

7-96-01  
II-A-316

U.S. ENVIRONMENTAL PROTECTION AGENCY

CONTRACT NUMBER 68-01-4414

TECHNOLOGY, COST AND ECONOMIC IMPACT ANALYSIS  
FOR THE REVISION OF THE INTERSTATE  
MOTOR CARRIER EMISSION REGULATIONS

WYLE LABORATORIES, INC.

MAY 11, 1978

U.S. ENVIRONMENTAL PROTECTION AGENCY

CONTRACT NUMBER 68-01-4414

TECHNOLOGY, COST AND ECONOMIC IMPACT ANALYSIS  
FOR THE REVISION OF THE INTERSTATE  
MOTOR CARRIER EMISSION REGULATIONS

WYLE LABORATORIES, INC.

MAY 11, 1978

WYLE LABORATORIES, INC.

## PROGRAM OBJECTIVES

### PHASE I

- REVIEW THE MOTOR CARRIER REGULATIONS APPLICABLE TO MOTOR CARRIER VEHICLES NOT SUBJECT TO NEW VEHICLE REGULATIONS

### PHASE II

- REVIEW THE MOTOR CARRIER REGULATIONS APPLICABLE TO MOTOR CARRIER VEHICLES SUBJECT TO NEW VEHICLE REGULATIONS

### PHASE III

- REVIEW MAINTENANCE INSTRUCTIONS, LANGUAGE, REGULATIONS AND WARRANTIES OF NOISE SENSITIVE COMPONENTS

INTERSTATE MOTOR CARRIER REGULATION REVIEW

PHASE I

TASK 1

IDENTIFICATION OF NEW DATA

TASK 5

RAISED SPEED BRAKE

TASK 2

REVIEW EPA NEW TRUCK REGULATION

TASK 6

TRACTOR TRAILER COMBINATIONS

TASK 3

IDENTIFICATION OF DISCREPANCIES

TASK 7

LEVEL STREET ANALYSIS

TASK 4

EFFECTS OF EXISTING REGULATIONS

TASK 8

HEALTH AND WELFARE IMPACT

INTERSTATE MOTOR CARRIER REGULATION REVIEW

PHASE II

TASK 1

TOTAL VEHICLE NOISE DEGRADATION

TASK 4

COMPONENT TAMPERING

TASK 2

COMPONENT NOISE DEGRADATION

TASK 5

FAN CLUTCH EVALUATION

TASK 3

COMPONENT NOISE VS MAINTENANCE AND OPERATION

INTERSTATE MOTOR CARRIER REGULATION REVIEW

PHASE III

TASK 1

MAINTENANCE AND TAMPERING  
WARNINGS

TASK 4

IDENTIFICATION OF NEEDED  
MAINTENANCE INSTRUCTIONS

TASK 2

COMMUNICATIVE EFFECTIVENESS

TASK 5

EXECUTIVE SUMMARY

TASK 3

LOCAL GOVERNMENT EXPERIENCE

PHASE I

REVISION OF MOTOR CARRIER NOISE REGULATIONS

APPLICABLE TO VEHICLES NOT SUBJECT TO

NEW TRUCK NOISE REGULATIONS

WYLE LABORATO

## TASK 1

### IDENTIFICATION OF NEW DATA

OBJECTIVE:

IDENTIFY AREAS WHERE NEW, REVISED OR EXPANDED DATA ARE AVAILABLE AS REVIEW INFORMATION FOR EXISTING INTERSTATE MOTOR CARRIER REGULATIONS

- DETERMINE NUMBER OF VEHICLES AFFECTED BY MOTOR CARRIER REGULATIONS AS A FUNCTION OF KEY DESIGN PARAMETERS.
- COLLECT, ORGANIZE, REVIEW RECENT TRUCK NOISE DATA AS ACCUMULATED BY BMCS, STATE OF CALIFORNIA, STATE OF FLORIDA, ETC.
- COLLECT, ORGANIZE, REVIEW BUS NOISE DATA FROM ROADSIDE MEASUREMENTS, SAE J366b TESTS, ETC.
- COMPILE, EVALUATE DATA ON SPEED DISTRIBUTION OF TRUCKS BEFORE AND AFTER INTRODUCTION OF NEW SPEED LIMIT.
- COMPILE DATA ON HARDWARE, MAINTENANCE, AND OPERATION COSTS OF AVAILABLE RETROFIT TECHNOLOGY.
- DEFINE MOTOR CARRIER TIRE USE PRACTICES APPLICABLE UNDER CURRENT AND FUTURE REGULATED CONDITIONS.
- COMPILE, REVIEW RECENT TRUCK TIRE NOISE AND TRACTION DATA.



