852	7.309	2.395	1.274	0.664	0.595	0.540	1.260	1.647	3.378	5.274	5.939	6.160	5.717	5.191	2.326		0.028				**52.547**
1	0.055	3.156	0.941	0.623	0.457	0.568	0.609	0.983	1.232	1.495	2.353	2.173	1.717	1.495	0.872	0.235	0.014					**18.978**
2		0.554	0.166	0.194	0.180	0.166	0.401	0.194	0.291	0.388	0.540	0.401	0.277	0.249	0.138		0.014					**4.153**
3		0.014	0.014	0.069	0.028	0.042	0.055	0.125	0.069	0.083	0.069	0.042	0.055	0.014	0.014							**0.692**
4		0.028	0.014	0.014	0.042	0.014	0.014	0.014	0.014		0.014	0.014		0.014								**0.194**
5				0.028	0.028	0.028																**0.083**
6			0.014	0.014	0.028										0.014							**0.069**
7															0.014							**0.014**
8		0.014																				**0.014**
9			0.014																			**0.014**
10																						
11																						
12													0.014									**0.014**
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.907**	**14.217**	**4.845**	**3.101**	**2.132**	**2.229**	**2.575**	**3.641**	**4.430**	**7.212**	**11.005**	**11.503**	**10.742**	**9.012**	**7.337**	**3.032**	**0.055**	**0.028**				**100.000**

Summary Statistics

Avg Speed (mph)	41.14	Time at Idle (%)	2.907	Avg Specific PKE (hp-sec/lb)	1.99
Min Speed (mph)	0.00	Time at Cruise (%)	76.744	Avg Total Specific Power (hp/lb)	0.0515
Max Speed (mph)	83.05	Time in Accel (%)	9.579	Avg Non-Zero Specific Power (hp/lb)	0.1044
Avg Non-Idle Speed (mph)	42.38	Time in Decel (%)	10.770	Max Specific Power (hp/lb)	3.1551
Avg Cruise Speed (mph)	40.43	Avg Trip Length (miles)	0.442	Spec Pwr Freq (%): 0 hp/lb	50.72
Avg Acceleration (mph/sec)	0.69	Avg Trip Time (min)	0.644	Spec Pwr Freq (%): >0-0.1 hp/lb	31.10
Max Acceleration (mph/sec)	12.32	# Stops per Mile	0.315	Spec Pwr Freq (%): >0.1-0.2 hp/lb	10.34
Avg Deceleration (mph/sec)	-0.76	# of 1-Sec Observations	7,224	Spec Pwr Freq (%): >0.2-0.3 hp/lb	4.49
Max Deceleration (mph/sec)	-11.09	# of Trips	187	Spec Pwr Freq (%): >0.3 hp/lb	3.35

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	6.325		
		Bin 0 % (braking)	3.297		
		Bin 1 % (idle)	4.633		
Bin 11 % (0-25 mph, <0 kw/tonne)	8.072	Bin 21 % (25-50 mph, <0 kw/tonne)	4.647		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	13.088	Bin 22 % (25-50 mph, 0-3 kw/tonne)	2.302	Bin 33 % (>50 mph, <6 kw/tonne)	11.155
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.464	Bin 23 % (25-50 mph, 3-6 kw/tonne)	3.411		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.611	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.766	Bin 35 % (>50 mph, 6-12 kw/tonne)	13.500
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.199	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.013		
Bin 16 % (0-25 mph, >=12 kw/tonne)	0.256		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	2.899	Bin 37 % (>50 mph, 12-18 kw/tonne)	13.003
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	1.151	Bin 38 % (>50 mph, 18-24 kw/tonne)	5.812
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	0.426	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.046
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.128	Bin 40 % (>50 mph, >=30 kw/tonne)	1.123

Sacramento 2004 Diamond-Downgrade On-Ramp Driving (D-D), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7					0.137																	**0.137**
-6			0.068	0.068		0.068																**0.205**
-5		0.137				0.068	0.068															**0.274**
-4			0.068			0.068																**0.137**
-3		0.205	0.137	0.068	0.068			0.068		0.068												**0.616**
-2		0.274		0.068	0.411	0.137	0.205	0.479	0.137	0.137	0.068											**1.916**
-1		0.342		0.068	0.205	0.068	1.369	0.548	0.342	0.205	0.274	0.342	0.205									**3.970**
0	3.217	0.274	0.068	0.342	0.205	0.274	2.943	1.574	0.890	1.780	1.985	2.875	3.559	0.890	0.068							**20.945**
1	0.411			0.342	0.411	0.342	2.806	2.259	2.464	4.449	6.229	5.886	3.285	0.411								**29.295**
2		0.274	0.205	0.274	0.753	0.684	2.533	3.559	4.244	4.791	4.107	2.053	1.095	0.137								**24.709**
3	0.068	0.616	0.274	0.342	1.164	1.437	1.232	1.985	1.985	0.753	0.479	0.411	0.068	0.137								**10.951**
4		0.479	0.548	0.479	1.164	1.027	0.821	0.274		0.068		0.068										**4.928**
5		0.342	0.479	0.274	0.274	0.137	0.137	0.068														**1.711**
6		0.068		0.068																		**0.137**
7			0.068																			**0.068**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.696**	**3.012**	**1.916**	**2.396**	**4.791**	**4.312**	**12.115**	**10.815**	**10.062**	**12.252**	**13.142**	**11.636**	**8.214**	**1.574**	**0.068**							**100.000**

Summary Statistics

Avg Speed (mph)	38.61	Time at Idle (%)	3.696	Avg Specific PKE (hp-sec/lb)	5.36
Min Speed (mph)	0.00	Time at Cruise (%)	46.680	Avg Total Specific Power (hp/lb)	0.2017
Max Speed (mph)	70.09	Time in Accel (%)	46.133	Avg Non-Zero Specific Power (hp/lb)	0.2521
Avg Non-Idle Speed (mph)	40.10	Time in Decel (%)	3.491	Max Specific Power (hp/lb)	0.7784
Avg Cruise Speed (mph)	44.01	Avg Trip Length (miles)	0.285	Spec Pwr Freq (%): 0 hp/lb	19.99
Avg Acceleration (mph/sec)	1.75	Avg Trip Time (min)	0.443	Spec Pwr Freq (%): >0-0.1 hp/lb	13.28
Max Acceleration (mph/sec)	6.69	# Stops per Mile	0.191	Spec Pwr Freq (%): >0.1-0.2 hp/lb	16.56
Avg Deceleration (mph/sec)	-1.24	# of 1-Sec Observations	1,461	Spec Pwr Freq (%): >0.2-0.3 hp/lb	21.49
Max Deceleration (mph/sec)	-7.03	# of Trips	55	Spec Pwr Freq (%): >0.3 hp/lb	28.68

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	14.839		
		Bin 0 % (braking)	1.565		
		Bin 1 % (idle)	4.267		
Bin 11 % (0-25 mph, <0 kw/tonne)	0.640	Bin 21 % (25-50 mph, <0 kw/tonne)	2.774		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.209	Bin 22 % (25-50 mph, 0-3 kw/tonne)	1.565	Bin 33 % (>50 mph, <6 kw/tonne)	1.209
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.423	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.694		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.494	Bin 24 % (25-50 mph, 6-9 kw/tonne)	3.770	Bin 35 % (>50 mph, 6-12 kw/tonne)	5.477
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.920	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.196		
Bin 16 % (0-25 mph, >=12 kw/tonne)	4.267		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	13.229	Bin 37 % (>50 mph, 12-18 kw/tonne)	6.899
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	15.292	Bin 38 % (>50 mph, 18-24 kw/tonne)	8.819
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	6.899	Bin 39 % (>50 mph, 24-30 kw/tonne)	4.054
		Bin 30 % (25-50 mph, >=30 kw/tonne)	1.423	Bin 40 % (>50 mph, >=30 kw/tonne)	2.916

Sacramento 2004 Diamond-Level On-Ramp Driving (D-L), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9					0.010		0.010															**0.020**
-8																						
-7			0.010	0.031	0.031	0.010	0.020	0.010														**0.112**
-6			0.020	0.031	0.072	0.051	0.041	0.031														**0.245**
-5		0.020	0.051	0.163	0.123	0.051	0.072	0.041	0.051	0.010												**0.582**
-4		0.051	0.123	0.082	0.102	0.255	0.163	0.133	0.041	0.031												**0.981**
-3		0.102	0.112	0.102	0.082	0.204	0.286	0.123	0.112	0.061	0.061	0.010										**1.257**
-2		0.368	0.296	0.194	0.184	0.194	0.296	0.235	0.123	0.123	0.061	0.051	0.031									**2.155**
-1		1.134	0.163	0.174	0.215	0.327	0.521	0.930	0.593	0.603	0.358	0.235	0.235	0.143								**5.629**
0	1.859	1.900	0.276	0.368	0.419	0.715	1.645	2.871	3.157	3.146	3.463	3.412	2.227	1.195	0.153	0.010	0.010					**26.826**
1	0.123	1.032	0.184	0.398	0.449	0.899	1.767	3.310	5.057	6.252	6.752	5.333	2.656	0.654	0.102	0.082	0.010					**35.060**
2	0.031	0.276	0.204	0.347	0.715	1.103	1.583	2.135	2.411	2.298	1.788	1.348	0.817	0.143	0.020							**15.221**
3	0.031	0.337	0.347	0.490	0.879	0.991	1.113	1.134	0.817	0.541	0.398	0.296	0.072	0.041	0.010							**7.498**
4		0.296	0.276	0.347	0.552	0.541	0.429	0.215	0.163	0.051	0.020											**2.891**
5		0.245	0.215	0.266	0.123	0.092	0.031	0.020	0.010	0.010												**1.011**
6		0.123	0.163	0.061	0.031																	**0.378**
7		0.010	0.061	0.020																		**0.092**
8		0.020		0.010																		**0.031**
9		0.010																				**0.010**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**2.043**	**5.925**	**2.503**	**3.085**	**3.984**	**5.435**	**7.978**	**11.186**	**12.534**	**13.127**	**12.902**	**10.685**	**6.037**	**2.176**	**0.286**	**0.092**	**0.020**					**100.000**

Summary Statistics

Avg Speed (mph)	37.96	Time at Idle (%)	2.043	Avg Specific PKE (hp-sec/lb)	4.67
Min Speed (mph)	0.00	Time at Cruise (%)	61.651	Avg Total Specific Power (hp/lb)	0.1514
Max Speed (mph)	78.85	Time in Accel (%)	30.575	Avg Non-Zero Specific Power (hp/lb)	0.2037
Avg Non-Idle Speed (mph)	38.75	Time in Decel (%)	5.731	Max Specific Power (hp/lb)	0.8415
Avg Cruise Speed (mph)	40.91	Avg Trip Length (miles)	0.326	Spec Pwr Freq (%): 0 hp/lb	25.69
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.515	Spec Pwr Freq (%): >0-0.1 hp/lb	18.71
Max Acceleration (mph/sec)	8.63	# Stops per Mile	0.194	Spec Pwr Freq (%): >0.1-0.2 hp/lb	21.88
Avg Deceleration (mph/sec)	-1.30	# of 1-Sec Observations	9,789	Spec Pwr Freq (%): >0.2-0.3 hp/lb	17.13
Max Deceleration (mph/sec)	-9.04	# of Trips	317	Spec Pwr Freq (%): >0.3 hp/lb	16.58

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	11.420		
		Bin 0 % (braking)	4.075		
		Bin 1 % (idle)	2.650		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.745	Bin 21 % (25-50 mph, <0 kw/tonne)	3.421		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	3.864	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.442	Bin 33 % (>50 mph, <6 kw/tonne)	1.362
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.373	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.793		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.689	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.849	Bin 35 % (>50 mph, 6-12 kw/tonne)	5.078
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.605	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.834		
Bin 16 % (0-25 mph, >=12 kw/tonne)	3.241		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	14.517	Bin 37 % (>50 mph, 12-18 kw/tonne)	8.193
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	8.288	Bin 38 % (>50 mph, 18-24 kw/tonne)	6.419
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	3.336	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.988
		Bin 30 % (25-50 mph, >=30 kw/tonne)	1.109	Bin 40 % (>50 mph, >=30 kw/tonne)	2.133

Sacramento 2004 Diamond-Upgrade On-Ramp Driving (D-U), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
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-11																						
-10																						
-9																						
-8					0.044																	**0.044**
-7				0.044			0.044															**0.088**
-6					0.044			0.044														**0.088**
-5			0.088	0.088	0.044	0.131	0.044															**0.394**
-4		0.044	0.044	0.175	0.219	0.088	0.219	0.088	0.044													**0.919**
-3		0.175	0.219	0.175	0.438	0.394	0.263	0.219														**1.883**
-2		0.657	0.306	0.219	0.219	0.394	0.306	0.482	0.263													**2.846**
-1		0.701	0.088	0.088	0.175	0.482	0.657	0.963	0.701	0.569	0.394	0.131	0.175									**5.123**
0	4.685	1.751	0.044	0.219	0.525	0.306	1.708	1.226	2.758	4.159	2.715	1.970	1.051	0.044								**23.161**
1	0.175	0.657	0.219	0.394	0.701	1.007	2.145	4.335	5.035	5.298	4.116	2.496	0.701	0.131								**27.408**
2		0.394	0.219	0.569	1.138	1.970	3.678	4.159	4.028	3.327	2.320	1.357	0.131									**23.292**
3		0.569	0.263	1.095	1.489	2.583	1.708	0.919	0.525	0.044	0.044											**9.238**
4		0.394	0.525	0.438	1.138	0.832	0.350	0.131														**3.809**
5		0.306	0.219	0.306	0.175	0.044																**1.051**
6		0.131	0.175	0.131	0.044																	**0.482**
7		0.044	0.131																			**0.175**
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Totals	**4.860**	**5.823**	**2.539**	**3.940**	**6.392**	**8.231**	**11.121**	**12.566**	**13.354**	**13.398**	**9.588**	**5.954**	**2.058**	**0.175**								**100.000**

Summary Statistics

Avg Speed (mph)	32.89	Time at Idle (%)	4.860	Avg Specific PKE (hp-sec/lb)	4.35
Min Speed (mph)	0.00	Time at Cruise (%)	49.825	Avg Total Specific Power (hp/lb)	0.1544
Max Speed (mph)	65.58	Time in Accel (%)	38.879	Avg Non-Zero Specific Power (hp/lb)	0.2167
Avg Non-Idle Speed (mph)	34.57	Time in Decel (%)	6.436	Max Specific Power (hp/lb)	0.5556
Avg Cruise Speed (mph)	38.78	Avg Trip Length (miles)	0.258	Spec Pwr Freq (%): 0 hp/lb	28.77
Avg Acceleration (mph/sec)	1.73	Avg Trip Time (min)	0.470	Spec Pwr Freq (%): >0-0.1 hp/lb	13.31
Max Acceleration (mph/sec)	7.30	# Stops per Mile	0.096	Spec Pwr Freq (%): >0.1-0.2 hp/lb	18.21
Avg Deceleration (mph/sec)	-1.40	# of 1-Sec Observations	2,284	Spec Pwr Freq (%): >0.2-0.3 hp/lb	22.20
Max Deceleration (mph/sec)	-7.71	# of Trips	81	Spec Pwr Freq (%): >0.3 hp/lb	17.51

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	10.485		
		Bin 0 % (braking)	4.494		
		Bin 1 % (idle)	5.720		
Bin 11 % (0-25 mph, <0 kw/tonne)	2.406	Bin 21 % (25-50 mph, <0 kw/tonne)	4.040		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.951	Bin 22 % (25-50 mph, 0-3 kw/tonne)	3.268	Bin 33 % (>50 mph, <6 kw/tonne)	0.726
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.407	Bin 23 % (25-50 mph, 3-6 kw/tonne)	4.449		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.270	Bin 24 % (25-50 mph, 6-9 kw/tonne)	5.856	Bin 35 % (>50 mph, 6-12 kw/tonne)	3.178
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.769	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.581		
Bin 16 % (0-25 mph, >=12 kw/tonne)	5.356		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	20.291	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.678
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	11.530	Bin 38 % (>50 mph, 18-24 kw/tonne)	3.314
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.769	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.043
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.272	Bin 40 % (>50 mph, >=30 kw/tonne)	0.636

Sacramento 2004 Loop-Downgrade On-Ramp Driving (L-D), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8				0.024	0.024	0.048	0.024															**0.121**
-7			0.024					0.024														**0.048**
-6			0.048	0.048	0.121	0.048		0.024														**0.290**
-5			0.097	0.097	0.145	0.121	0.024															**0.483**
-4		0.072	0.072	0.072	0.097	0.121	0.072		0.024													**0.531**
-3		0.097	0.121	0.072	0.097	0.169	0.386	0.531	0.048	0.024												**1.546**
-2		0.266	0.242	0.072	0.169	0.411	1.498	1.159	0.411	0.024												**4.251**
-1		1.522	0.193	0.024	0.121	0.845	3.478	2.391	0.725	0.145		0.072										**9.517**
0	1.014	2.705	0.459	0.024	0.362	1.932	13.937	5.966	1.256	0.386	0.845	0.797	0.845	0.676	0.024							**31.232**
1	0.121	1.159	0.097		0.314	2.464	9.058	6.643	1.570	0.507	0.290	0.507	0.386	0.411								**23.527**
2		0.242	0.048	0.048	0.048	0.217	1.039	3.357	2.536	1.208	1.014	0.990	0.845	0.145								**11.739**
3	0.024	0.121	0.145	0.072	0.145	0.386	0.411	1.594	2.826	3.140	2.391	1.715	0.604									**13.575**
4		0.145	0.048	0.072	0.217	0.145	0.048	0.097	0.411	0.580	0.242	0.048										**2.053**
5		0.121	0.048	0.072	0.024		0.024	0.072	0.048		0.048											**0.459**
6		0.121	0.048	0.121	0.072	0.024		0.024		0.024												**0.435**
7		0.048	0.048	0.072	0.024																	**0.193**
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11																						
12																						
13																						
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Totals	**1.159**	**6.618**	**1.739**	**0.894**	**1.981**	**6.932**	**30.000**	**21.884**	**9.855**	**6.039**	**4.831**	**4.130**	**2.681**	**1.232**	**0.024**							**100.000**

Summary Statistics

Avg Speed (mph)	33.12	Time at Idle (%)	1.159	Avg Specific PKE (hp-sec/lb)	4.53
Min Speed (mph)	0.00	Time at Cruise (%)	62.343	Avg Total Specific Power (hp/lb)	0.1588
Max Speed (mph)	67.85	Time in Accel (%)	29.227	Avg Non-Zero Specific Power (hp/lb)	0.2257
Avg Non-Idle Speed (mph)	33.51	Time in Decel (%)	7.271	Max Specific Power (hp/lb)	1.1336
Avg Cruise Speed (mph)	30.68	Avg Trip Length (miles)	0.263	Spec Pwr Freq (%): 0 hp/lb	29.64
Avg Acceleration (mph/sec)	1.48	Avg Trip Time (min)	0.476	Spec Pwr Freq (%): >0-0.1 hp/lb	29.86
Max Acceleration (mph/sec)	7.24	# Stops per Mile	0.184	Spec Pwr Freq (%): >0.1-0.2 hp/lb	11.40
Avg Deceleration (mph/sec)	-1.25	# of 1-Sec Observations	4,140	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.21
Max Deceleration (mph/sec)	-8.38	# of Trips	145	Spec Pwr Freq (%): >0.3 hp/lb	22.90

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	10.369		
		Bin 0 % (braking)	3.830		
		Bin 1 % (idle)	1.777		
Bin 11 % (0-25 mph, <0 kw/tonne)	3.329	Bin 21 % (25-50 mph, <0 kw/tonne)	8.310		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	4.431	Bin 22 % (25-50 mph, 0-3 kw/tonne)	6.733	Bin 33 % (>50 mph, <6 kw/tonne)	0.100
Bin 13 % (0-25 mph, 3-6 kw/tonne)	0.951	Bin 23 % (25-50 mph, 3-6 kw/tonne)	16.996		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	0.776	Bin 24 % (25-50 mph, 6-9 kw/tonne)	12.315	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.278
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.325	Bin 25 % (25-50 mph, 9-12 kw/tonne)	5.182		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.026		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.108	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.726
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	6.133	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.901
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	4.581	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.126
		Bin 30 % (25-50 mph, >=30 kw/tonne)	6.408	Bin 40 % (>50 mph, >=30 kw/tonne)	5.657

Sacramento 2004 Loop-Level On-Ramp Driving (L-L), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.044																		**0.044**
-8						0.044																**0.044**
-7					0.044																	**0.044**
-6				0.044	0.044	0.044	0.044															**0.176**
-5			0.088			0.088	0.044	0.044														**0.265**
-4		0.044	0.176	0.221	0.221	0.044	0.044		0.044	0.088	0.044											**0.926**
-3		0.176	0.265	0.044	0.088	0.265	0.088	0.221	0.176		0.044											**1.367**
-2		0.221	0.132	0.221	0.221	0.221	0.926	1.147	0.573	0.221	0.088	0.088	0.044									**4.102**
-1		1.720	0.485	0.265	0.265	0.794	1.588	2.250	0.662	0.485		0.132	0.132									**8.778**
0	1.103	6.661	1.412	0.353	1.147	1.191	8.161	7.190	1.985	4.235	2.161	1.279	1.191	1.147								**39.215**
1	0.044	1.809	0.309	0.353	0.662	1.676	5.249	4.940	1.853	1.456	1.147	1.853	1.632	0.353								**23.335**
2		0.265	0.309	0.088	0.309	0.573	0.838	2.867	2.117	1.367	1.191	0.926	0.353	0.044								**11.248**
3		0.441	0.221	0.265	0.485	0.176	0.221	0.662	1.412	1.632	1.412	0.618	0.176									**7.719**
4		0.221	0.132	0.309	0.088	0.176	0.221	0.132	0.132	0.176	0.132											**1.720**
5		0.088	0.088		0.044	0.132	0.044	0.044		0.044												**0.485**
6		0.088	0.044	0.088			0.044	0.088		0.044												**0.397**
7			0.044		0.044				0.044													**0.132**
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Totals	**1.147**	**11.734**	**3.705**	**2.294**	**3.661**	**5.426**	**17.512**	**19.585**	**8.999**	**9.749**	**6.220**	**4.896**	**3.529**	**1.544**								**100.000**

Summary Statistics

Avg Speed (mph)	32.36	Time at Idle (%)	1.147	Avg Specific PKE (hp-sec/lb)	4.48
Min Speed (mph)	0.00	Time at Cruise (%)	68.064	Avg Total Specific Power (hp/lb)	0.1167
Max Speed (mph)	66.71	Time in Accel (%)	23.688	Avg Non-Zero Specific Power (hp/lb)	0.1815
Avg Non-Idle Speed (mph)	32.74	Time in Decel (%)	7.102	Max Specific Power (hp/lb)	1.2025
Avg Cruise Speed (mph)	31.14	Avg Trip Length (miles)	0.345	Spec Pwr Freq (%): 0 hp/lb	35.69
Avg Acceleration (mph/sec)	1.27	Avg Trip Time (min)	0.640	Spec Pwr Freq (%): >0-0.1 hp/lb	29.55
Max Acceleration (mph/sec)	6.93	# Stops per Mile	0.147	Spec Pwr Freq (%): >0.1-0.2 hp/lb	12.13
Avg Deceleration (mph/sec)	-1.01	# of 1-Sec Observations	2,267	Spec Pwr Freq (%): >0.2-0.3 hp/lb	8.51
Max Deceleration (mph/sec)	-8.55	# of Trips	59	Spec Pwr Freq (%): >0.3 hp/lb	14.12

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.050		
		Bin 0 % (braking)	4.755		
		Bin 1 % (idle)	1.495		
Bin 11 % (0-25 mph, <0 kw/tonne)	4.755	Bin 21 % (25-50 mph, <0 kw/tonne)	6.748		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	11.051	Bin 22 % (25-50 mph, 0-3 kw/tonne)	7.745	Bin 33 % (>50 mph, <6 kw/tonne)	0.634
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.812	Bin 23 % (25-50 mph, 3-6 kw/tonne)	13.225		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.178	Bin 24 % (25-50 mph, 6-9 kw/tonne)	9.239	Bin 35 % (>50 mph, 6-12 kw/tonne)	2.717
Bin 15 % (0-25 mph, 9-12 kw/tonne)	0.725	Bin 25 % (25-50 mph, 9-12 kw/tonne)	4.801		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.540		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.612	Bin 37 % (>50 mph, 12-18 kw/tonne)	2.989
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	4.937	Bin 38 % (>50 mph, 18-24 kw/tonne)	3.080
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.989	Bin 39 % (>50 mph, 24-30 kw/tonne)	1.087
		Bin 30 % (25-50 mph, >=30 kw/tonne)	3.261	Bin 40 % (>50 mph, >=30 kw/tonne)	2.627

Sacramento 2004 Loop-Upgrade On-Ramp Driving (L-U), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8																						
-7																						
-6																						
-5																						
-4																						
-3		0.210						0.210														**0.419**
-2					0.210	0.629	1.048	1.258														**3.145**
-1					0.419	1.887	5.451	2.725	0.839	1.048												**12.369**
0		0.210		0.210	0.419	7.128	13.836	5.870	1.258	1.258	1.048	0.839										**32.075**
1				0.419	0.629	5.451	9.015	3.983	0.839	0.210		0.210										**20.755**
2				0.419	1.887	2.096	4.822	4.403	2.516	1.677	0.419											**18.239**
3		0.210	0.419	0.419	0.629	0.210	1.048	2.725	2.725	2.096	1.258											**11.740**
4			0.419						0.210	0.419	0.210											**1.258**
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20																						
Totals		**0.629**	**0.839**	**1.468**	**4.193**	**17.400**	**35.220**	**21.174**	**8.386**	**6.709**	**2.935**	**1.048**										**100.000**

Summary Statistics

Avg Speed (mph)	31.90	Time at Idle (%)	0.000	Avg Specific PKE (hp-sec/lb)	3.52
Min Speed (mph)	0.00	Time at Cruise (%)	65.199	Avg Total Specific Power (hp/lb)	0.1327
Max Speed (mph)	55.85	Time in Accel (%)	31.237	Avg Non-Zero Specific Power (hp/lb)	0.1918
Avg Non-Idle Speed (mph)	31.90	Time in Decel (%)	3.564	Max Specific Power (hp/lb)	0.7447
Avg Cruise Speed (mph)	31.10	Avg Trip Length (miles)	0.235	Spec Pwr Freq (%): 0 hp/lb	30.82
Avg Acceleration (mph/sec)	1.43	Avg Trip Time (min)	0.442	Spec Pwr Freq (%): >0-0.1 hp/lb	28.30
Max Acceleration (mph/sec)	4.11	# Stops per Mile	0.000	Spec Pwr Freq (%): >0.1-0.2 hp/lb	13.00
Avg Deceleration (mph/sec)	-0.81	# of 1-Sec Observations	477	Spec Pwr Freq (%): >0.2-0.3 hp/lb	12.58
Max Deceleration (mph/sec)	-3.08	# of Trips	18	Spec Pwr Freq (%): >0.3 hp/lb	15.30

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	8.771		
		Bin 0 % (braking)	0.436		
		Bin 1 % (idle)	0.000		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.525	Bin 21 % (25-50 mph, <0 kw/tonne)	13.290		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	1.307	Bin 22 % (25-50 mph, 0-3 kw/tonne)	11.765	Bin 33 % (>50 mph, <6 kw/tonne)	0.000
Bin 13 % (0-25 mph, 3-6 kw/tonne)	2.832	Bin 23 % (25-50 mph, 3-6 kw/tonne)	17.429		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	2.397	Bin 24 % (25-50 mph, 6-9 kw/tonne)	11.983	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.307
Bin 15 % (0-25 mph, 9-12 kw/tonne)	2.614	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.486		
Bin 16 % (0-25 mph, >=12 kw/tonne)	1.089		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	11.765	Bin 37 % (>50 mph, 12-18 kw/tonne)	0.000
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	6.754	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.218
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	4.575	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.218
		Bin 30 % (25-50 mph, >=30 kw/tonne)	4.357	Bin 40 % (>50 mph, >=30 kw/tonne)	0.654

Sacramento 2004 Ramp-Metered On-Ramp Driving (MON), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9				0.035	0.035		0.035															**0.104**
-8				0.035	0.069	0.069	0.035															**0.208**
-7			0.069	0.139	0.139		0.069	0.035														**0.450**
-6			0.104	0.139	0.312	0.243	0.069	0.104														**0.970**
-5		0.069	0.347	0.416	0.416	0.312	0.312	0.069	0.069													**2.010**
-4		0.243	0.347	0.520	0.520	0.554	0.450	0.312	0.104	0.035												**3.084**
-3		0.450	0.658	0.416	0.450	0.866	0.728	0.450	0.243	0.069	0.069	0.035										**4.435**
-2		1.871	1.143	0.485	0.520	0.658	1.074	0.485	0.277	0.173	0.069	0.035										**6.791**
-1		6.480	0.520	0.347	0.243	0.485	1.629	1.559	0.589	0.728	0.173	0.104	0.035									**12.890**
0	2.564	11.920	1.005	0.554	0.312	0.658	3.812	2.911	1.836	1.525	0.866	0.520	0.901									**29.383**
1	0.450	5.301	0.347	0.277	0.243	0.520	1.525	1.802	1.490	1.386	0.901	0.485	0.277									**15.003**
2	0.069	1.040	0.243	0.243	0.520	1.213	1.490	1.351	0.970	0.970	0.728	0.520	0.035									**9.390**
3	0.069	0.832	0.243	0.277	0.901	1.455	1.490	1.005	0.554	0.312	0.208											**7.346**
4		0.728	0.312	0.277	0.832	0.693	0.277	0.173	0.139	0.035												**3.465**
5		0.554	0.277	0.520	0.173	0.104	0.035	0.035	0.069													**1.767**
6		0.658	0.416	0.450	0.243	0.035																**1.802**
7		0.139	0.416	0.173	0.035																	**0.762**
8		0.069		0.035																		**0.104**
9		0.035																				**0.035**
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**3.153**	**30.388**	**6.445**	**5.336**	**5.960**	**7.866**	**13.028**	**10.291**	**6.341**	**5.232**	**3.015**	**1.698**	**1.247**									**100.000**

Summary Statistics

Avg Speed (mph)	21.32	Time at Idle (%)	3.153	Avg Specific PKE (hp-sec/lb)	4.59
Min Speed (mph)	0.00	Time at Cruise (%)	53.950	Avg Total Specific Power (hp/lb)	0.0875
Max Speed (mph)	61.97	Time in Accel (%)	24.809	Avg Non-Zero Specific Power (hp/lb)	0.1672
Avg Non-Idle Speed (mph)	22.02	Time in Decel (%)	18.087	Max Specific Power (hp/lb)	0.7886
Avg Cruise Speed (mph)	21.19	Avg Trip Length (miles)	0.311	Spec Pwr Freq (%): 0 hp/lb	47.68
Avg Acceleration (mph/sec)	1.83	Avg Trip Time (min)	0.875	Spec Pwr Freq (%): >0-0.1 hp/lb	24.57
Max Acceleration (mph/sec)	8.63	# Stops per Mile	1.346	Spec Pwr Freq (%): >0.1-0.2 hp/lb	8.35
Avg Deceleration (mph/sec)	-1.76	# of 1-Sec Observations	2,886	Spec Pwr Freq (%): >0.2-0.3 hp/lb	6.79
Max Deceleration (mph/sec)	-9.04	# of Trips	55	Spec Pwr Freq (%): >0.3 hp/lb	12.61

EPA VSP (Vehicle Specific Power) Statistics

		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	3.245		
		Bin 0 % (braking)	14.518		
		Bin 1 % (idle)	5.616		
Bin 11 % (0-25 mph, <0 kw/tonne)	12.257	Bin 21 % (25-50 mph, <0 kw/tonne)	5.899		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	17.732	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.027	Bin 33 % (>50 mph, <6 kw/tonne)	0.318
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.837	Bin 23 % (25-50 mph, 3-6 kw/tonne)	5.228		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.660	Bin 24 % (25-50 mph, 6-9 kw/tonne)	2.861	Bin 35 % (>50 mph, 6-12 kw/tonne)	1.484
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.660	Bin 25 % (25-50 mph, 9-12 kw/tonne)	3.144		
Bin 16 % (0-25 mph, >=12 kw/tonne)	5.299		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	6.146	Bin 37 % (>50 mph, 12-18 kw/tonne)	1.201
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	4.698	Bin 38 % (>50 mph, 18-24 kw/tonne)	0.318
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	2.119	Bin 39 % (>50 mph, 24-30 kw/tonne)	0.530
		Bin 30 % (25-50 mph, >=30 kw/tonne)	0.883	Bin 40 % (>50 mph, >=30 kw/tonne)	0.565

Sacramento 2004 Non-Metered On-Ramp Driving (MOF), No Grade Compensation SAFD (%)

ACCEL BIN (mph/s)	SPEED BIN (mph) 0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	TOTALS
-20																						
-19																						
-18																						
-17																						
-16																						
-15																						
-14																						
-13																						
-12																						
-11																						
-10																						
-9																						
-8						0.006																**0.006**
-7					0.011	0.006	0.006	0.006														**0.029**
-6			0.011	0.017	0.029	0.011	0.017	0.011														**0.097**
-5		0.011	0.017	0.057	0.040	0.040	0.011	0.017	0.017	0.006												**0.217**
-4		0.017	0.063	0.029	0.051	0.103	0.068	0.034	0.023	0.023	0.006											**0.416**
-3		0.074	0.057	0.040	0.068	0.097	0.177	0.188	0.057	0.034	0.029											**0.821**
-2		0.097	0.091	0.108	0.154	0.205	0.548	0.610	0.240	0.086	0.040	0.034	0.023									**2.236**
-1		0.268	0.125	0.097	0.194	0.525	1.397	1.363	0.633	0.433	0.245	0.194	0.183	0.080								**5.738**
0	1.877	0.856	0.291	0.228	0.513	1.158	5.481	3.913	2.481	2.869	2.818	2.692	1.882	1.055	0.097	0.006	0.006					**28.223**
1	0.086	0.297	0.137	0.314	0.513	1.523	4.312	4.620	4.073	4.637	4.894	4.078	2.105	0.559	0.057	0.046	0.006					**32.255**
2	0.006	0.148	0.171	0.285	0.627	0.913	1.814	3.091	3.006	2.464	1.928	1.369	0.804	0.131	0.011							**16.769**
3	0.017	0.268	0.285	0.462	0.747	0.890	0.856	1.289	1.523	1.329	1.015	0.684	0.211	0.034	0.006							**9.617**
4		0.200	0.257	0.302	0.479	0.439	0.348	0.171	0.188	0.200	0.091	0.017										**2.692**
5		0.154	0.165	0.143	0.097	0.068	0.034	0.034	0.006	0.011	0.011											**0.724**
6		0.023	0.063	0.023			0.006	0.017		0.011												**0.143**
7			0.006		0.006				0.006													**0.017**
8																						
9																						
10																						
11																						
12																						
13																						
14																						
15																						
16																						
17																						
18																						
19																						
20																						
Totals	**1.985**	**2.413**	**1.740**	**2.105**	**3.531**	**5.983**	**15.075**	**15.366**	**12.252**	**12.104**	**11.077**	**9.069**	**5.208**	**1.859**	**0.171**	**0.051**	**0.011**					**100.000**

