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Technical Report

Selection of Transient Cycles for Heavy-Duty Vehicles

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by

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Standards Development and Support Branch
Emission Control Technology Division
Office of Mobile Source Air Pollution Control
Office of Air and Waste Management
U.S. Environmental Protection Agency

Summary

A result of EPA's heavy-duty cycle development project has been the computer-generation of some 35 candidate chassis cycles by the contractor, Olson Labs. This collection of cycles, synthesized from actual urban driving data, has been narrowed down by EPA to four cycles representing truck operation under both freeway and non-freeway conditions in Los Angeles and New York. In an effort to choose a cycle for each category which best represented the actual data, we scored the candidates according to their summary statistics, provided by Olson with each cycle. Our selected cycles appear below in Table 1, denoted by their random number designations; and their second-by-second listings may be found in Appendix B.

Table 1

		Cycle #
Los Angeles	Non-Freeway	210 620 459 3
	Freeway	153 913 507 1
New York	Non-Freeway	212 012 741 3
	Freeway	203 708 236 5

Background and Introduction

The basis of the cycle-generation effort is the road data compiled in the CAPE-21 truck-usage survey. This project involved the instrumenting of actual in-use trucks in Los Angeles and New York, cities considered to exemplify the extremes of urban traffic flow. Forty-four trucks in each city (as well as 3 buses in Los Angeles and 4 in New York) were allowed to perform their normal duties while vehicle and engine parameters were being recorded on an approximately second-by-second basis. Among the monitored parameters were vehicle speed, engine speed, road and traffic conditions, and a measure of power (such as manifold vacuum or throttle position). With the intent of making possible laboratory testing in which the vehicle (or engine) operation simulates actual on-the-road use, transient computer cycles of relatively short duration have been synthesized. The result has been the delivery to EPA of cycles both for the testing of engines and of vehicles. The vehicle - or chassis - cycles are the concern of this report.

Olson found it necessary to generate many thousands of cycles in order to produce a few which approached the characteristics of the data base. The several "good" cycles as screened by Olson include at least three (and as many as twelve, if later work was done) five-minute candidates for each of the four road categories. Additionally, cycles of approximately 10-, 20-, and 30-minute duration were generated for the sake of comparison. EPA's task was to further screen the candidates and arrive at one five-minute cycle to best represent each category.

The primary way by which both we and Olson compared and rated the cycles was with the Kolgomorov-Smirnov one-sample test, hereafter abbreviated "K-S test." The K-S test is a non-parametric statistical test concerned with the degree of agreement between two distributions. It determines whether two distributions can reasonably be thought to have come from the same population. Specifically, the cumulative distributions of the candidate cycles are compared to the CAPE-21 cumulative distribution (assumed to be the theoretical distribution). When compared on an increment-by-increment basis, there will occur at some point a maximum difference D between the two distributions. D can be related to a level of significance, α, which depends on the size of the sample. If the maximum difference, D, exceeds the critical difference for that sample size at a particular significance level (α), then the sample does not pass the K-S test and it must be assumed that the two distributions are dissimilar. Table 2 relates sample size to significance levels and critical differences.

Table 2*

Sample Size (N)	Significance Level .20	.15	.10	.05	.01
Over 35	$\frac{1.07}{\sqrt{N}}$	$\frac{1.14}{\sqrt{N}}$	$\frac{1.22}{\sqrt{N}}$	$\frac{1.36}{\sqrt{N}}$	$\frac{1.63}{\sqrt{N}}$

The computed values are the critical differences for a particular N. The smallest critical difference which exceeds the maximum difference D for the test yields the significance level. The reader is referred to Appendix A for an example of the use of the K-S test.

In digression, the significance level is the probability of rejecting a true hypothesis when it is actually true. In relation to the K-S test, significance level is the probability of not accepting two distributions as being the same, when in reality they are. This type of error is acceptable when comparing two cumulative distributions. Therefore, it is desirable to have a large significance level, since this results in more assurance that the two

* From Nonparametric Statistics, Sidney Siegel, McGraw-Hill, NY, 1956.

distributions being compared are really the same. For most engineering and statistical application, significance levels of .05 or .10 are adequate. The following discussion addresses how the test was applied as a screening criterion by Olson and subsequently by EPA.

In addition to the 5-minute cycles discussed above, Olson generated cycles of longer duration as a means of judging the effect of length on cycle quality. Candidates on the order of 10 minutes in length were submitted for each category; and 20- and 30-minute cycles were generated for the L.A. Freeway category.

