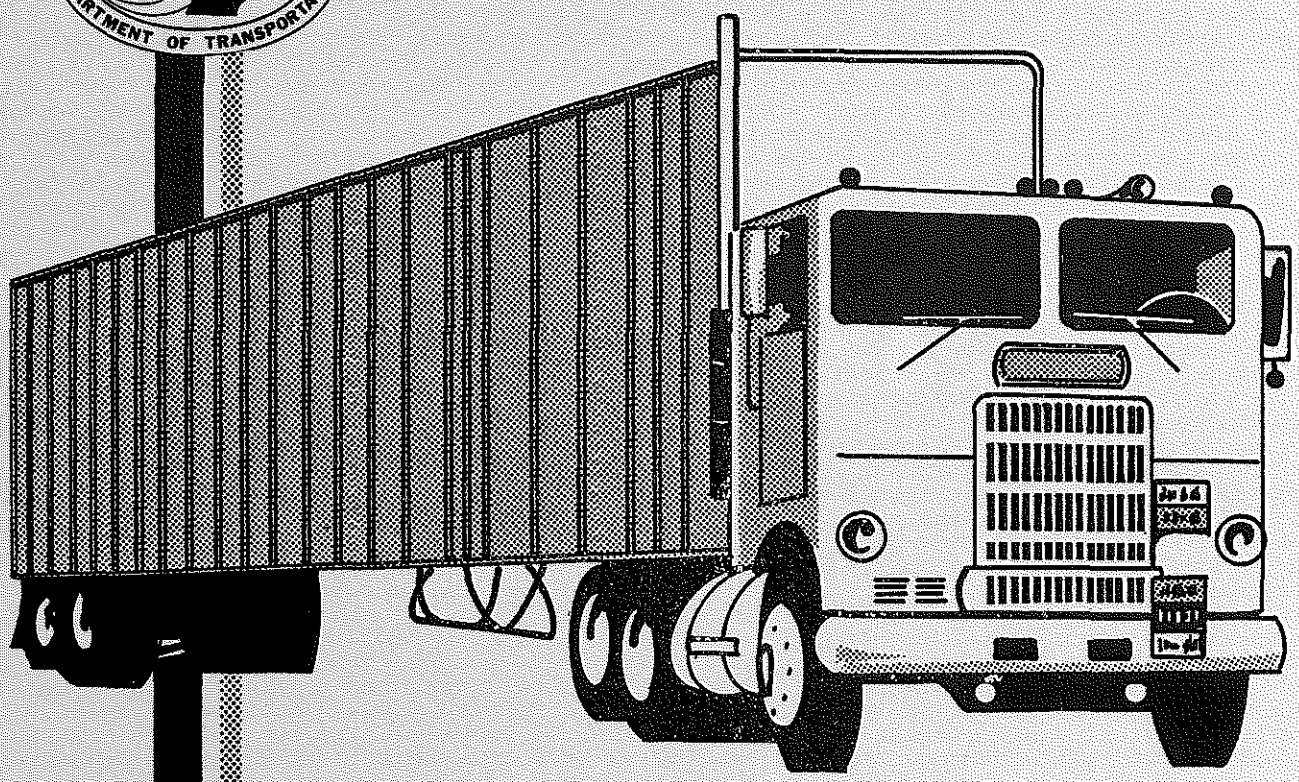
A BACKGROUND REPORT ON TRUCK SAFETY, REVENUE AND TAXATION, TRUCK SERVICES AND HIGHWAY FACILITIES



MICHIGAN DEPARTMENT OF TRANSPORTATION

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A BACKGROUND REPORT TO THE STATE TRANSPORTATION COMMISSION ON TRUCK SAFETY, REVENUE AND TAXATION, AND TRUCK SERVICES AND HIGHWAY FACILITIES

May 1986

This report represents the findings and/or professional opinions of the Michigan Department of Transportation staff. Its publication does not represent an official opinion of the State Transportation Commission.

ACKNOWLEDGMENTS

This report was prepared by the Departmental Truck Committee of the Michigan Department of Transportation. This committee contained representation from the Bureau of Highways, Bureau of Transportation Planning, and the Bureau of Urban and Public Transportation. The organization of this committee is shown below.

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GLOSSARY OF ACRONYMS

AASHTO	- American Association of State Highway Transportation Officials
ATA	- American Trucking Association
BVMT	- Billion Vehicle Miles of Travel
FAP	- Federal Aid Primary System
FHWA	- Federal Highway Administration
GVW	- Gross Vehicle Weight
HVUT	- Heavy Vehicle Use Tax
ICC	- Interstate Commerce Commission
IFTA	- International Fuel Tax Agreement
IRP	- International Registration Plan
MDOT	- Michigan Department of Transportation
MPSC	- Michigan Public Service Commission
MRA	- Multi-State Reciprocity Agreement
MTF	- Michigan Transportation Fund
NGA	- National Governors Association
NTP	- National Truck Plate
OMTA	- Office of Motor Transportation Affairs
O&D	- Origin and Destination (Studies)
PCN	- Priority Commercial Network
STAA	- Surface Transportation Assistance Act
UPRA	- Uniform Vehicle Registration Proration and Reciprocity Agreement
U.S. DOT	- United States Department of Transportation
VMT	- Vehicle Miles of Travel

EXECUTIVE SUMMARY

The trucking industry represents an essential component of Michigan's transportation service system. As such, the Michigan Department of Transportation has a vital interest in assuring that truck transportation services are provided in a manner consistent with the needs of Michigan shippers and citizens. The department is expanding its involvement in a number of areas relating to trucking. This report is intended to provide background material on the industry in Michigan and to establish an agenda for future department activities. Proposed actions are underlined for easy reference.