Summary Statistics

Avg Speed (mph)	38.06	Time at Idle (%)	1.985	Avg Specific PKE (hp-sec/lb)	4.62
Min Speed (mph)	0.00	Time at Cruise (%)	61.220	Avg Total Specific Power (hp/lb)	0.1632
Max Speed (mph)	78.85	Time in Accel (%)	32.712	Avg Non-Zero Specific Power (hp/lb)	0.2158
Avg Non-Idle Speed (mph)	38.83	Time in Decel (%)	4.084	Max Specific Power (hp/lb)	1.2025
Avg Cruise Speed (mph)	39.59	Avg Trip Length (miles)	0.299	Spec Pwr Freq (%): 0 hp/lb	24.36
Avg Acceleration (mph/sec)	1.44	Avg Trip Time (min)	0.471	Spec Pwr Freq (%): >0-0.1 hp/lb	20.89
Max Acceleration (mph/sec)	6.93	# Stops per Mile	0.065	Spec Pwr Freq (%): >0.1-0.2 hp/lb	19.21
Avg Deceleration (mph/sec)	-1.01	# of 1-Sec Observations	17,532	Spec Pwr Freq (%): >0.2-0.3 hp/lb	16.04
Max Deceleration (mph/sec)	-7.71	# of Trips	620	Spec Pwr Freq (%): >0.3 hp/lb	19.50

EPA VSP (Vehicle Specific Power) Statistics

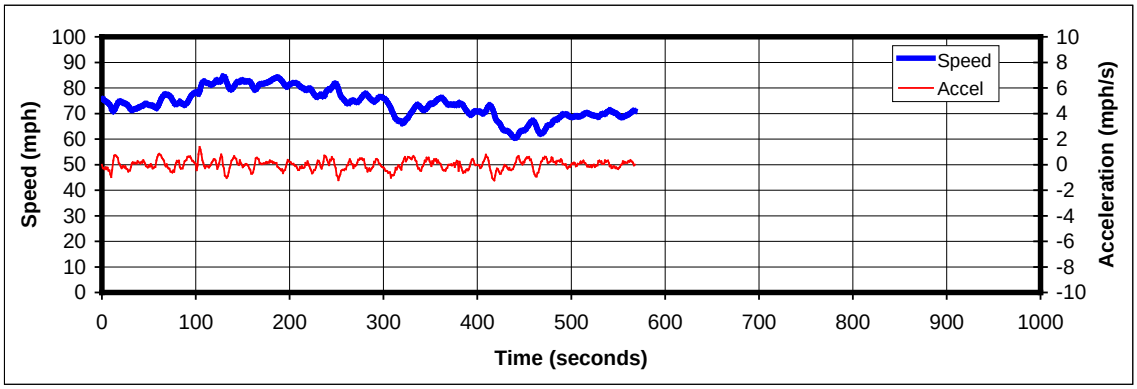
		EPA Avg Veh Spec Pwr, VSP (kW/tonne)	12.191		
		Bin 0 % (braking)	2.105		
		Bin 1 % (idle)	2.259		
Bin 11 % (0-25 mph, <0 kw/tonne)	1.301	Bin 21 % (25-50 mph, <0 kw/tonne)	4.890		
Bin 12 % (0-25 mph, 0-3 kw/tonne)	2.206	Bin 22 % (25-50 mph, 0-3 kw/tonne)	4.730	Bin 33 % (>50 mph, <6 kw/tonne)	1.011
Bin 13 % (0-25 mph, 3-6 kw/tonne)	1.301	Bin 23 % (25-50 mph, 3-6 kw/tonne)	8.994		
Bin 14 % (0-25 mph, 6-9 kw/tonne)	1.490	Bin 24 % (25-50 mph, 6-9 kw/tonne)	8.314	Bin 35 % (>50 mph, 6-12 kw/tonne)	4.393
Bin 15 % (0-25 mph, 9-12 kw/tonne)	1.384	Bin 25 % (25-50 mph, 9-12 kw/tonne)	7.143		
Bin 16 % (0-25 mph, >=12 kw/tonne)	2.454		0.000		0.000
		Bin 27 % (25-50 mph, 12-18 kw/tonne)	13.470	Bin 37 % (>50 mph, 12-18 kw/tonne)	5.872
		Bin 28 % (25-50 mph, 18-24 kw/tonne)	8.905	Bin 38 % (>50 mph, 18-24 kw/tonne)	5.328
		Bin 29 % (25-50 mph, 24-30 kw/tonne)	4.045	Bin 39 % (>50 mph, 24-30 kw/tonne)	2.602
		Bin 30 % (25-50 mph, >=30 kw/tonne)	2.685	Bin 40 % (>50 mph, >=30 kw/tonne)	3.122

APPENDIX C

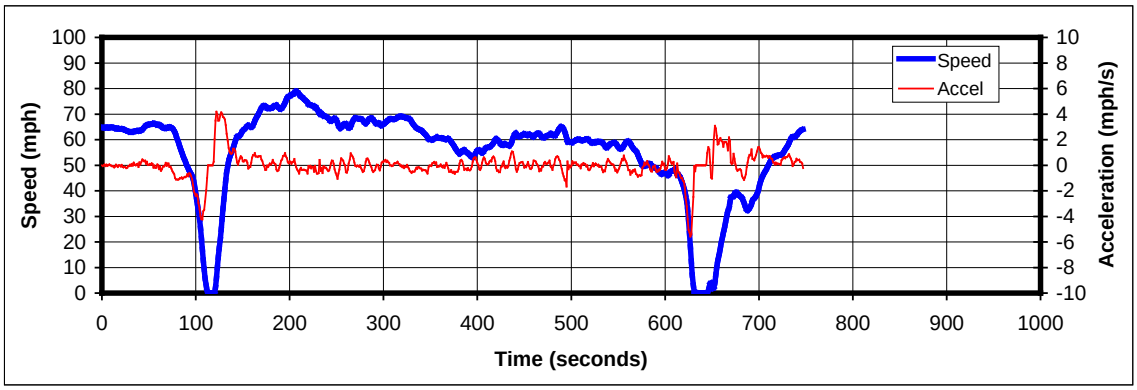
Final Link-Level Driving Cycle Traces

Rural Functional Class (FC) Driving Cycles

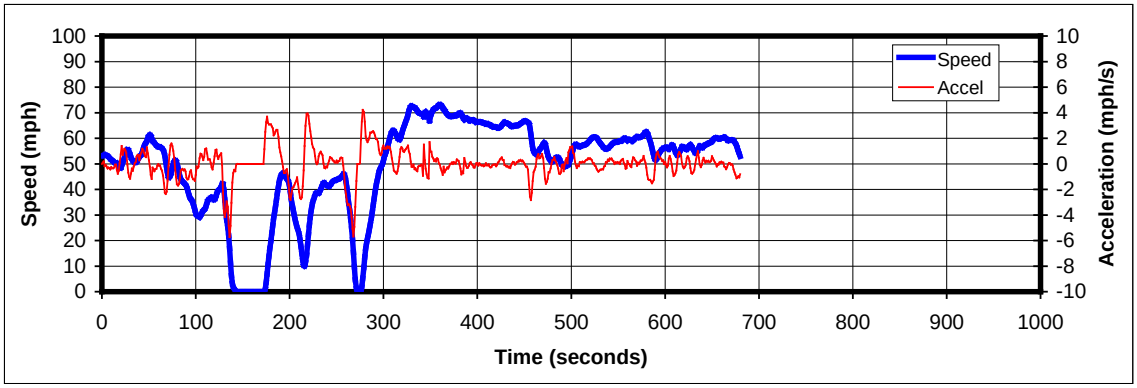
Rural Principal Arterial Interstate (FC=01) Driving Cycle



Rural Other Principal Arterial (FC=02) LOS A-C Driving Cycle

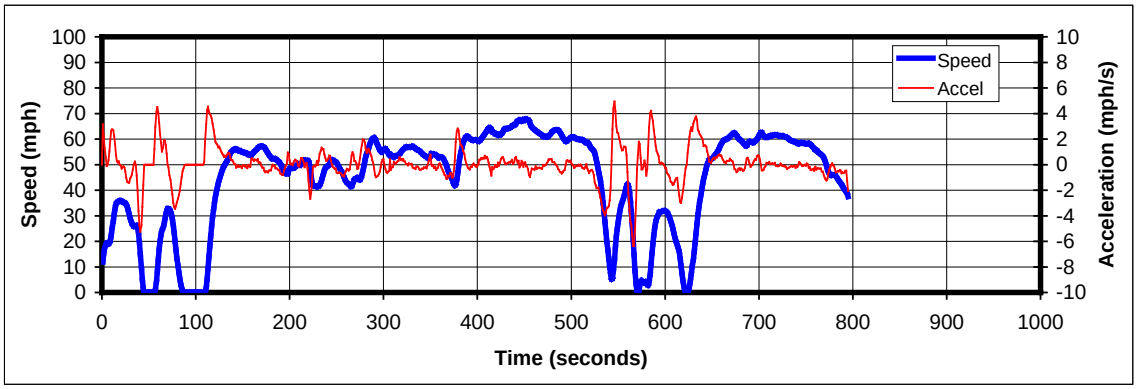


Rural Other Principal Arterial (FC=02) LOS D-F Driving Cycle

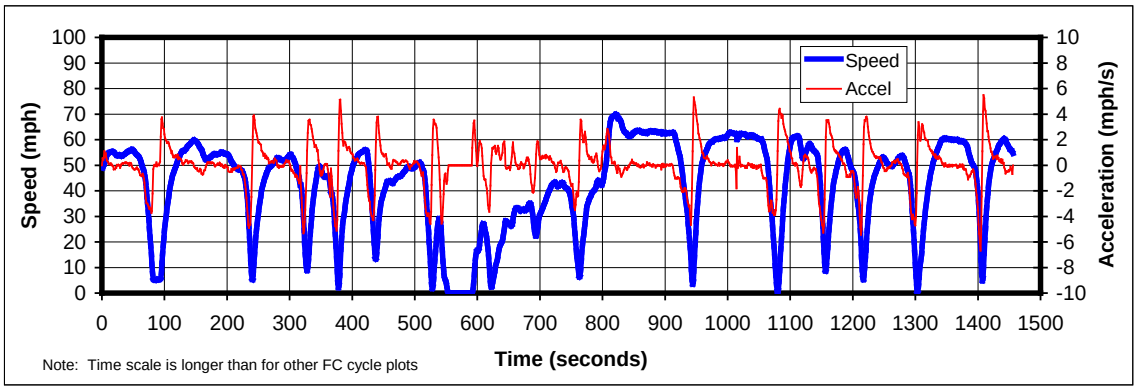


Rural Functional Class (FC) Driving Cycles (cont.)

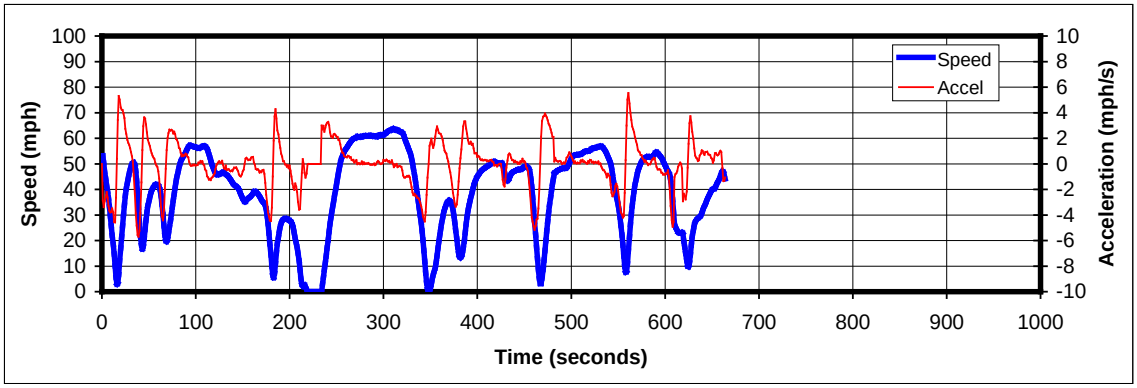
Rural Major Arterial (FC=06) Driving Cycle



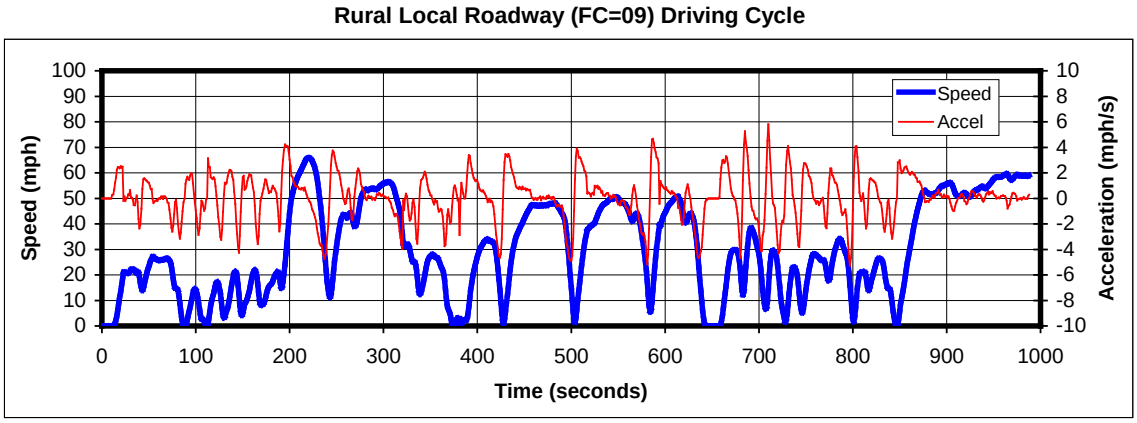
Rural Minor Arterial (FC=07) Driving Cycle



Rural Collector (FC=08) Driving Cycle

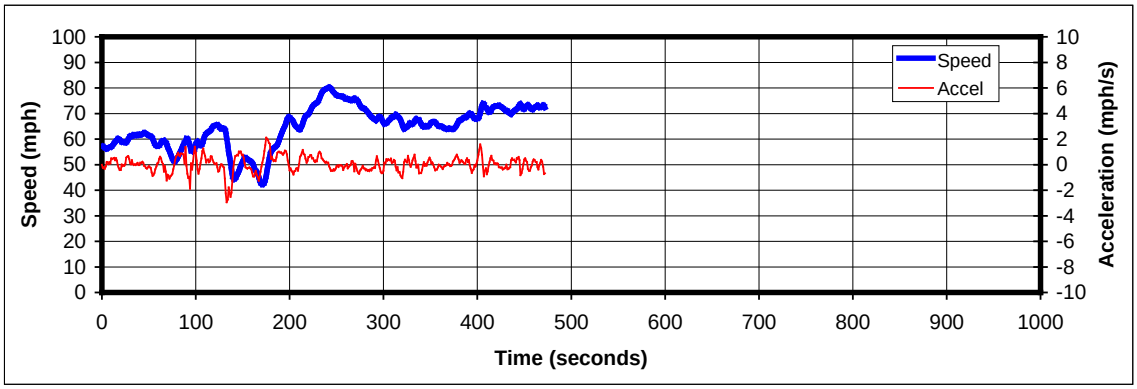


Rural Functional Class (FC) Driving Cycles (cont.)

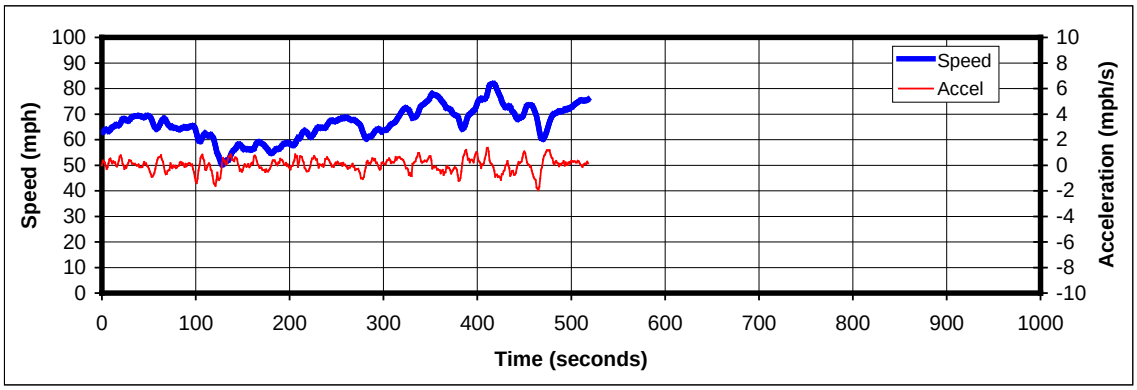


Urban Functional Class (FC) Driving Cycles

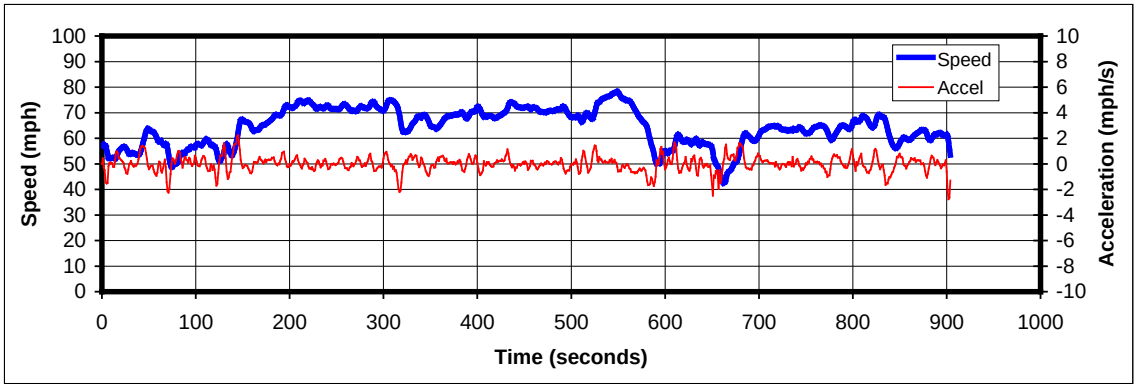
Urban Principal Arterial Interstate (FC=11) LOS A Driving Cycle



Urban Principal Arterial Interstate (FC=11) LOS B Driving Cycle

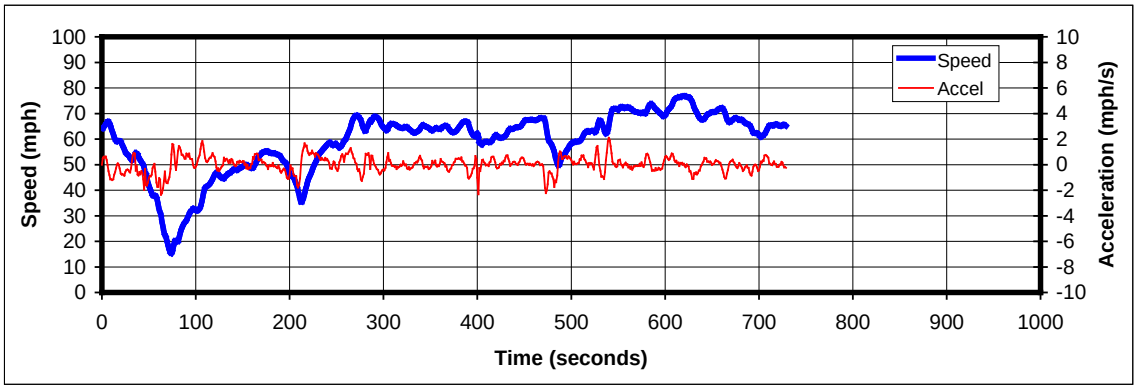


Urban Principal Arterial Interstate (FC=11) LOS C Driving Cycle

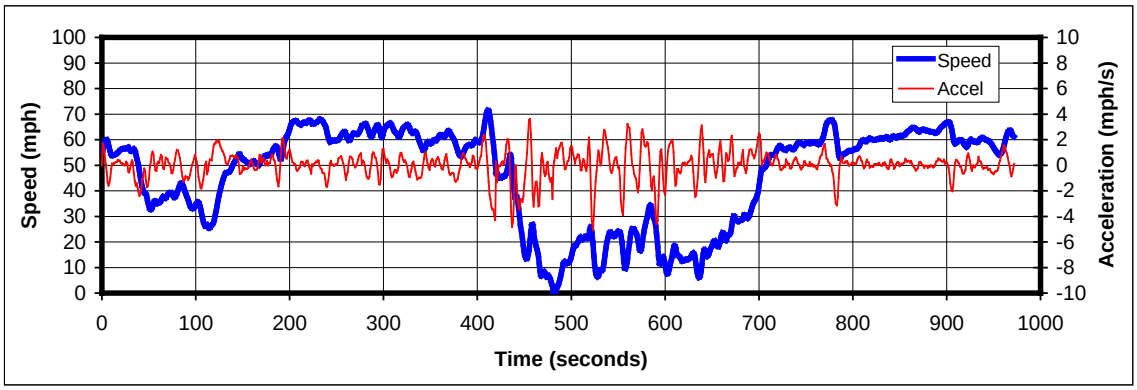


Urban Functional Class (FC) Driving Cycles (cont.)

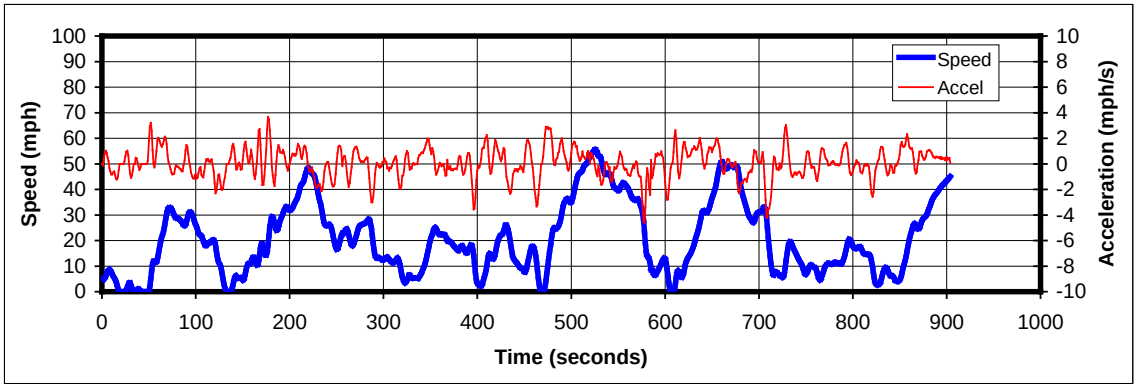
Urban Principal Arterial Interstate (FC=11) LOS D Driving Cycle



Urban Principal Arterial Interstate (FC=11) LOS E Driving Cycle

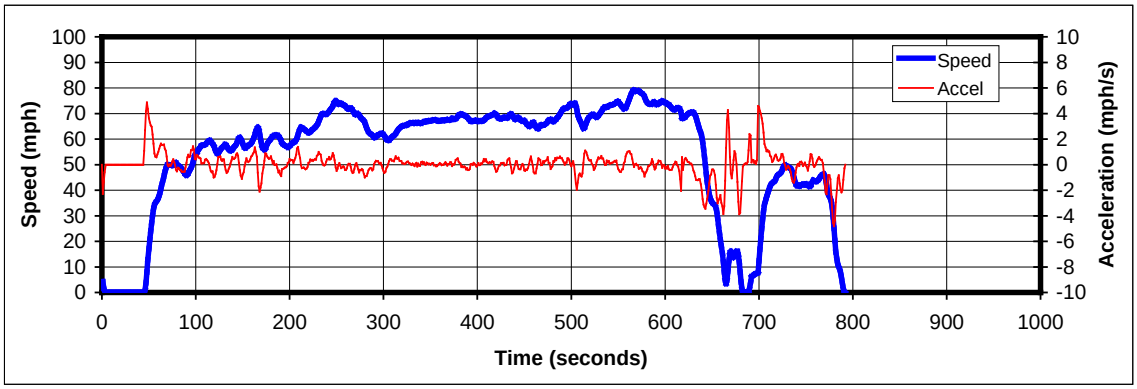


Urban Principal Arterial Interstate (FC=11) LOS F Driving Cycle

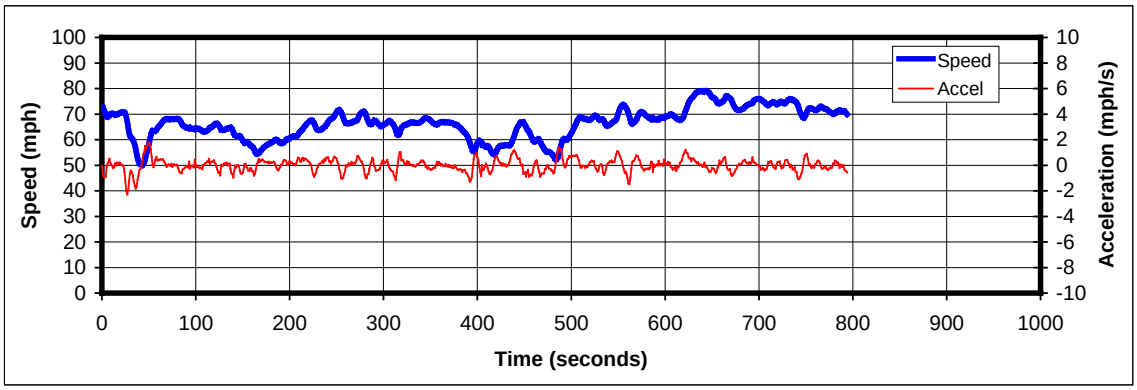


Urban Functional Class (FC) Driving Cycles (cont.)

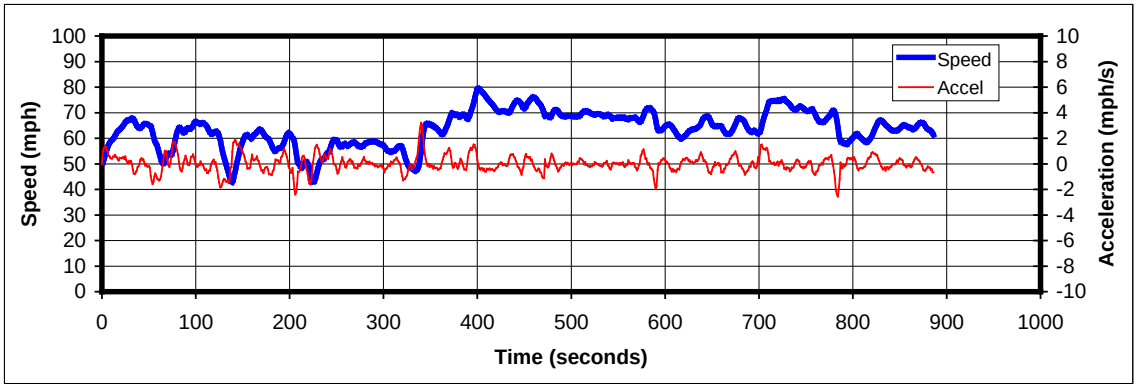
Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS A Driving Cycle



Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS B Driving Cycle

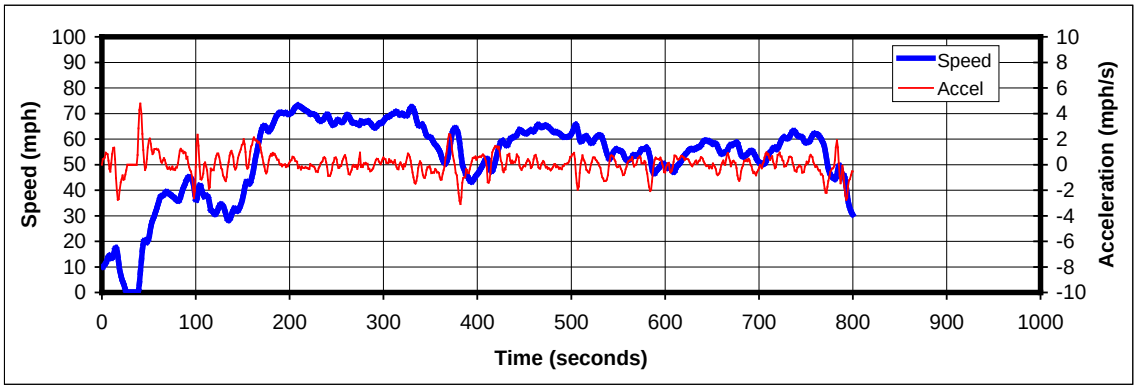


Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS C Driving Cycle

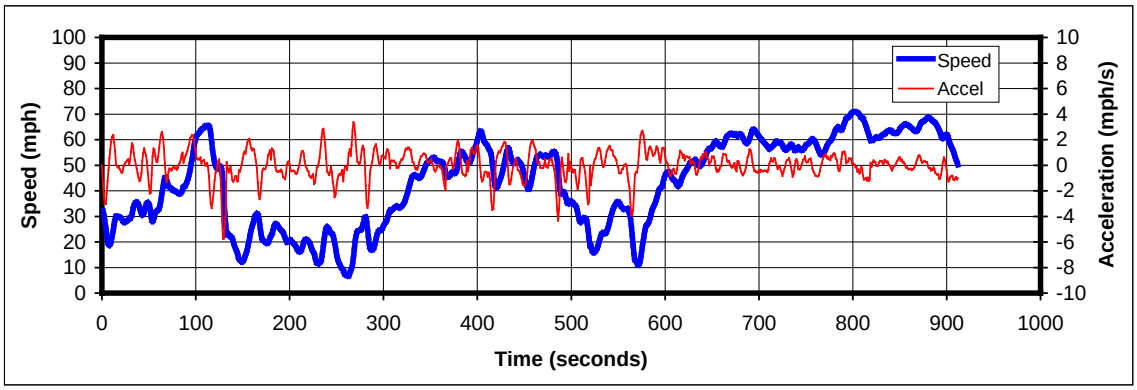


Urban Functional Class (FC) Driving Cycles (cont.)

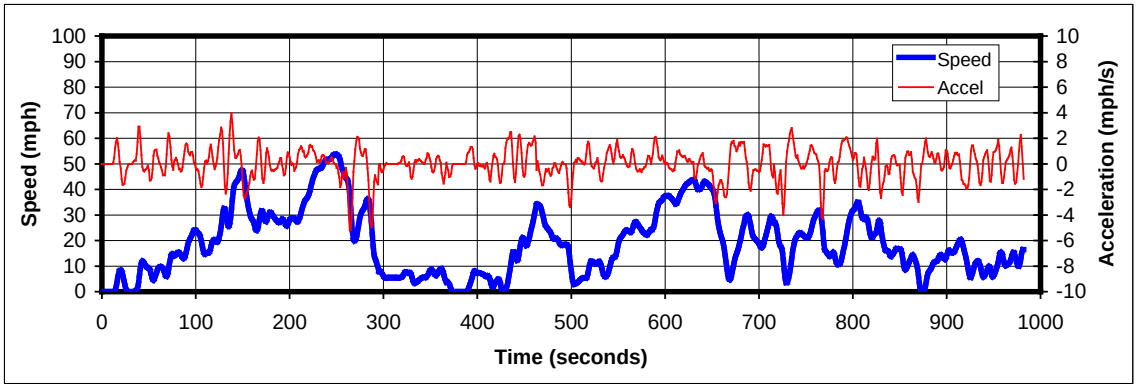
Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS D Driving Cycle



Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS E Driving Cycle

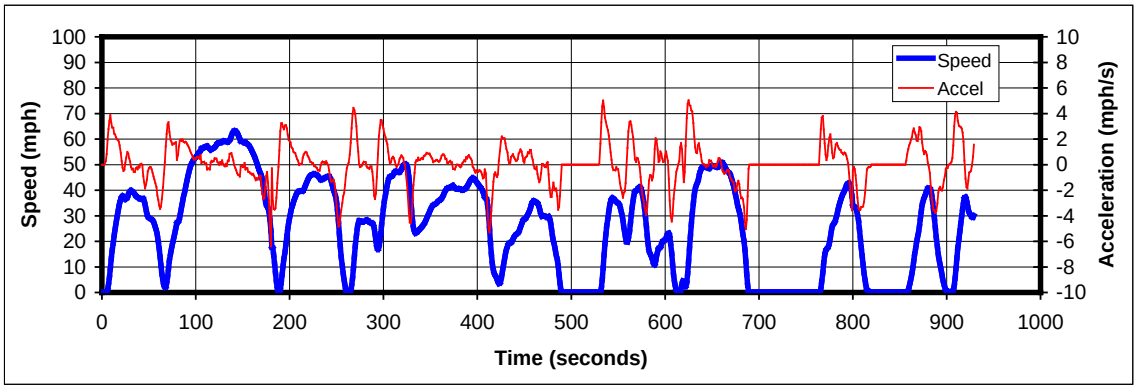


Urban Principal Arterial Other Freeway/Expressway (FC=12) LOS F Driving Cycle

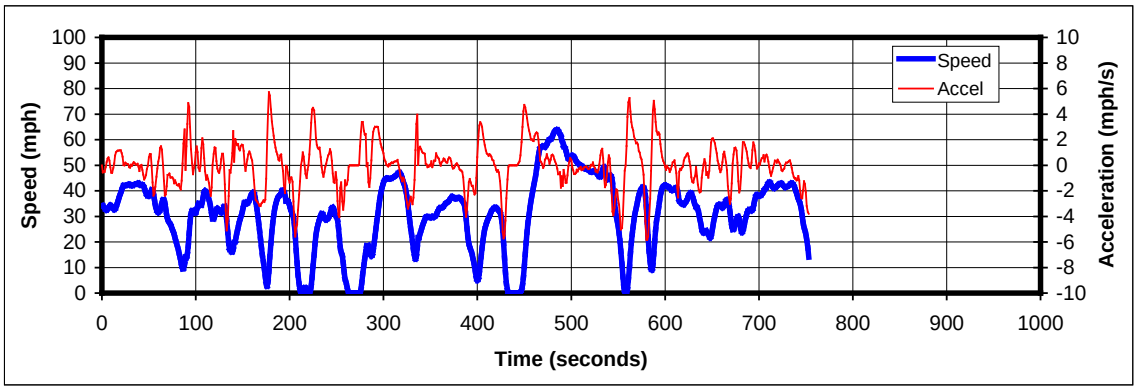


Urban Functional Class (FC) Driving Cycles (cont.)