We have attempted to compare the 5-minute cycles within a particular category with the corresponding 10-minute candidates. Such a task, however, is handicapped by the absence of K-S results for the 10-minute density functions. But despite this difficulty, it is possible to make several generalizations concerning the 10-minute cycles:

1) Their average speeds for the most part come as close as - or closer than - their 5-minute counterparts to matching the average speed of the input.

2) The cycle percentages as well show a slight improvement over those of the 5-minute cycles.

3) A visual comparison of the density plots shows that the 10-minute candidates reach a higher maximum speed than do the 5-minute versions.

The very nature of the cycle generation process suggests that the longer the cycle, the greater the similarity it should exhibit relative to the input data. In any statistical comparison, a larger sample is more likely to simulate the population; in our case, one would expect that a longer cycle (i.e., more records) would better match the input than a short cycle. The computer has a chance to sample more parts of the "transition probability" matrix and is able to generate a better cycle.

In the case of the L.A. Freeway category, even longer cycles - on the order to 20 and 30 minutes - were also submitted by Olson. As expected, the general trend is for cycle quality to improve a little with increased duration.

Although the longer cycles generally have better statistics, the improvement over the 5-minute cycles is slight. An average speed is rarely as much as 1 mph closer to the input in a 10-minute cycle;

likewise, the cycle percentages generally vary by only 2 or 3 percentage points, regardless of cycle length. Since a series of four or five cycles will be run in a test procedure, the 5-minute versions are much more attractive from a practical standpoint. Thus, the improved quality of the longer cycles is not marked enough to heavily favor their use. Our attention is directed almost exclusively toward the 5-minute cycles.

Selection Procedure

Several criteria formed tha basis for the selection of one candidate cycle from each category. A relative scoring of Olson's summary statistics and a consideration of the quality of the speed density functions played the major roles in the decision process.

With each candidate cycle, Olson provided EPA a tabulation of summary statistics which indicate how well the particular computer-generated candidate imitates the characteristics of the input matrix. This input matrix was the result of Olson's compiling of the massive road data for a category - New York non-freeway, for example - into a single matrix relating initial speed and change in speed. Each cell of the matrix is the probability that a particular change in speed (or no change) will occur at the initial speed in question. The cycle-generation program utilizes these probabilities and, record-by-record, creates a cycle of the desired length. Now the cycle itself can be converted into a similar initial-speed/delta-speed matrix and compared with the input matrix. By generating numerous cycles and testing them against the input, the best cycles in each category are filtered and submitted by Olson.

For purposes of testing how faithfully a given cycle matched its category's input, several portions of its speed/delta-speed matrix were examined by Olson. In each, the columns were converted to cumulative distributions and checked by the K-S test for similarity to the corresponding portion of the input matrix. The matrix as a whole was screened in this manner, as were the parts corresponding to acceleration, deceleration, and cruise. Thus, the significance level at which a cycle passed (or failed) was determined - that is, the lowest of these four scores - allowing the candidates to be compared among themselves within a given category (Table 3 presents these levels; the higher the better).

Additionally, Olson K-S tested the speed frequency distribution as a further means of comparison. The importance of the density functions (from which the distributions are derived) lies in the fact that percent of operation at, say, 55 mph or at idle can significantly affect emissions; the cycles should match the operation in the data base reasonably well. Obviously, it is the cumulative distributions that are checked, not the density curves; but

Table 3

						Average Speed (MPH)	Density Significance Level (X=Did not pass at .01)	Matrix Significance Levels				Cycle Percentages			
								M	C	A	D	I	C	A	D
LA Non-Freeway			INPUT			15.10						30.1	32	21	17
		152	778	878	5	15.44	X	.755	.461	.179	.521	30.1	28	22	20
	*	210	620	459	3	14.55	.220	.353	.542	.700	.344	28.8	29	21	21
		211	939	981	9	14.87	.039	.363	.265	.261	.153	29.6	31	20	20
LA Freeway			INPUT			45.54						2.3	75	12.8	10.0
		327	663	671		45.15	.002	X	X	.63	.30	2.6	65	16.6	15.7
		137	221	132	7	45.39	.001	X	X	.41	.43	2.6	62	19.2	16.0
		432	285	647		45.41	X	X	X	.81	.22	2.6	62	18.9	16.3
		786	981	11		45.29	.45	.02	X	.60	.24	2.6	61.0	18.1	18.4
	*	153	913	507	1	44.79	.43	.10	.001	.30	.13	2.6	62.6	18.4	16.5
		129	422	102	9	44.95	.41	.007	X	.32	.34	2.5	58.7	19.6	19.2
		152	997	154	3	44.42	.10	.05	X	.26	.22	2.6	63.1	17.0	17.3
		103	847	192	5	44.82	.05	.06	.001	.776	.39	2.5	62.5	17.8	17.1
		148	353	223	1	44.35	.03	.07	.009	.11	.65	2.6	60.5	19.8	17.2
		833	528	981		44.23	.02	.13	.001	.80	.44	2.6	62.9	18.2	16.3
NY Non-Freeway			INPUT			7.80						50.8	20	15.1	13.7
		123	667	645	7	7.48	.09	.83	.67	.43	.77	51.2	18	16.3	15.0
		179	960	930	5	7.37	.42	.70	.50	.79	.89	52.7	17	15	14.9
		104	736	920	3	7.83	.06	.49	.28	.35	.77	52.7	15	16.1	16

Table 3 (cont.)