PUBLIC SECTOR INVOLVEMENT

1. Departmental Interest. The department recognizes the importance of truck transportation and will strengthen its involvement in truck transportation issues through an improved data base and analytical capability, expanded inter- and intra- departmental communication, state and federal legislative monitoring, and development of a cooperative working relationship with truck companies and industry representatives. This will enable the department to respond in a coordinated and knowledgable manner to the variety of trucking issues which arise. The Bureau of Transportation Planning will serve as the principal clearinghouse for truck related issues and information. The Bureau of Highways will continue to provide specialized services.

2. State Involvement in the Trucking Industry. Responsibility for trucking activities are dispersed among a number of state agencies, including

the departments of State Police, Commerce, State, Treasury, and Transportation. All share an interest in a safe, efficient truck industry serving Michigan's transportation needs. The Department of State Police is responsible for safety compliance and enforcement activities; the Department of Commerce issues route and rate authority for intrastate moves; the Department of Treasury collects fuel taxes; the Department of State issues driver licenses and registers vehicles; and the Department of Transportation has basic responsibility for construction and maintenance of a highway system and for issuance of oversize vehicle permits. An Interagency Truck Work Group, with representation from each department, has recently been established to coordinate truck issues. This group is chaired by MDOT. The department will utilize this organization to address and resolve truck issues involving the several state departments.

3. Federal Involvement in the Trucking Industry. The federal government has a number of agencies directly involved with the trucking industry. These include the Interstate Commerce Commission (ICC) which is responsible for regulation of trucking rates and entry. The functions of the ICC have been significantly reduced in recent years and there is a pending bill to abolish most remaining responsibilities. The Bureau of Motor Carrier Safety in the Federal Highway Administration (FHWA) has federal jurisdiction over the safety performance of all commercial motor carriers engaged in interstate or foreign commerce. Only 130 inspectors are presently available for the entire United States. By comparison, there are 127 officers in the Motor Carrier Division of the Michigan Department of State Police. The FHWA is also responsible for federal level highway research and for the administration of Federal-aid highway funding programs. The department will work closely with FHWA at both

the state and national level on commercial traffic count issues and on federal studies such as the Weight Distance Tax Study.

4. Relationship of the Public and Private Sector. Truck services are provided entirely by the private sector using vehicles and terminal facilities owned and operated without direct governmental support. These services are provided over a public system of streets and highways constructed and maintained by the public sector using, in part, user revenues from the trucks which utilize the system. The Michigan Public Service Commission, Department of Commerce established a Motor Carrier Advisory Board in 1983 to provide for the exchange of information between the state, private trucking companies, and shippers. The department will request ex officio membership on this board.

5. Intermodalism. The department is supportive of rail, water, and truck transport modes. Each plays a vital role in providing freight transportation services. The department takes a comprehensive view toward freight planning and program development and will assist shippers and local communities to meet their needs in the most appropriate manner. At times, this involves substitution of one mode for another. An example of this would be departmental assistance to shippers who must switch to truck service when rail services are discontinued.

DEREGULATION

6. Federal Deregulation Initiatives. The U.S. Congress, during the late 1970's, began to significantly change the federal role with respect to transportation. This included elimination or reduction of strict federal control relating to routes, rates and services. A philosophy was adopted that competition could more efficiently control the availability

and cost of transportation service. The Airline Deregulation Act of 1978, the Motor Carrier Deregulation Act of 1980, and the Staggers Rail Act of 1980 were evidence of this changing philosophy. In general, these acts provided for minimal federal control over routes operated, rates charged or quality of services provided. The previous protection enjoyed by airlines and trucking companies were eliminated and any company that was "fit, willing and able" could enter most markets. The federal government did retain responsibility for safety matters.

7. Truck Deregulation Impacts. There has been an ongoing debate as to whether deregulation would reduce transportation services and/or increase prices for persons and businesses located in rural areas or smaller communities. There is indication that this has occurred with respect to airline and intercity bus service. However, this is apparently not true for trucking services. MDOT surveys and contacts with shippers indicate that truck service remains available at competitive prices. There has, however, been significant changes in the industry with many long established companies going out of business and new firms entering the business. This includes many independent owner operators and new firms with a lower cost structure than was typical of previous carriers. The short term result appears to be a reduction in truck transportation costs. However, it is too early to determine longer term impacts associated with the changes. The department will periodically survey shippers to determine service or rate changes or other problems being encountered with truck services.