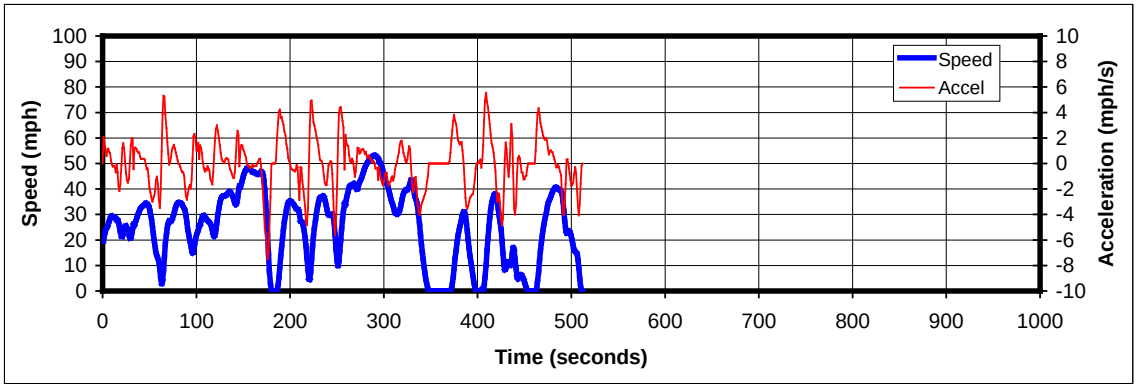
Urban Other Principal Arterial (FC=14) LOS A Driving Cycle



Urban Other Principal Arterial (FC=14) LOS B Driving Cycle

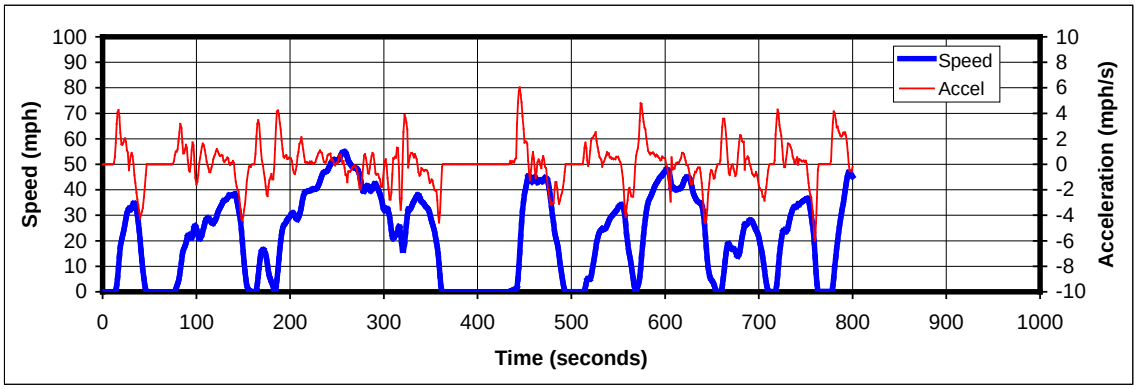


Urban Other Principal Arterial (FC=14) LOS C Driving Cycle

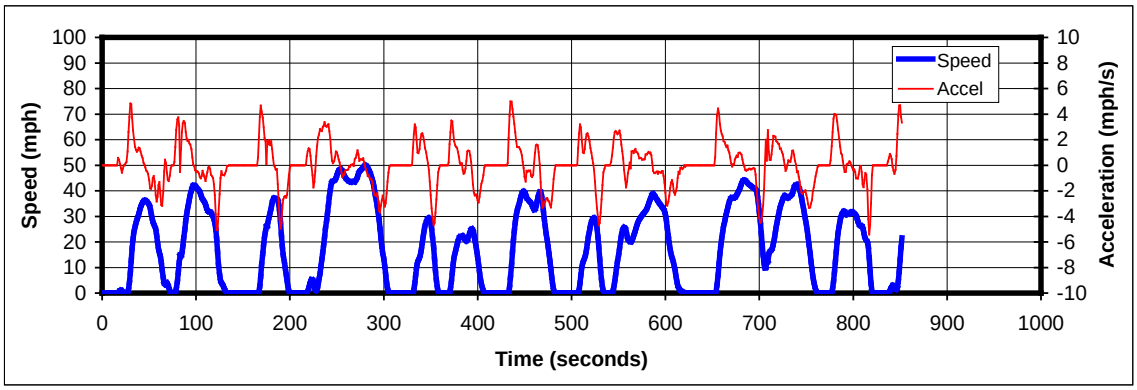


Urban Functional Class (FC) Driving Cycles (cont.)

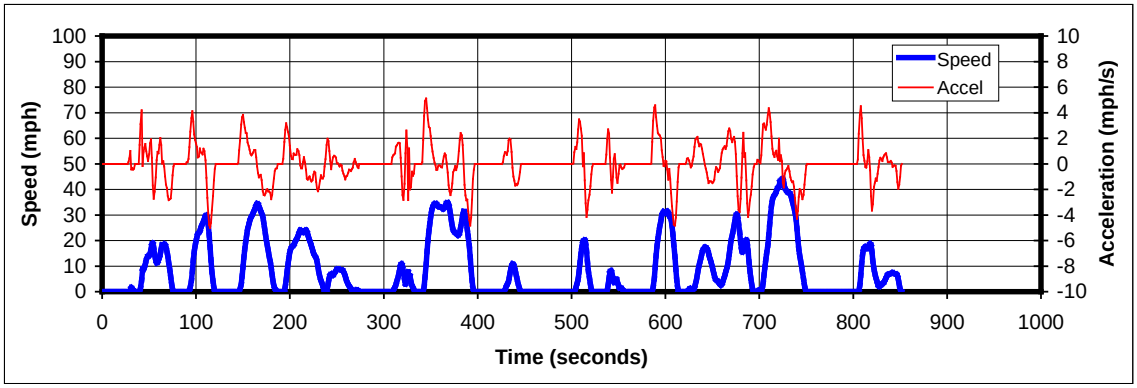
Urban Other Principal Arterial (FC=14) LOS D Driving Cycle



Urban Other Principal Arterial (FC=14) LOS E Driving Cycle

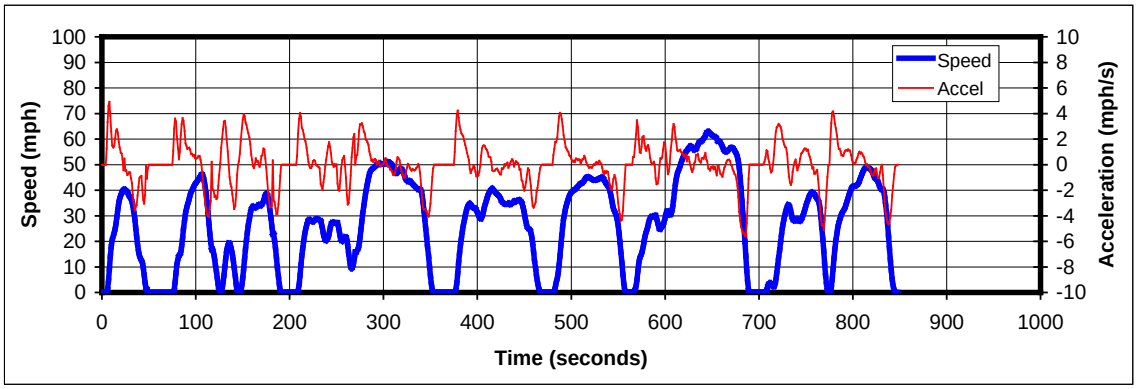


Urban Other Principal Arterial (FC=14) LOS F Driving Cycle

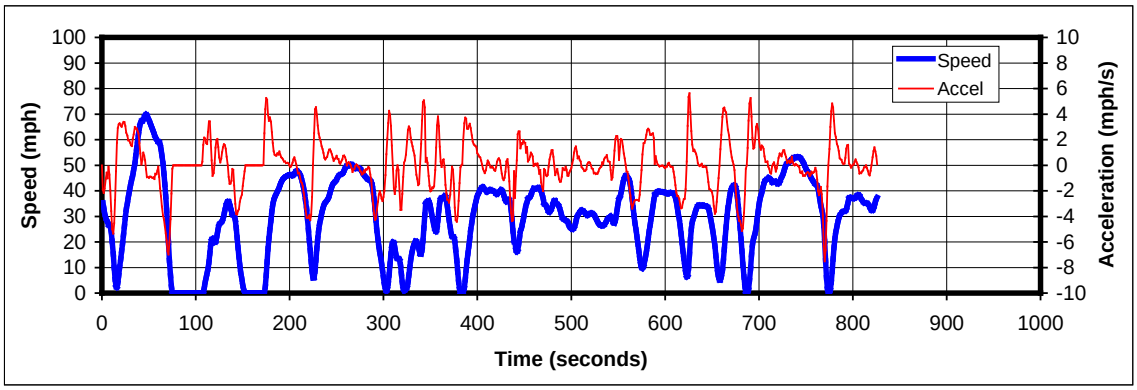


Urban Functional Class (FC) Driving Cycles (cont.)

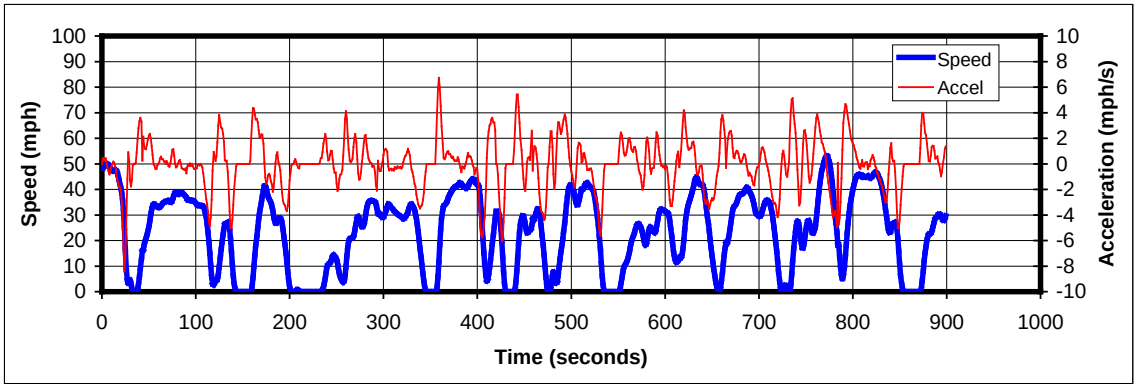
Urban Minor Arterial (FC=16) LOS A Driving Cycle



Urban Minor Arterial (FC=16) LOS B Driving Cycle

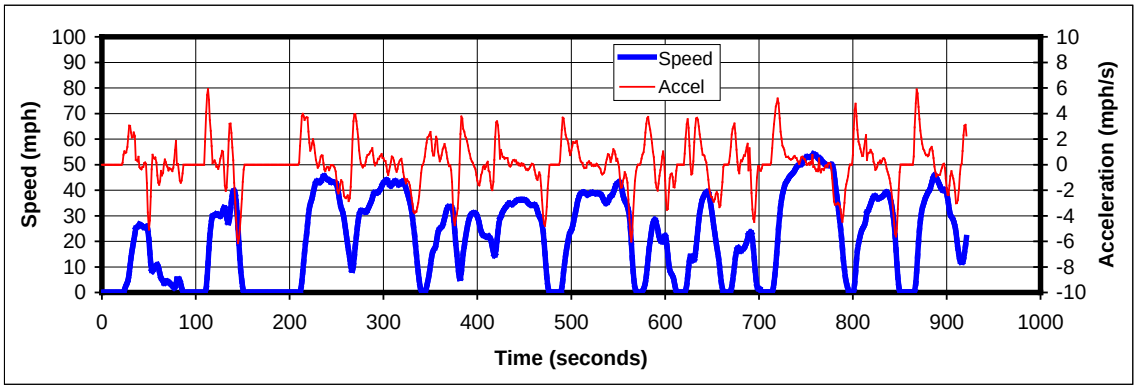


Urban Minor Arterial (FC=16) LOS C Driving Cycle

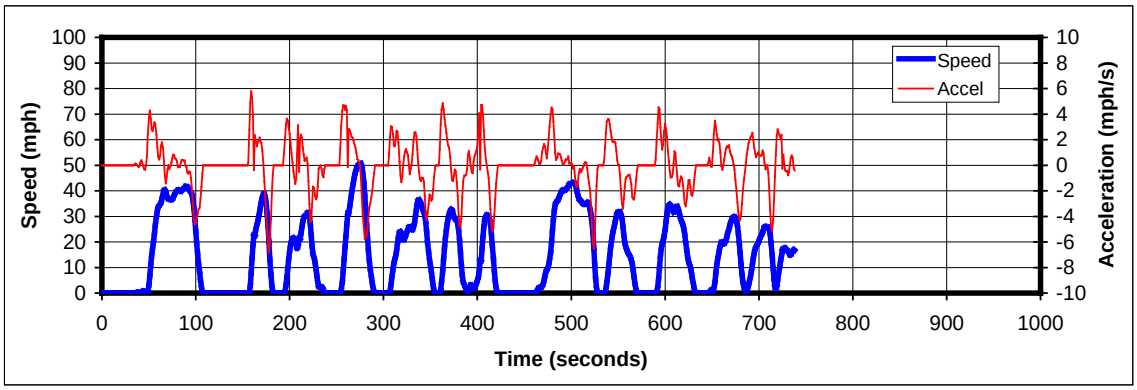


Urban Functional Class (FC) Driving Cycles (cont.)

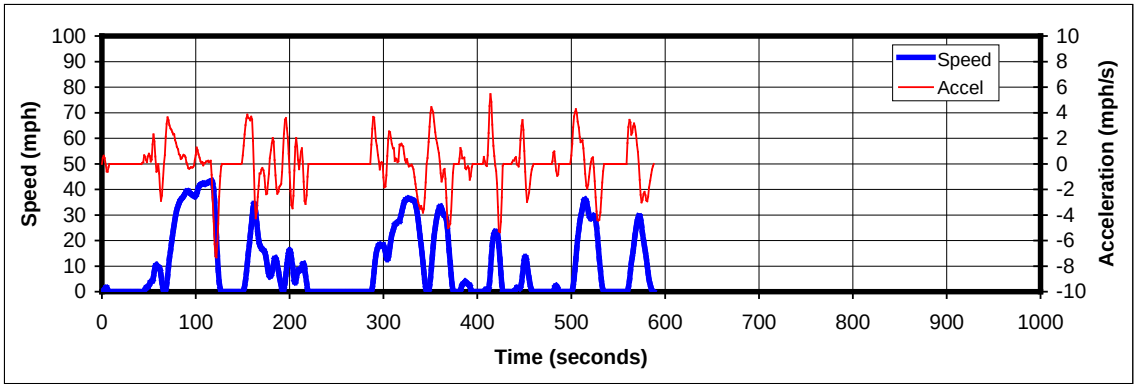
Urban Minor Arterial (FC=16) LOS D Driving Cycle



Urban Minor Arterial (FC=16) LOS E Driving Cycle

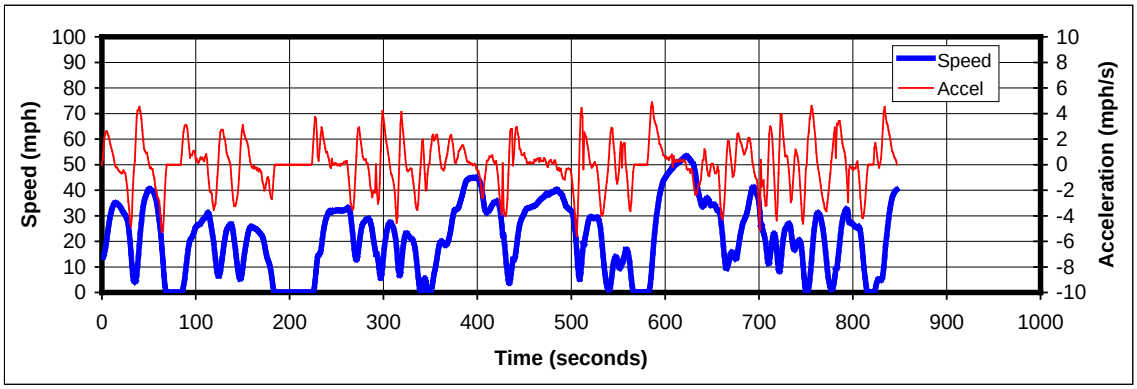


Urban Minor Arterial (FC=16) LOS F Driving Cycle

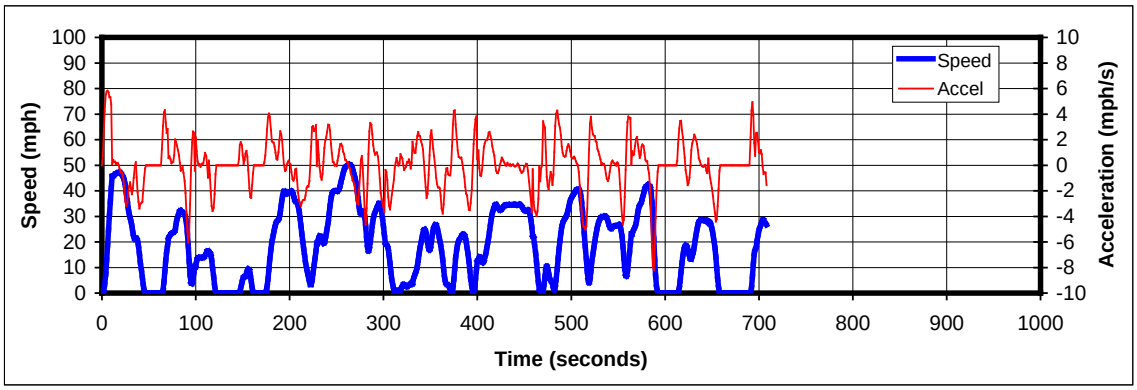


Urban Functional Class (FC) Driving Cycles (cont.)

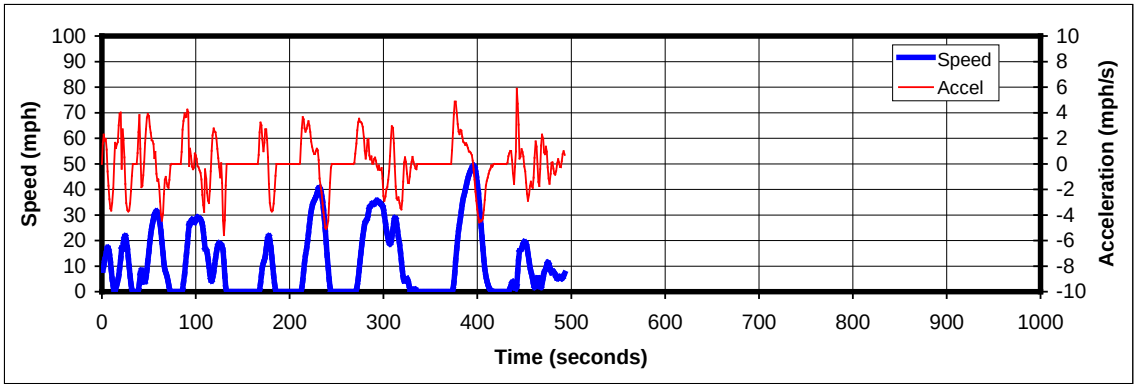
Urban Collector (FC=17) LOS A-C Driving Cycle



Urban Collector (FC=17) LOS D Driving Cycle

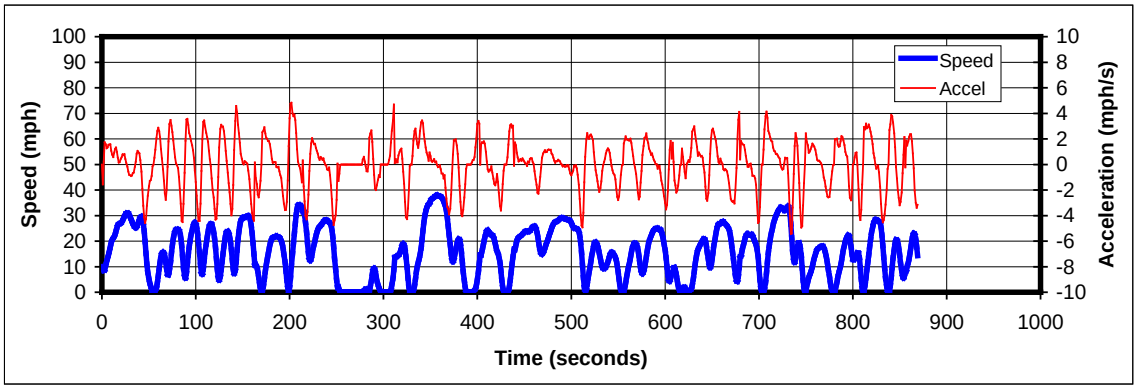


Urban Collector (FC=17) LOS E-F Driving Cycle

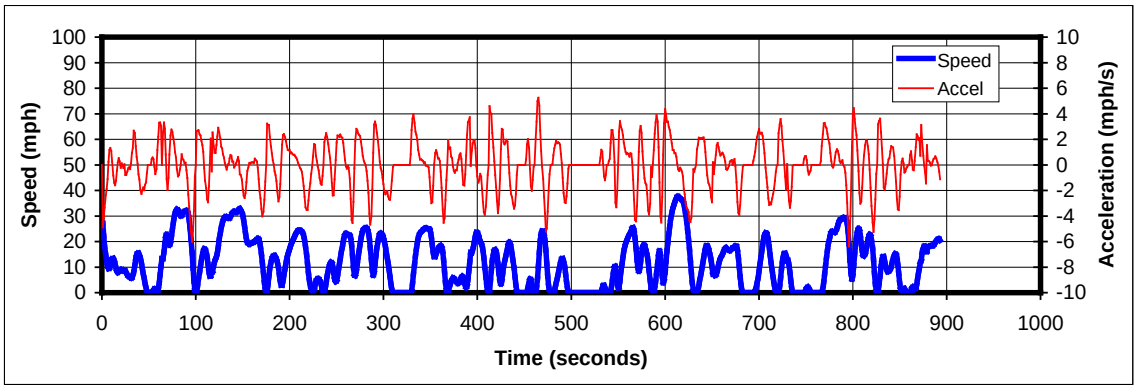


Urban Functional Class (FC) Driving Cycles (cont.)

Urban Local Roadway (FC=19) LOS A-C Driving Cycle

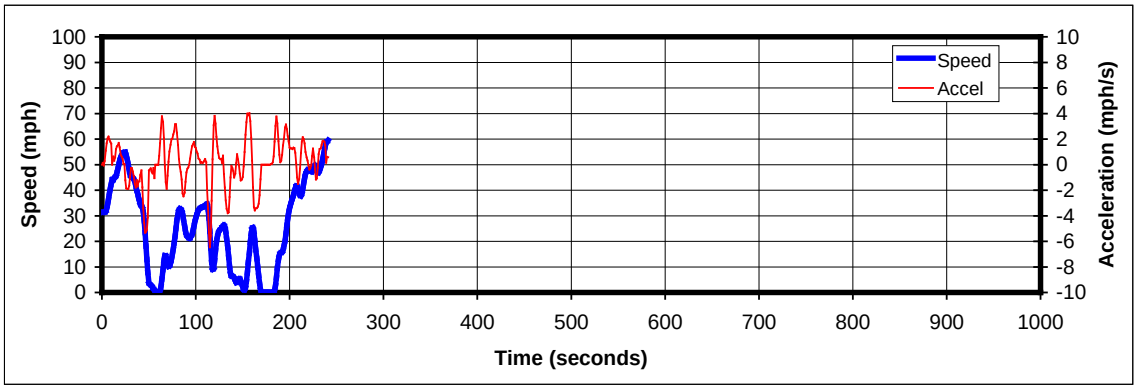


Urban Local Roadway (FC=19) LOS D-F Driving Cycle

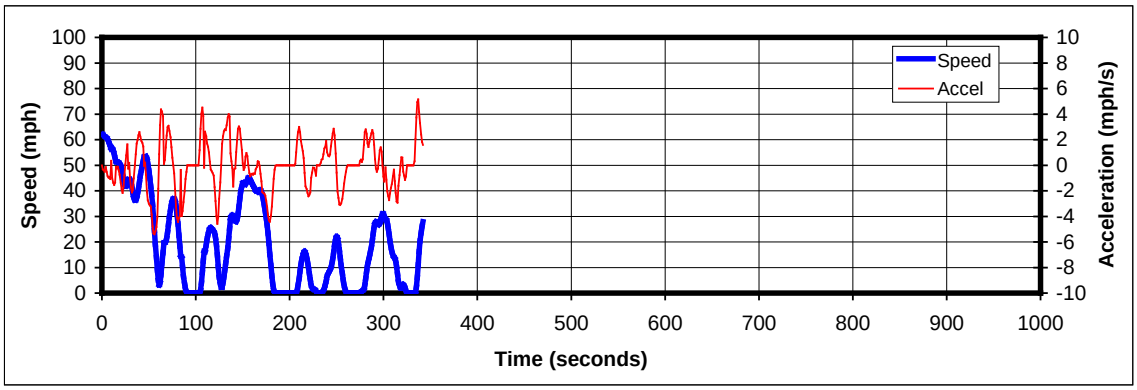


Urban Functional Class (FC) Driving Cycles (cont.)

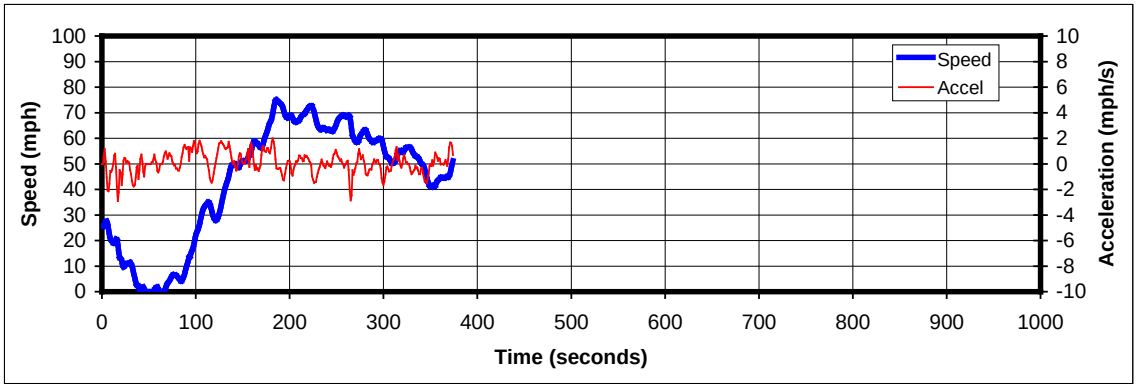
Freeway On-Ramp Driving Cycle



Freeway Off-Ramp Driving Cycle

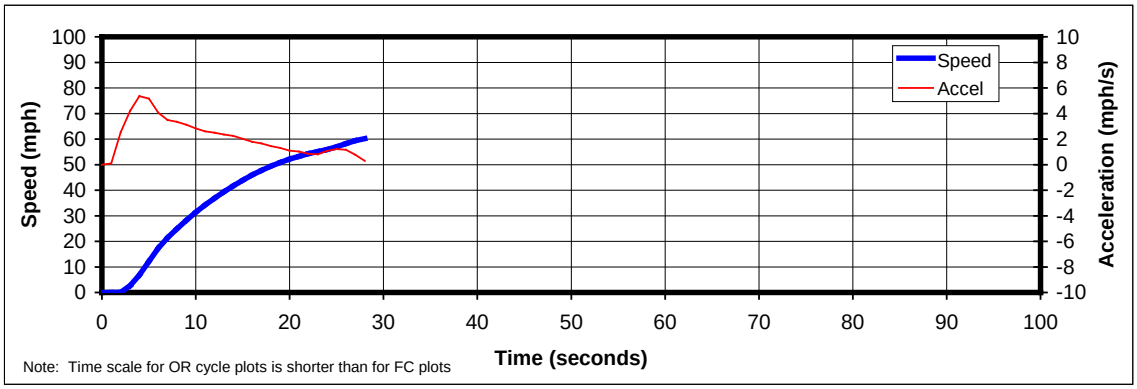


Freeway-to-Freeway Transition Ramp Driving Cycle

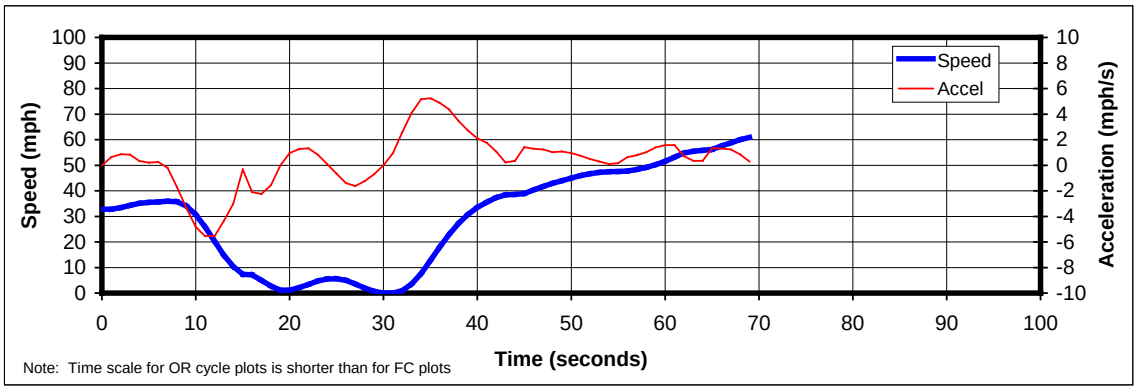


Specialized Freeway On-Ramp (OR) Driving Cycles

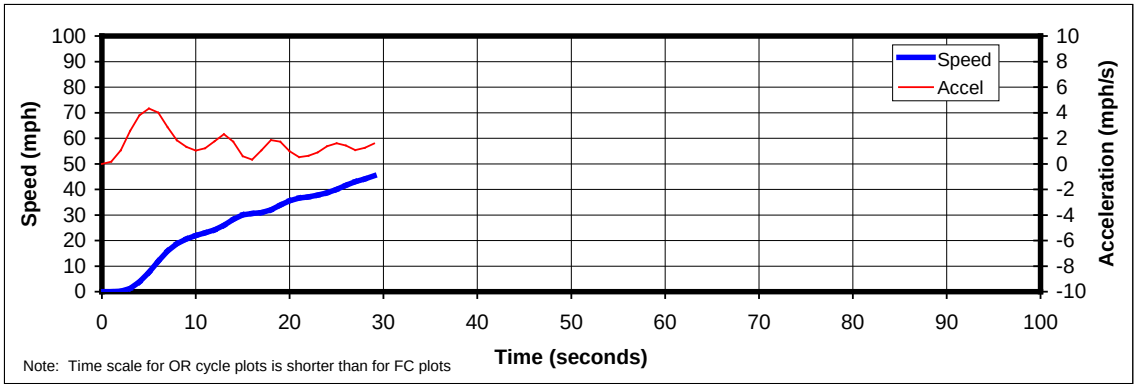
Diamond, Downgrade Freeway On-Ramp Driving Cycle



Diamond, Level Grade Freeway On-Ramp Driving Cycle

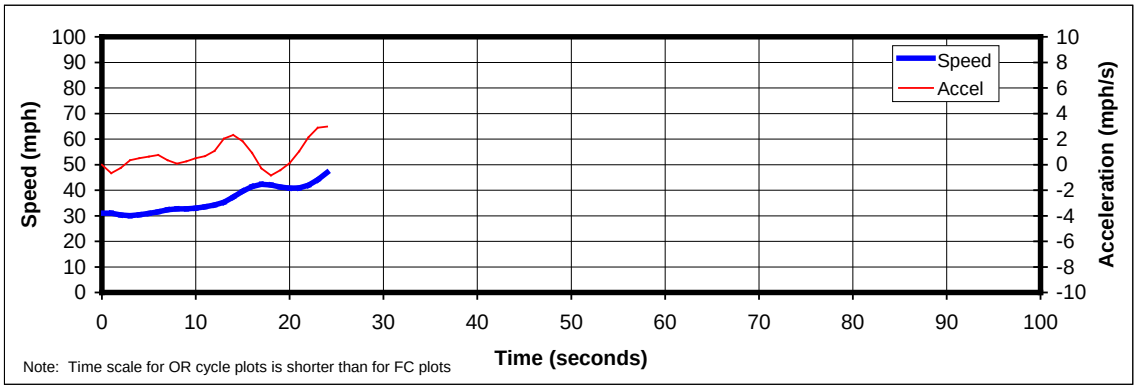


Diamond, Upgrade Freeway On-Ramp Driving Cycle

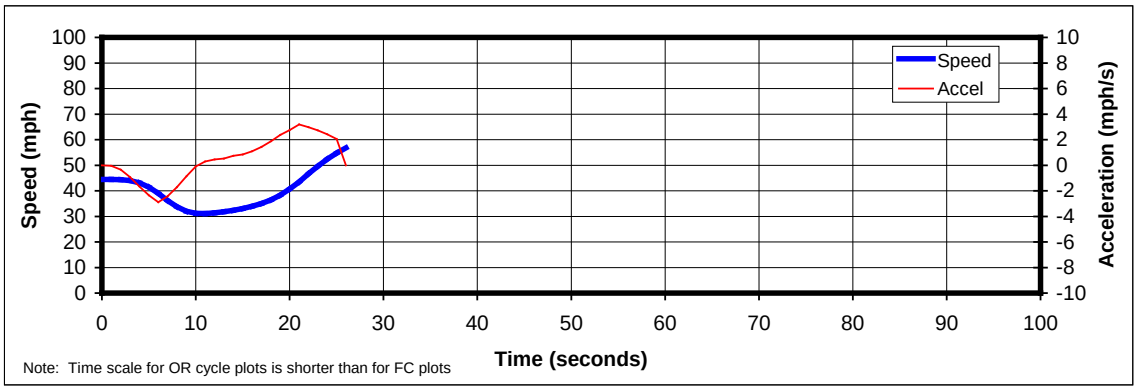


Specialized Freeway On-Ramp (OR) Driving Cycles (cont.)