						Average Speed (MPH)	Density Significance Level (X=Did not pass at .01)	Matrix Significance Levels				Cycle Percentages			
								M	C	A	D	I	C	A	D
	*	212	012	741	3	7.57	.74	.85	.35	.38	.74	52.0	15	17	16
		211	373	494	3	8.11	.54	.86	.99	.48	.19	48.0	18	17	17
		210	952	317	5	7.95	.41	.80	.95	.22	.24	51.0	18	14	17
		202	167	539	7	7.34	.38	.99	.79	.13	.46	52.4	18	16	14
		213	923	722	9	7.03	.17	.80	.64	.53	.64	49.8	19	15	16
		213	153	035	7	8.14	.06	.92	.72	.05	.84	49.4	20	15	16
NY Freeway			INPUT			26.39						15.8	41.2	22.2	20.7
		741	286	985		26.54	.005	.605	.16	.30	.43	14.9	36	24.5	24.5
		209	279	083	3	26.53	X	.23	.02	.02	.26	15.1	36	24.77	23.0
		137	610	363		27.39	.002	.07	.04	.19	.64	15.7	35	27.0	22.6
	*	203	708	236	5	26.91	.050	.17	.51	.009	.141	15.7	37	25	22

if a cycle distribution closely matches the input distribution, the corresponding density function is generally faithful to the input as well. As a gauge of their quality, the density curves were converted to cumulative distribution functions and tested against those of the input data, again by means of the K-S test.

The summary statistics also include "cycle percentages", which simply give the fraction of the total cycle operation which occurs in the various modes (acceleration, deceleration, cruise (less idle) and idle (zero speed, zero delta-speed)). The average speed of the cycle is provided as well. These parameters, which also appear in Table 3, allow further insight into the relative quality of the cycles when they are compared to their input values.

There are several reasons why a cycle can score well on Olson's K-S tests (as reflected in the summary statistics) and simultaneously make a poor showing as regards the speed distribution K-S test. Primarily, the screening done by Olson was not designed to choose good speed distributions - rather the process simply looks at how well a cycle imitates the initial-speed/delta-speed matrix of the input. In addition, the relatively short length of the cycles, in particular those of 5-minute duration, makes it difficult for the computer to sample the entire population (i.e., the input matrix). However, since the generation process tends toward cycles possessing accurate average speeds and percents idle, one would expect some correlation between good summary statistics and a reasonable speed density function (and this is generally the case).

Returning to the selection procedure itself, we chose the final cycles according to their performance on 1) the speed density K-S test, 2) the matrix K-S tests, with the overall matrix test bearing the most weight, and 3) a comparison of the cycle's average speed to its input. It did not become necessary to consider the cycle percentages since most choices were fairly straightforward. The order above reflects the relative importance given each criterion.

The general procedure employed in making a single selection per category was to first eliminate any cycles whose speed density K-S level is markedly lower than the rest. Then, a scan of the four matrix and sub-matrix K-S levels reveals the level at which that cycle passed (i.e., the smallest value determines the passing level) and this value may be compared with the other remaining candidates. Any further dispute between cycles is usually settled by the overall matrix value or by the average speed.

The following paragraphs describe the rationale involved in selecting one 5-minute candidate for each of the four truck categories. The reader is referred to Table 3.

LA Non-Freeway. The selection of cycle 210- demonstrates the procedure outlined above. Cycle 152- is eliminated since it failed the densty K-S test. The matrix significance levels show that 211- passed at .15 and 210- at .34, reinforcing the density test and finalizing the decision.

LA Freeway. Six of the ten candidates in this category can be eliminated immediately because of low density significance levels, leaving cycles 786-, 153-, 129-, and 152- with moderate to excellent density scores. Of these, only 153- passes the matrix K-S tests (though just barely) and is selected on this merit.