TASK 1

SUMMARY OF EFFORTS

- STATISTICS ON TRUCK POPULATION WILL BE AVAILABLE IN JUNE THROUGH 1977 CENSUS OF TRANSPORTATION; 1977 TRUCK SALES DATA ALREADY COMPILED
- TRUCK NOISE DATA SOURCES AVAILABLE:
  - RECENT DOT QUIET TRUCK REFERENCES
  - BUREAU OF MOTOR CARRIER SAFETY
  - STATE OF FLORIDA
  - 1977 WYLE TRUCK NOISE SURVEY
- SYNOPSIS OF BUS DATA COMPLETED
- 1976 TRAFFIC SPEED DISTRIBUTION SAMPLES OBTAINED BY WYLE
- COSTS OF RETROFIT TECHNOLOGY EVALUATED IN CONCERT WITH PHASE II EFFORTS
- SUMMARY OF HEAVY TRUCK TIRE USE PRACTICES AVAILABLE FROM WYLE/DOT STUDY
- HSRI TIRE TRACTION DATA UNDER REVIEW

**TASK 1**

**SAMPLE OF TIRE LIFE CYCLE COST CALCULATIONS**

	Scenario Number					
	1-1	1-2	1-3	1-4	1-5	1-6
<b>Vehicles:</b>	4x2 Tractor 2 Semitrailers	4x2 Tractor 2 Semitrailers	4x2 Tractor 2 Semitrailers	6x4 Tractor Tandem Axle Semitrailer	6x4 Tractor Tandem Axle Semitrailer	6x4 Tractor Tandem Axle Semitrailer
<b>Tires:</b>						
Steer	Bias Rib	Bias Rib	Radial Rib	Bias Rib	Bias Rib	Radial Rib
Drive	Bias Rib	Bias Crossbar	Radial Rib	Bias Rib	Bias Crossbar	Radial Rib
<b>Tire Prices (\$):</b>						
Steer	150	150	185	150	150	185
Drive	150	173	185	150	173	185
Recap	42	42	42	42	42	42
<b>Wear Rates: (Miles/32nd)</b>						
Steer	8,780	8,780	10,440	6,610	6,610	8,335
Drive	3,575	3,090	6,050	4,340	6,490	8,970
Trailer	9,500	9,500	14,400	9,500	9,500	14,400
<b>Pull Depth (in.):</b>						
Steer	6/32	8/32	4/32	4/32	4/32	4/32
Drive	5/32	6/32	4/32	2/32	4/32	2/32
Trailer	2/32	2/32	2/32	2/32	2/32	2/32
<b>Mileage Available per Trailer Tire</b>	219,780	200,349	208,590	323,478	214,155	328,846
<b>Tire Use:</b>						
Steer	4.1	5.0	2.9	4.7	4.7	3.7
Drive	18.6	13.6	10.2	24.6	11.7	11.9
<b>Cost per Mile</b>	0.0035	0.0032	0.0030	0.0040	0.0028	0.0029

TASK 2

REVIEW OF EPA BACKGROUND DOCUMENT FOR NEW TRUCK NOISE  
REGULATIONS -- MAINTENANCE, OPERATION, COST THEREOF

OBJECTIVE:

UPDATE INFORMATION IN EPA MEDIUM AND HEAVY TRUCK NOISE  
EMISSION REGULATIONS REGARDING MAINTENANCE AND OPERA-  
TION, AND COST THEREOF, OF TRUCKS MEETING NEW TRUCK  
REGULATIONS

- COMPILE AND REVIEW MAINTENANCE/OPERATION MANUALS  
PUBLISHED BY VEHICLE MANUFACTURERS AND PARTS SUPPLIERS.
- REVIEW LITERATURE PUBLISHED SINCE EPA BACKGROUND  
DOCUMENT.
- SOLICIT INFORMATION DIRECTLY FROM VEHICLE OPERATORS.

TASK 2

SUMMARY OF EFFORTS

- MAINTENANCE MANUALS SOLICITED FROM:
  - GMC
  - FORD
  - FREIGHTLINER
  - INTERNATIONAL HARVESTER
- ADDITIONAL MANUALS SUPPLIED BY EPA/ONAC ENFORCEMENT DIVISION
- PERTINENT DOCUMENTS FROM DOT QUIET TRUCK PROGRAM UNDER REVIEW
- COMMENTS ON COMPLIANCE COSTS ACQUIRED FROM MOTOR CARRIER OPERATIONS
- FURTHER DATA COMPILED IN CONCERT WITH PHASE II

### TASK 3

#### IDENTIFICATION OF REGULATORY DISCREPANCIES

OBJECTIVE: REVIEW/COMPARE ONAC BACKGROUND DOCUMENT FOR NEW TRUCK NOISE REGULATIONS AND OAWM DRAFT DOCUMENT FOR HEAVY ENGINE AIR EMISSION STANDARDS TO DETERMINE POTENTIAL DISCREPANCIES IN KEY TRUCK POPULATION AND ECONOMIC DATA.