8. Interstate and Intrastate Regulations. The federal Motor Carrier Act of 1980 eliminated most federal requirements for truck rate and route authority. It is important to emphasize that deregulation applies only

to interstate trucking. Intrastate trucking is still regulated by the Michigan Public Service Commission in the Department of Commerce. Any request for new service or a new rate structure for an intrastate move is reviewed and requires state approval.

TRUCK NETWORKS AND STANDARDS

9. National Network for Trucks/Federal Standards. Each state has basic authority to establish size and weight standards for trucks. This has resulted in a confusing and widely divergent set of standards which varies significantly on a state to state basis. The federal government, through the Surface Transportation Assistance Act of 1982 (STAA), made an attempt to create a national system that had certain minimum standards. The STAA provided that each state establish a basic highway network which allows 48' semitrailers or two 28' twin trailer units, 102" width, and 80,000 pound weight limits. States may exceed these standards at their option. An exception is that states may not exceed the 80,000 pound weight limit on national network routes if they did not exceed that limit prior to enactment of the STAA.

10. Michigan Truck Standards. Michigan currently allows 102" wide trucks on most trunklines with a 50' limitation for semi-trailers or two 28.5' twin trailers. Legislation has been introduced to increase semi-trailer length to 53', similar to that allowed in several other states. Michigan allows 164,000 pound trucks (with proper axle spacing). This is the highest weight allowed in the country with most states having an 80,000 pound limit. The next highest state to Michigan allows 117,000 pounds.

11. Michigan's Priority Commercial Network (PCN). The department recently identified state trunklines considered most important for commercial

traffic. This network contains 48 percent of total trunkline mileage but carries 77 percent of total trunkline commercial traffic. The department will assign priority to the PCN for improvement funding to assure that the state's commerce will move over a well maintained and comprehensively developed highway network.

TRUCK TRAFFIC

12. Commercial Traffic. The department maintains an extensive traffic counting process. Analysis of these counts indicates that commercial traffic represents about nine percent of state trunkline traffic. About 68 percent of all commercial travel occurs on the state trunkline system. The heaviest truck flows are concentrated in the southern half of the lower peninsula; very few highways north of US-10 carry over 500 trucks daily. By contrast, highway volumes in major freeway corridors in the southern part of the state range up to 14,000 trucks per day.

Corridor	Daily Truck Volumes	Location
I-94	7,600	Berrien County
I-96	4,100	Lansing-Brighton
I-75	4,000	S. of Saginaw
US-23	4,000	S. of Flint
I-75	12,000	Monroe Co. (N. of Ohio S.L.)
I-75	11,000	Wayne Co. (S. of M-39)
I-94	14,000	Wayne Co. (E. of US-24)

These corridors are vital to the efficient conduct of Michigan's commerce. This is especially true given just-in-time delivery concepts which require reliable, on-time transport service. The department will undertake a special review of major commercial corridors to determine if previous forecasts, plans, and strategies are consistent with current trends. This is necessary to assure a safe and efficient highway facility for both autos and trucks.

13. Truck Traffic Data. Commercial traffic in Michigan has ranged from 4.2 to 4.9 billion (VMT) over the last ten years with trends up or down depending on Michigan's economy. There are indications that commercial traffic estimates have been understated in recent years and a careful review of the process is underway. A comprehensive plan to meet truck data needs will be developed and implemented. This will include installation, during 1986, of automated vehicle classification and weigh-in-motion equipment.

ACCIDENTS

14. Accident Data Deficiencies. The Michigan Department of Transportation receives raw accident data, on a statewide basis, from the Department of State Police. Two major problems have been encountered in using this data to analyze truck accidents. First, vehicle dimensions are not included on the accident report; the vehicle is described only in broad terms. Second, measures of exposure of vehicles of different sizes and configurations on different types of highways are not available. The department will work closely with the Department of State Police to obtain necessary vehicle dimension information. In addition, truck survey improvements discussed above will be implemented to determine exposure information for various commercial vehicle types.

15. Truck Accident Trends. During the early 1980's, the number of truck accidents nationwide was relatively constant. However, from 1983 to 1984, they increased 18 percent. This trend was echoed in Michigan where trucking accidents increased by 20 percent during this same period. For the first four months of 1985, truck accidents were up by

28 percent over the corresponding period of 1984. It must be emphasized that, even with recent increases, truck accidents and fatal truck accidents are still significantly less than they were in 1978. Michigan truck related accidents and fatalities by year are shown as follows:

Year	Truck Accidents	Fatal Truck Accidents	Fatalities	Commercial Truck Registrations	Total BVMT*
1978	20,057	192	228	85,039	67.4
1979	18,869	177	201	86,749	64.9
1980	13,521	130	149	NA	61.5
1981	13,394	129	141	86,391	62.0
1982	12,928	104	121	63,437	61.3
1983	13,696	123	145	81,920	63.6
1984	16,497	132	150	82,851	65.7

* Billion Vehicle Miles of Travel

A large part of the truck accident increase between 1983 and 1984 occurred in southeast Michigan. The increase from 2,668 to 3,916 truck accidents in this area amounts to a 47 percent increase. The reasons for this are not clear. The department will continue to analyze high accident locations and will undertake a special review of southeast Michigan accident experiences. Truck-related accidents constitute about five percent of all vehicular accidents. Approximately 57 percent of all truck accidents occurred on state trunklines. Over the seven year span, trucks were involved in 10 percent of all fatal accidents.