NY Non-Freeway. Eliminating the three cycles whose density K-S values fall below .10, six cycles which look very good remain: 179-, 2120-, 2113-, 2109-, 2021-, and 2139-. This pool may be pared down by removing 2021- and 2113- from contention, since they passed the matrix K-S tests at values less than .20. The overall matrix scores for these remaining four candidates are all so high that they are worth little as quality indicators. The matrix tests show 179- and 2139- to be slightly better matches of the input matrix than 2120- and 2109-; however, their average speeds stray further from the data base. The density significance level of 2139- though good (.17) is outscored by the other three. The final decision reflects the greater weight given the density level as a criterion; cycle 2120- is chosen for its combination of a high density score (though it is important to remember that the improvement of a value of .74 over an also-excellent value of .42 is difficult to quantify), excellent matrix values, and an average speed close to that of the input. Any of the final four cycles, however, could have reasonably been expected to be as representative as 2120-.

NY Freeway. Of the four candidates, cycle 203- shows the best density K-S value and the second-best matrix K-S scores; this cycle is an easy selection for this category.

Conclusions

The selected cycles, denoted by their random number designations, follow; their second-by-second listings are included in Appendix B.

Los Angeles	Non-Freeway	210 620 4593
	Freeway	153 913 5071
New York	Non-Freeway	212 012 7413
	Freeway	203 708 2365

These cycles have been judged to be the most representative of the CAPE-21 data base on the basis of statistical considerations alone. Further evaluation will follow as the cycles are actually run on the dynamometer.

APPENDIX A

Sample K-S Test on Speed Distribution

MPH Increment	Cumulative Distribution Function (Input)	Cumulative Distribution Function (Cycle 212 012 7413)	K-S Difference
0	.517	.539	-.022
1	.540	.556	-.016
2	.560	.566	-.006
3	.578	.573	.005
4	.598	.580	.018
5	.615	.590	.025
6	.632	.603	.029
7	.644	.610	.039*
8	.665	.631	.034
9	.682	.664	.018
10	.698	.688	.010
11	.714	.698	.016
12	.730	.725	.005
13	.746	.749	-.003
14	.762	.769	-.006
15	.778	.800	-.022
16	.794	.814	-.020
17	.810	.841	-.031
18	.824	.851	-.027
19	.838	.858	-.020
20	.852	.868	-.016
21	.864	.885	-.021
22	.877	.885	-.008
23	.888	.892	-.004
24	.898	.895	.003
25	.907	.895	.012
26	.916	.895	.021
27	.924	.905	.014
28	.932	.908	.024
29	.938	.908	.030
30	.944	.925	.019
31	.949	.942	.006
32	.954	.963	-.009
33	.959	.986	-.025
34	.963	1.000	-.037
35	.966	--	--
36	.969	--	--

The maximum difference of .039 occurs at *. Since the sample size (total number of records in the cycle) is 294, Table 2 shows a critical difference at a .20 significance level of .062. Thus the cycle passes easily at the high .20 level, indicating a close match with the input as far as the speed distribution is concerned.