- COMPARE VEHICLE POPULATION ESTIMATES.
- IDENTIFY DIFFERENCES IN GROWTH RATE ASSUMPTIONS AND FORECASTING METHODOLOGIES.
- IDENTIFY VARIATIONS IN BASIC COST INFORMATION.

TASK 3

SUMMARY OF DOCUMENTS REVIEWED

Regulating Agency	Document	Publication Date
EPA Office of Noise Abatement and Control (ONAC)	<ol style="list-style-type: none"><li>1. <u>Background Document for Medium and Heavy Truck Noise Emission Regulations</u></li><li>2. <u>Noise Emission Standards for Medium and Heavy Trucks</u></li></ol>	March 1976  April 13, 1976
EPA Office of Air and Waste Management (OAWM)	<ol style="list-style-type: none"><li>1. <u>Draft Environmental and Inflationary Impact Statement; Interim Heavy Duty Engine Regulations for 1979 and Later Model Years</u></li><li>2. <u>Environmental Impact Statement: Emission Standards for New Light Duty Trucks</u></li><li>3. <u>Revised Light Duty Truck Regulations for 1979 and Later Model Years</u></li></ol>	April 21, 1976  November 29, 1976  December 28, 1976

### TASK 3

#### - SUMMARY OF RESULTS

- 1972 TRUCK POPULATION UNDERESTIMATED IN ONAC BACKGROUND DOCUMENT
- WIDE VARIATION AMONGST DOCUMENTS IN VEHICLE POPULATION GROWTH RATE ASSUMPTIONS
- OAWM PROVIDES LITTLE INSIGHT INTO TRUCK USE AND LIFE-CYCLE MODELS
- INSUFFICIENT EXAMINATION IN ALL DOCUMENTS OF PRICE ELASTICITY OF DEMAND

TASK 4

EFFECTS OF EXISTING MOTOR CARRIER REGULATIONS

OBJECTIVE:

ASSESS IMPACT OF INTERSTATE MOTOR CARRIER NOISE REGULATIONS BY REVIEWING EXPERIENCES OF REGULATORY AGENCIES AND MOTOR CARRIERS

- CONTACT STATE/LOCAL GOVERNMENTS REGARDING REGULATORY ACTIVITY AND ENFORCEMENT EXPERIENCE.
- REVIEW BMCS ENFORCEMENT EXPERIENCE.
- REVIEW COMPLIANCE EXPERIENCE OF MOTOR CARRIERS.



TASK 4

SUMMARY OF EFFORTS

- REVIEWED/SUMMARIZED DATA FROM 15 STATES REGARDING:
  - EXPERIENCES WITH FEDERAL IMC NOISE REGULATIONS
  - EXPERIENCES WITH STATE OPERATIONAL REGULATIONS
  - MAJOR TYPES OF VIOLATIONS
  - PERCENT OF VEHICLES IN VIOLATIONS
- REVIEWED/SUMMARIZED SIMILAR DATA FROM SELECTED LOCAL GOVERNMENTS
- INTERVIEWED BMCS OFFICIALS REGARDING REGULATORY EXPERIENCES
- INTERVIEWED SELECTED MOTOR CARRIERS REGARDING COMPLIANCE EXPERIENCES

**TASK 4**

**SUMMARY OF STATE TRUCK NOISE REGULATIONS**

State	Min. GVW to which Regs. Apply (1000 lbs)	Operational Regulations					New Truck Regulations									
		Effective Date	Noise Limit			Degree of Enforcement <sup>(2)</sup>	SAE Noise Limit in Year 19-								Degree of Enforcement	
			< 56 km/h	> 56 km/h	Other <sup>(1)</sup>		68	72	73	74	75	76	77	78		
United States	10	1975	86	90	-	+									83	-
California	6	1973	86	90	LS/82	+	88	86				83			80	+
Colorado	8	1975	80	82	ST/85	0			86	83	80					0
Connecticut	6 <sup>(4)</sup>	1975	84 <sup>(4)</sup>	88 <sup>(4)</sup>	LS/82	+			90 <sup>(3)</sup>		88 <sup>(3)</sup>					+
Florida	10	1975	86	90	-	+			86					83		0
Hawaii	6	1972	84 <sup>(5)</sup>	84	-	+	To Be Adopted									0
Idaho	All Vehicles	Not Available	92 <sup>(6)</sup>	92 <sup>(6)</sup>	-	+	None									-
Indiana	7	1974	88	90	-	0	None									-
Maryland	10	1976	86	90	-	+				86	83				80	+
Minnesota	6	1975	86	90	-	+		88			86					0
Nebraska	10	1975	86	90	-	+		88	86		84					0
Nevada	6	1973	86	90	-	0		88	86							0
New York	All Vehicles	1975	88	88	ST/88	0	None									-
Oregon	10	1976	85 <sup>(4)</sup>	87 <sup>(4)</sup>	ST/88	0					86			83 <sup>(4)</sup>		+
Pennsylvania	7		90 <sup>(7)</sup>	92 <sup>(7)</sup>	-	0			90 <sup>(7)</sup>							0
Washington	10	1975	86	90	ST/88	0					86			83		0