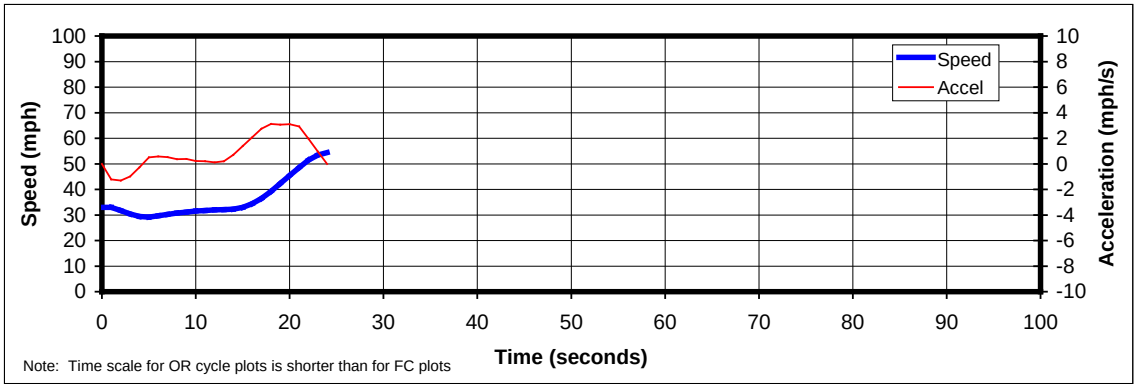
Loop, Downgrade Freeway On-Ramp Driving Cycle



Loop, Level Grade Freeway On-Ramp Driving Cycle

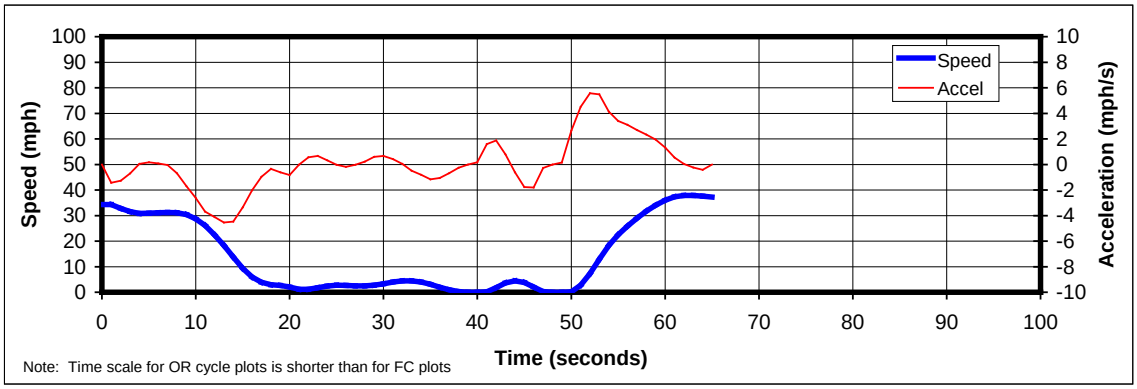


Loop, Upgrade Freeway On-Ramp Driving Cycle

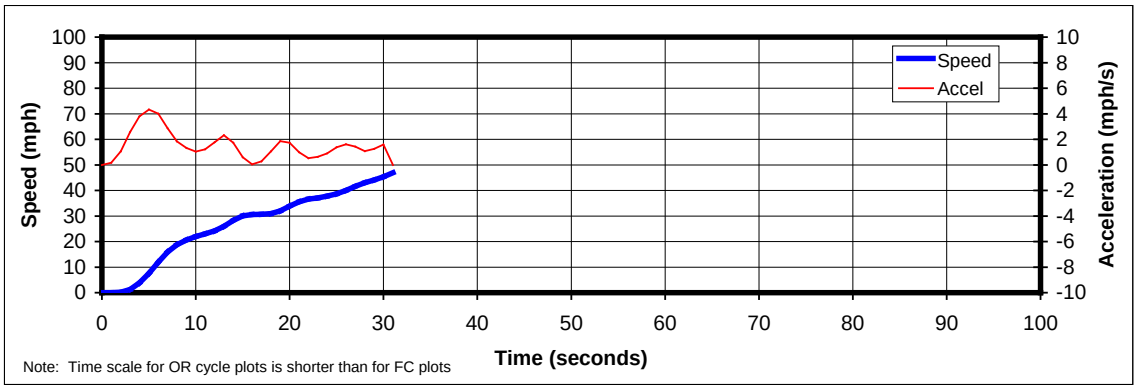


Specialized Freeway On-Ramp (OR) Driving Cycles (cont.)

Metered Freeway On-Ramp Driving Cycle

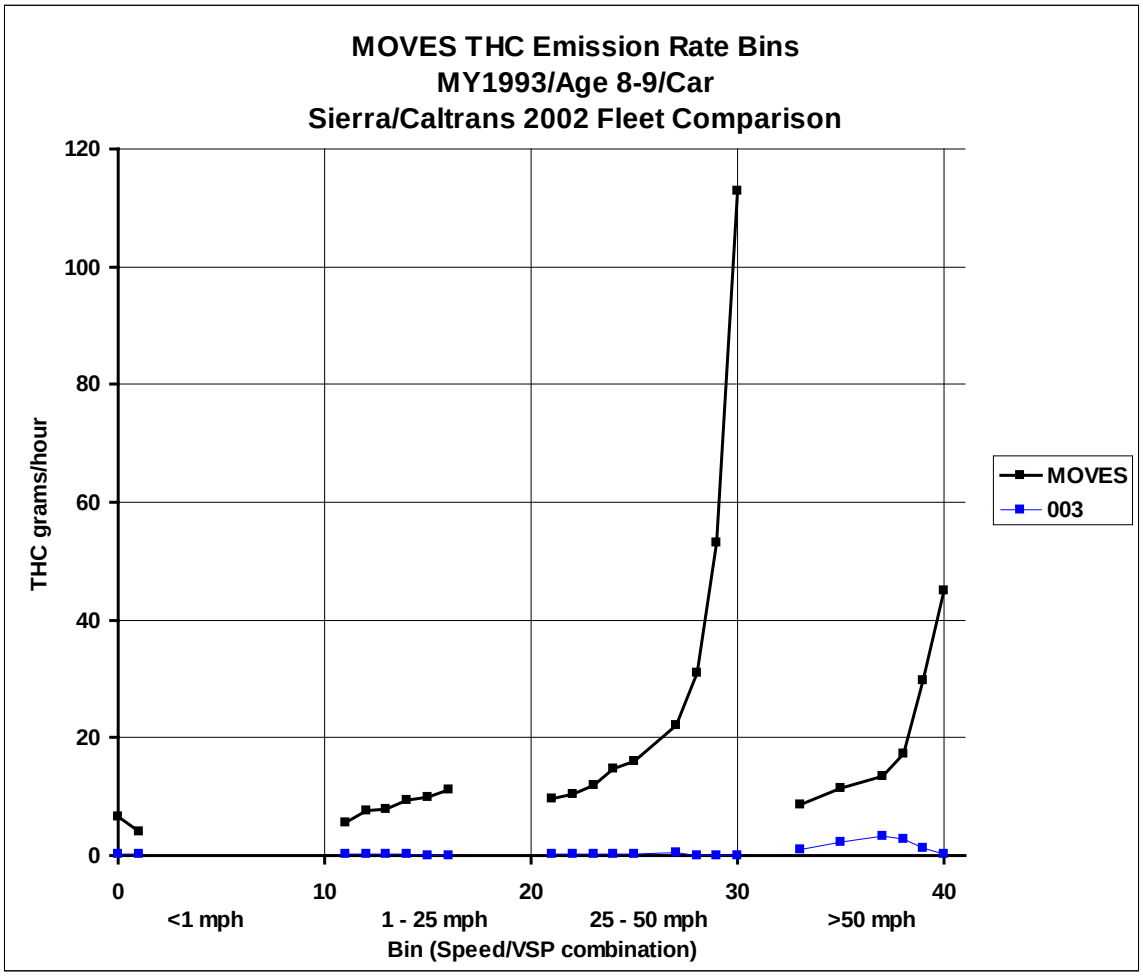


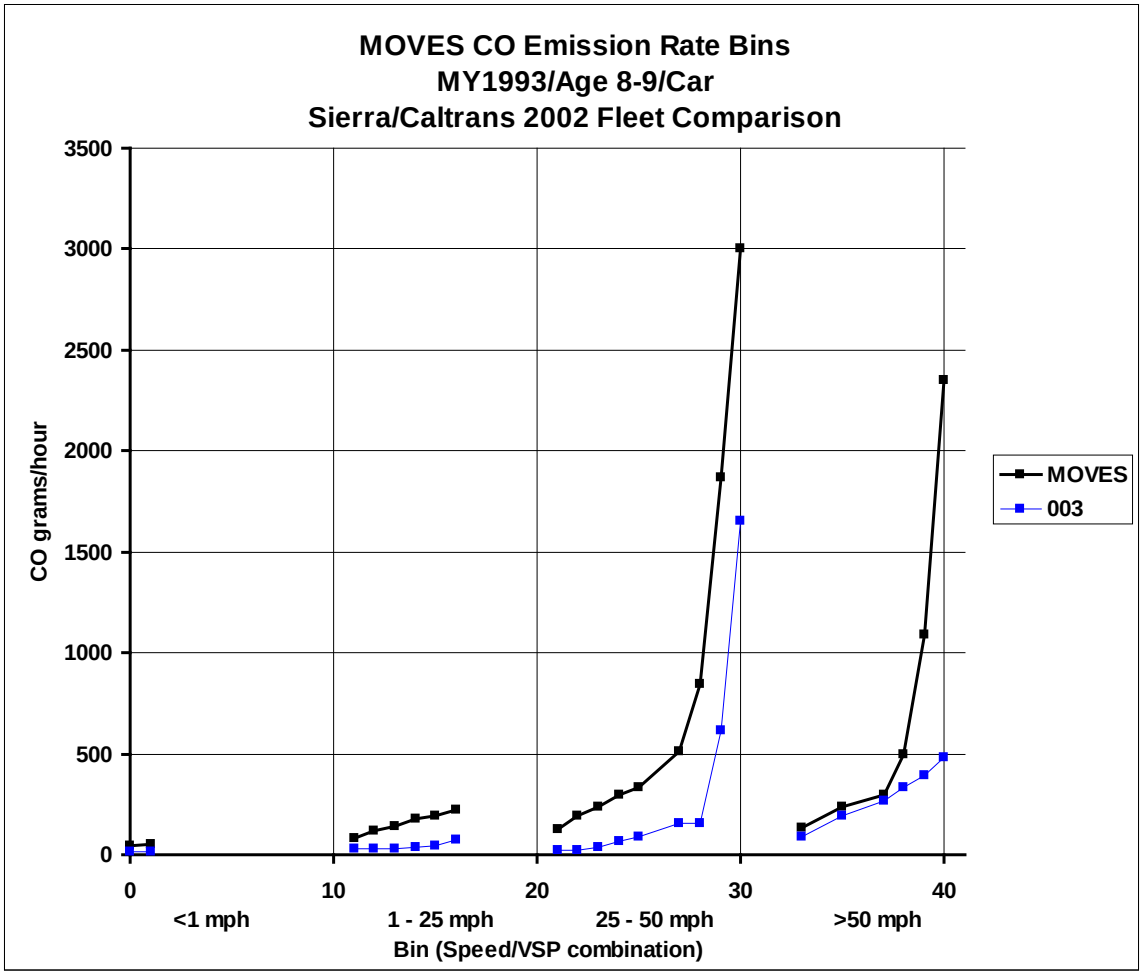
Non-Metered Freeway On-Ramp Driving Cycle

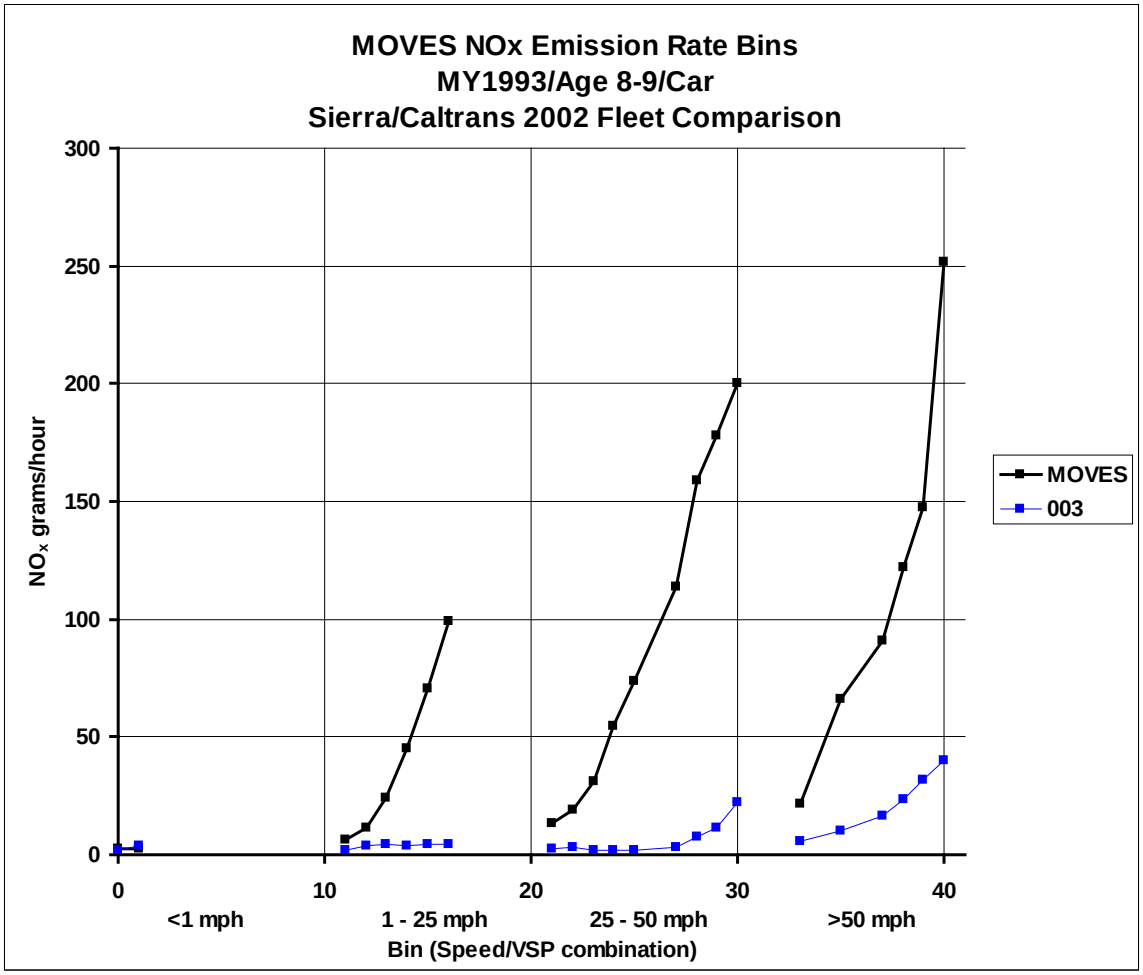


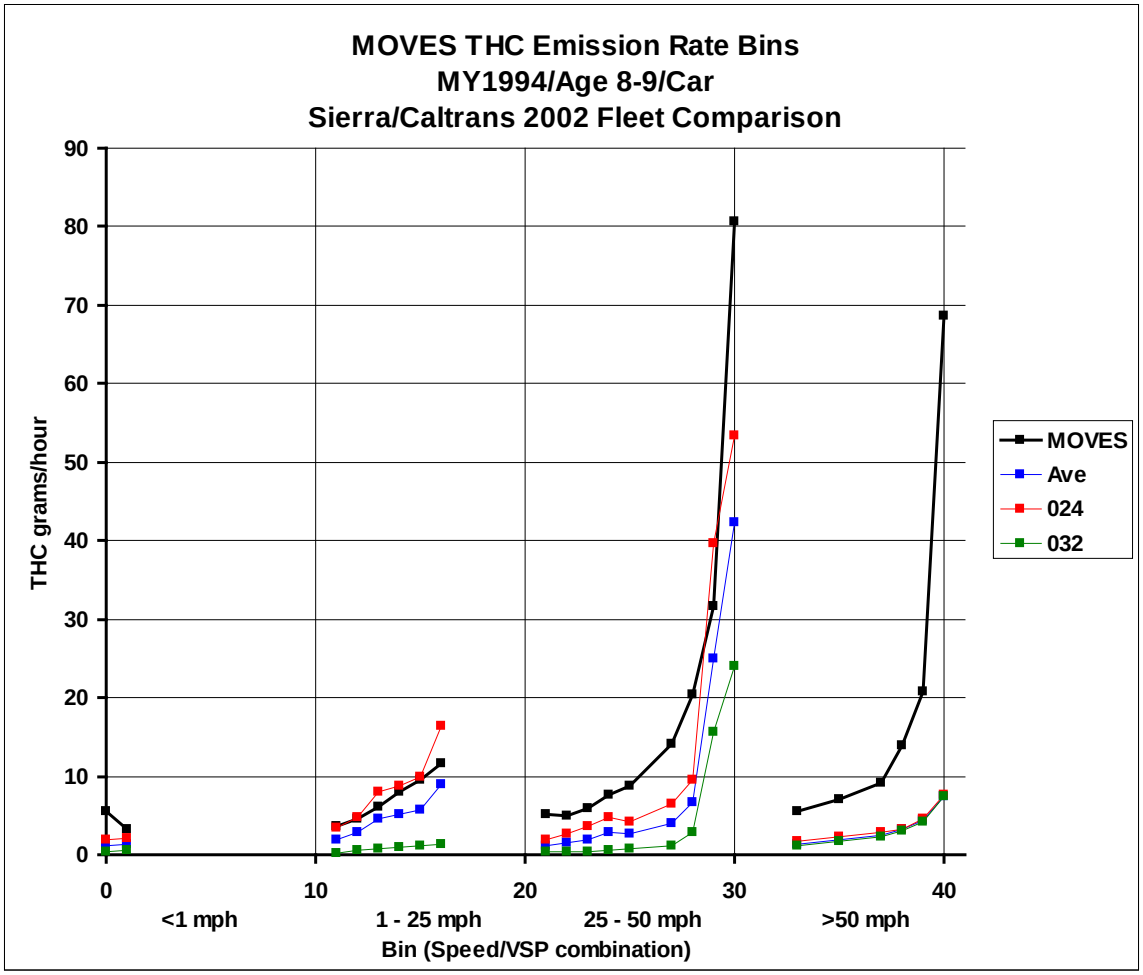
APPENDIX D

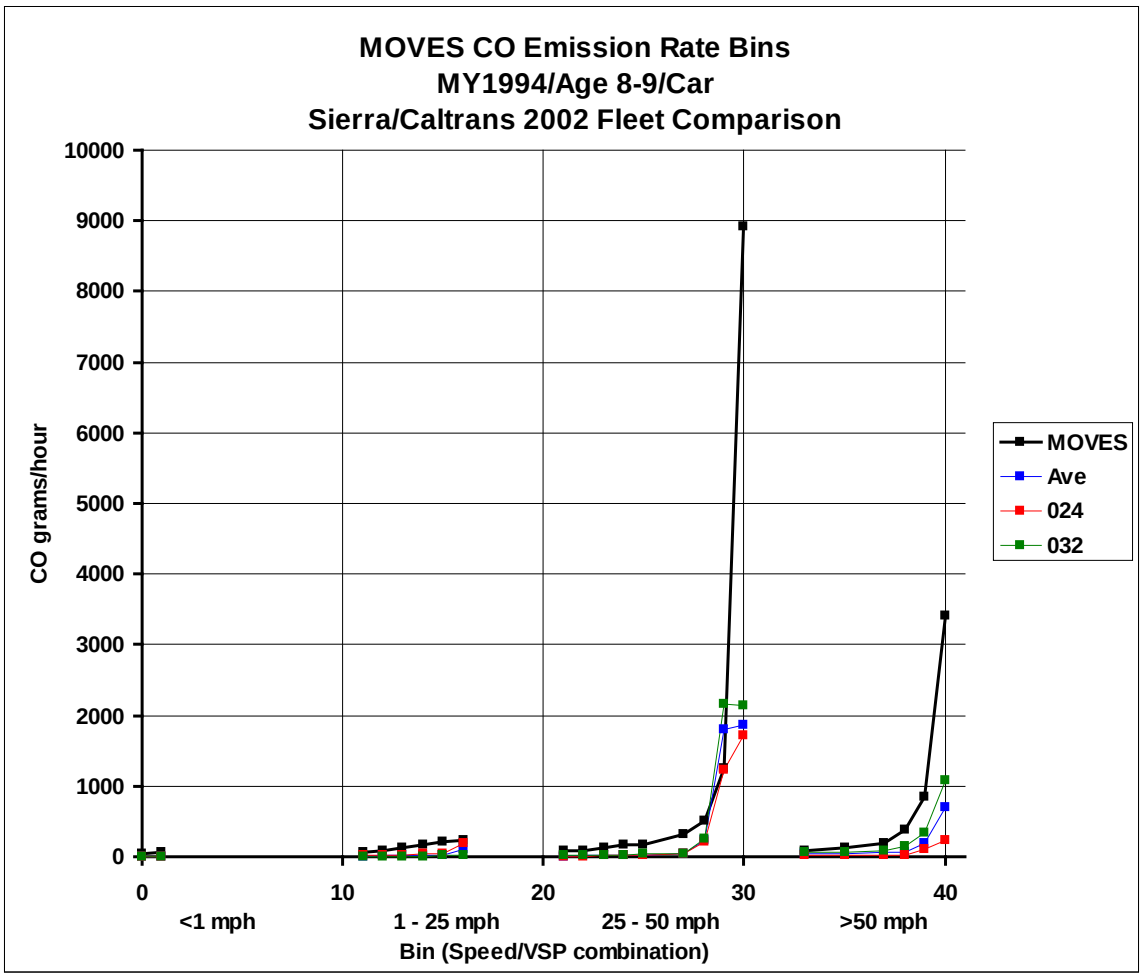
MOVES vs. CAMP Measured Emission Rates

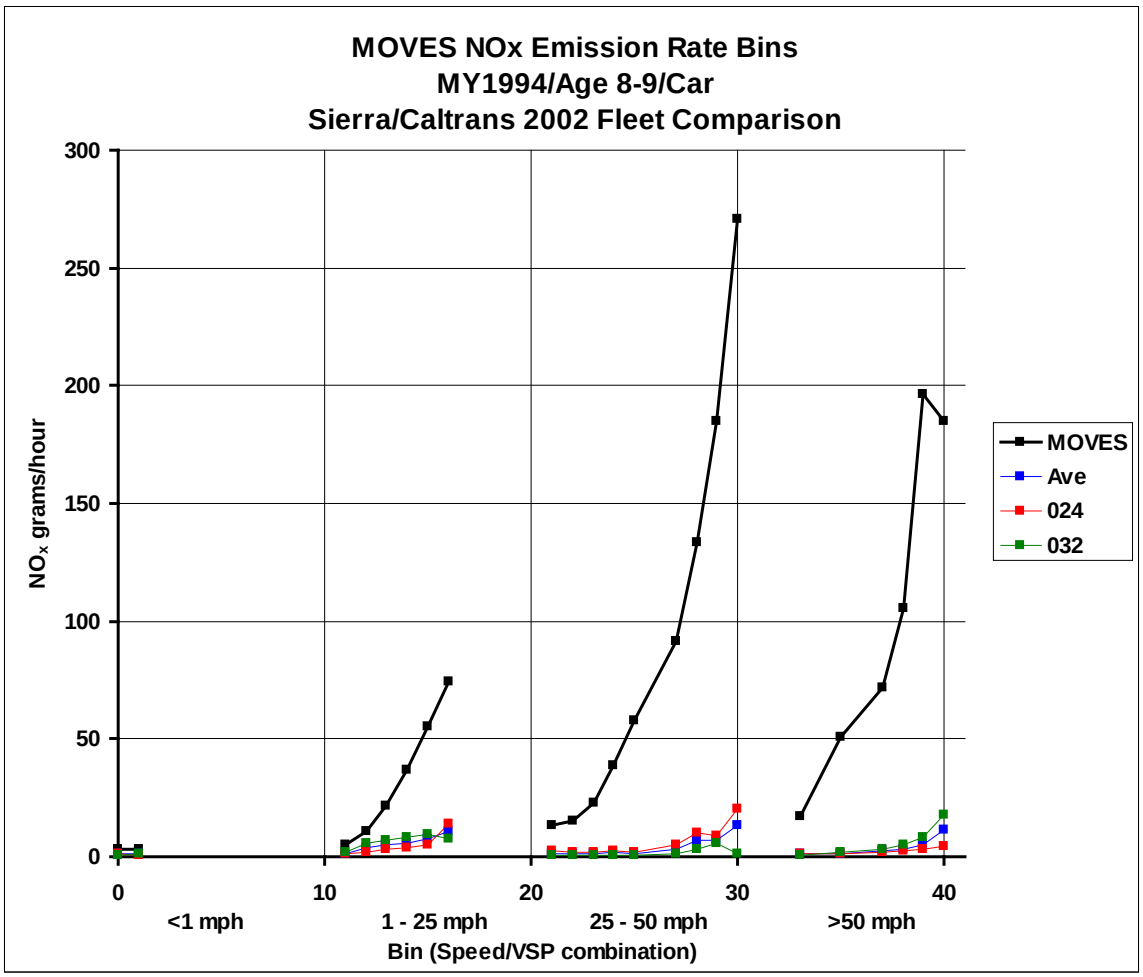

MOVES THC Emission Rate Bins
MY1993/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
003

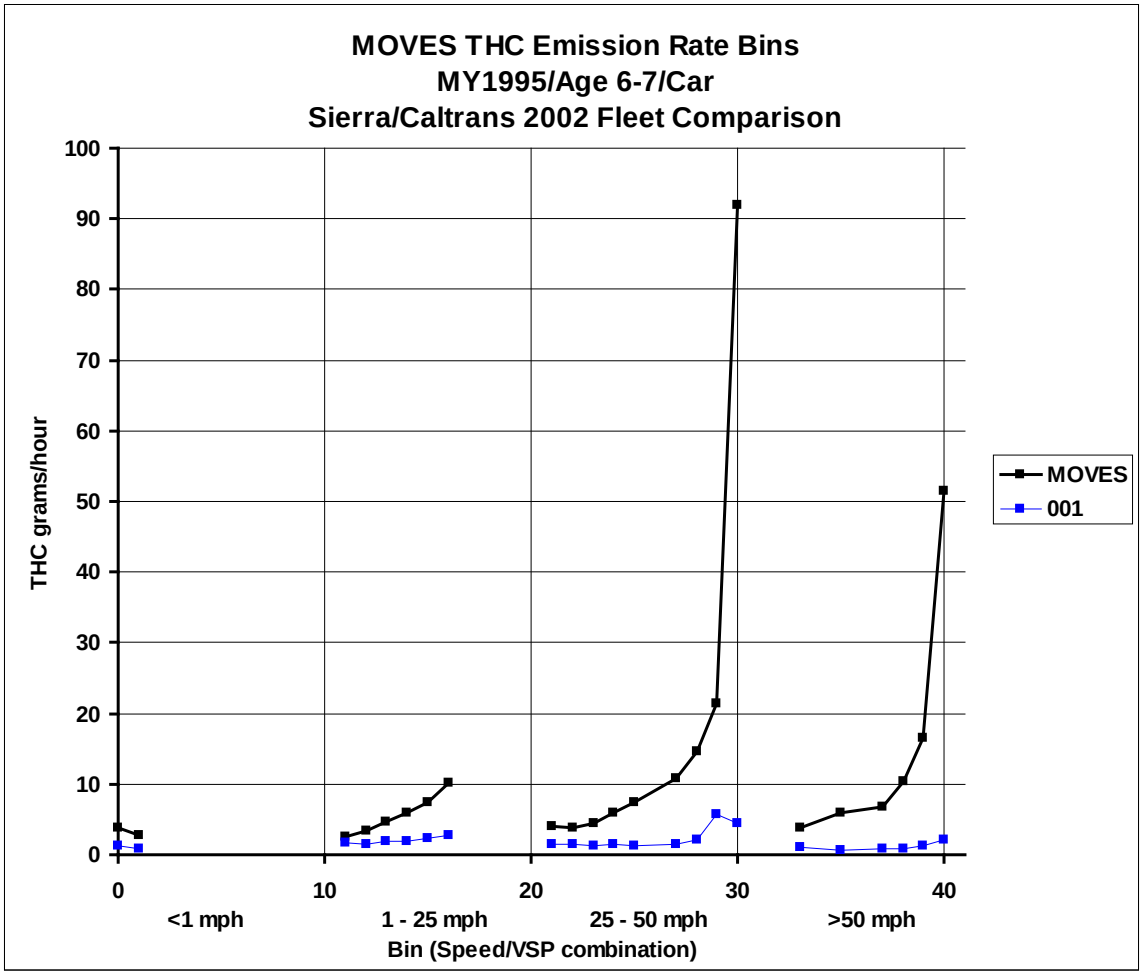

MOVES CO Emission Rate Bins
MY1993/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
003

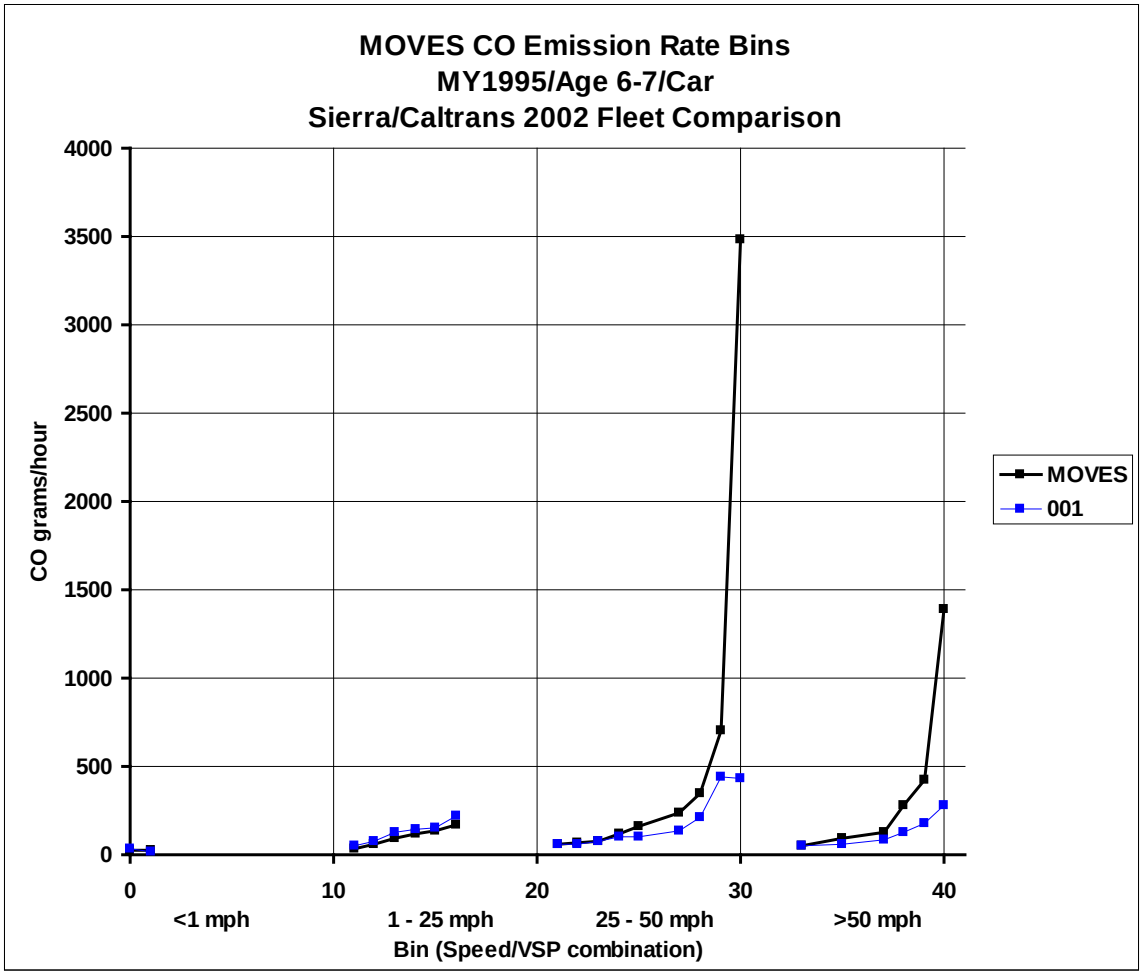

MOVES NOx Emission Rate Bins
MY1993/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
300
250
200
150
100
50
0
NOx grams/hour
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
003