APPENDIX B

SECOND-BY-SECOND LISTINGS

1.00-SECOND INTERPOLATION OF 2106204593 LA G+D N 16:01:29 FEB 10, 1978

0.	0.0	50.	2.00	100.	11.00	150.	19.61	200.	32.52	250.	9.31	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
1.	0.0	51.	3.08	101.	11.90	151.	20.00	201.	32.00	251.	7.50	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
2.	0.0	52.	5.63	102.	12.89	152.	20.00	202.	32.00	252.	6.34	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
3.	0.0	53.	4.00	103.	10.36	153.	20.00	203.	32.95	253.	4.37	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
4.	0.0	54.	4.00	104.	7.26	154.	20.00	204.	33.00	254.	3.03	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
5.	0.0	55.	3.34	105.	4.95	155.	20.00	205.	33.00	255.	1.87	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
6.	0.0	56.	1.37	106.	4.68	156.	19.45	206.	33.42	256.	0.71	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
7.	0.0	57.	1.00	107.	6.68	157.	20.42	207.	34.00	257.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
8.	0.0	58.	0.0	108.	8.00	158.	21.67	208.	34.74	258.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
9.	0.0	59.	0.0	109.	7.84	159.	20.97	209.	35.00	259.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
10.	0.0	60.	0.0	110.	7.00	160.	20.37	210.	35.00	260.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
11.	0.0	61.	0.0	111.	6.53	161.	22.00	211.	35.00	261.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
12.	0.0	62.	0.0	112.	7.89	162.	22.00	212.	35.00	262.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
13.	0.0	63.	0.0	113.	10.57	163.	22.66	213.	35.00	263.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
14.	0.0	64.	0.0	114.	11.00	164.	23.00	214.	35.00	264.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
15.	0.0	65.	0.23	115.	10.10	165.	23.97	215.	35.84	265.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
16.	0.0	66.	1.39	116.	10.74	166.	25.51	216.	37.99	266.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
17.	0.0	67.	2.00	117.	10.42	167.	29.00	217.	38.00	267.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
18.	0.0	68.	4.11	118.	11.00	168.	29.00	218.	37.69	268.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
19.	0.0	69.	5.00	119.	12.46	169.	29.00	219.	38.41	269.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
20.	0.0	70.	6.02	120.	14.77	170.	30.51	220.	39.37	270.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
21.	0.0	71.	7.18	121.	14.09	171.	31.00	221.	39.00	271.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
22.	0.0	72.	7.33	122.	16.20	172.	30.00	222.	39.00	272.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
23.	0.0	73.	6.49	123.	17.00	173.	30.00	223.	38.10	273.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
24.	0.0	74.	7.00	124.	17.00	174.	30.00	224.	39.00	274.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
25.	0.0	75.	7.00	125.	17.00	175.	30.54	225.	39.41	275.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
26.	0.0	76.	7.00	126.	17.00	176.	31.00	226.	40.57	276.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
27.	0.0	77.	7.00	127.	15.02	177.	31.96	227.	41.73	277.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
28.	0.0	78.	7.00	128.	15.71	178.	31.00	228.	42.00	278.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
29.	0.0	79.	7.43	129.	14.00	179.	31.17	229.	41.92	279.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
30.	0.0	80.	8.00	130.	14.92	180.	32.33	230.	40.00	280.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
31.	0.0	81.	8.00	131.	15.38	181.	33.00	231.	40.00	281.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
32.	0.0	82.	7.09	132.	15.78	182.	33.00	232.	39.49	282.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
33.	0.0	83.	11.06	133.	16.00	183.	33.80	233.	37.66	283.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
34.	0.0	84.	12.89	134.	16.00	184.	34.00	234.	37.00	284.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
35.	0.0	85.	14.49	135.	16.25	185.	35.12	235.	36.01	285.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
36.	0.0	86.	11.46	136.	17.41	186.	36.00	236.	34.86	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
37.	0.0	87.	13.08	137.	18.56	187.	36.00	237.	33.70	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
38.	0.0	88.	16.55	138.	19.00	188.	34.32	238.	32.54	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
39.	0.0	89.	16.00	139.	19.88	189.	33.25	239.	29.54	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
40.	0.0	90.	15.34	140.	21.00	190.	32.09	240.	26.46	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
41.	0.0	91.	12.32	141.	21.00	191.	32.00	241.	22.28	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
42.	0.0	92.	13.00	142.	21.00	192.	32.00	242.	19.91	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
43.	0.0	93.	13.00	143.	20.49	193.	32.00	243.	18.76	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
44.	0.0	94.	13.00	144.	20.00	194.	32.00	244.	17.60	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
45.	0.0	95.	15.86	145.	19.18	195.	32.00	245.	16.44	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
46.	0.24	96.	12.00	146.	19.00	196.	32.95	246.	14.57	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
47.	0.60	97.	11.73	147.	18.86	197.	33.01	247.	13.13	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
48.	0.0	98.	11.00	148.	16.29	198.	34.00	248.	11.97	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
49.	1.42	99.	11.00	149.	19.00	199.	33.68	249.	10.81	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00