(1) LS - Level Street Standard  
 ST - Stationary Runup Standard  
 - = Not Applicable

(2) + - Heavy to Moderate  
 0 - Little or None

(3) High Speed Cruise-by Limit  
 (4) Revised in 1976 to Conform with Federal Standards  
 (5) 73 dB at Night, Sundays, and on Holidays

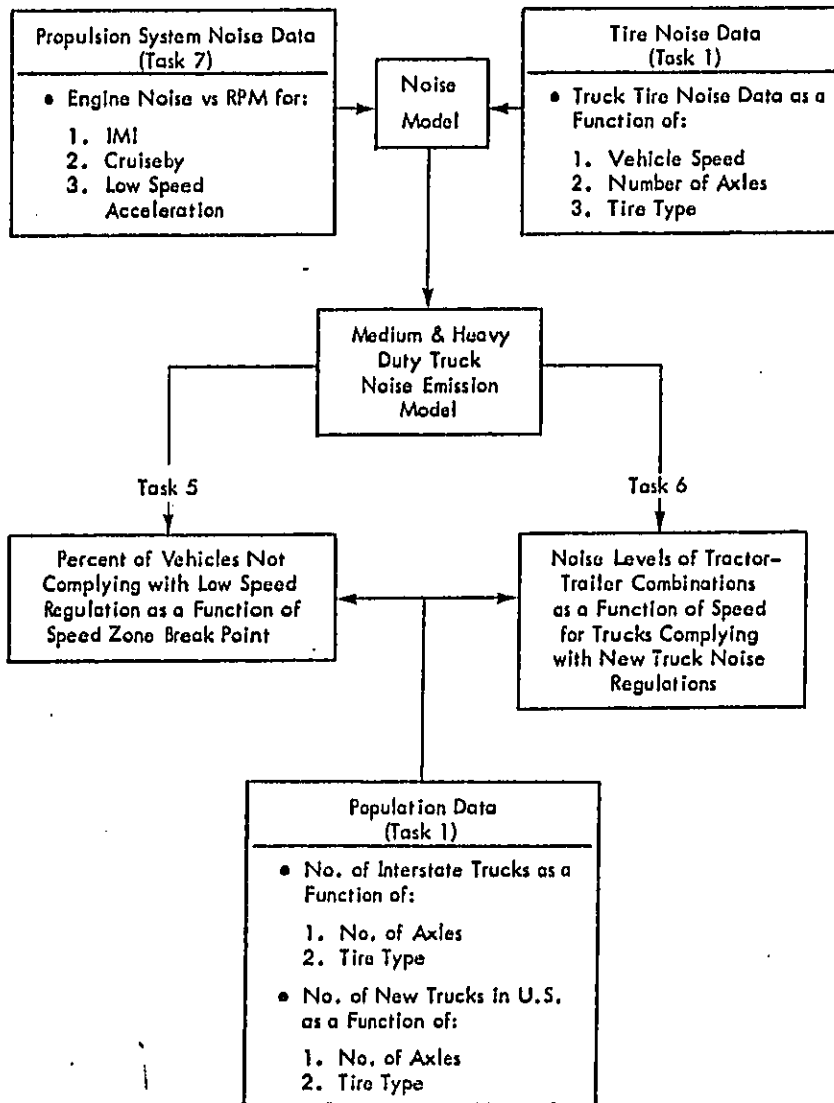
(6) At 6.1 meters (20 feet)  
 (7) Presently Being Revised to Conform with Federal Standards

#### TASK 4

#### SUMMARY OF RESULTS

- MOTOR CARRIER COMPLIANCE EXPERIENCE:
  - 0 PERCENT HAVE HAD TO REBUILD/RETROFIT TRUCKS TO MEET INTERSTATE MOTOR CARRIER NOISE REGULATIONS.
  - 14 PERCENT HAVE HAD TO REBUILD/RETROFIT TRUCKS TO MEET INTERIOR NOISE STANDARDS.
  - 71 PERCENT USE FAN CLUTCHES AND 62 PERCENT USE RADIAL TIRES FOR FUEL ECONOMY REASONS.
  - 0 PERCENT HAVE INCURRED ADDITIONAL MAINTENANCE COSTS RESULTING FROM VOLUNTARY RETROFITTING.
  - 39 PERCENT HAVE NEVER BEEN STOPPED FOR COMPLIANCE CHECK.
  - 90 PERCENT REPORT NO VIOLATIONS.