16. Accident Comments. Accident data do not permit clear conclusions to be drawn on the cause of the increase in accidents. There is evidence that there have been increases in truck traffic which have not been reflected in truck traffic estimates. This would be in keeping with significant improvements in the Michigan economy during the last several years as well as longer term trends toward additional trucking

trucking activity caused by just-in-time delivery concepts and changes in the level and type of manufacturing activity. Weather differences (i.e. Mild vs severe winters) also appear to be a factor in year to year changes. The impact of trucking deregulation cannot be ignored as a causal factor. Many new companies and independent operators have entered the industry since passage of the Motor Carrier Act of 1980. This has resulted in significant price competition and reduced profit margins. This may cause maintenance to be reduced and hours of service rules to be exceeded. For example, a recent study by AAA indicates that approximately 60 percent of truck accidents involve a fatigued driver. The department will work more closely with the Department of State Police regarding safety inspections, hours of service log inspections, overweight vehicle enforcement and other safety related issues.

17. Truck Safety Studies. A number of truck safety studies are underway at the state and national level. These relate to driver training and licensing, establishment of a national driver register, roadway geometric and design issues, and studies relating to the safety of large dimension and heavy trucks. Within the last month, the MDOT initiated discussions with the Department of State relative to possible changes in driver licensing procedures. In addition, the department recently contracted with the University of Michigan Transportation Research Institute to examine the safety issues associated with 53' trucks and to compare Michigan truck accident experience with national truck accident experience. These and other studies will be carefully reviewed by the Department to determine causal factors for accidents and a basis for improvements.

18. Truck Revenue and Taxation. Current debate on truck related taxes and policy focuses on concerns regarding 1) cost responsibility and 2) state tax and registration requirements and procedures. The issue of cost responsibility addresses the questions of whether heavy vehicles pay sufficient user charges to compensate their costs in terms of wear and tear and damage resulting from their use of highway facilities. Concern for greater efficiency and equity in state tax and registration policy is a result of the financial burden on interstate truck operators arising from non-uniformity across states.

19. Cost Responsibilities. The federal highway cost allocation study submitted to the Congress in May 1982 found that a substantial disparity existed between different classes of vehicles in the ratio of payments to allocated costs. The user fee structure subsequently enacted by the Surface Transportation Assistance Act (STAA) of 1982 did not eliminate the disparities, but it did shift more of the tax burden to heavier vehicles. The federal study indicated that, even with the 1982 tax increase provisions, heavy trucks still did not pay their proportionate share of highway costs. Conversely, automobiles and light trucks paid more than their proportionate share. The federal government, and certain states, are currently engaged in further studies to determine whether heavy trucks pay their fair share of highway construction and maintenance costs. The department will carefully monitor these studies to determine if state level studies are warranted.

20. Truck Taxes. Federal truck taxes include a gasoline tax of 9 cents/gallon, diesel fuel tax of 15 cents/gallon and a 12 percent tax on the purchase of medium and larger size trucks, tractors, and trailers. In addition, there is an annual use tax on heavy vehicles, ranging from $0

for those under 55,000 lbs. to $550 for vehicles over 75,000 lbs. GVW. Michigan taxes include a 15 cents/gallon gasoline and diesel fuel tax and a vehicle registration fee ranging from $421 for a 32,000 gross vehicle weight (GVW) truck, $1,097 for an 80,000 GVW and $2,072 for a 160,001 GVW. Trucks with a fuel tax permit receive a rebate of 6 cents/gallon on diesel fuel tax paid.

21. Administration of Truck Tax and Registration Procedures. The wide variance among states in taxing and registration procedures causes inefficiencies and confusion for interstate truck operators. Several agencies in a single state may have to be contacted in order to get the proper licenses and permits. Efforts are underway in Michigan and elsewhere to streamline this process. This includes the International Registration Plan (IRP), where a truck registered in one of the participating states is accepted in the other participating states. At present, 34 states including Michigan, belong to the IRP. Registration revenues paid to the home state are distributed to other states on the basis of mileage traveled. Payment of fuel taxes is more cumbersome and generally involves acquisition of a permit and payment of fuel taxes based on the mileage driven in each state. This is required even if fuel is not purchased in the state. The Department will continue to work with the National Governors Association, the U.S. DOT and other interested organizations to achieve a greater degree of cooperation and uniformity between states on truck taxation and revenue issues. The Interagency Truck Work Group will be the focal point for these activities.

CHAPTER I

INTRODUCTION

I. INTRODUCTION

The trucking industry represents a large and complex component of Michigan's total transportation system. Over 80,000 commercial vehicles are registered in the state including about 10,000 licensed to carry over 80,000 pounds. These vehicles, and their counterparts in other states, are responsible for a significant portion of the freight transportation provided in this country. Nationally, trucks carry about 24 percent of all freight ton-miles. This compares to 37 percent for railroads, 23 percent for pipelines, and 15 percent for water transportation. This statistic tends to understate the importance of trucking since trucks often carry lighter weight, higher value cargoes than the other transport modes. This is reflected in the fact that, in 1984, the trucking industry generated over $200 billion in revenues compared to $65 billion for all other transport modes combined. Trucks provide virtually all local freight collection and distribution service as well as much of the longer distance service.