SUM OF SPEEDS = 4148.17

IF THE ABOVE TIME INTERVAL IS 1 SECOND, THEN:
AVERAGE SPEED: 14.55 DURATION: 4.75 MIN. DISTANCE: 1.15

1.00-SECOND INTERPOLATION OF 1539135071 LA G+D FWY 10:24:18 FEB 14, 1978

0.	0.0	50.	45.00	100.	50.00	150.	55.00	200.	58.00	250.	32.66	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
1.	0.0	51.	44.97	101.	50.00	151.	55.00	201.	58.00	251.	30.50	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
2.	0.0	52.	44.18	102.	50.00	152.	55.00	202.	58.00	252.	28.34	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
3.	0.0	53.	44.66	103.	50.00	153.	55.00	203.	58.00	253.	26.37	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
4.	0.0	54.	44.00	104.	50.00	154.	55.00	204.	58.00	254.	25.03	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
5.	2.36	55.	44.00	105.	50.00	155.	55.00	205.	58.00	255.	21.87	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
6.	3.94	56.	44.81	106.	50.00	156.	55.00	206.	57.15	256.	19.85	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
7.	5.31	57.	45.00	107.	50.00	157.	55.00	207.	56.00	257.	16.56	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
8.	8.26	58.	45.00	108.	50.00	158.	55.00	208.	56.00	258.	15.40	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
9.	9.42	59.	45.00	109.	50.00	159.	55.00	209.	56.00	259.	14.24	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
10.	11.15	60.	45.44	110.	50.00	160.	55.00	210.	56.00	260.	12.17	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
11.	12.73	61.	46.00	111.	50.47	161.	55.00	211.	56.00	261.	10.71	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
12.	14.78	62.	46.00	112.	51.00	162.	54.50	212.	55.63	262.	6.08	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
13.	16.05	63.	46.92	113.	51.00	163.	54.66	213.	55.00	263.	2.61	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
14.	17.41	64.	47.00	114.	51.00	164.	55.00	214.	55.00	264.	1.45	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
15.	19.72	65.	47.00	115.	51.00	165.	54.03	215.	55.00	265.	0.30	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
16.	21.52	66.	47.00	116.	51.00	166.	54.00	216.	55.00	266.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
17.	23.35	67.	47.00	117.	51.42	167.	54.00	217.	55.00	267.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
18.	24.83	68.	47.00	118.	52.00	168.	54.00	218.	55.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
19.	25.99	69.	47.00	119.	52.00	169.	54.00	219.	55.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
20.	27.15	70.	47.04	120.	52.00	170.	54.00	220.	55.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
21.	28.31	71.	49.00	121.	52.00	171.	54.00	221.	54.22	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
22.	29.46	72.	49.33	122.	52.20	172.	54.00	222.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
23.	30.62	73.	49.51	123.	53.00	173.	54.00	223.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
24.	31.78	74.	49.00	124.	53.00	174.	54.77	224.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
25.	32.94	75.	49.00	125.	53.00	175.	56.00	225.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
26.	34.18	76.	49.00	126.	53.00	176.	56.00	226.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
27.	36.25	77.	49.00	127.	53.00	177.	56.00	227.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
28.	37.41	78.	48.72	128.	53.00	178.	56.02	228.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
29.	38.56	79.	48.87	129.	53.00	179.	57.00	229.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
30.	39.72	80.	50.00	130.	53.00	180.	56.67	230.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
31.	40.00	81.	50.00	131.	52.38	181.	56.00	231.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
32.	40.00	82.	50.00	132.	52.00	182.	56.00	232.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
33.	40.00	83.	50.00	133.	52.93	183.	56.00	233.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
34.	40.00	84.	49.78	134.	52.91	184.	56.00	234.	54.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
35.	40.00	85.	49.00	135.	52.25	185.	56.00	235.	53.01	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
36.	40.00	86.	49.00	136.	53.00	186.	56.00	236.	50.86	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
37.	40.82	87.	49.69	137.	53.00	187.	56.00	237.	49.70	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
38.	41.00	88.	50.00	138.	53.00	188.	56.00	238.	48.54	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
39.	41.00	89.	50.00	139.	53.00	189.	56.00	239.	47.39	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
40.	41.30	90.	50.00	140.	53.00	190.	56.91	240.	46.23	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
41.	42.00	91.	49.68	141.	53.00	191.	57.00	241.	45.07	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
42.	42.00	92.	49.00	142.	53.00	192.	57.00	242.	43.91	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
43.	42.00	93.	49.00	143.	53.00	193.	57.00	243.	42.51	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
44.	42.93	94.	48.20	144.	53.00	194.	57.00	244.	40.60	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
45.	43.00	95.	48.00	145.	53.00	195.	57.00	245.	39.44	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
46.	43.00	96.	48.00	146.	53.98	196.	57.85	246.	38.28	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
47.	43.00	97.	48.27	147.	55.00	197.	58.00	247.	37.13	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
48.	43.56	98.	49.00	148.	55.00	198.	58.00	248.	35.94	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
49.	44.71	99.	49.58	149.	55.00	199.	58.00	249.	33.81	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00