## INTERRELATIONSHIP OF TASKS 5, 6, AND 7



## WYLE TRUCK NOISE EMISSION MODEL

- MODEL ESTIMATES STATISTICAL NOISE LEVEL DISTRIBUTION FOR MEDIUM AND HEAVY TRUCK NATIONAL POPULATION.
  - LOW SPEED MODEL (PROPULSION NOISE)
  - HIGH SPEED MODEL (PROPULSION AND TIRE NOISE)
- MODEL DEVELOPMENT BASED UPON:
  - SAN ONOFRE WEIGH STATION MEASUREMENTS (TASK 7)
  - CONTROLLED TESTS
  - OTHER DATA SOURCES
- DISTRIBUTION OF NOISE LEVELS DEPENDENT UPON:
  - ENGINE RPM
  - ENGINE LOAD
  - VEHICLE SPEED (FOR HIGH SPEED CASE)
  - TRUCK CLASSIFICATION (NO. OF AXLES, GVWR, ETC.)
- MODEL DIRECTLY APPLICABLE TO DETERMINING PERCENT VEHICLES NOT COMPLYING TO ALTERNATIVE REGULATED CONDITIONS

TASK 5

RAISED SPEED BREAK

OBJECTIVE: ASSESS PERCENT OF VEHICLES OUT OF COMPLIANCE IF SPEED BREAK RAISED FROM 56 kmh (35 mph) TO 64 kmh (40 mph) OR 72 kmh (45 mph).

- CALCULATE PERCENT OF VEHICLES OUT OF COMPLIANCE USING WYLE NOISE EMISSION MODEL AND VEHICLE POPULATION DATA.
- IDENTIFY HARDWARE MODIFICATIONS/CHANGE IN TIRE USE PRACTICES NECESSARY TO MEET STANDARD BASED UPON RAISED SPEED BREAK.

TASK 6

TRACTOR-TRAILER COMBINATIONS

OBJECTIVE: ESTIMATE NOISE EMISSIONS OF SPECIFIED TRACTOR-TRAILER CONFIGURATIONS AS A FUNCTION OF SPEED

- CALCULATE NOISE LEVELS OF TRACTOR-TRAILER COMBINATIONS AT 56, 64 AND 72 kmh (35, 40 AND 45 mph) USING WYLE NOISE EMISSION MODEL.
- ASSESS EFFECTS OF ALTERNATIVE TIRE USE PRACTICES.

## TASK 7

### LEVEL STREET ANALYSIS

OBJECTIVE: ASSESS POTENTIAL FOR REGULATING TRUCK NOISE EMISSIONS UNDER URBAN STREET OPERATING CONDITIONS

- EXECUTE CONTROLLED TESTS TO MEASURE DIFFERENCE IN TRUCK NOISE LEVELS FOR ACCELERATION AND CRUISE.
- PERFORM NOISE SURVEY OF MEDIUM/HEAVY TRUCKS TO DETERMINE DISTRIBUTION OF NOISE EMISSION LEVELS.
- ASSESS FEASIBILITY OF "61m (200 ft.) FROM INTERSECTION" RULE.
- EVALUATE NUMBER OF EXISTING REGULATED VEHICLES THAT COULD MEET LOWER LEVEL STREET NOISE STANDARD.



TASK 7

SUMMARY OF SAN ONOFRE NOISE MEASUREMENTS

- NUMBER OF VEHICLES MEASURED:
  - GASOLINE MEDIUM DUTY = 24
  - HEAVY DUTY = 3
  - DIESEL MEDIUM DUTY = 14
  - HEAVY DUTY = 83
  - TOTAL 124
  
- AVERAGE (MEAN) NOISE LEVELS:
  - GASOLINE MEDIUM DUTY 77.6 dBA
  - HEAVY DUTY ---
  - DIESEL MEDIUM DUTY 81.2 dBA
  - HEAVY DUTY 82.8 dBA

PHASE II

TASK 1

OBJECTIVE: COLLECT NOISE DEGRADATION DATA ON TOTAL VEHICLE

APPROACH: TEST PROGRAM

- PRIMARILY STATIONARY (IDLE-MAX-IDLE) TESTING
- PASS-BY TESTING
- IN-CAB NOISE MEASUREMENT
- STATIONARY TESTING WITH EXHAUST GAS NOISE DUCTED AWAY
- FACTORY TESTING; STATIONARY AND PASS-BY