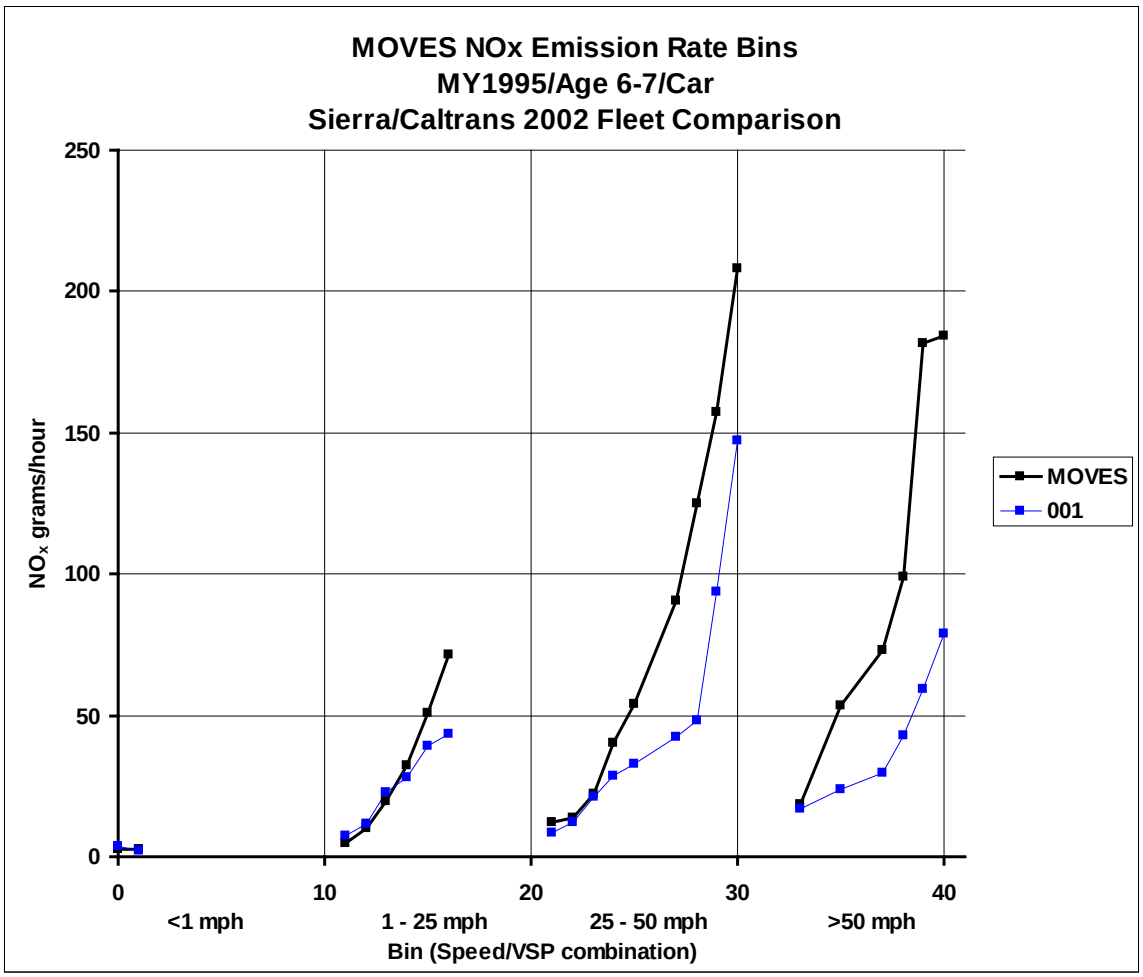

MOVES THC Emission Rate Bins
MY1994/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
024
032

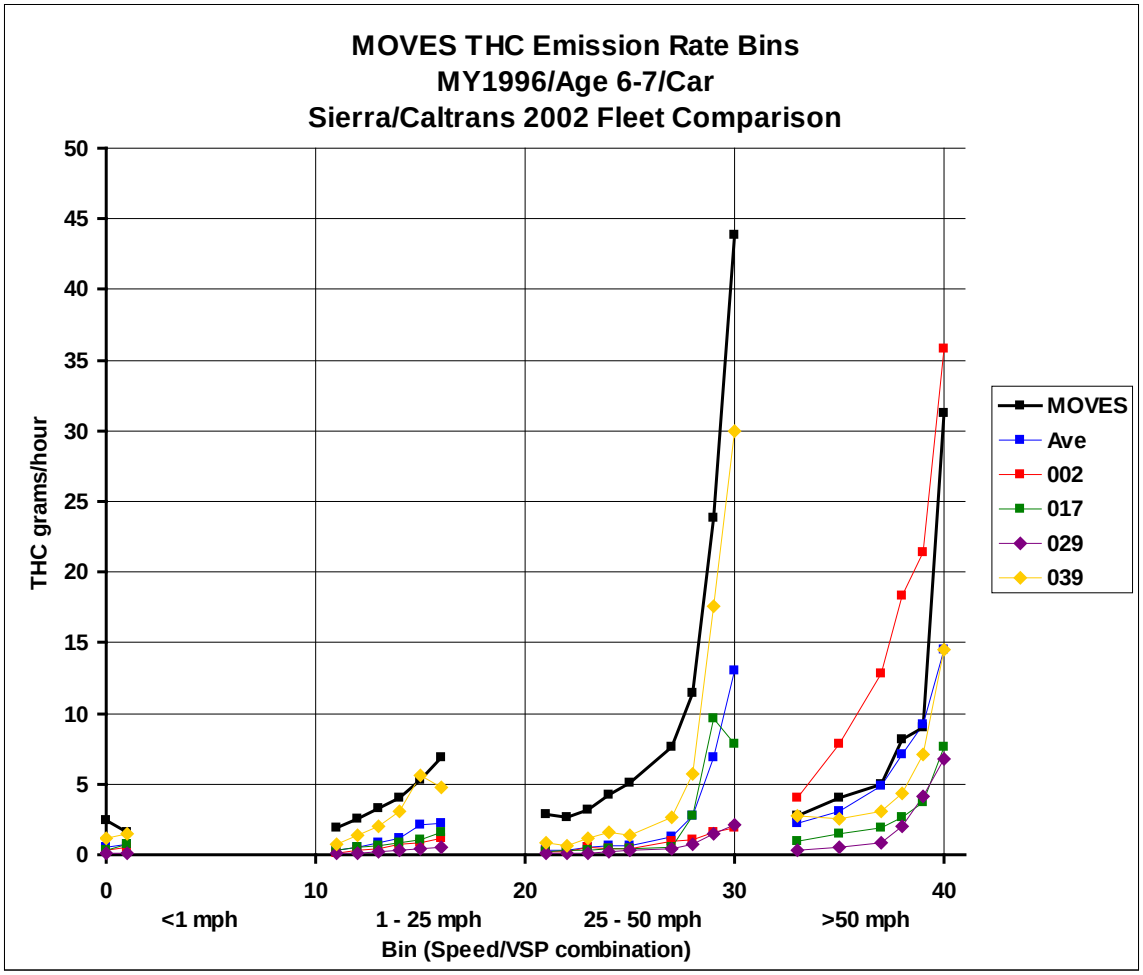

MOVES CO Emission Rate Bins
MY1994/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
024
032

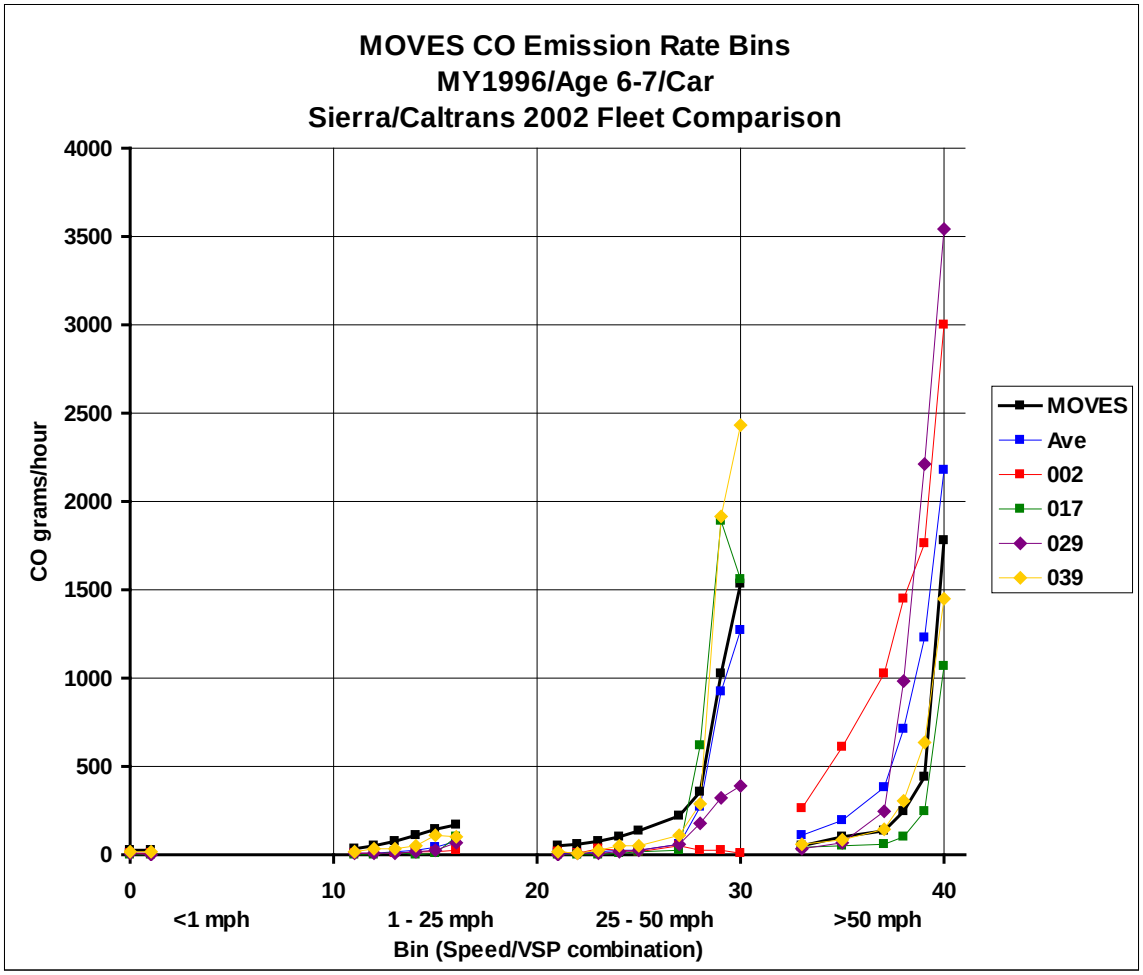

MOVES NOx Emission Rate Bins
MY1994/Age 8-9/Car
Sierra/Caltrans 2002 Fleet Comparison
300
250
200
150
100
50
0
NOx grams/hour
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
024
032

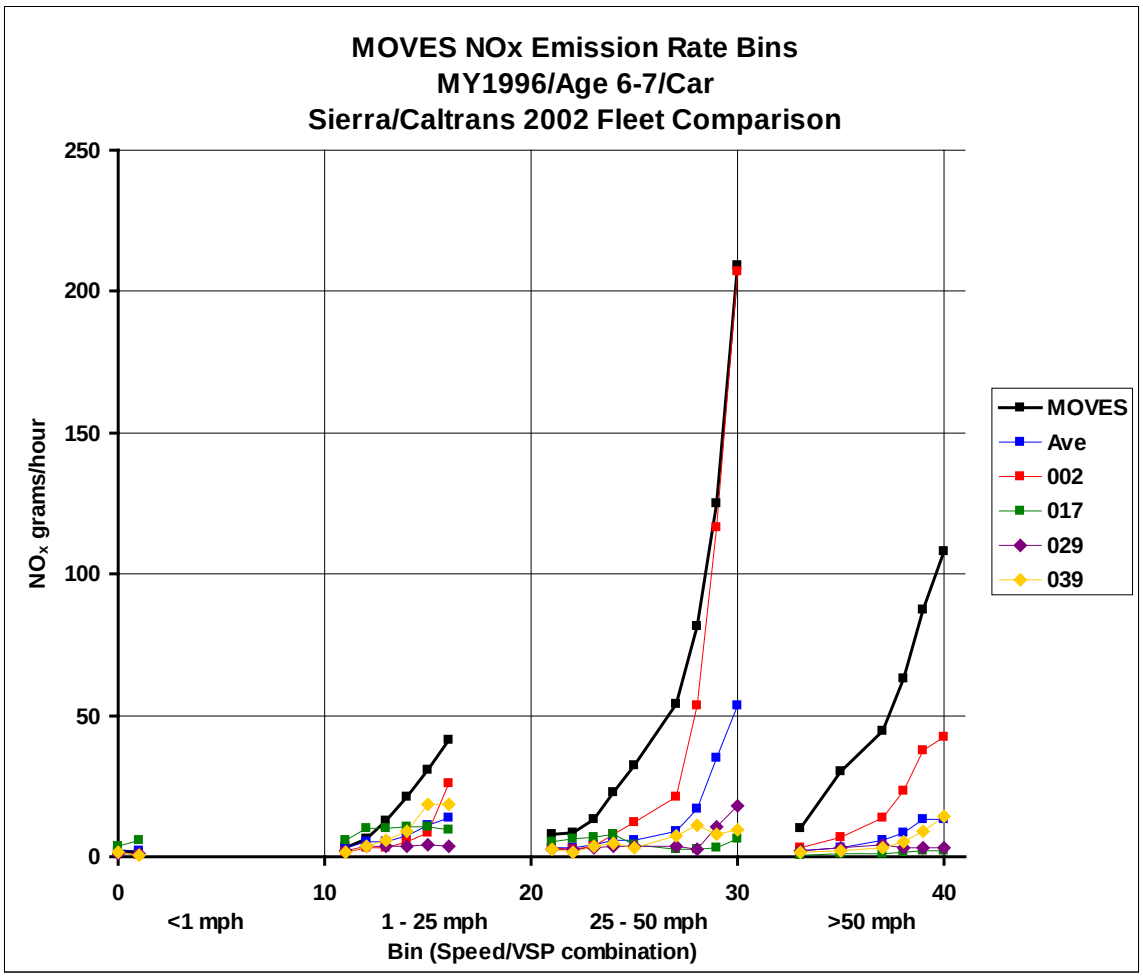

MOVES THC Emission Rate Bins
MY1995/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
001

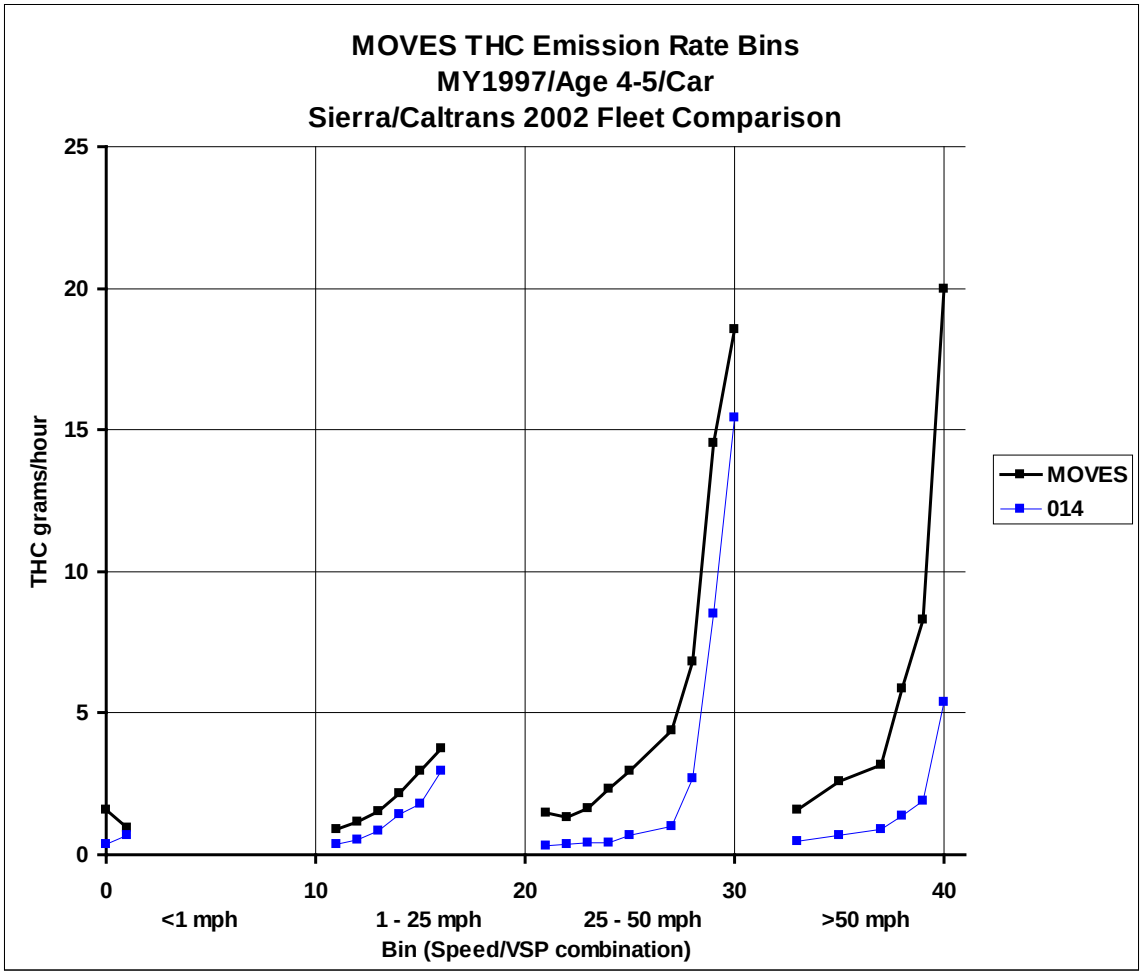

MOVES CO Emission Rate Bins
MY1995/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
4000
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
001

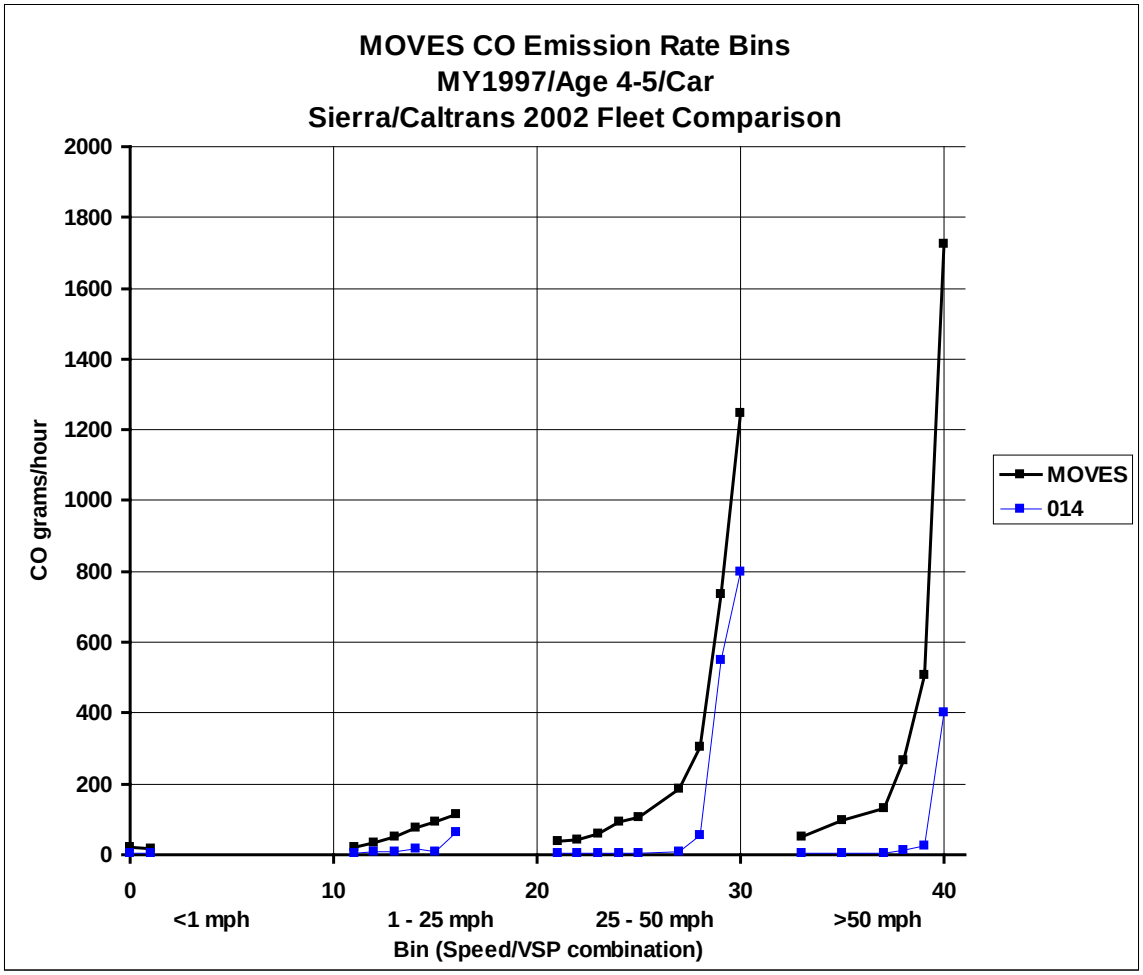

MOVES NOx Emission Rate Bins
MY1995/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
250
200
150
100
50
0
NOx grams/hour
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
001

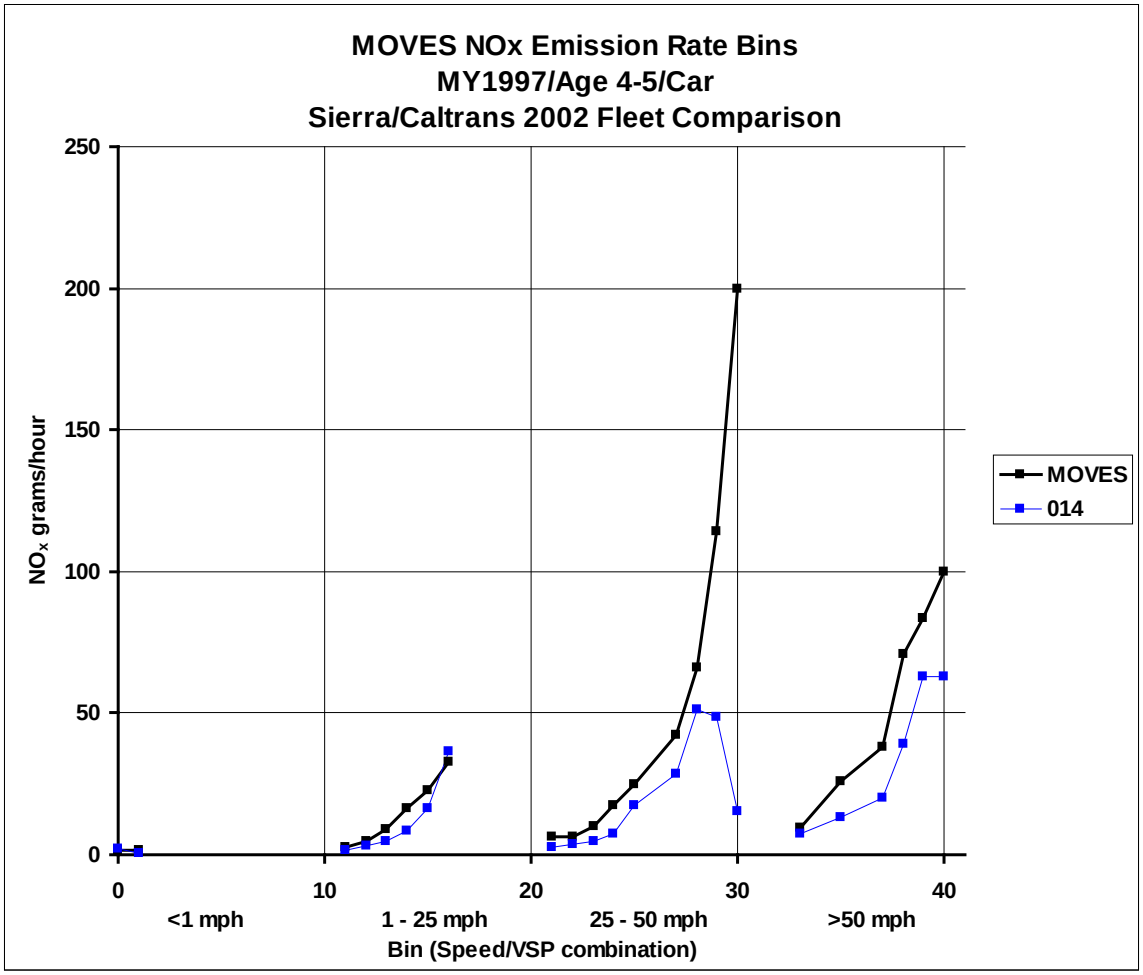

MOVES THC Emission Rate Bins
MY1996/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
50
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
002
017
029
039

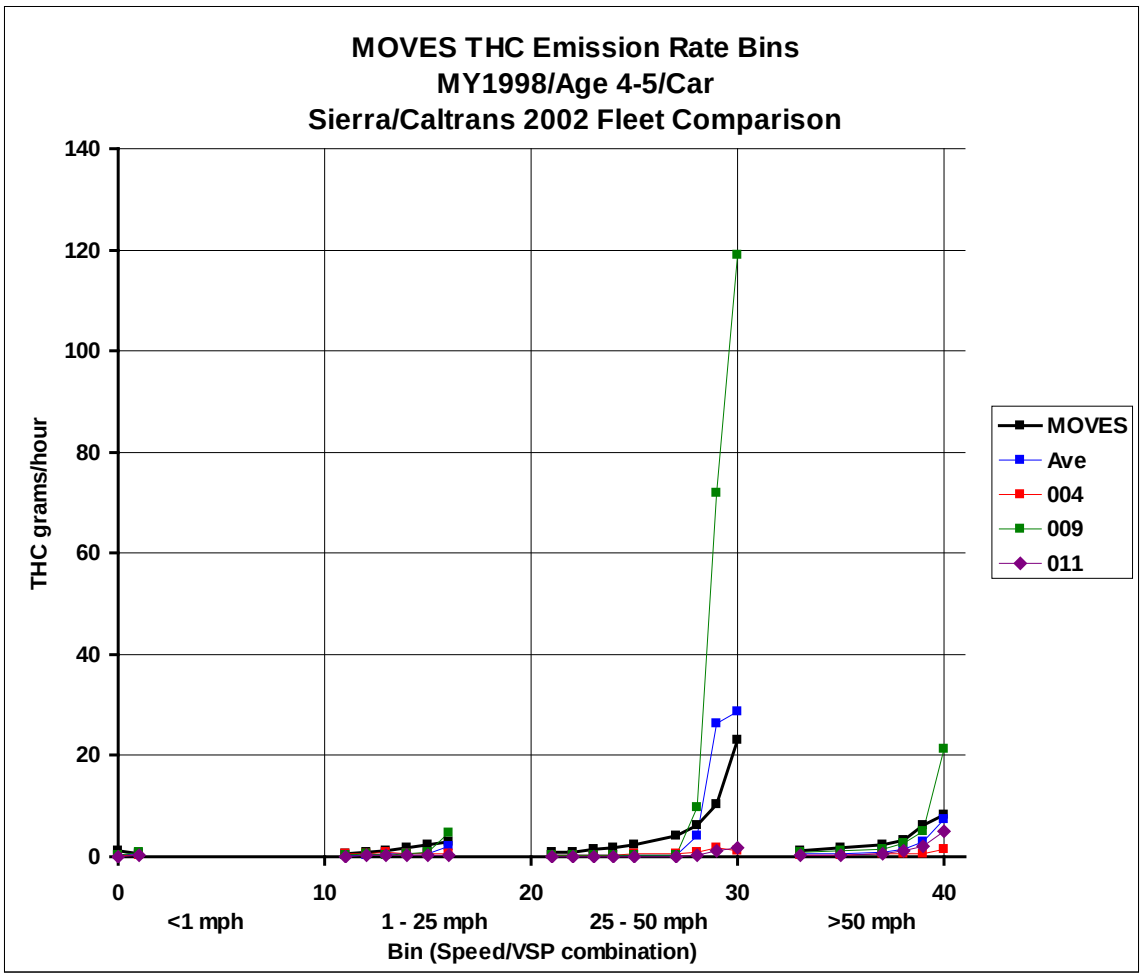

MOVES CO Emission Rate Bins
MY1996/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
4000
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
002
017
029
039

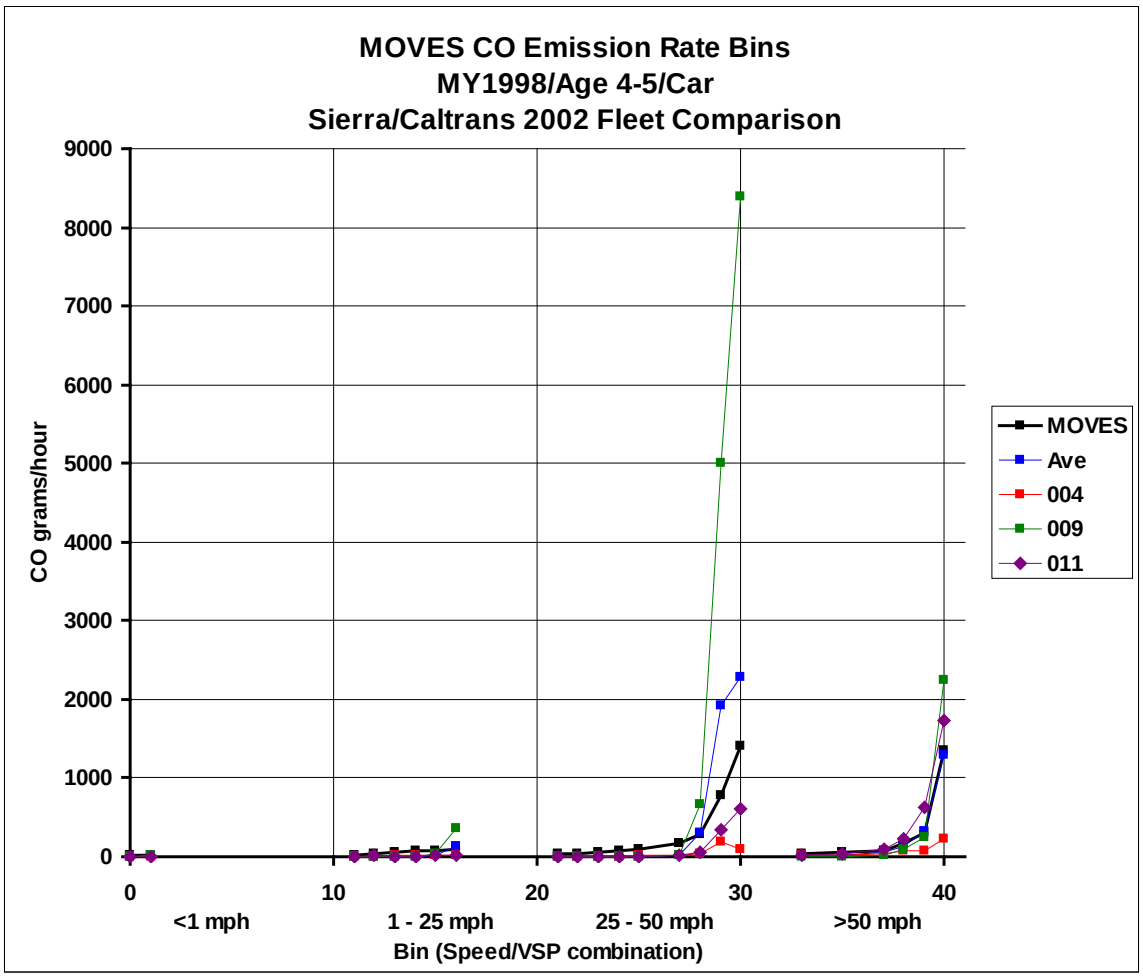

MOVES NOx Emission Rate Bins
MY1996/Age 6-7/Car
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
250
200
150
100
50
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
002
017
029
039

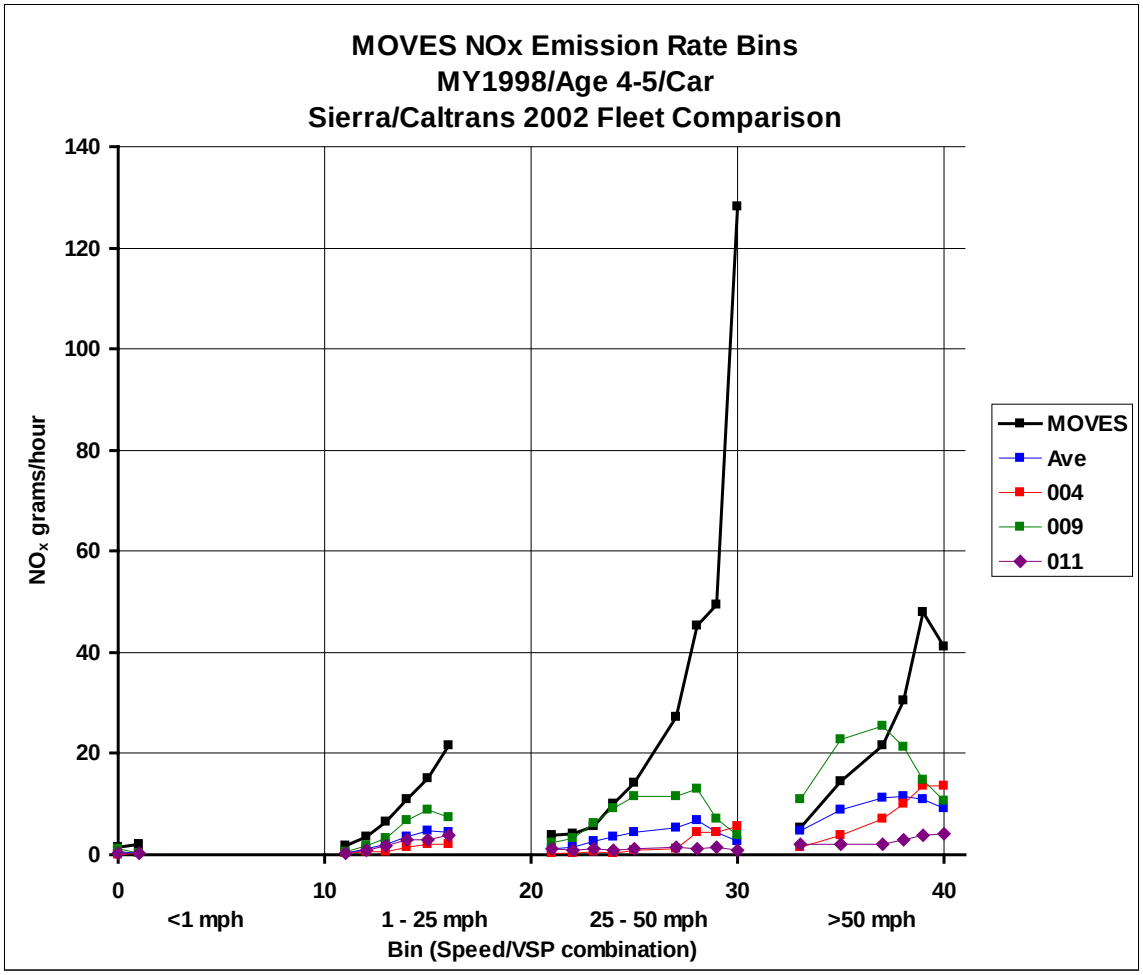

MOVES THC Emission Rate Bins
MY1997/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
014