SUM OF SPEEDS = 11997.68

IF THE ABOVE TIME INTERVAL IS 1 SECOND, THEN:
AVERAGE SPEED: 44.94 DURATION: 4.45 MIN. DISTANCE: 3.33

0.	0.0	50.	17.00	100.	26.22	150.	54.00	200.	45.00	250.	3.66	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
1.	0.0	51.	17.05	101.	27.00	151.	53.23	201.	46.27	251.	2.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
2.	0.0	52.	19.00	102.	29.00	152.	53.00	202.	45.41	252.	0.34	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
3.	0.0	53.	19.00	103.	29.42	153.	52.92	203.	45.00	253.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
4.	0.0	54.	19.50	104.	31.37	154.	52.24	204.	44.11	254.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
5.	0.0	55.	20.00	105.	32.00	155.	53.00	205.	44.73	255.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
6.	0.0	56.	18.37	106.	32.00	156.	53.00	206.	44.00	256.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
7.	0.0	57.	18.00	107.	32.00	157.	52.29	207.	44.58	257.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
8.	0.0	58.	18.74	108.	34.00	158.	48.53	208.	43.52	258.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
9.	0.0	59.	17.29	109.	34.16	159.	48.00	209.	43.00	259.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
10.	0.0	60.	18.44	110.	34.69	160.	48.18	210.	44.05	260.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
11.	1.46	61.	19.00	111.	35.41	161.	49.00	211.	44.58	261.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
12.	0.22	62.	21.28	112.	38.26	162.	48.50	212.	42.63	262.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
13.	0.0	63.	19.25	113.	39.00	163.	46.03	213.	41.47	263.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
14.	0.0	64.	19.29	114.	39.94	164.	45.00	214.	41.00	264.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
15.	0.0	65.	23.00	115.	40.20	165.	43.06	215.	41.00	265.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
16.	0.0	66.	23.00	116.	42.00	166.	40.13	216.	39.01	266.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
17.	0.0	67.	23.00	117.	42.00	167.	41.00	217.	39.85	267.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
18.	0.0	68.	23.70	118.	42.00	168.	41.00	218.	37.75	268.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
19.	2.97	69.	24.00	119.	41.27	169.	41.00	219.	35.00	269.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
20.	4.00	70.	24.00	120.	41.00	170.	40.24	220.	35.00	270.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
21.	3.69	71.	24.00	121.	41.04	171.	40.00	221.	35.00	271.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
22.	3.00	72.	23.67	122.	42.00	172.	39.00	222.	35.94	272.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
23.	3.62	73.	23.49	123.	42.36	173.	39.00	223.	37.00	273.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
24.	4.00	74.	23.35	124.	43.52	174.	39.00	224.	37.51	274.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
25.	5.87	75.	23.00	125.	44.67	175.	39.00	225.	39.00	275.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
26.	9.00	76.	24.92	126.	45.83	176.	39.70	226.	39.00	276.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
27.	9.00	77.	24.88	127.	46.00	177.	40.96	227.	39.00	277.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
28.	9.41	78.	23.72	128.	46.00	178.	42.00	228.	39.00	278.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
29.	10.56	79.	23.43	129.	46.30	179.	42.00	229.	37.87	279.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
30.	11.00	80.	23.41	130.	47.46	180.	42.00	230.	35.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
31.	12.76	81.	23.00	131.	48.62	181.	41.51	231.	35.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
32.	13.00	82.	20.28	132.	48.22	182.	41.65	232.	35.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
33.	13.00	83.	20.06	133.	48.00	183.	42.00	233.	36.34	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
34.	13.35	84.	21.00	134.	48.00	184.	41.04	234.	37.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
35.	14.51	85.	20.24	135.	48.00	185.	42.12	235.	36.01	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
36.	14.33	86.	19.00	136.	48.41	186.	42.72	236.	33.71	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
37.	14.00	87.	19.00	137.	49.56	187.	42.43	237.	31.70	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
38.	14.98	88.	20.70	138.	50.00	188.	43.00	238.	29.63	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
39.	15.55	89.	21.01	139.	51.76	189.	43.00	239.	26.77	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
40.	18.11	90.	22.33	140.	52.04	190.	43.91	240.	25.23	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
41.	15.55	91.	23.68	141.	52.81	191.	45.00	241.	21.28	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
42.	15.61	92.	22.52	142.	52.00	192.	45.22	242.	19.91	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
43.	16.00	93.	22.00	143.	52.00	193.	45.25	243.	18.03	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
44.	15.07	94.	22.80	144.	52.00	194.	44.00	244.	14.60	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
45.	16.00	95.	21.09	145.	52.00	195.	44.00	245.	13.44	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
46.	16.24	96.	21.22	146.	52.00	196.	44.00	246.	11.57	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
47.	17.00	97.	22.73	147.	53.00	197.	44.00	247.	9.26	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
48.	17.00	98.	22.00	148.	53.00	198.	44.33	248.	7.94	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
49.	17.00	99.	23.16	149.	53.45	199.	45.68	249.	5.63	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00