LITERATURE SEARCH AND MANUFACTURER CONTACTING

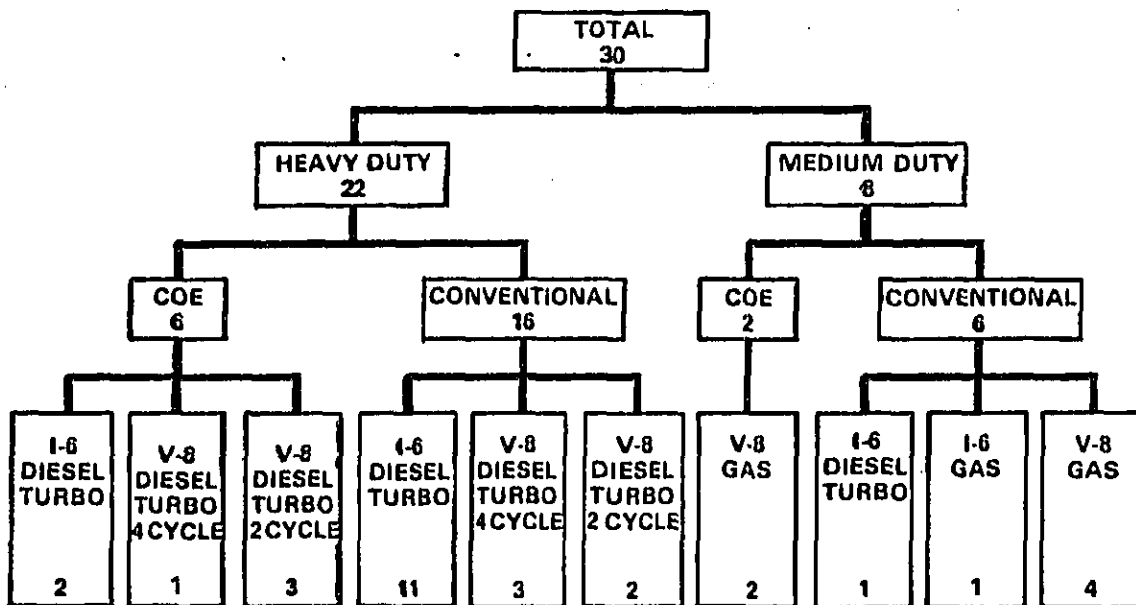
ACCOMPLISHMENTS: TEST PROGRAM

- THIRTY TRUCKS IN TEST
- FOUR HAVE COMPLETED TEST #3
- ELEVEN HAVE COMPLETED TEST #2
- THIRTY HAVE COMPLETED TEST #1

OTHER PROGRAMS

- INTERNATIONAL HARVESTER
- MVMA PERFORMED BY WYLE

# TEST VEHICLE CONFIGURATIONS



SUMMARY OF OBSERVED CHANGES IN AVERAGE NOISE LEVEL  
WITH CUMULATIVE KILOMETERS

SOURCE: WYLE REPORT TO MVMA

APPROXIMATE KILOMETERS COMPLETED	NUMBER OF VEHICLES	AVERAGE CHANGE FROM INITIAL VALUE (dB)	STANDARD DEVIATION (dB)	PROBABILITY THAT CHANGE WAS DUE TO CHANCE (%)
16,000	8	+0.4	1.1	35
32,000	7	+0.5	1.0	30
48,000	7	+0.2	1.1	60
64,000	4	-0.2	1.7	80

FACTORY DATA VS. WYLE DATA  $L_A$

VEHICLE NUMBER	PASS-BY		$\Delta$ dB	IMI		$\Delta$ dB
	FACTORY	WYLE		FACTORY	WYLE	
2	81.0	79.9	-1.1	80.0	80.6	+0.6
3	83.0	84.2	+1.2	84.0	85.1	+1.1
4	82.0	79.4	-2.6	81.0	80.6	-0.4
5	83.0	82.5	-0.5	85.0	84.8	-0.2
19				78.1	77.0	-1.1
20				78.8	77.5	-1.3
27				78.5	78.2	-0.3
28				77.9	78.0	+0.1

PHASE II

TASK 2

OBJECTIVE: COLLECT NOISE DEGRADATION DATA ON TRUCK COMPONENTS  
EXPERIMENTALLY AND FROM LITERATURE

APPROACH: TEST PROGRAM

- USE SAMPLE OF TRUCKS FROM TASK 1, TOTAL VEHICLE NOISE  
DEGRADATION
- STATIONARY TESTING USING FOLLOWING CONFIGURATION:  
ENGINE ONLY  
ENGINE PLUS FAN  
ENGINE PLUS EXHAUST  
ENGINE PLUS INTAKE

LITERATURE SEARCH AND MANUFACTURER CONTACT

ACCOMPLISHMENTS: TEST PROGRAM

- ONE VEHICLE COMPLETED TEST #2
- TWO VEHICLES COMPLETED TEST #1

LITERATURE SEARCH

- QUIET TRUCK PROGRAM, IH, WHITE, FREIGHTLINER, DONALDSON,  
STEMCO, PACCAR, MC DONNELL DOUGLAS
- COMPONENT MANUFACTURERS FAN, MUFFLER, ENGINE