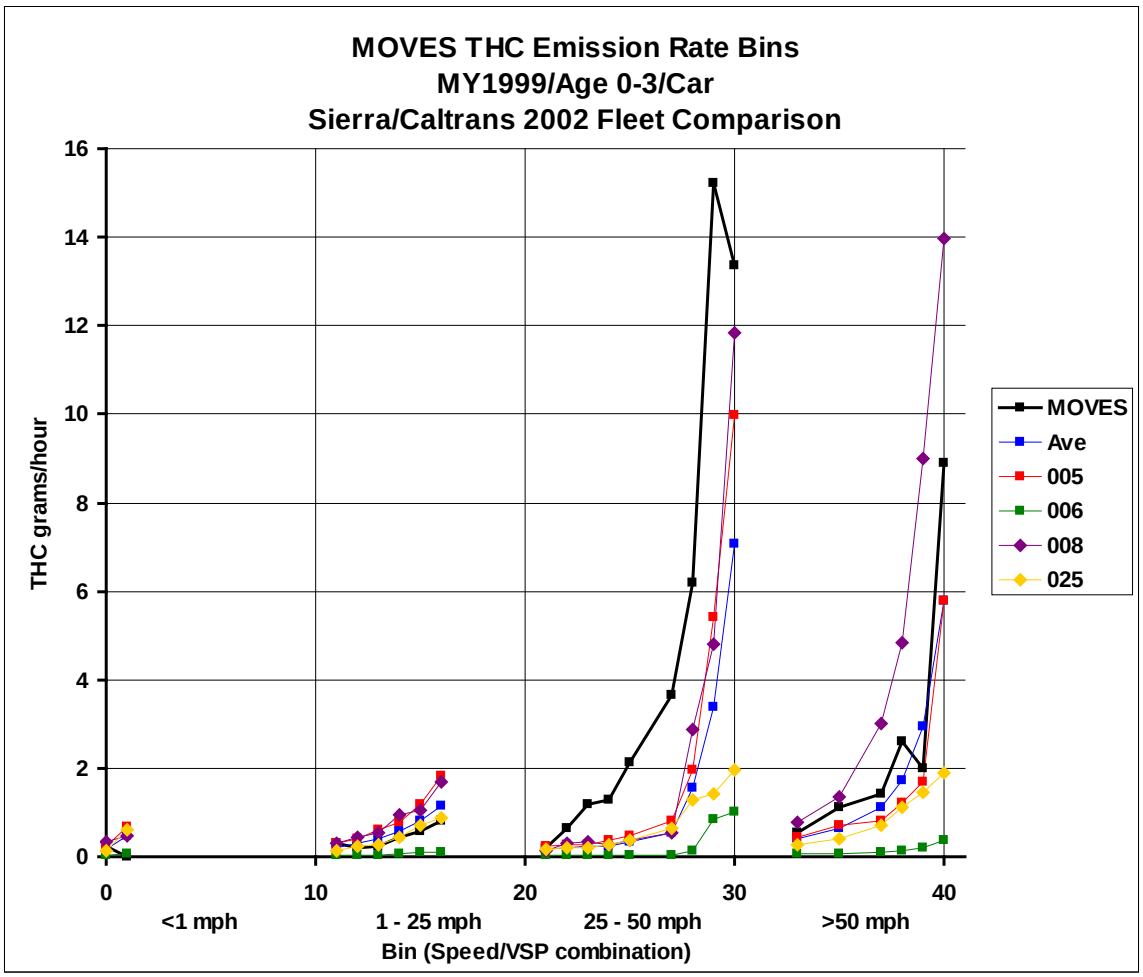

MOVES CO Emission Rate Bins
MY1997/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
014

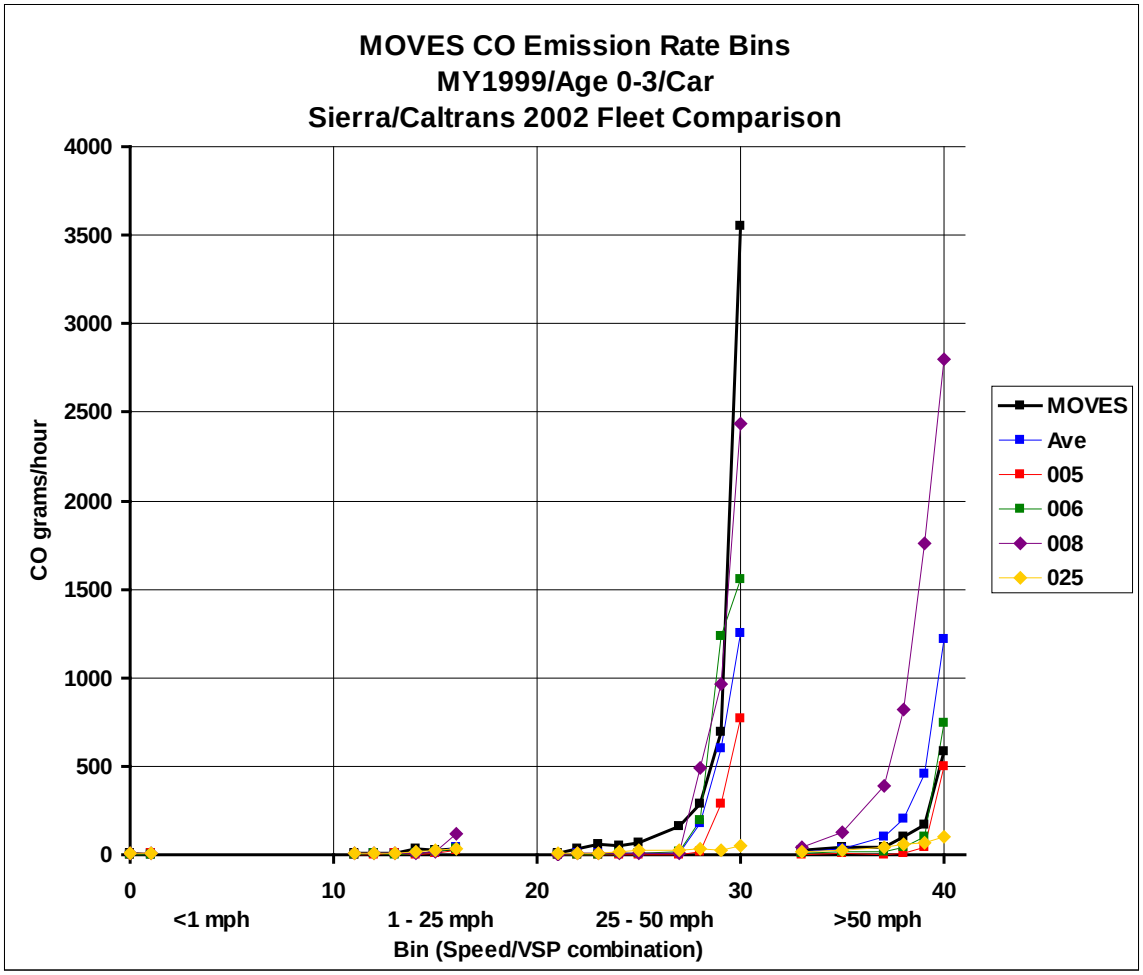

MOVES NOx Emission Rate Bins
MY1997/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
250
200
150
100
50
0
NOx grams/hour
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
014

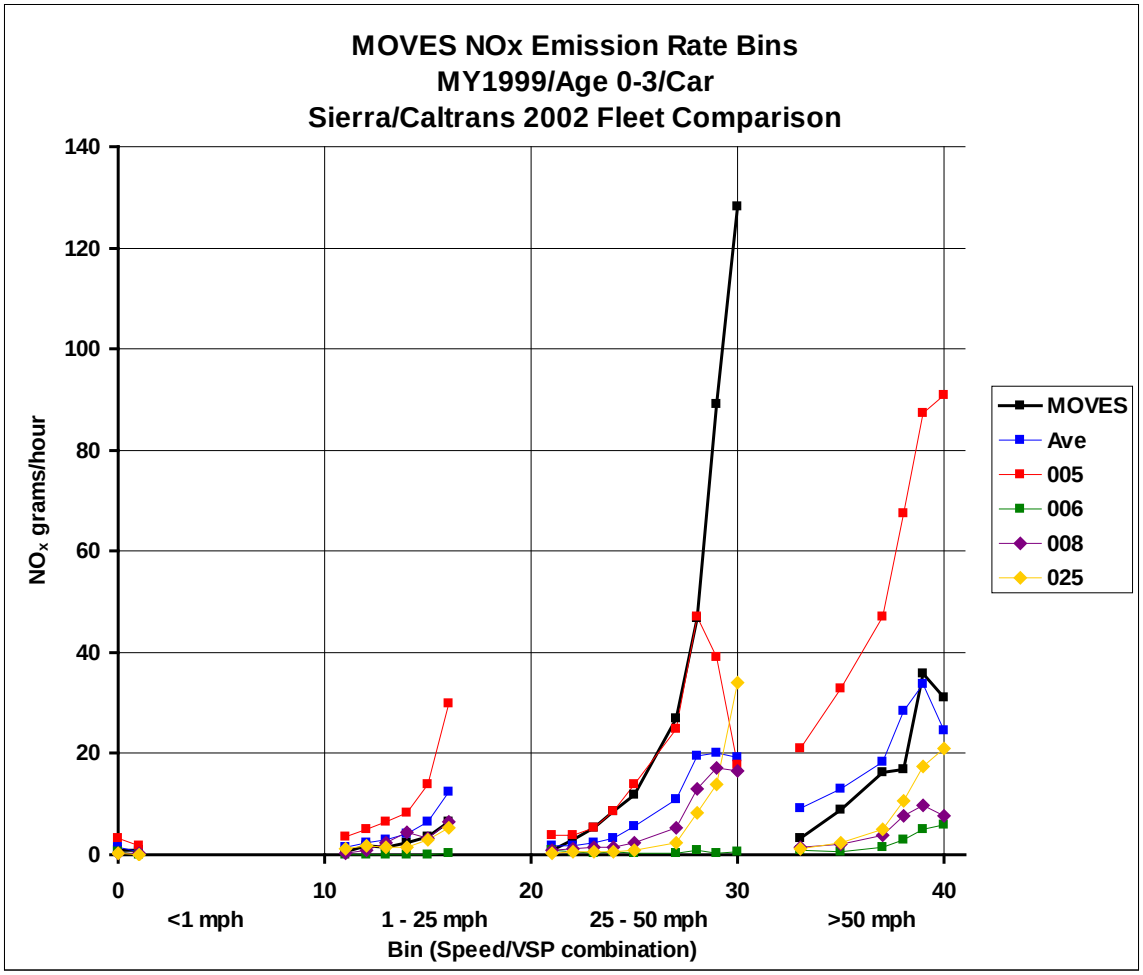

MOVES THC Emission Rate Bins
MY1998/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
004
009
011

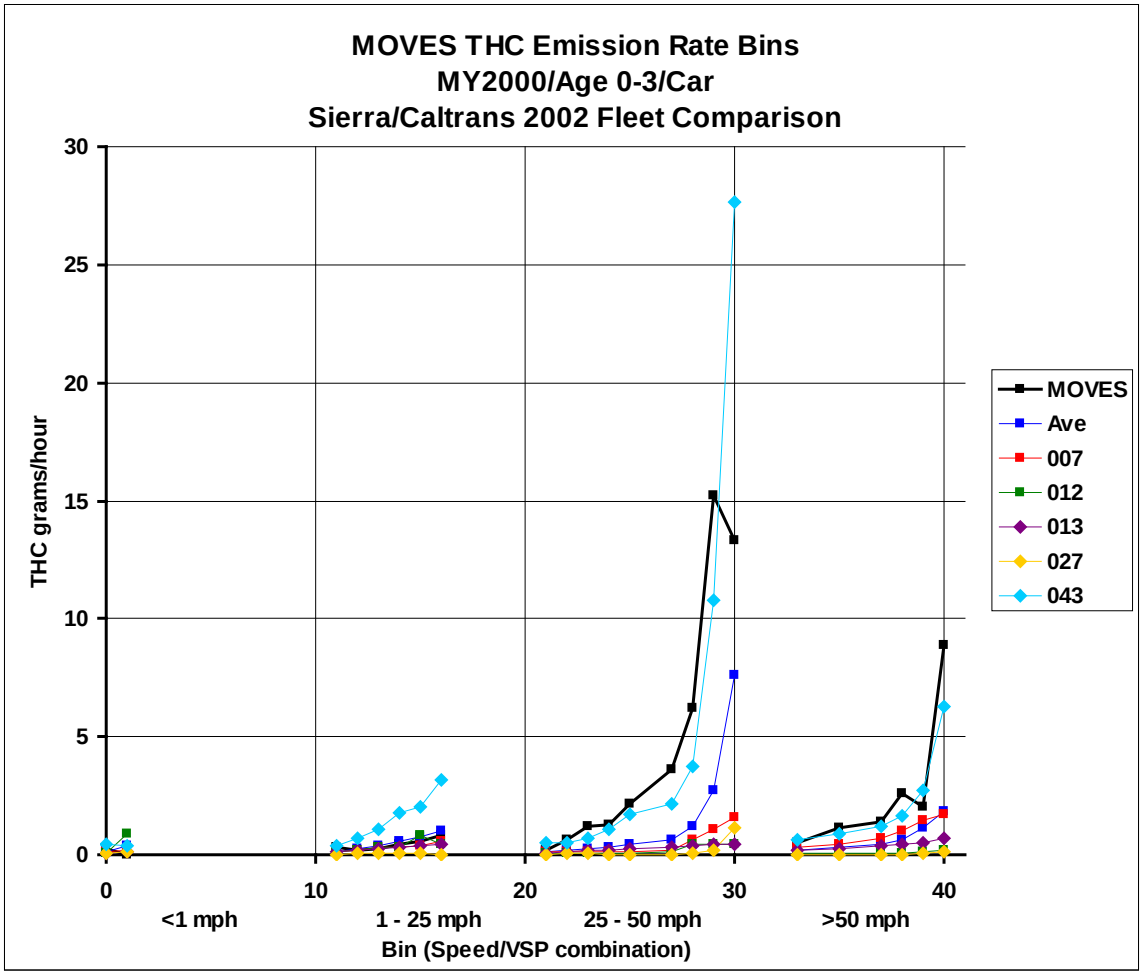

MOVES CO Emission Rate Bins
MY1998/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
004
009
011

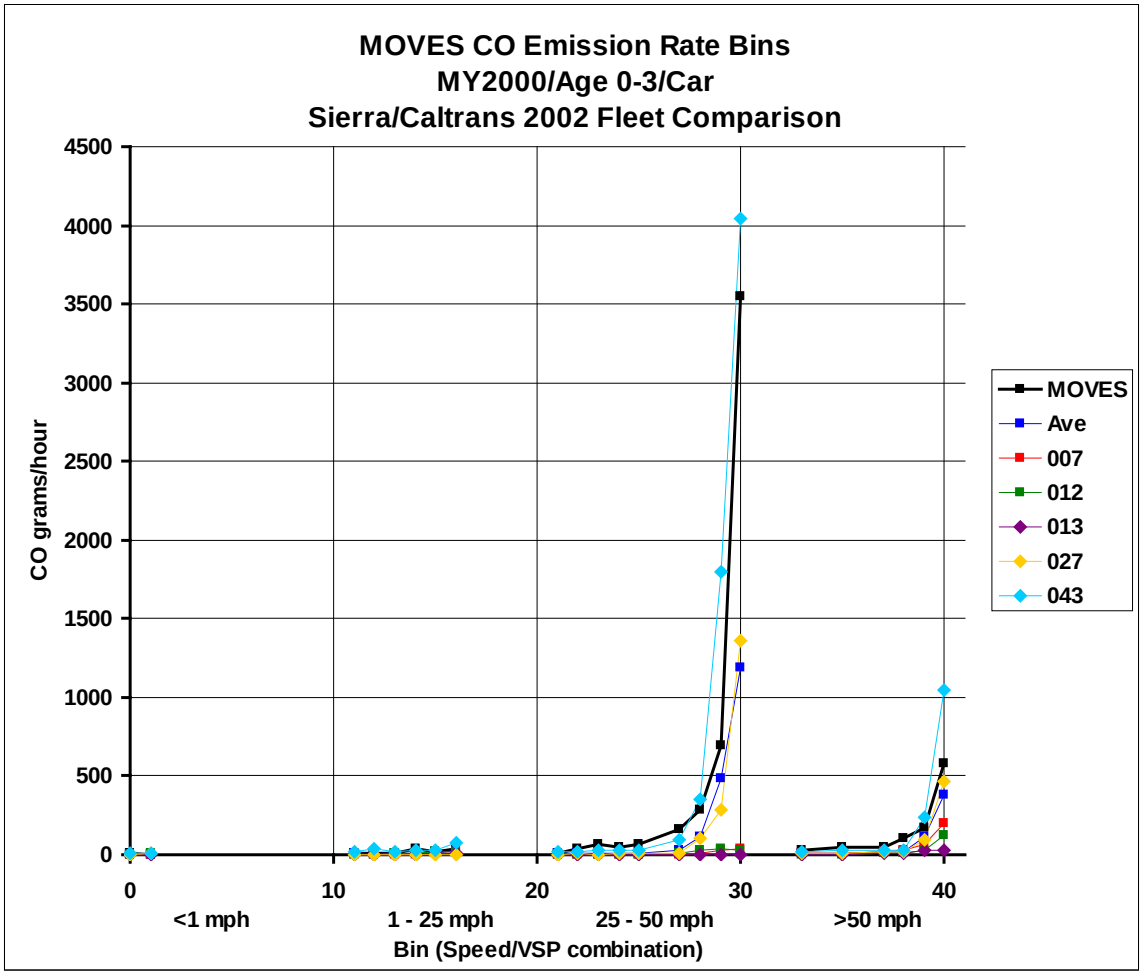

MOVES NOx Emission Rate Bins
MY1998/Age 4-5/Car
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
004
009
011

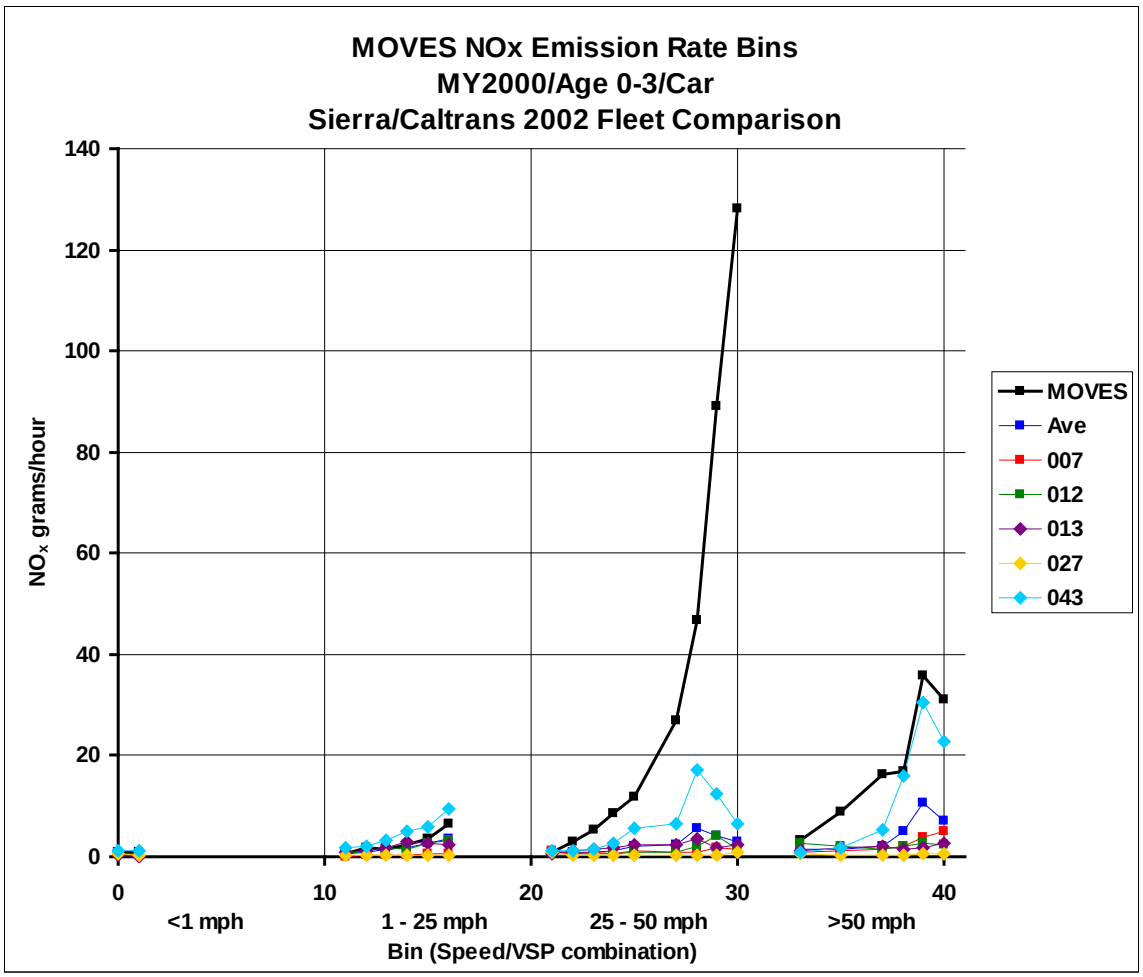

MOVES THC Emission Rate Bins
MY1999/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
16
14
12
10
8
6
4
2
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
005
006
008
025

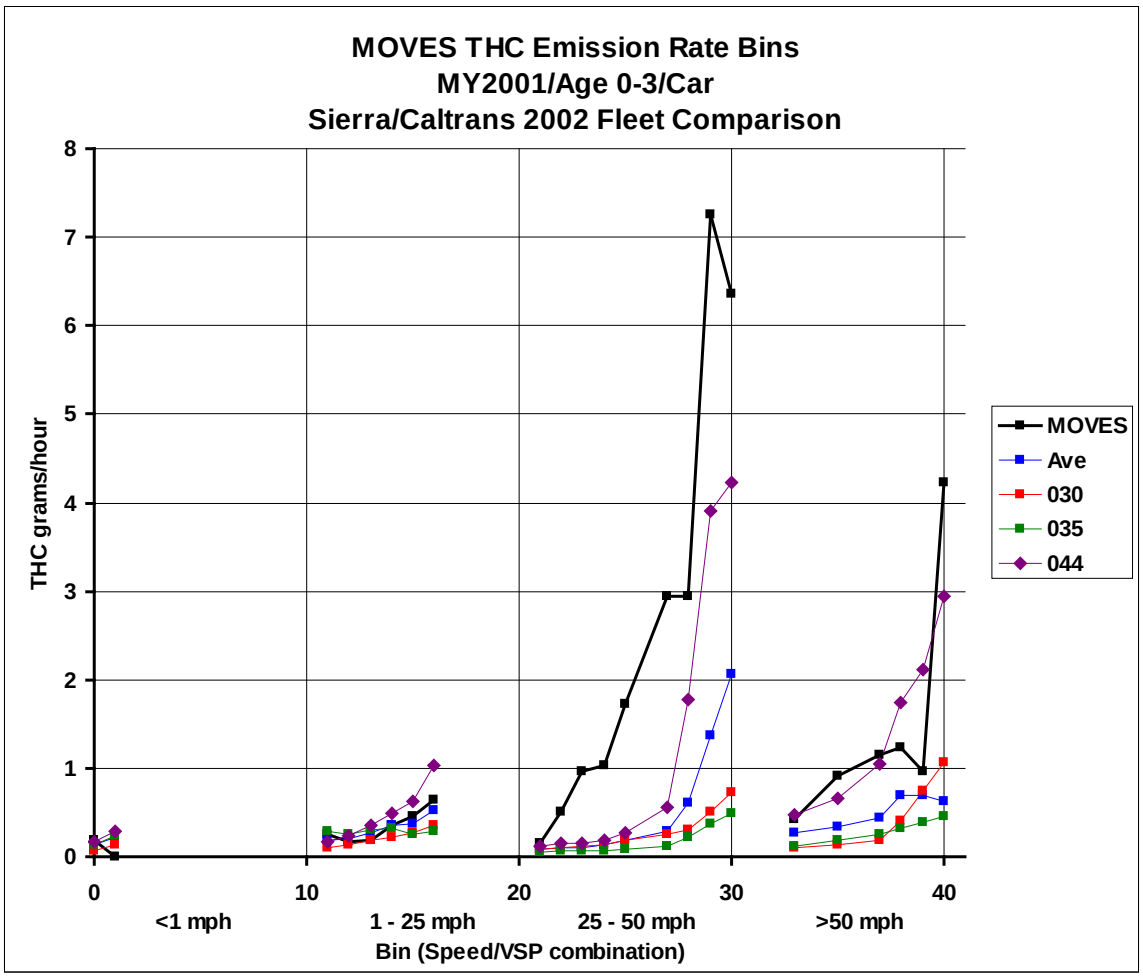

MOVES CO Emission Rate Bins
MY1999/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
4000
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
005
006
008
025

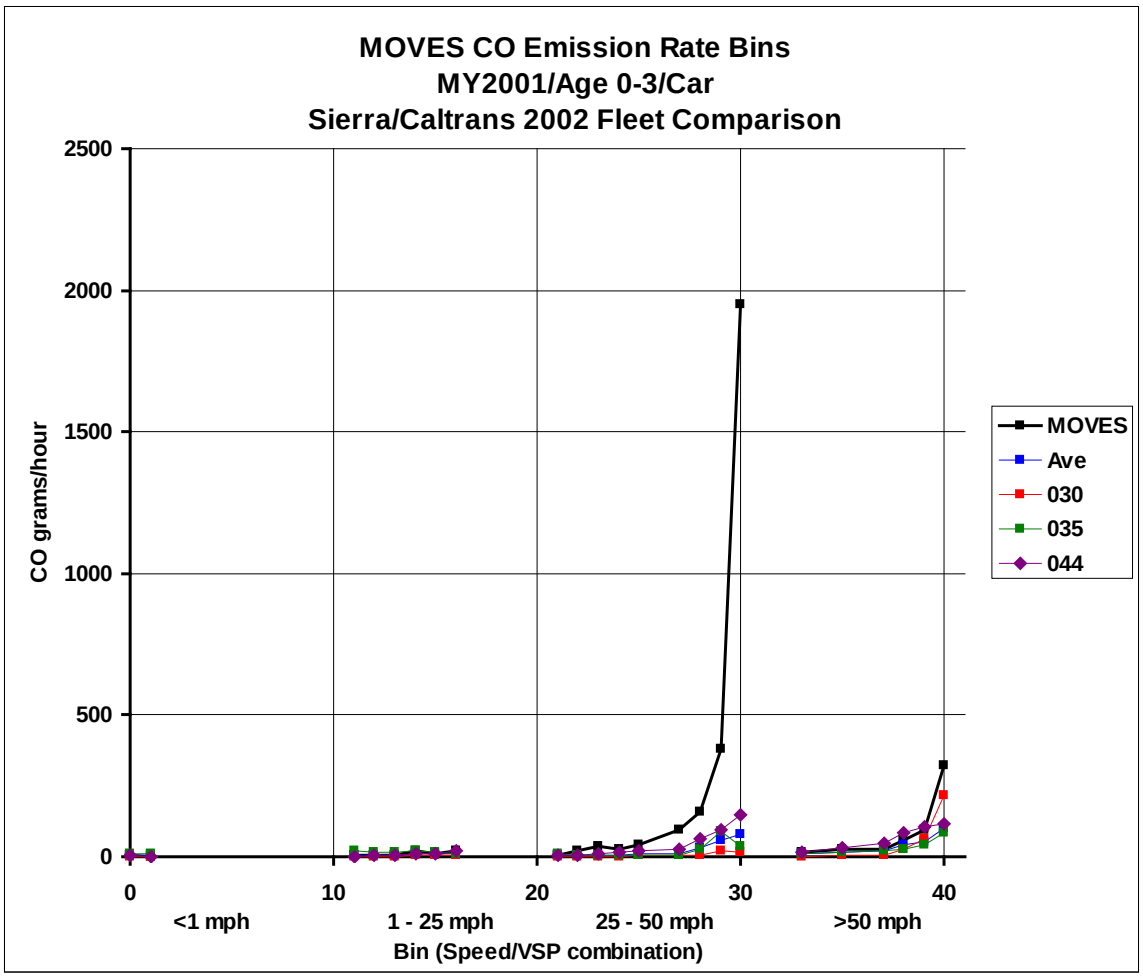

MOVES NOx Emission Rate Bins
MY1999/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
005
006
008
025

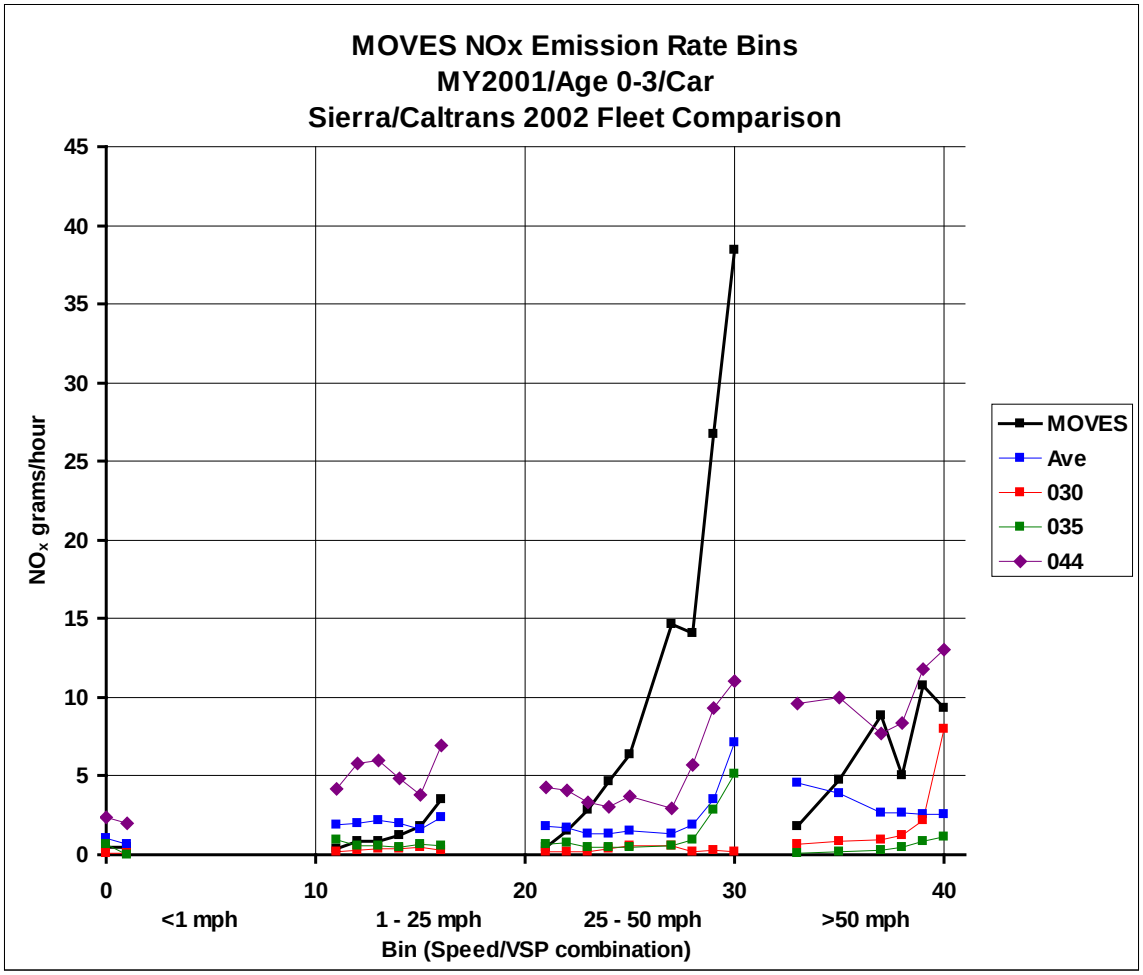

MOVES THC Emission Rate Bins
MY2000/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
30
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
007
012
013
027
043

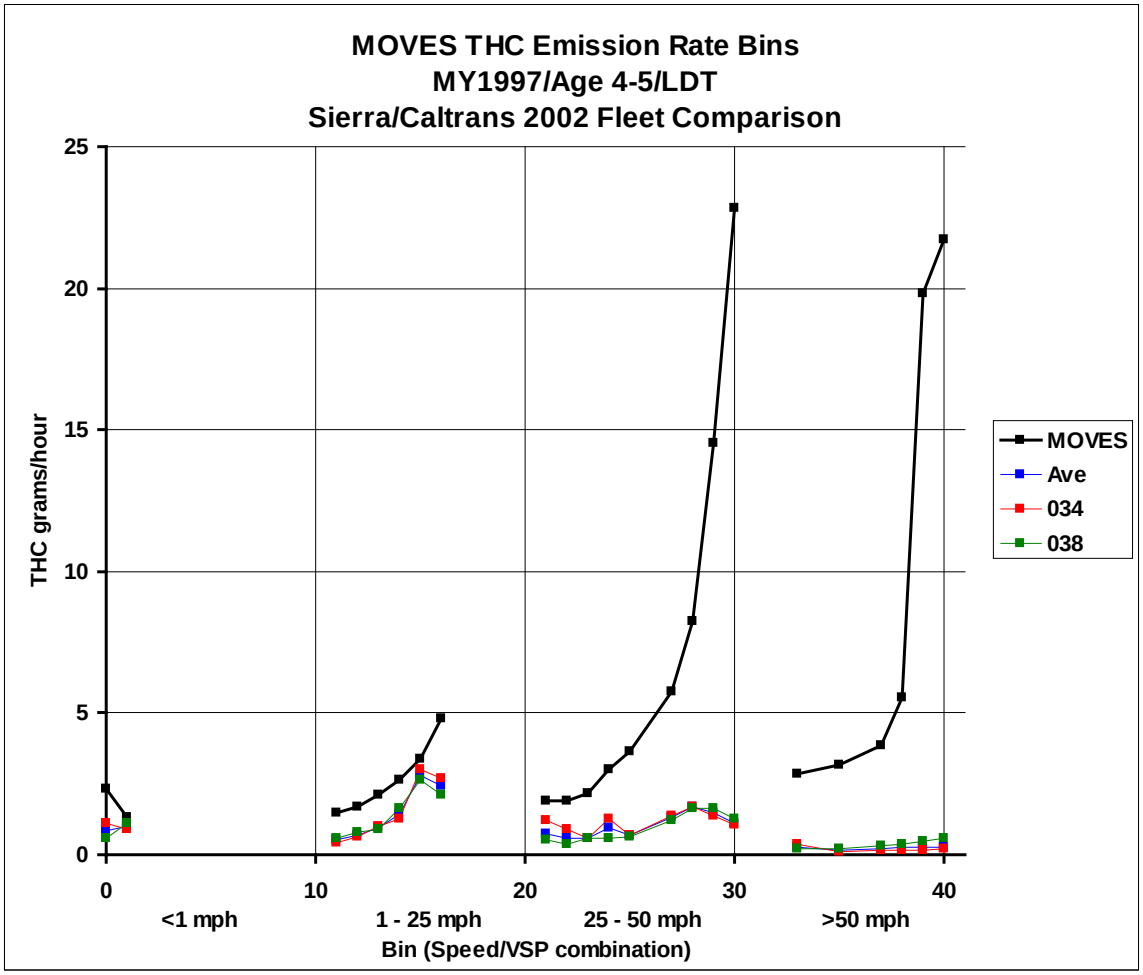

MOVES CO Emission Rate Bins
MY2000/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
007
012
013
027
043