In recent years, trucks have assumed increasing importance as distribution, manufacturing, and production concepts have evolved to reflect basic changes in this nation's economic base and its relationship to the world economy. The "just-in-time concept" of providing a product or a component when needed is one example which is designed to reduce costs through better inventory control. This requires reliability of transport service and usually implies truck

transportation to and from plants located in proximity to one another. This concept alone has caused the establishment of many new truck companies and a general decline in the use of rail transport for certain products. "Just-in-time" has also placed increased emphasis on the highway system as a vital component of the production process. This is evident on major highways in the state where significant truck-traffic increases have occurred over the past decade.

The importance of the trucking industry to the Michigan economy and to the health and welfare of its citizens suggests an increased level of involvement by the Department of Transportation. Concerns exist that freight transport services be provided in a safe and efficient manner and, to this end, programs are supported for rail, port, and highway transportation. Evolving issues relative to truck transportation include:

- truck safety concerns associated with an increasing number of truck accidents.
- truck rates and adequacy of services in a deregulated transportation environment.
- truck taxation equity questions relating to whether large trucks pay their proportionate share of highway costs.
- highway design and capacity issues given increasing truck traffic volumes.
- truck transportation roles vis-a-vis other transport modes.
- truck program concerns associated with a complex and fragmented national system.

A number of state agencies are involved in truck related activities including such things as regulation of routes and tariffs, weight limit enforcement, safety inspection, revenue and taxation, and the provision of a basic highway infrastructure over which the vehicles operate. These include the Motor Carrier Division, Department of State Police; Michigan Public Service Commission, Department of Commerce; Bureau of Driver and Vehicle Records, Department of State. Department of Treasury, and Department of Transportation. These agencies have recently joined together into an Interagency Truck Work Group to coordinate problems and issues of joint concern. In addition, a Departmental Truck Committee has been established within the Michigan Department of Transportation to coordinate and conduct departmental studies and other activities relating to the trucking industry. This report represents a product of that committee. It discusses current issues and presents summary findings from selected truck safety and other studies. It also provides basic statistical information on the industry as well as the role of the state and federal government. Lastly, it discusses current data deficiencies and suggests areas requiring future research and analysis.

CHAPTER II

TRUCK SERVICE AND HIGHWAY FACILITY ISSUES

II. TRUCK SERVICE AND HIGHWAY FACILITY ISSUES

The State Transportation Commission has adopted a goal of providing essential transportation services for all modes of transportation. This goal suggests that a level of truck service be available for Michigan shippers which meets their basic transport needs in terms of both price and frequency. The goal also suggests the maintenance of a street and highway system constructed to a level conducive to efficient and cost effective truck operation.

This section deals with both trucking services and the highway network over which the services are provided. It is important to understand the interaction of the private and public sector in this relationship. Truck services are provided by the private sector using vehicles and terminal facilities owned and operated without direct government support. These services are, however, provided over a public system of streets and highways constructed and maintained by the public sector using, in part, revenues from the trucks which utilize the system. The public sector also has responsibilities to regulate services and to enforce safety and weight limit laws.

A. Deregulation and Service Issues

A major current issue relating to the provision of trucking services is the impact of truck deregulation. During the 1970s, the ICC, in a reversal of its previous policies, began to implement new rules that were designed to increase competition in interstate trucking and lessen reliance on the federal government as the arbiter to

insure that all shippers received reasonable, fair, and non-discriminatory rates and services. These new rules and policies were based on economic theory which suggested that strict federal regulation was responsible for an unresponsive, excessively expensive, non-competitive, inefficient U.S. transportation system as it related to commerce. Especially with respect to motor carriers, economists argued that the danger of a trucking company monopolizing traffic in an area (and charging excessive rates) would be minimal because of the ease with which new trucking firms could enter markets and undercut the existing price.

As the trend toward a reduced government role in trucking, and other transport modes, accelerated in the late 1970s, Congress brought motor carrier laws into line with the prevailing regulatory and policy changes by passing the Motor Carrier Act of 1980. This loosened regulatory constraints and generally reduced the federal role in trucking. Although this represented a substantial step toward motor carrier deregulation, the Act did not result in total deregulation. The ICC still regulates entry and provides a degree of oversight on rates. This ICC involvement may end in the near future, however. In September 1985, the U.S. DOT sent a bill to Congress which would:

- eliminate all remaining ICC regulation of trucking rates and entry;
- eliminate antitrust immunity for collective ratemaking;
- eliminate tariff publication requirements;
- eliminate the "common carrier obligation";

- transfer jurisdiction for consumer protection in household goods carriers' operations to the Federal Trade Commission;
- eliminate special antitrust immunity for household goods van line-agent relationships after three years;
- prevent states from "encroaching" -- imposing new regulations on operations that previously were regulated by the ICC; but
- not change current statutory provisions requiring DOT to set financial responsibility requirements.