PHASE II

TASK 3

**OBJECTIVE:** EVALUATE VEHICLE AND COMPONENT NOISE DEGRADATION AS RELATED TO PROPER MAINTENANCE AND OPERATION

**APPROACH:**

- PROCURE MANUFACTURERS MAINTENANCE AND OPERATION MANUALS
- REVIEW MAINTENANCE AND OPERATION OF IN TEST VEHICLES
- LITERATURE SEARCH COUPLED WITH MANUFACTURERS AND USER SURVEY

**ACCOMPLISHMENT:**

- SOME MAINTENANCE MANUALS RECEIVED FROM MAJOR MANUFACTURERS
- ACCUMULATING DATA ON TEST VEHICLES. RECORDS REVIEWED WHEN VEHICLES ARE TESTING
- LIMITED DATA PROCURED FROM LITERATURE AND COMPONENT MANUFACTURERS

PHASE II

TASK 4

**OBJECTIVE:** DETERMINE EFFECTS ON TOTAL VEHICLE NOISE AS A RESULT OF TAMPERING OR COMPONENT REPLACEMENT

**APPROACH:**

- MUFFLER SUBSTITUTION AND NOISE PANEL REMOVAL DONE EXPERIMENTALLY
- LITERATURE SEARCH AND VENDOR CONTACT

**ACCOMPLISHMENTS:**

- THREE TRUCKS TESTED
- LITERATURE SEARCH INDICATES EXHAUST SYSTEM DEGRADATION IS PRIMARY PROBLEM



CHANGE IN NOISE LEVELS (L<sub>A</sub>)  
 RESULTING FROM MUFFLER SUBSTITUTION

VEHICLE NUMBER	MUFFLER CONFIGURATION					MAXIMUM INCREASE (dB)
	FACTORY	SUBSTITUTE 1	SUBSTITUTE 2	SUBSTITUTE 3	SUBSTITUTE 4	
#7 MEDIUM DUTY V-8 GAS 28,000 KILOMETERS	79.9	79.7	82.5	DID NOT FIT		+2.6
#40 HEAVY DUTY V-8 DIESEL 4-CYCLE TURBO 90,000 KILOMETERS	85.8	86.1	85.9	86.2	86.2	+0.4
#41 HEAVY DUTY V-6 DIESEL 2-CYCLE TURBO 54,000 KILOMETERS	81.7	81.9	84.9	80.4	83.5	+3.2

PHASE II

TASK 5

**OBJECTIVE:** EVALUATION OF FAN CLUTCHES TO DETERMINE EFFECTS UPON TRUCK NOISE DEGRADATION

**APPROACH:**

- LITERATURE SEARCH
- TRUCK MANUFACTURER AND COMPONENT MANUFACTURER CONTACT

FAN CLUTCH PROJECTED USAGE

PREVIOUS OR PRESENT TEST PROGRAMS

POSSIBLE FAILURE RATE

NOISE LEVEL REDUCTION RESULTING FROM USE

TYPES OF MODIFICATIONS OR REMOVALS ANTICIPATED OR EXPERIENCED

**ACCOMPLISHMENTS:**

- ESTIMATED USAGE 52% CLASS 7 AND 8 BY 1978  
90% CLASS 7 AND 8 BY 1982
- SOME GUARANTEE 250,000 MILES OPERATION
- MOST RECENT TESTS RUN BY RCCC IN ST. LOUIS
- TAMPERING OR CONTINUOUS ON MODE MAY CAUSE FAILURE

PHASE III

TASK 1

**OBJECTIVE:** CATALOG DOMESTIC AND FOREIGN MAINTENANCE INSTRUCTIONS AND TAMPERING WARNINGS ON NOISE SENSITIVE COMPONENTS

- APPROACH:**
- REVIEW AND SUMMARIZE LISTS OF REQUIRED MAINTENANCE FOR NOISE SENSITIVE COMPONENTS AND TAMPERING LISTS SUBMITTED TO THE NOISE ENFORCEMENT OFFICE
  - REQUEST INFORMATION FROM MANUFACTURERS ON THEIR EXPERIENCE WITH THE INTERSTATE MOTOR CARRIER REGULATIONS
  - OBTAIN COPIES OF MANUALS SPECIFICALLY WRITTEN FOR MAINTENANCE OF NOISE EMISSION CONTROL SYSTEMS