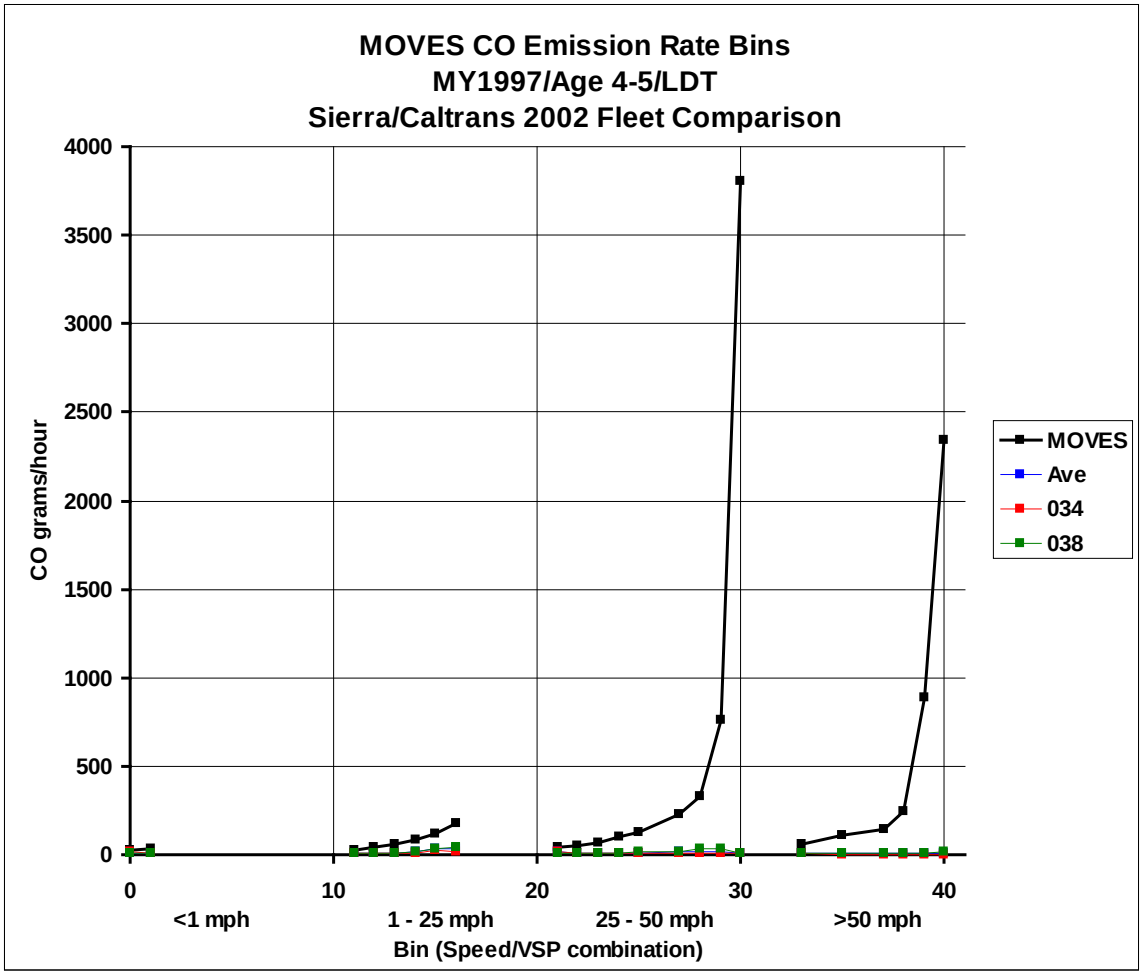

MOVES NOx Emission Rate Bins
MY2000/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
007
012
013
027
043

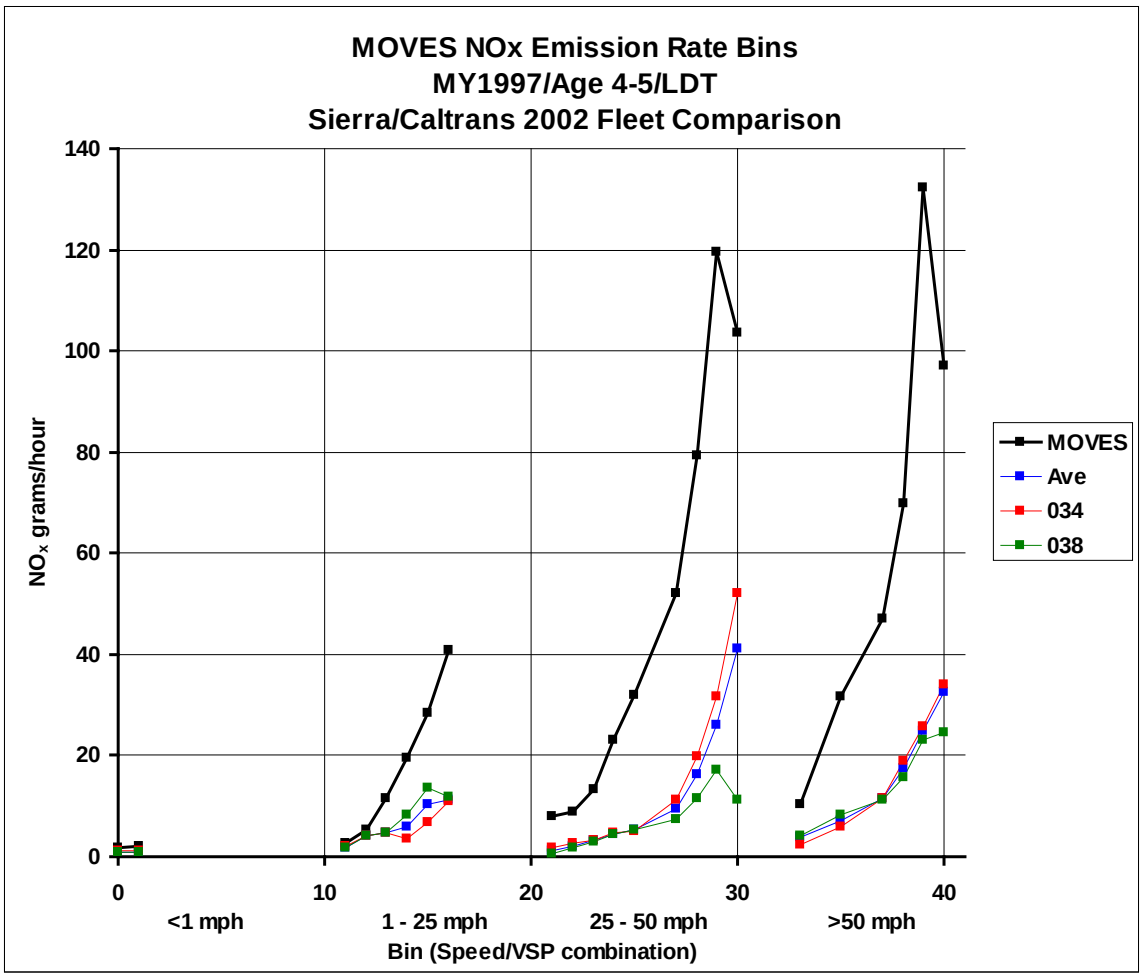

MOVES THC Emission Rate Bins
MY2001/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
0
1
2
3
4
5
6
7
8
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
030
035
044

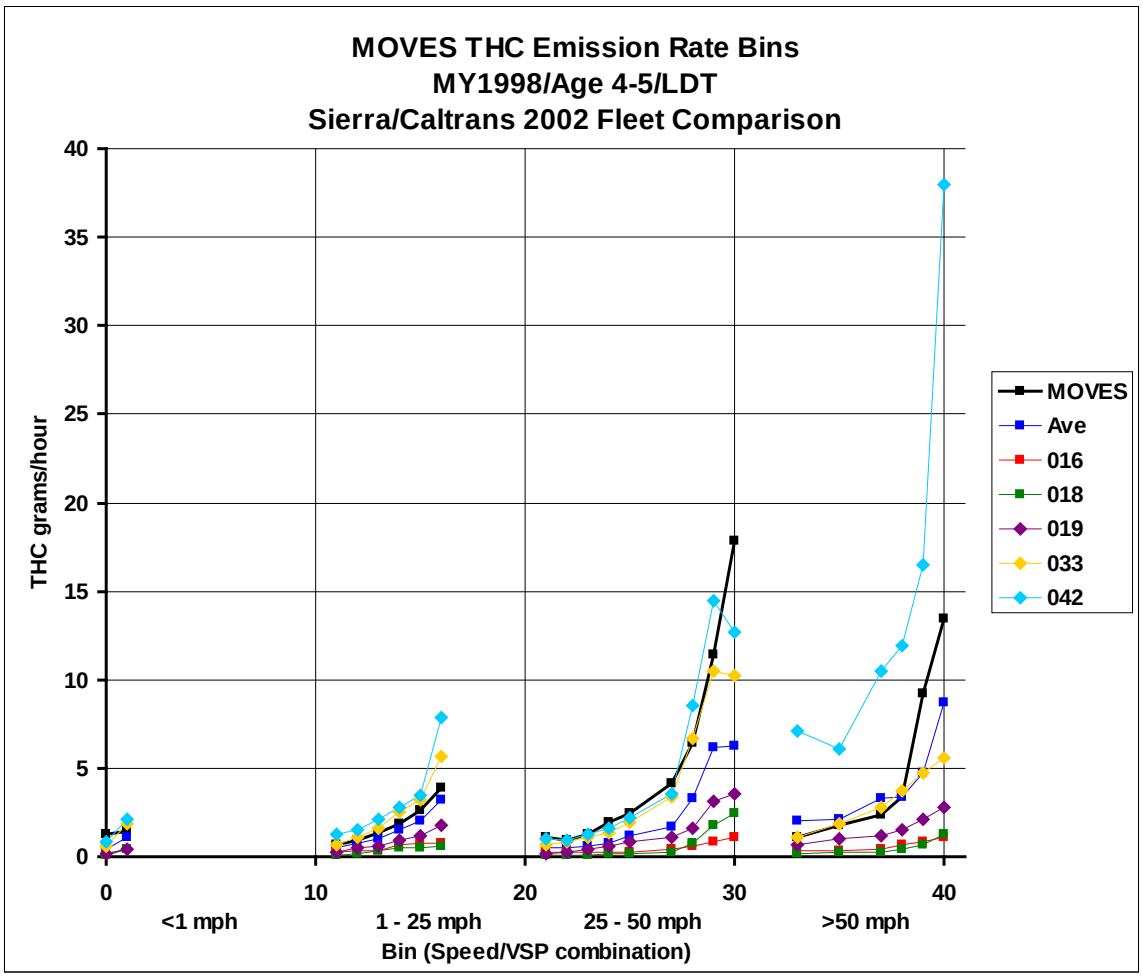

MOVES CO Emission Rate Bins
MY2001/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
030
035
044

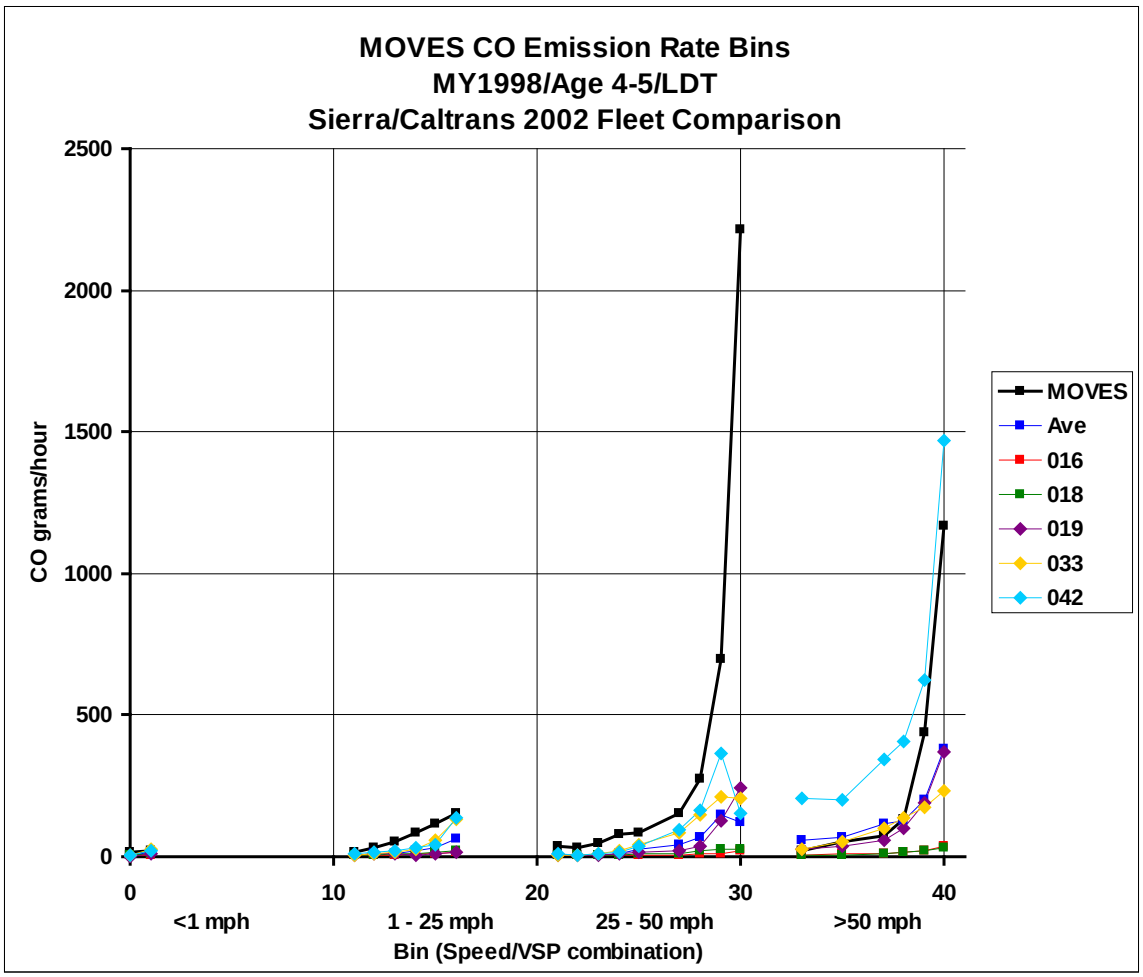

MOVES NOx Emission Rate Bins
MY2001/Age 0-3/Car
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
030
035
044

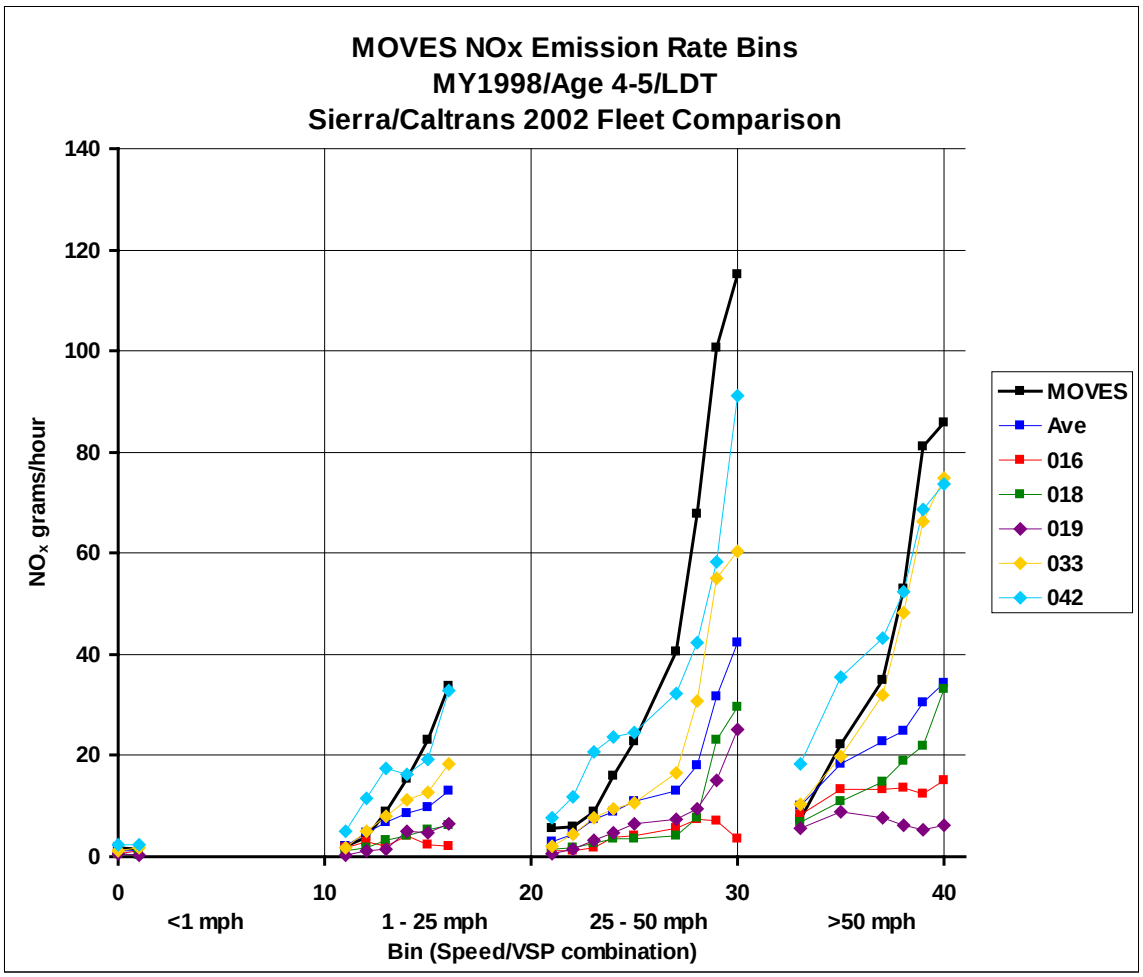

MOVES THC Emission Rate Bins
MY1997/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
034
038

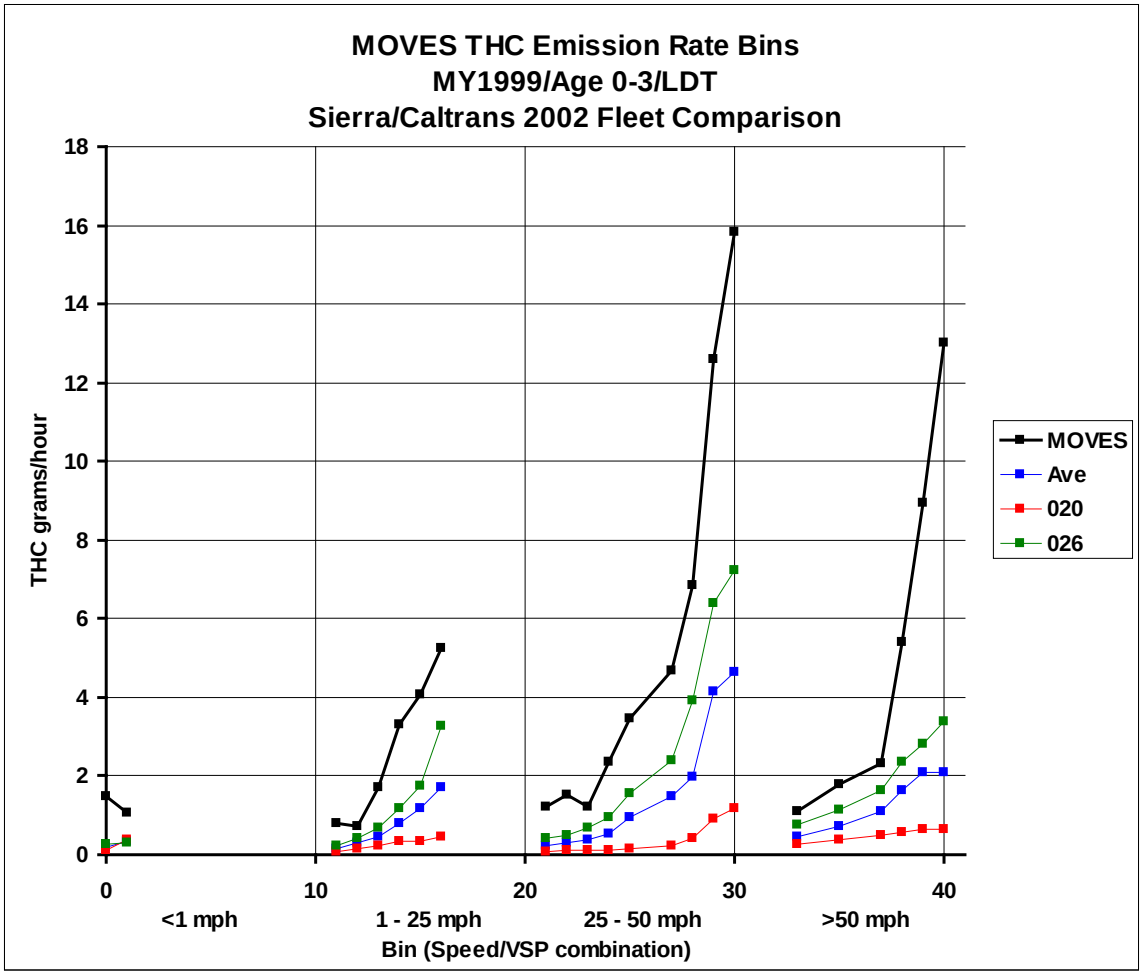

MOVES CO Emission Rate Bins
MY1997/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
4000
3500
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
034
038

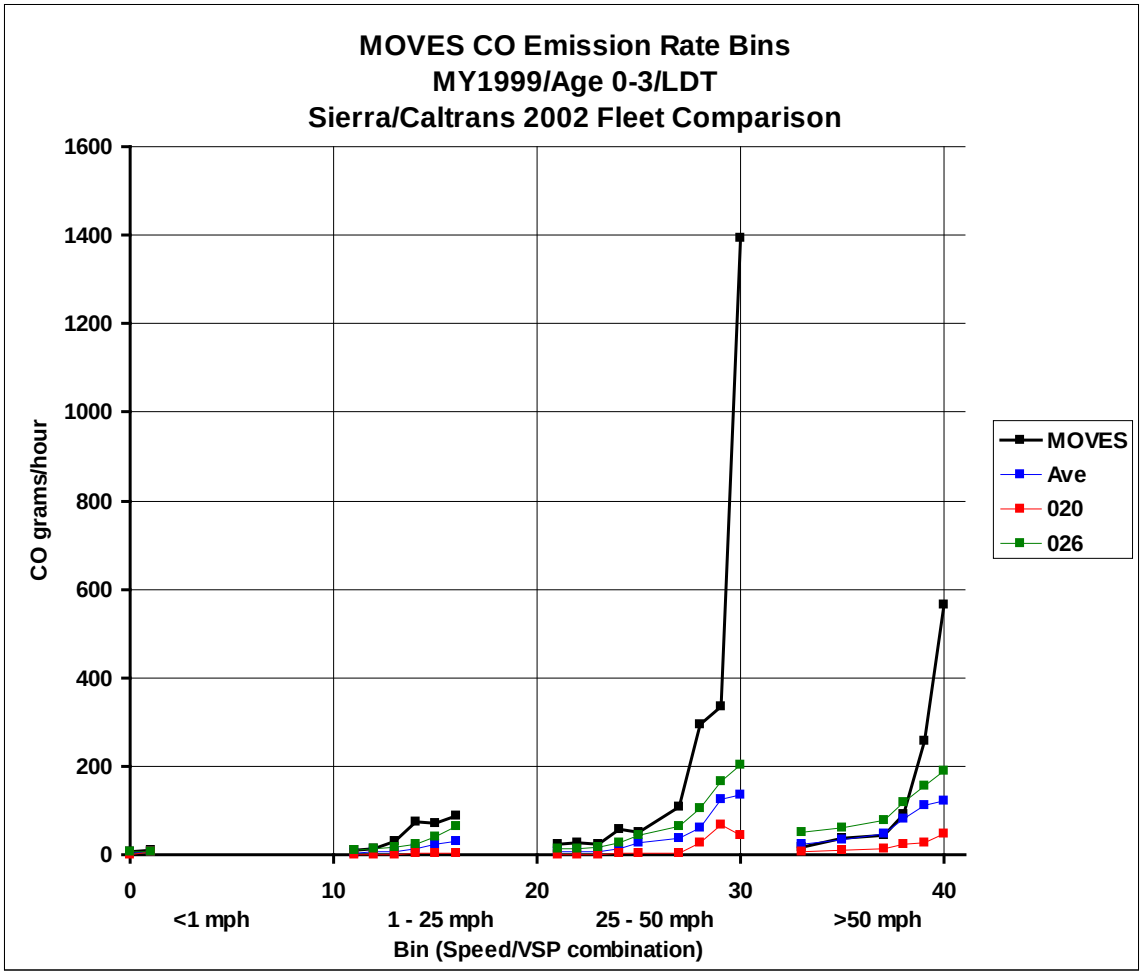

MOVES NOx Emission Rate Bins
MY1997/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
034
038

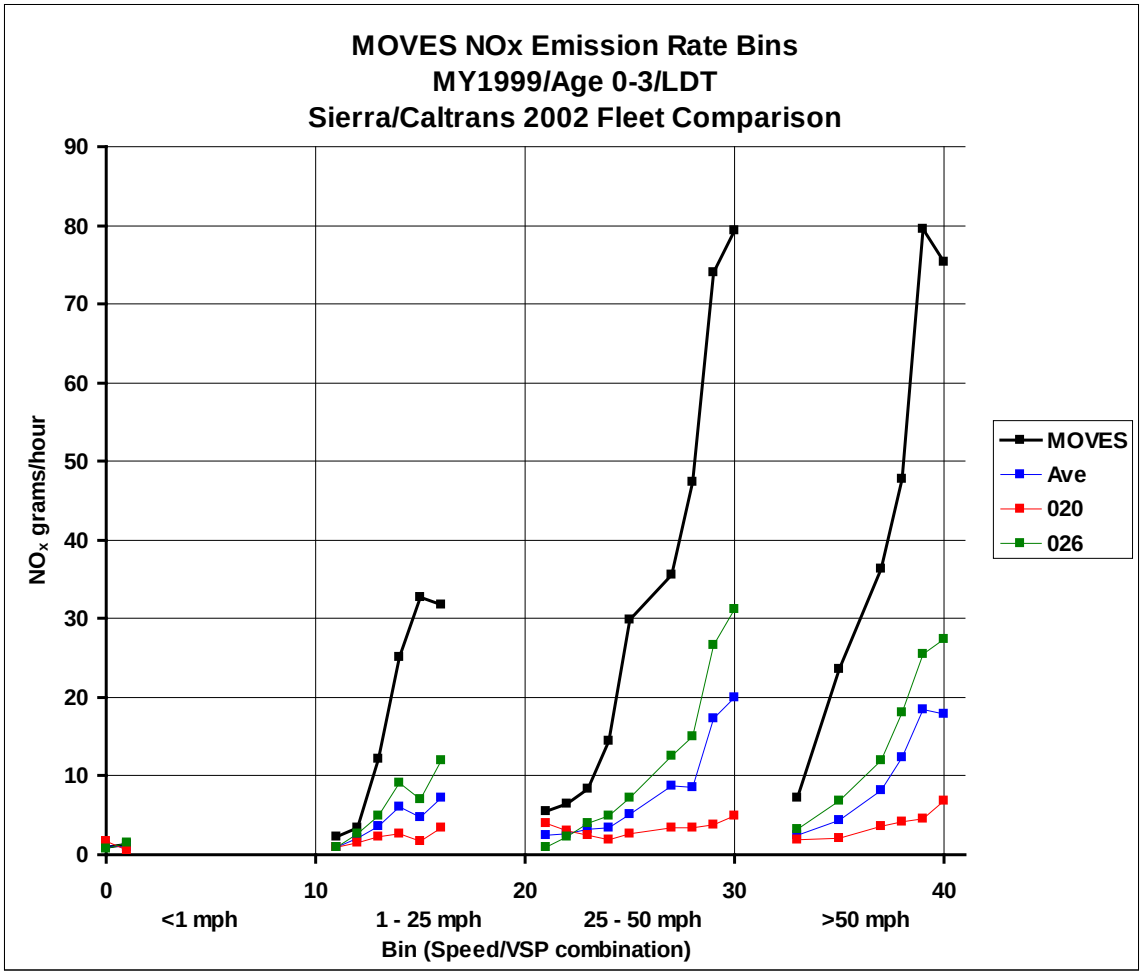

MOVES THC Emission Rate Bins
MY1998/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
40
35
30
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
016
018
019
033
042

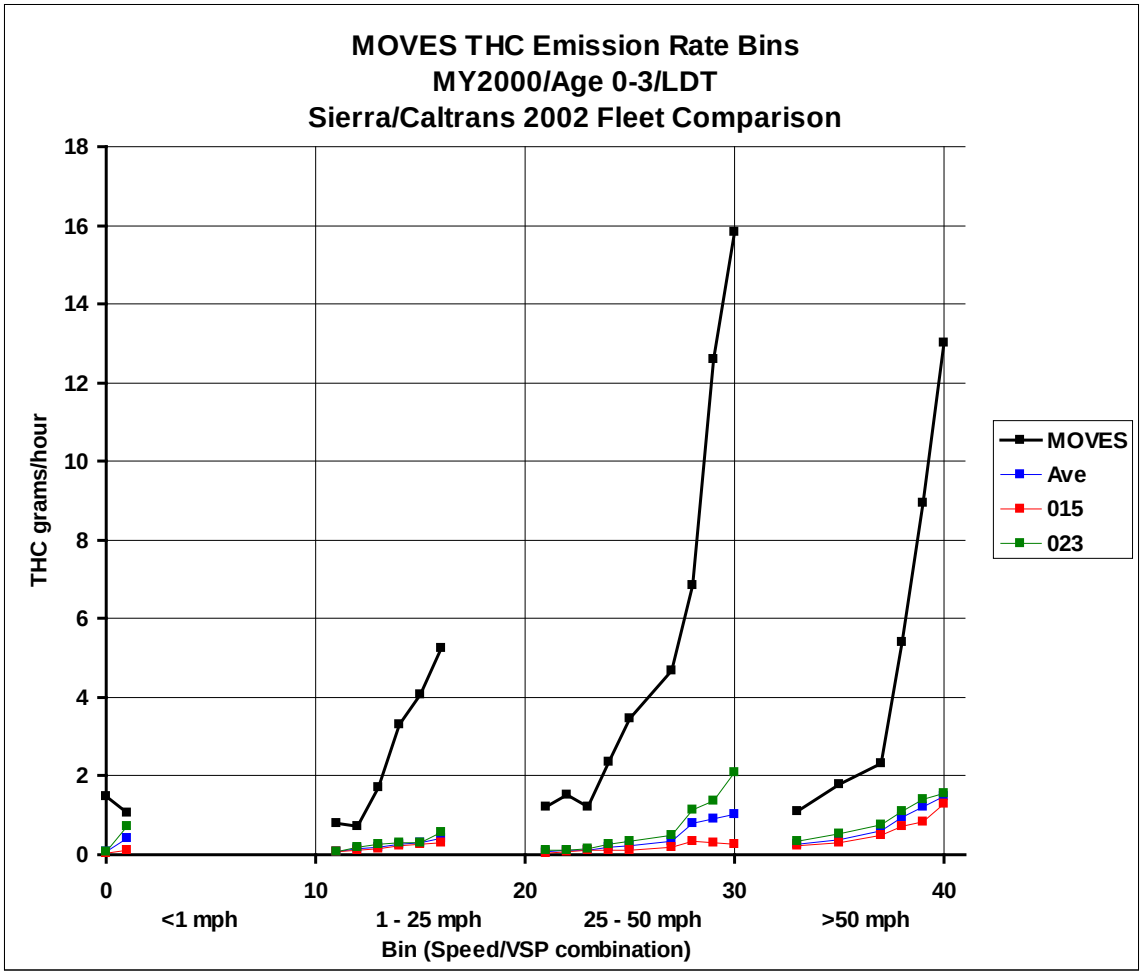

MOVES CO Emission Rate Bins
MY1998/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
2500
2000
1500
1000
500
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
016
018
019
033
042