These changes at the federal level have been most pronounced for interstate truck movements. The State of Michigan, through the Public Service Commission, Department of Commerce, still regulates intrastate trucking to a degree. Any request for new service or a new rate structure for intrastate traffic is carefully reviewed and requires state approval.

In order to more fully understand the current nature of the trucking industry, a discussion of the deregulation issue is helpful. Proponents of regulation argue that a reduced governmental role will eventually lead to cutthroat competition, unsafe operations (as truckers reduce maintenance in order to meet competition), poor service to small or rural shippers and bankruptcy for many firms. The resulting oligopolistic industry, with a few large trucking companies controlling most business would then be able to charge high prices and offer selective service to the most desirable shippers. The proponents of deregulation on the other hand stress ease of entry into trucking, numerous possible competitors, and knowledgeable shippers as reasons why an extensive governmental role is not necessary to economically control the trucking industry.

Deregulation proponents advocate that free and open competition will do a more efficient job of allocating resources and providing needed service than a regulated environment.

Service availability, including the establishment of new trucking firms, is one area of concern that has occurred as a result of deregulation. The contention leading to regulatory reform relative to relaxing entry of new companies to provide trucking services was that restrictive entry created a monopolistic environment possibly resulting in inefficiencies and subsequently artificially high prices. (In Michigan, few significant new operating authorities were granted over the years prior to deregulation.) On the other hand, under regulation, certain levels and frequencies of service were guaranteed through common carrier responsibility. Service availability concerns, resulting from deregulation in Michigan, centered upon the possibility of loss of service in rural and lightly developed commercial centers, particularly in the upper Lower Peninsula and the Upper Peninsula. Service has been of major importance to shippers; surveys have indicated that the shipping public has appeared to be most concerned with reliable, dependable service, with price being a secondary consideration.

Presently, MDOT surveys and contacts with shippers indicate that service has generally increased and prices are currently competitive and reasonable. The department is not aware of a shipper or local community which has lost service or has suffered harm from deregulation. On balance, shippers appear to be pleased with the overall

service they are receiving. As an example, in the Upper Peninsula, Clairmont Motor Freight withdrew service (bankruptcy) and five new firms now provide service. Whether greater competition will cause deterioration of service and safety, especially for less-than-truckload and rural service, remains to be seen. Monitoring service availability and quality may become an important future task of MDOT, and state government. The importance of efficient movement of Michigan's commerce and the extensive public investment dictate monitoring of the trucking industry, and the effects of deregulation, by the state to insure the future health of Michigan's economy.

B. The National Network for Trucks

On January 6, 1983, the Surface Transportation Assistance Act (STAA) of 1982 became law, requiring the establishment of a National Network for Trucks and specifying length and weight limits for commercial motor vehicles. Subsequently, the STAA was amended to include truck width provisions.

Prior to the enactment of this law, federal involvement was limited to matters involving maximum vehicle weights and widths for the National System of Interstate and Defense Highways. The changes created by the STAA have preempted state authority with respect to width and to length. All states must, as a minimum, allow trucks of a certain weight, width, and length on the National Network. The dimensional limits established for the network by the STAA follow:

Weight - All states must allow on the interstate system 20,000 lb. on a single axle, 34,000 lb. on tandem axle, and a gross weight limit determined by the bridge formula, with a cap of 80,000 lb.

Width - All states must establish a 102-inch width limit on National Network routes.

Length - All states must allow the following on their portion of the National Network:

- a 48-foot semitrailer in a tractor-semitrailer combination; however, semitrailer lengths in normal, nonpermitted use on December 1, 1982, must continue to be allowed.
- tractor-semitrailer-trailers or "doubles" combination vehicles. This has now been interpreted by the U.S. DOT to include tractor-semitrailer-semitrailer vehicles to allow the use of new coupling methods for the units.
- twenty-eight-foot trailer and semitrailer units as part of doubles. Twenty-eight-and-one-half-foot units in legal operation within a 65-foot overall length limit on December 1, 1982, must also be allowed.
- tractor semitrailer and tractor-semitrailer-trailer (or second semitrailer) to operate without being subject to an overall length limits.

For Michigan, the comparison of state and federal limits are shown in Table II-1. The Appendix, pages 151-154, details general size restrictions and weight/axle loads for Michigan highways.

TABLE II-1

COMPARISON OF FEDERAL AND STATE LIMITS

		Michigan	
	Federal National Network Standards[1/]	Green Routes	Seasonal & Black Routes
Trailer Width	102"	102"	96"
Trailer Length	48'	50'	50'
Twin trailer length/unit	28'	28.5'	28.5'
Combination Length	None	None	59'
Weight Limits	80,000#	164,000#[2/]	164,000#[2/]

1/ States may exceed standards. An exception is that 80,000# limit may only be exceeded when higher limits allowed prior to 1982.

2/ This weight based on proper axle spacings. A five axle truck tractor semi-trailer combination is limited to 80,000 pounds on green routes and 73,280 on other state trunklines.

