

Technical Report

January, 1980

The Effect of Load and Inertia
on Particulate Emissions

by

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NOTICE

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Introduction

This report summarizes particulate emissions data from light-duty diesel trucks operating over a range of road loads and inertia weights. The results indicate that diesel particulate emissions are relatively insensitive to road load but are significantly influenced by changes in vehicle inertia weight. Information of this nature is useful in determining differences in particulate emissions that can be expected when the same engine is applied to vehicles of different sizes and weights.

Discussion

Data from four sources are presented in this report. They are General Motors' and Mercedes Benz' responses to the Light-Duty Diesel Particulate Notice of Proposed Rulemaking, Ricardo Consulting Engineers, and the EPA Motor Vehicle Emissions Laboratory. The EPA tests were run on a small diesel Dodge truck over a range of load and inertia conditions indicated in Figures 1 and 2, and Table 1. Data from the other sources were collected in a similar fashion and while there are differences in levels and slopes of the results the trends among sources are consistent.

Table 1

Summary of Particulate Emissions for Various Loads and Inertias (Continued)

<u>Vehicle</u>	<u>Source</u>	<u>IW</u>	<u>HP</u>	<u>Particulate Emissions</u>	<u>g/mi</u>
Mercedes 300D	Mercedes Submission to LDD Particulate Hearings	3000	7.4		0.47
		3000	9.2		0.46
		3000	12.8		0.47
		3000	16.4		0.48
		4000	7.4		0.47
		4000	9.2		0.48
		4000	11.0		0.48
		4000	14.6		0.49
		4000	16.4		0.49
		2500	12.8		0.45
		3500	12.8		0.46
		3750	12.8		0.43
		4000	12.8		0.48
		4500	12.8		0.50
Opel 2100D	Ricardo data	2000	8.3		0.54
		2000	16.6		0.57
		3000	10.3		0.57
		3000	20.6		0.62
		4000	12.0		0.62
		4000	24.0		0.72

Table 1

Summary of Particulate Emissions for Various Loads and Inertias

<u>Vehicle</u>	<u>Source</u>	<u>IW</u>	<u>HP</u>	<u>Particulate Emissions</u>	<u>g/mi</u>
Dodge Truck	EPA MVEL Lab	4500	14	0.50	
		5500	14	0.61	
		4500	20	0.50	
		5500	20	0.60	
GM Vehicle #78504	GM Submission	3500	14	0.65	
	to LDD Particulate	4500	14	0.71	
	Hearings	5500	14	0.81	
GM Vehicle #89589	GM Submission	3500	14	0.30	
	to LDD Particulate	4500	14	0.35	
	Hearings	5500	14	0.46	
Oldsmobile 350D install- ed in LD Truck	GM Submission	5000	20	0.58	
	to LDD Particulate Hearings	5500	20	0.76	

Figure 1

Particulate Emissions as a Function of Inertia Weight
FTP Driving Cycle

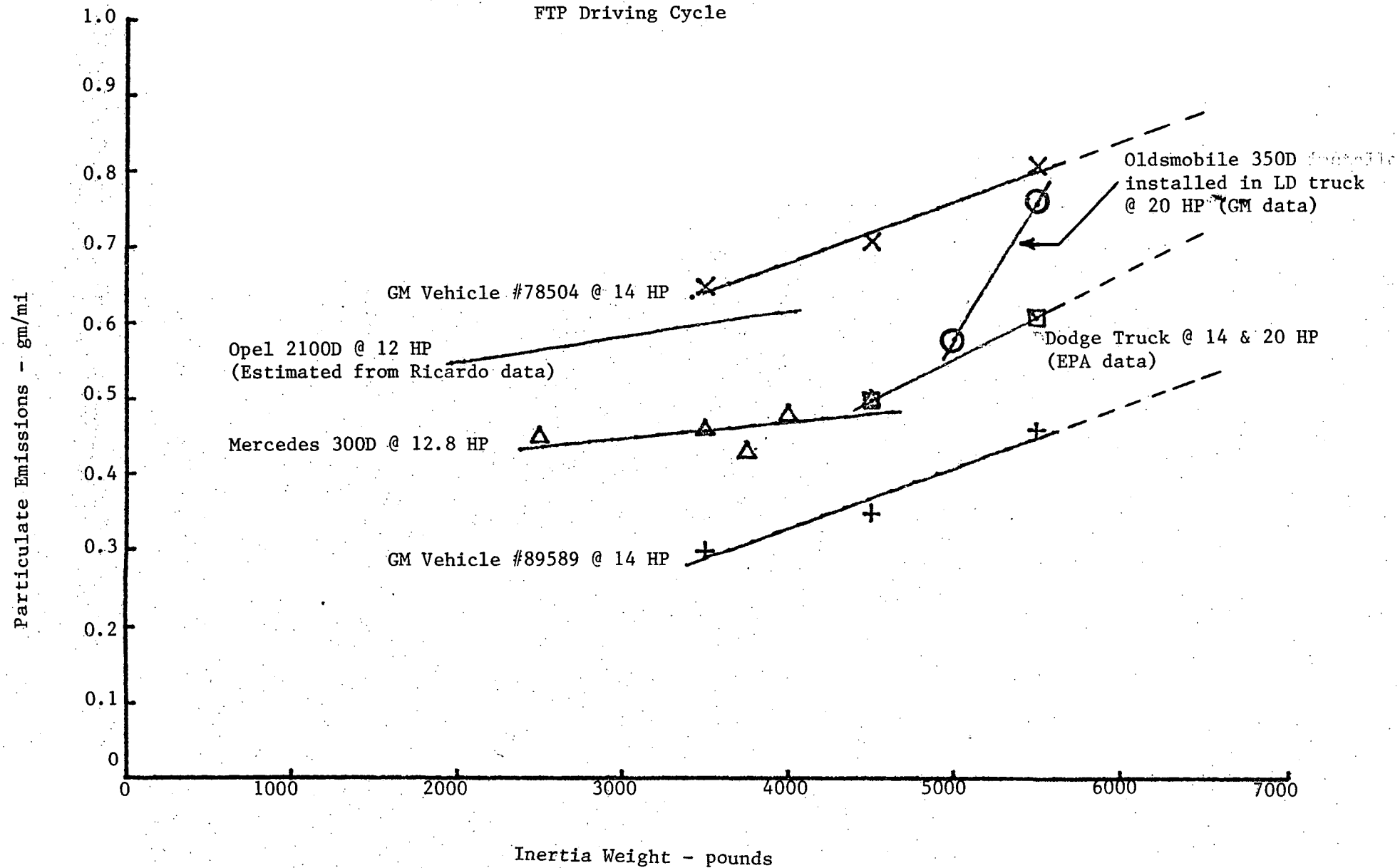


Figure 2

Particulate Emissions as a Function of Roadload
FTP Driving Cycle