SUM OF SPEEDS = 7533.55

IF THE ABOVE TIME INTERVAL IS 1 SECOND, THEN:
AVERAGE SPEED: 27.00 DURATION: 4.65 MIN. DISTANCE: 2.09

0.	0.0	50.	0.0	100.	0.0	150.	9.22	200.	10.00	250.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
1.	0.0	51.	0.0	101.	0.0	151.	10.00	201.	9.36	251.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
2.	0.0	52.	0.0	102.	0.0	152.	9.08	202.	9.00	252.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
3.	0.0	53.	0.0	103.	0.0	153.	10.08	203.	9.95	253.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
4.	0.0	54.	0.0	104.	0.0	154.	11.24	204.	14.33	254.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
5.	0.0	55.	0.0	105.	0.0	155.	12.79	205.	17.53	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
6.	0.0	56.	0.0	106.	0.0	156.	14.00	206.	19.42	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
7.	0.0	57.	0.0	107.	0.0	157.	12.58	207.	20.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
8.	0.0	58.	0.13	108.	0.0	158.	12.27	208.	20.74	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
9.	0.0	59.	0.71	109.	0.0	159.	13.00	209.	21.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
10.	0.0	60.	0.0	110.	0.0	160.	13.00	210.	21.11	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
11.	0.0	61.	0.0	111.	0.0	161.	13.68	211.	23.84	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
12.	0.0	62.	0.0	112.	0.0	162.	15.00	212.	27.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
13.	0.0	63.	0.0	113.	0.0	163.	15.00	213.	27.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
14.	0.0	64.	4.15	114.	0.0	164.	13.37	214.	29.05	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
15.	0.0	65.	6.00	115.	0.0	165.	12.03	215.	32.52	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
16.	0.0	66.	6.00	116.	0.0	166.	12.26	216.	31.01	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
17.	0.0	67.	6.00	117.	0.0	167.	14.29	217.	31.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
18.	0.0	68.	5.30	118.	0.0	168.	14.56	218.	31.62	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
19.	0.0	69.	4.14	119.	0.0	169.	15.20	219.	33.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
20.	0.0	70.	1.96	120.	0.0	170.	16.76	220.	32.37	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
21.	0.0	71.	0.0	121.	0.0	171.	17.00	221.	30.43	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
22.	0.0	72.	0.0	122.	0.0	172.	17.00	222.	30.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
23.	0.0	73.	0.0	123.	0.0	173.	17.23	223.	30.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
24.	0.0	74.	0.0	124.	0.0	174.	18.77	224.	30.51	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
25.	0.0	75.	0.0	125.	0.0	175.	20.54	225.	32.41	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
26.	0.0	76.	0.0	126.	0.0	176.	19.60	226.	33.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
27.	0.0	77.	0.0	127.	0.0	177.	18.14	227.	32.27	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
28.	0.0	78.	0.0	128.	0.0	178.	17.98	228.	32.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
29.	0.0	79.	0.0	129.	0.0	179.	17.00	229.	31.04	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
30.	0.0	80.	0.0	130.	0.0	180.	16.34	230.	32.20	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
31.	0.0	81.	0.0	131.	0.0	181.	15.00	231.	33.36	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
32.	0.0	82.	0.0	132.	0.0	182.	15.00	232.	34.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
33.	0.0	83.	0.0	133.	0.0	183.	15.00	233.	34.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
34.	0.0	84.	0.0	134.	0.0	184.	15.96	234.	34.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
35.	0.51	85.	0.0	135.	0.0	185.	12.35	235.	33.01	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
36.	0.33	86.	0.0	136.	0.0	186.	15.28	236.	31.86	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
37.	0.0	87.	0.0	137.	0.0	187.	14.27	237.	30.10	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
38.	0.0	88.	0.0	138.	0.0	188.	12.59	238.	26.17	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
39.	0.0	89.	0.0	139.	0.0	189.	12.25	239.	23.39	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
40.	0.0	90.	0.0	140.	0.0	190.	9.28	240.	21.46	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
41.	0.0	91.	0.0	141.	0.19	191.	8.00	241.	17.28	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
42.	0.0	92.	0.48	142.	1.00	192.	8.00	242.	15.83	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
43.	0.0	93.	1.64	143.	1.51	193.	8.38	243.	13.76	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
44.	0.0	94.	0.41	144.	2.66	194.	9.53	244.	12.60	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
45.	0.0	95.	0.0	145.	4.64	195.	10.69	245.	10.33	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
46.	0.0	96.	0.0	146.	6.96	196.	11.00	246.	8.28	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
47.	0.0	97.	0.0	147.	8.86	197.	9.00	247.	5.38	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
48.	0.0	98.	0.0	148.	7.71	198.	9.00	248.	2.91	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00
49.	0.0	99.	0.0	149.	7.45	199.	9.32	249.	0.0	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00	-0.	-0.00

SUM OF SPEEDS = 1920.68

IF THE ABOVE TIME INTERVAL IS 1 SECOND, THEN:
AVERAGE SPEED: 7.56 DURATION: 4.23 MIN. DISTANCE: 0.53