The STAA also required that the states provide access so that commercial motor vehicles may travel from the interstate and other designated roads to terminals and facilities for food, fuel, repair, and rest, and for household goods carriers to points of loading and unloading. The STAA mandates that the full interstate system be available for the operation of commercial vehicles of the dimensions authorized. In addition, the Secretary of U.S. DOT was required to designate qualifying Federal Aid Primary (FAP) highways on whith the larger vehicles would be allowed to operate.

To conform to the Act, FHWA decided to design a network in cooperation with the states, designating only those FAP routes meeting the highest standards - namely multi-lane, divided, full control access facilities. States were then asked to propose additions to this system that were safe for the operation of the larger vehicles. FHWA's goal was to designate a consistent system that could safely accommodate large vehicles. Michigan submitted its all-season truck routes shown in green on the truck operators map. This system was accepted without changes for inclusion in the national network by FHWA. As of June 5, 1984, 181,000 miles of FAP routes were open to vehicles authorized by the STAA. The final network is undergoing an additional formal examination that may result in some adjustment.

Establishment of this national highway system resulted in a change in trucking that affected Michigan operators. Historically, local motor carrier pickup and delivery operations have been conducted using substantially the same equipment used for over-the-road operations. This meant an 18 wheeler that included a semitrailer, nominally 45 feet long by 96 inches wide. Most companies, by splitting the STAA-authroized combination at the terminal, now use individual 28- or 28.5-foot trailers now allowed in a doubles combination, for pickup and delivery operations. This should improve local traffic flow because even though these vehicles will be an 6 inches wider, they will be 17 feet shorter.

National uniformity in all aspects of trucking operations has long

been a goal of the trucking industry. In the years to come, industry is likely to continue pressing for even more uniformity at increasing levels, limits, or amounts. Therefore, the traffic engineering community must be able to respond with factual information on the operation of existing vehicles and with sound estimates of how longer and larger vehicles are likely to affect safety. The FHWA has several research studies underway that are designed to provide information for current unanswered questions. One such issue being considered in Michigan is increasing trailer length to 53 feet.

C. Michigan Truck Routes

The national network for trucks was developed as a result of the STAA of 1982 and the U.S. DOT Appropriations Act that required the states to implement certain changes in regard to allowable vehicle sizes and weight for movement on designated routes. Michigan's statutes and policies relative to vehicle width and weight were basically not in conflict with the changes required by federal law. Michigan, for several years, allowed the weights prescribed by federal law on designated highways, and Michigan's width law was worded so that 102" wide vehicles were allowed on certain designated routes administratively.

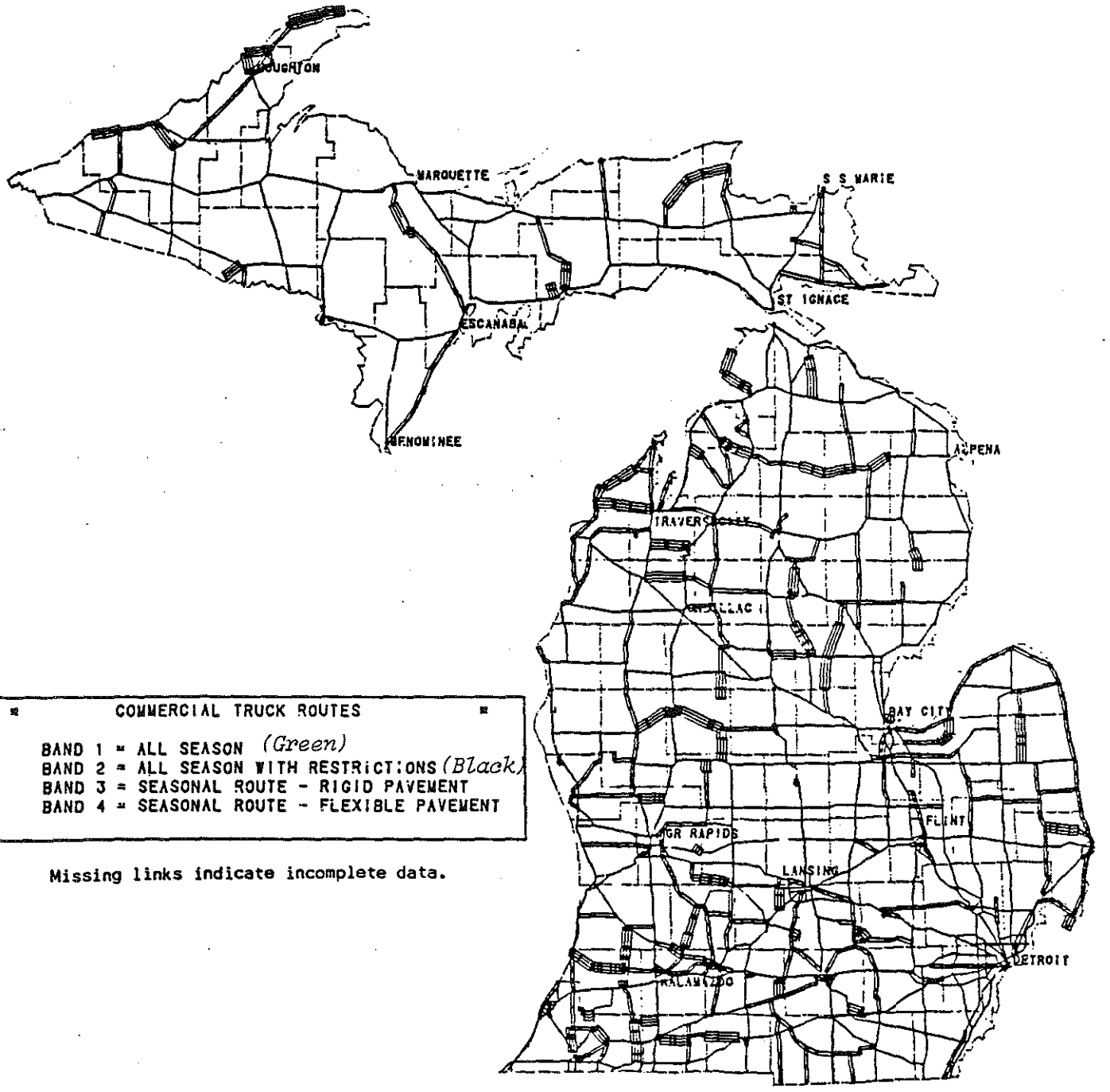
Due to Michigan's lenient weight allowances, and its long history of identifying a statewide truck route, system compliance with the federal legislation was met by Michigan submitting its "green routes" identified on the annual Truck Operator's Map. The