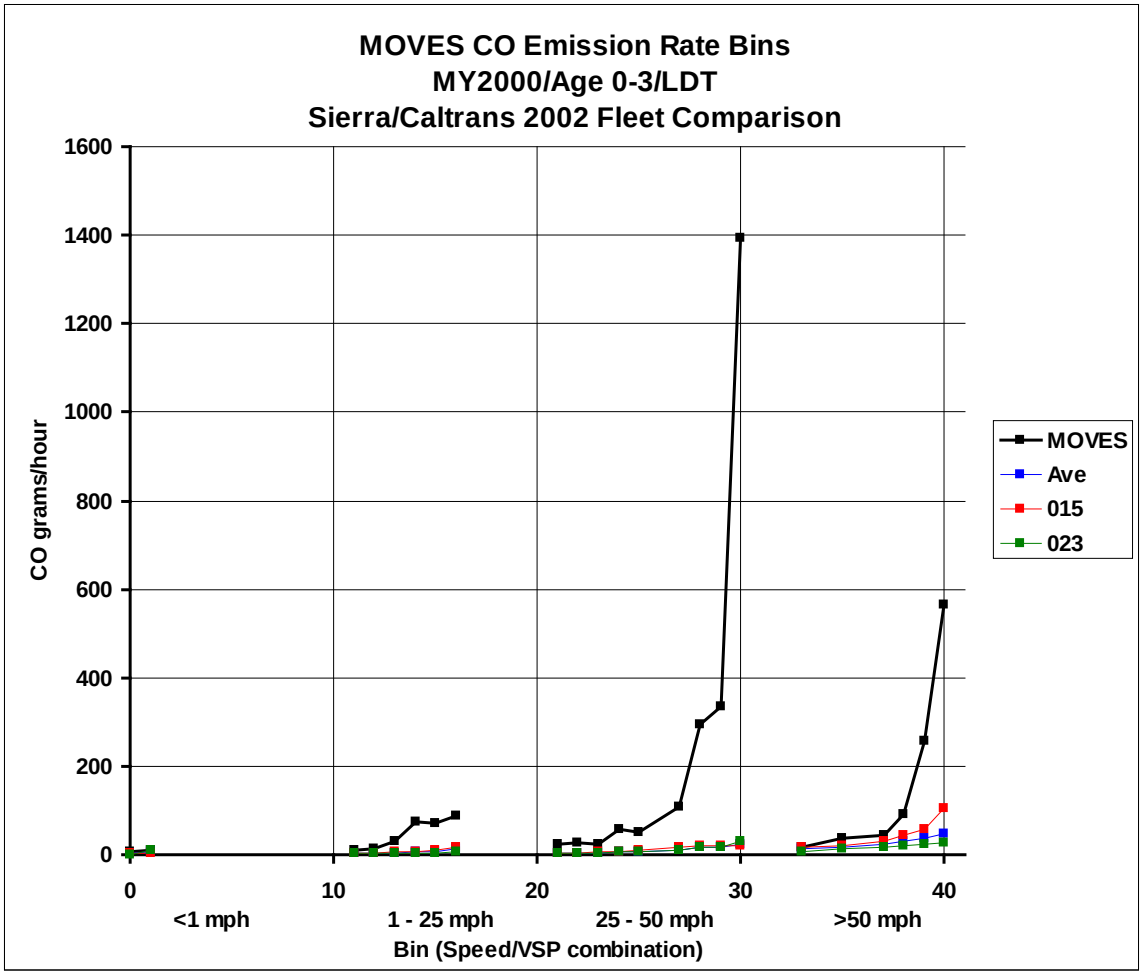

MOVES NOx Emission Rate Bins
MY1998/Age 4-5/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
140
120
100
80
60
40
20
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
016
018
019
033
042

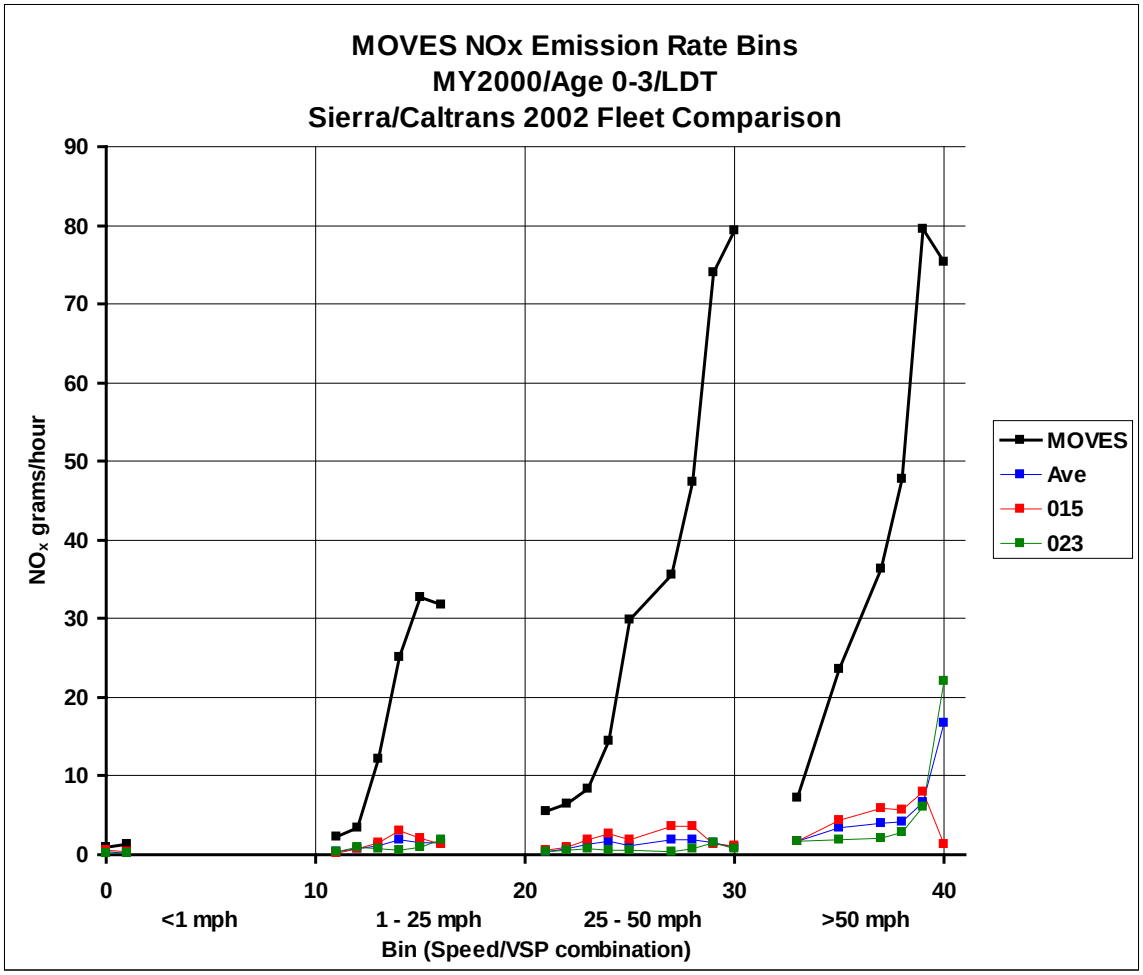

MOVES THC Emission Rate Bins
MY1999/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
18
16
14
12
10
8
6
4
2
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
020
026

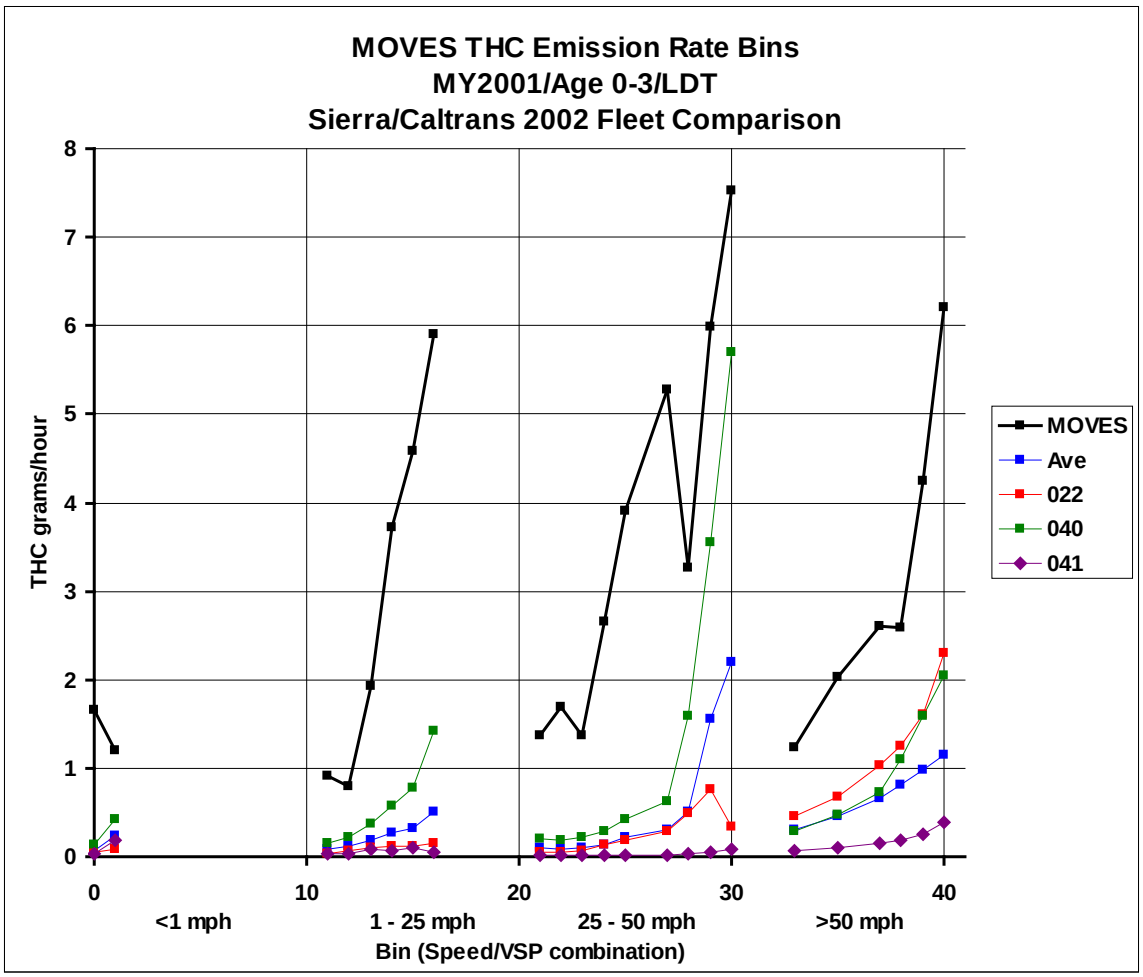

MOVES CO Emission Rate Bins
MY1999/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
020
026

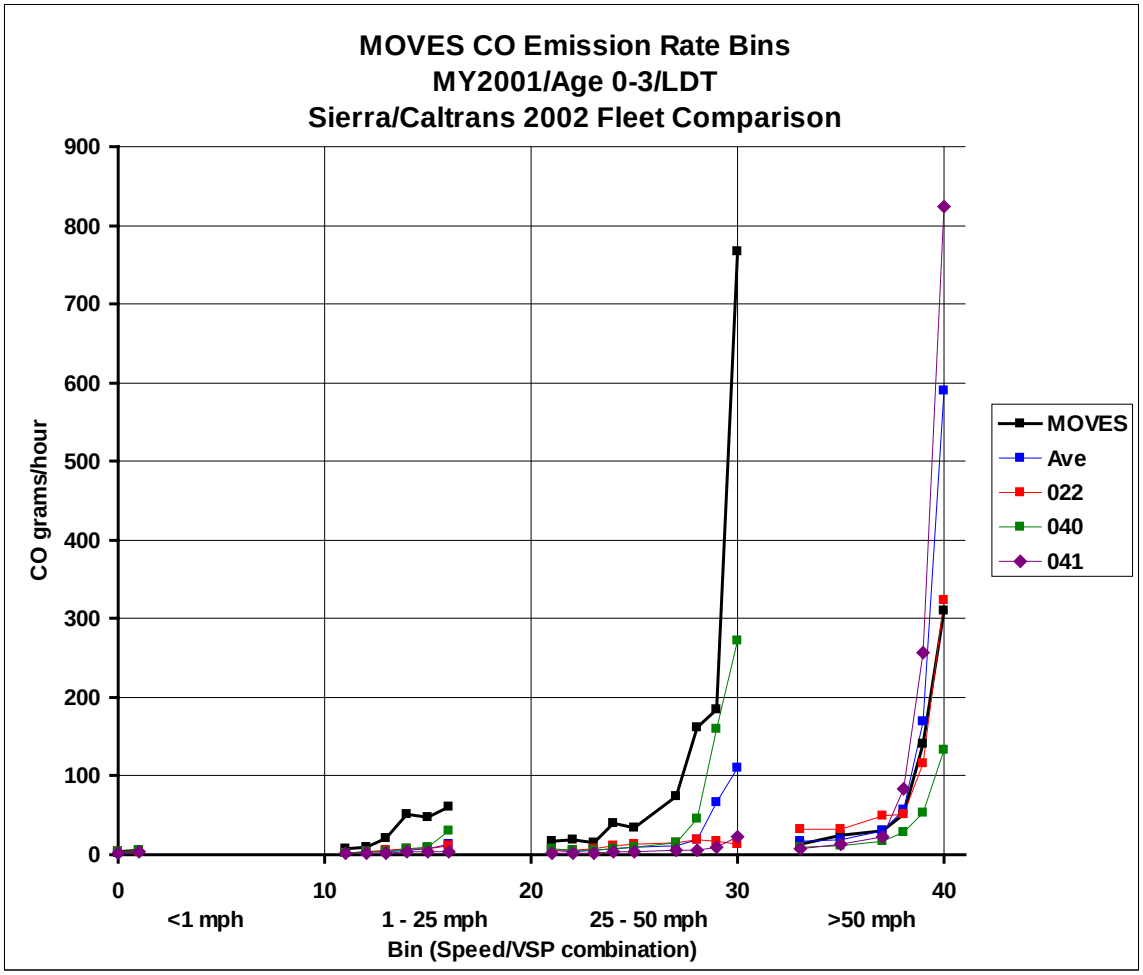

MOVES NOx Emission Rate Bins
MY1999/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
020
026

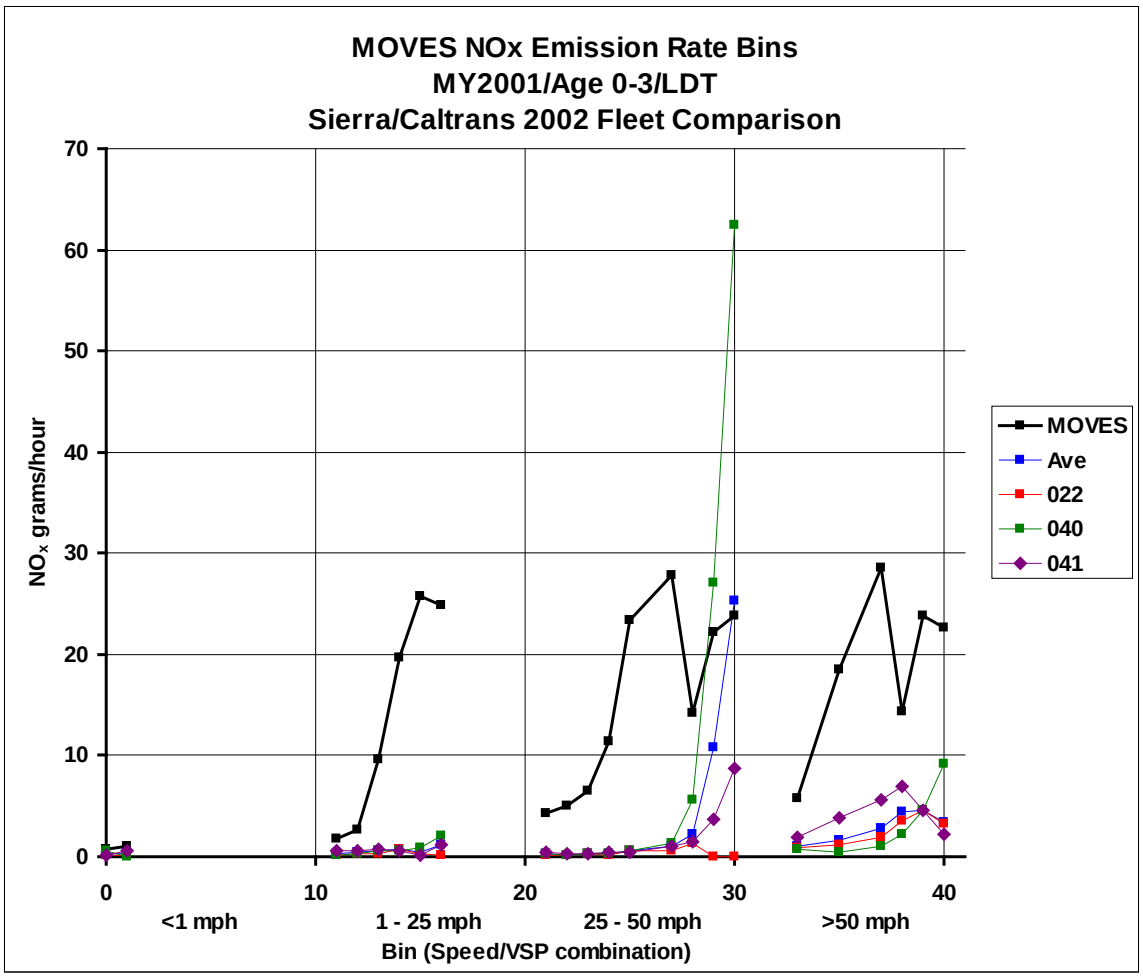

MOVES THC Emission Rate Bins
MY2000/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
18
16
14
12
10
8
6
4
2
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
015
023

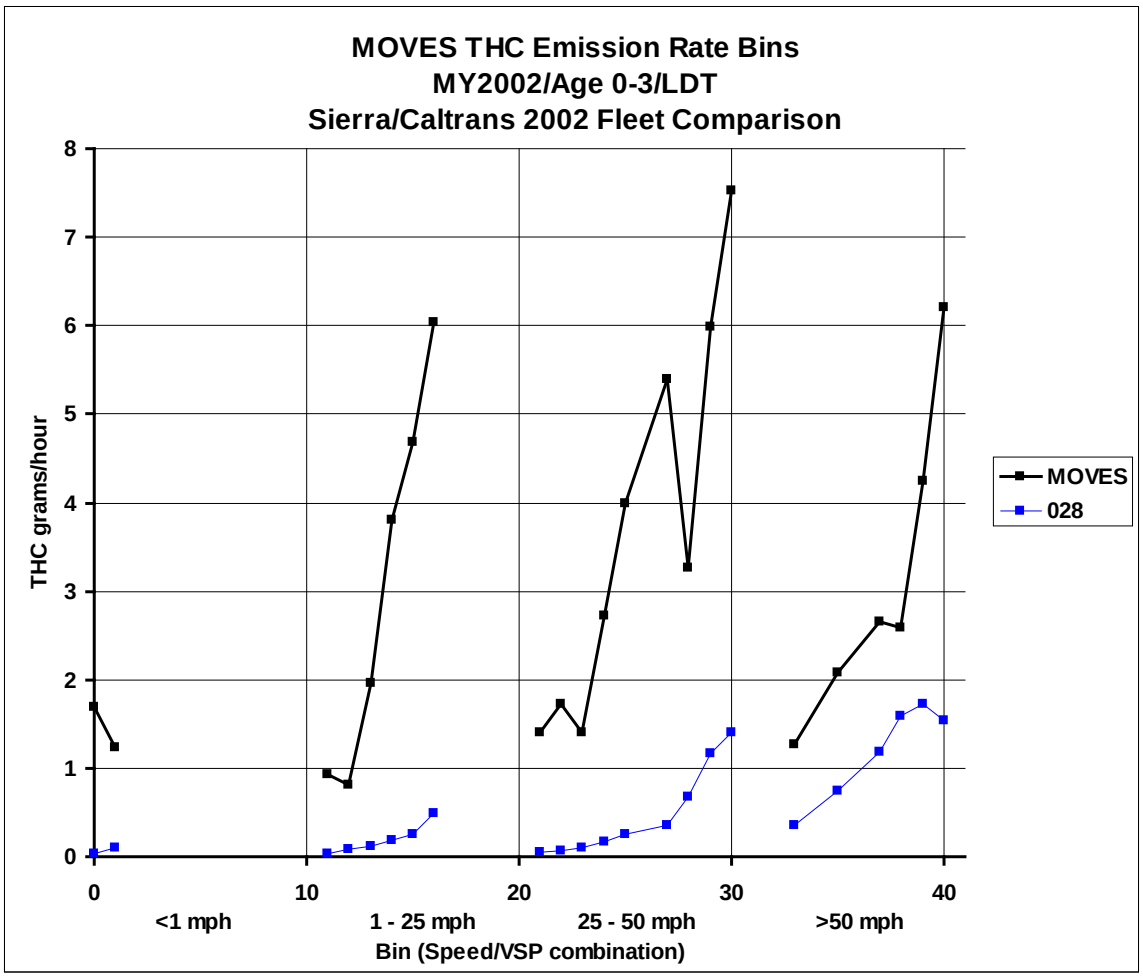

MOVES CO Emission Rate Bins
MY2000/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
1600
1400
1200
1000
800
600
400
200
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
015
023

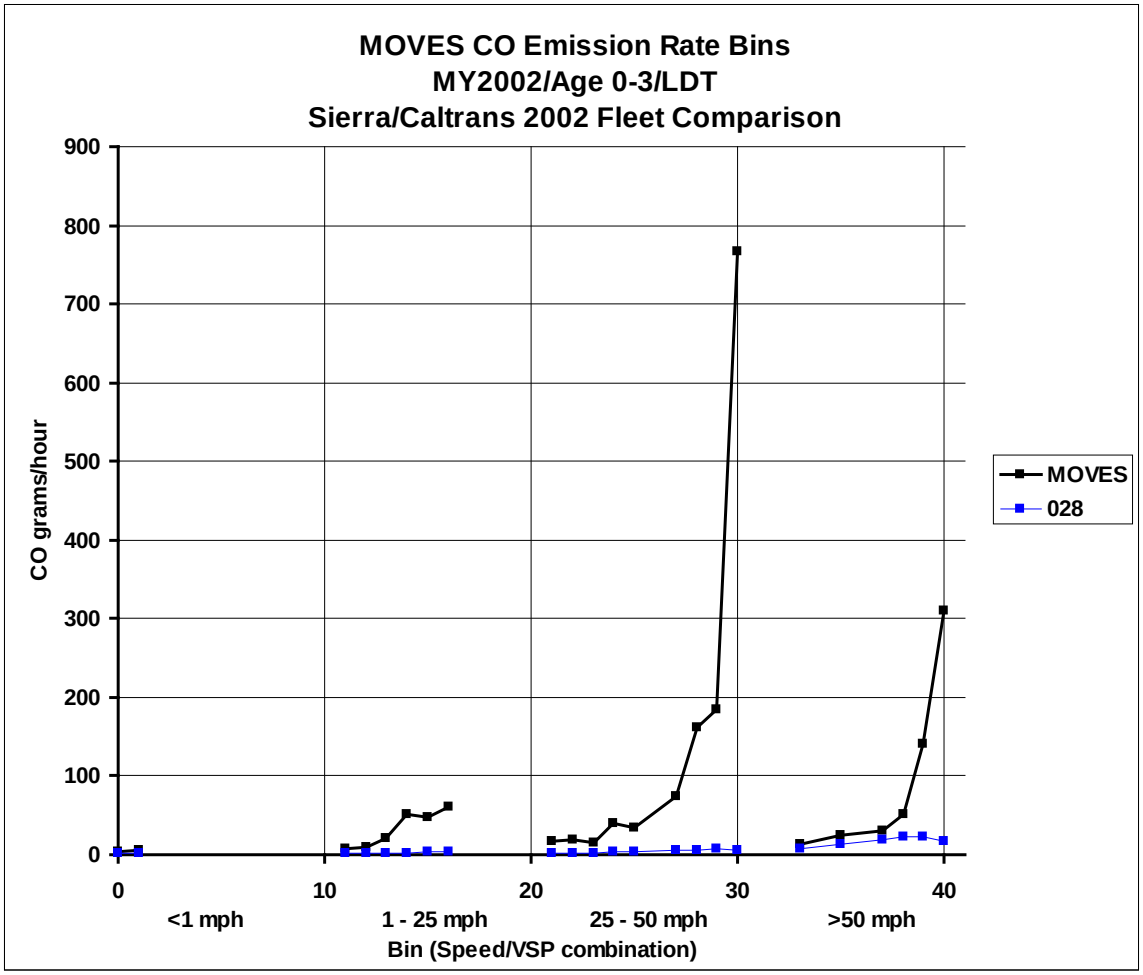

MOVES NOx Emission Rate Bins
MY2000/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
015
023

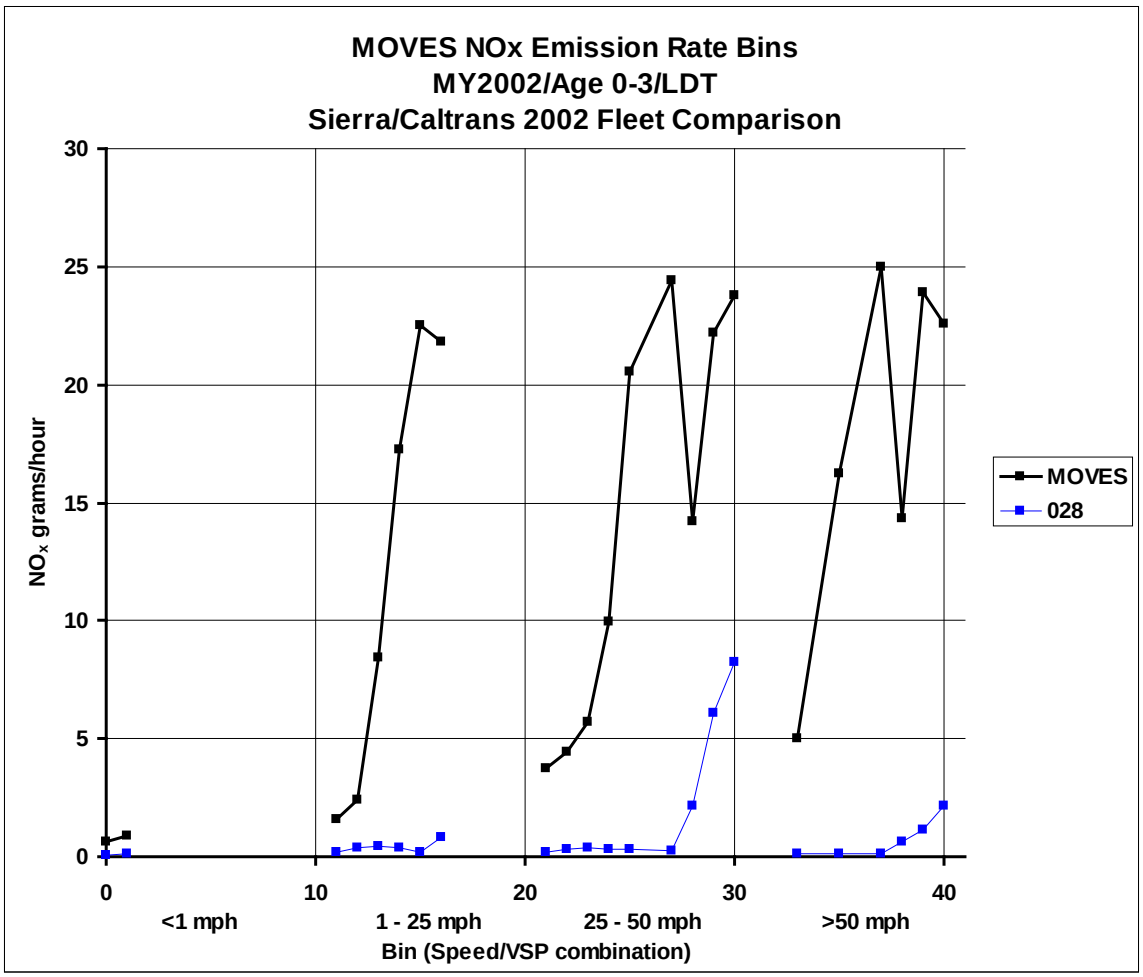

MOVES THC Emission Rate Bins
MY2001/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
0
1
2
3
4
5
6
7
8
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
022
040
041


MOVES CO Emission Rate Bins
MY2001/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
900
800
700
600
500
400
300
200
100
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
022
040
041


MOVES NOx Emission Rate Bins
MY2001/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
70
60
50
40
30
20
10
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
Ave
022
040
041


MOVES THC Emission Rate Bins
MY2002/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
THC grams/hour
0
1
2
3
4
5
6
7
8
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
028


MOVES CO Emission Rate Bins
MY2002/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
CO grams/hour
900
800
700
600
500
400
300
200
100
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
028


MOVES NOx Emission Rate Bins
MY2002/Age 0-3/LDT
Sierra/Caltrans 2002 Fleet Comparison
NOx grams/hour
30
25
20
15
10
5
0
0
10
20
30
40
<1 mph
1 - 25 mph
25 - 50 mph
>50 mph
Bin (Speed/VSP combination)
MOVES
028

APPENDIX E

Responses to EPA Comments

Comment p. 48-49: Sierra describes how a comparison of Speed-Acceleration Frequency Distributions (SAFD's) from the gathered data and a proposed representative drive-cycle is not enough to determine if the representative drive-cycle is the best among the 50 created. In addition to the SAFD comparison, Sierra constructed "a weighting function over those SAFD speed and acceleration bins for which high emissions were found ...". However, the weighting function used (see Table 4-6) seems rather arbitrary - How does Sierra know this weighting function serves the purpose of providing an additional basis for comparison between the actual data and the representative drive-cycles?

Response: As described on p. 48, the weighting function was developed from modal emission test results of 12 vehicles. The measured emissions of HC, CO, and NOx from these vehicles were examined over the SAFD. However, since this test sample was not broadly representative of the fleet (nor future fleets with different emission control technologies), a "roughly" binary-based weighting function was developed to simply identify those regions within the entire speed-acceleration domain where emissions were higher. As explained in the report, this weighting function was used only as a "tiebreaker" when evaluating unweighted SAFDs (speed-acceleration frequency distributions) that exhibited nearly identical representativeness of their intended driving population. We believe this narrow use of the emissions weighting function is appropriate for selecting between two candidate driving cycles with very similar representativeness of the driving population.

Comment p. 50: In Table 4-7, what is the "Total" column a total of? It is not the sum of Non-Cruise and Emis-Wtd. DiffSum's.

Response: A clarifying sentence was added to explain the meaning of the Total Diffsum in Table 4-7.

Comment p. 61: In Figure 5-14, why is there low-speed creep behavior in the Diamond Level-Grade On-Ramp drive-cycle? Neither the Diamond up-grade or down-grade have this behavior and it does not state that this is a metered on-ramp (see Figure 5-19).

Response: The specialized on-ramp driving cycles discussed in this section of the report are not mutually exclusive between ramp-metering and ramp configuration (shape and grade). In other words, any of the ramp configurations represented in Figures 5-13 through 5-18 can include both metered and non-metered ramps. Similarly, metered and non-metered ramp cycles shown in Figures 5-19 and 5-20 can include any combination of ramp configuration (e.g., Diamond, Level Grade). The decision to make the metering and ramp configuration driving groups not mutually exclusive was governed by the amount of available driving data.

The low-speed creep EPA observed for the Diamond-Level Grade cycle shown in Figure 5-14 is indeed travel that occurred on a metered ramp. As noted in Section 5.1, Sierra recognized that cycles generated by grafting trip segments together tend to break down for these specialized on-ramp cycles (since trip segments that generally consist of an overall acceleration cannot be grafted together). As a result, we proposed an

alternative means to representing on-ramp driving patterns in MOVES—use of the VSP/speed bin distributions for the entire driving population. In addition, the Sacramento driving data on which these ramp cycles were based were somewhat limited and did not include broad sampling of each ramp. Thus, some of the differences in driving patterns seen in each on-ramp group may result from sample bias.

Comment p. 69: In Table 6-3, the "%Diff" column is not labeled correctly. For example, the first entry for THC is:

THC (grams/hour) |		
MOVES	Meas	%Diff
20.43	0.60	3%

So in this entry, the % difference is 97% [(20.43 - 0.6) / 20.43 = 0.97], not 3%. This column could instead be called a proportion of Meas to MOVES.

Response: EPA is correct. The narrative on p. 69 was edited to define the "%Diff column as the proportion of the MOVES emission rate represented by the measured value.

Comment p. 69-70: Sierra points out that the average CO emission rate in MOVES for 1994 model year cars is higher than the emission rate for 1993 cars. This was confirmed by Ed and Sean, and a similar trend is present in the MOVES Draft database. This is possibly explained by the fact that the highest emitting bins are too heavily weighted and 1994 cars are still "cleaner" because most of the emissions occur in the low emitting bins, but does not explain why those high emitting bins are (presumably much) higher for 1994 cars.

Response: No response warranted.

Comment p. C-14: In general, the ramp driving cycles do not appear logical in many cases, but this page in particular shows drive cycles that seem very unrealistic. For instance, in the on-ramp drive-cycle, the vehicle stops 3 times and it takes 240 seconds (4 minutes). Similarly, for the off-ramp drive, the vehicle stops or nearly stops 7 times and it takes 350 seconds (nearly 6 minutes).

Response: The generalized on-ramp and off-ramp cycles plotted in Appendix C, p, C-14 should not be confused with individual ramp driving traverses. The ramp cycles plotted on p. C-14 were intentionally given cycle times of several minutes to increase their representativeness of their intended driving populations and thus can include multiple individual traverses. The stops EPA notes in its comment likely reflect individual traverses or instances where the vehicle stopped (e.g., a metered on-ramp) that allowed the cycle building software the ability to graft on another driving segment.

The fact that the specialized on-ramp driving groups contained so few segments which could be smoothly grafted onto each other (due to a stop or steady cruise portion) is what led to their shorter times and poorer fits to their driving populations.

Comment p. C-17: The metered on-ramp drive cycle only goes up to a speed of 40 mph. All of the other on-ramp drive cycles go up to almost 50 mph and some up to 60mph.

Response: The is an artifact of the limited amount of metered ramp driving data and the problematic use of the driving segment cycle building process for the specialized on-ramp cycles. The entire specialized on-ramp database consisted of some 20,400 seconds of driving data. Of these, only 2,886 seconds (about 14%) were collected on metered ramps. Since meters are operated during peak commute periods, it is likely that the highest speeds are lower than non-metered ramps as the vehicles merge onto a congested freeway. Comparison of the driving statistics for the metered and non-metered ramp driving population groups contained in Appendix A (p. A-46 and A-47) show top speeds of 62 and 79 mph, respectively. Thus, the lower maximum speed of the metered driving data group (or driving cycle) likely results from the freeway congestion that is prevalent when the ramp meter is operating.