- ACCOMPLISHMENTS:**
- QUESTIONS AND REQUESTS ARE BEING FORMULATED FOR INQUIRIES TO BE SUBMITTED TO THE MANUFACTURERS
  - REQUESTS HAVE BEEN MADE TO THE MANUFACTURERS PRESENTLY INVOLVED IN OUR PROGRAM FOR COPIES OF NOISE EMISSION CONTROL SYSTEM MANUALS THAT THEY SUPPLY TO TRUCK OWNERS

PHASE III

TASK 2

**OBJECTIVE:**

- DETERMINE COMMUNICATIVE EFFECTIVENESS OF EXISTING MAINTENANCE INSTRUCTIONS, WARRANTIES OR TAMPERING WARNINGS FROM TRUCK MANUFACTURERS, OPERATORS AND ENFORCEMENT PERSONNEL
- DEVELOP RECOMMENDATIONS FOR METHOD OF INFORMATION COMMUNICATION FOR WARRANTIES, MAINTENANCE INSTRUCTIONS AND TAMPERING WARNINGS

**APPROACH:**

- PHONE, WRITTEN AND PERSONAL COMMUNICATION WITH MANUFACTURERS, OPERATORS AND ENFORCEMENT PERSONNEL TO ASK ABOUT THEIR EXPERIENCE WITH EXISTING MAINTENANCE INSTRUCTIONS, WARRANTIES OR TAMPERING WARNINGS REGARDING NOISE CONTROL DEVICES COVERING THE FOLLOWING:
  - LANGUAGE
  - FORMULATIONS MOST EFFECTIVE
  - RESEARCH PLANNED FOR INSTRUCTIONS OR LABELING
  - EXPERIENCE REGARDING LABEL LOCATION
  - EXPERIENCE REGARDING USE OF SYMBOLS AND COLORS

**ACCOMPLISHMENTS:**

- THIS TASK IS IN PLANNING STAGE

PHASE III

TASK 3

OBJECTIVE:

- REVIEW AND ANALYZE ALL PLANNED STATE, LOCAL OR FOREIGN WARRANTY OR MAINTENANCE INSTRUCTION REGULATIONS OR REQUIREMENTS

APPROACH:

- CONTACT ALL STATE AND MANY SELECTED LOCAL GOVERNMENTS AND FOREIGN GOVERNMENTS REGARDING INFORMATION ON EXISTING OR PLANNED REGULATIONS OR REQUIREMENTS ON WARRANTY, MAINTENANCE INSTRUCTIONS AND TAMPERING WARNINGS AND ANY EXISTING ASSOCIATED EXPERIENCE

ACCOMPLISHMENTS:

- STATE AND LOCAL GOVERNMENT CONTACTS HAVE BEEN ESTABLISHED DURING PHASE I. THESE CONTACTS PLUS OTHERS WILL BE APPROACHED FOR INFORMATION REQUIRED FOR THIS TASK. FIFTEEN STATES AND SEVENTEEN LOCAL GOVERNMENTS RESPONDED TO OUR QUESTIONS DURING PHASE I

PHASE III

TASK 4

- OBJECTIVE:**
- IDENTIFY EQUIPMENT AND COMPONENTS WHICH SHOULD BE SUBJECT TO WARRANTIES, SPECIAL MAINTENANCE INSTRUCTIONS AND/OR TAMPERING WARNINGS
- APPROACH:**
- USE INFORMATION FROM TASK 4 (COMPONENT SUBSTITUTION AND TAMPERING) OF PHASE II AS BASIS FOR ANALYSIS
  - SUPPLEMENT WITH INFORMATION GATHERING FROM MANUFACTURERS, OPERATORS AND ENFORCEMENT PERSONNEL ON ASSESSMENT OF PREMEDITATED AND ACCIDENTAL TAMPERING OF NOISE CONTROL OR NOISE SENSITIVE COMPONENTS
  - INFORMATION REQUESTS WILL BE COMBINED WITH TASK 1 AND TASK 2 INQUIRIES TO MANUFACTURERS, OPERATORS AND ENFORCEMENT PERSONNEL
- ACCOMPLISHMENTS:**
- TYPE OF INFORMATION NEEDED IS BEING FORMULATED BASED UPON RESULTS OF PHASE II, TASK 4

PHASE III

TASK 5

**OBJECTIVE:**

- PREPARATION OF EXECUTIVE SUMMARY REPORT WITH SPECIFIC RECOMMENDATIONS FOR EPA ACTION, FORMULATING TEXTS OF WARRANTIES, MAINTENANCE INSTRUCTIONS AND TAMPERING WARNINGS
- RECOMMENDATIONS WILL ALSO BE MADE, WHERE APPROPRIATE, ON THE BEST LOCATION OF AFFIXING LABELS AND WARNINGS AND THE USE OF SYMBOLS AND COLORS

**ACCOMPLISHMENTS:**

- REPORT WILL FOLLOW THE COMPLETION OF TASKS 1 THROUGH 4