Michigan route system initially began as an identification of all weather truck routes and evolved into a hierarchical system specifying weight limitations on all state trunklines. The Michigan truck route system segments state trunklines into categories based on weight and width allowances for the standard five axle truck configuration. (Michigan's 1984 Truck Operators' Map is depicted in figure II-1.) Michigan's "green" routes (Band 1), which also comprise the National Network system, allow for an 80,000 lb Gross Vehicle Weight (GVW) for a standard 5 axle configuration, and up to 102" wide trailers. The "black" (Band 2) routes allow for a 73,280 lb GVW and 96" width. With additional properly spaced axles, loads of 164,000 lb are allowed. Both the green and black systems have no seasonal load limitations. The remainder of the trunkline system (shown as solid and dotted red on the truck map; Bands 3 and 4) are seasonal routes which are subject to spring load limitations. The seasonal routes, when not restricted, allow for 73,280 lb. GVW and 96" wide trailers.

On the "green" (federally designated system), there is no overall length limit for a truck tractor and semi combination; however, the trailer cannot exceed 50 feet. For a tractor and two trailers the overall limit is 59 feet for the black and red routes; there is no overall length limit for two trailers (each limited to 28 feet) on the green routes.

FIGURE II-1

Commercial Truck Routes



COMMERCIAL TRUCK ROUTES

BAND 1 = ALL SEASON *(Green)*
BAND 2 = ALL SEASON WITH RESTRICTIONS *(Black)*
BAND 3 = SEASONAL ROUTE - RIGID PAVEMENT
BAND 4 = SEASONAL ROUTE - FLEXIBLE PAVEMENT

Missing links indicate incomplete data.

Prepared by: Transportation Planning Procedures Section, MDOT
Source: 1984 MDOT Truck Operator's Map

The mileage, by trunkline category on the Truck Operators' Map, is as follows:

TABLE II-2

Band 1	Green	5,696 miles
Band 2	Black	2,768 miles
Band 3 & 4	Red (dot & solid)	774 miles
	TRUNKLINE MILEAGE	9,238

Source: 1984 Needs Study and Truck Operators Map.

The route systems previously described have occasional changes made at the request of users or governmental agencies. The Utility Permits Division of MDOT analyzes requests for additions to the systems. Comments regarding addition of a route to the "green" or "black" systems are solicited from MDOT's Traffic and Safety Division, Materials and Technology Division, and the appropriate District Office. The following factors are considered when an addition, or change, to the system is requested.

*1. Lane Width

- 10' is not acceptable
- Must be minimum 11' prefer 12'

*2. Shoulder Width

- Minimum 3' paved

*3. Structural Adequacy of the Pavement

- Sufficiency rating

4. Intersection Geometrics

- Can larger trucks make turns
- Sight around corner

5. Grades

- Length
- Severity

6. Narrow Bridges

7. Underclearance

8. Load Limits

9. Site Distance

   - Passing and non-passing area

10. Safety Record

    - General
    - Truck

11. Current and Safety Problems

    - If larger trucks allowed

12. Alternative Route

    - Is a reasonable one available

13. Major Arterial

    - Is route classified as major arterial

*These factors must be in place, or programmed for construction.

In addition to the federal and state truck systems, the cities and counties limit and restrict truck movement to certain routes. These limitations are primarily based on bridge restrictions, seasonal pavement characteristics, and noise/annoyance factors. The city and county routes are based on individual characteristics of the jurisdiction and vary accordingly.

D. Michigan's Priority Commercial Network

Another important highway system in Michigan is the Priority Commercial Network (PCN). In Michigan an intricate network of highways is of major importance to the social interaction of its citizens and to the health of the state's economy. The MDOT is responsible for a major portion of the highway system used in interstate and intrastate commerce and is therefore concerned with monitoring the

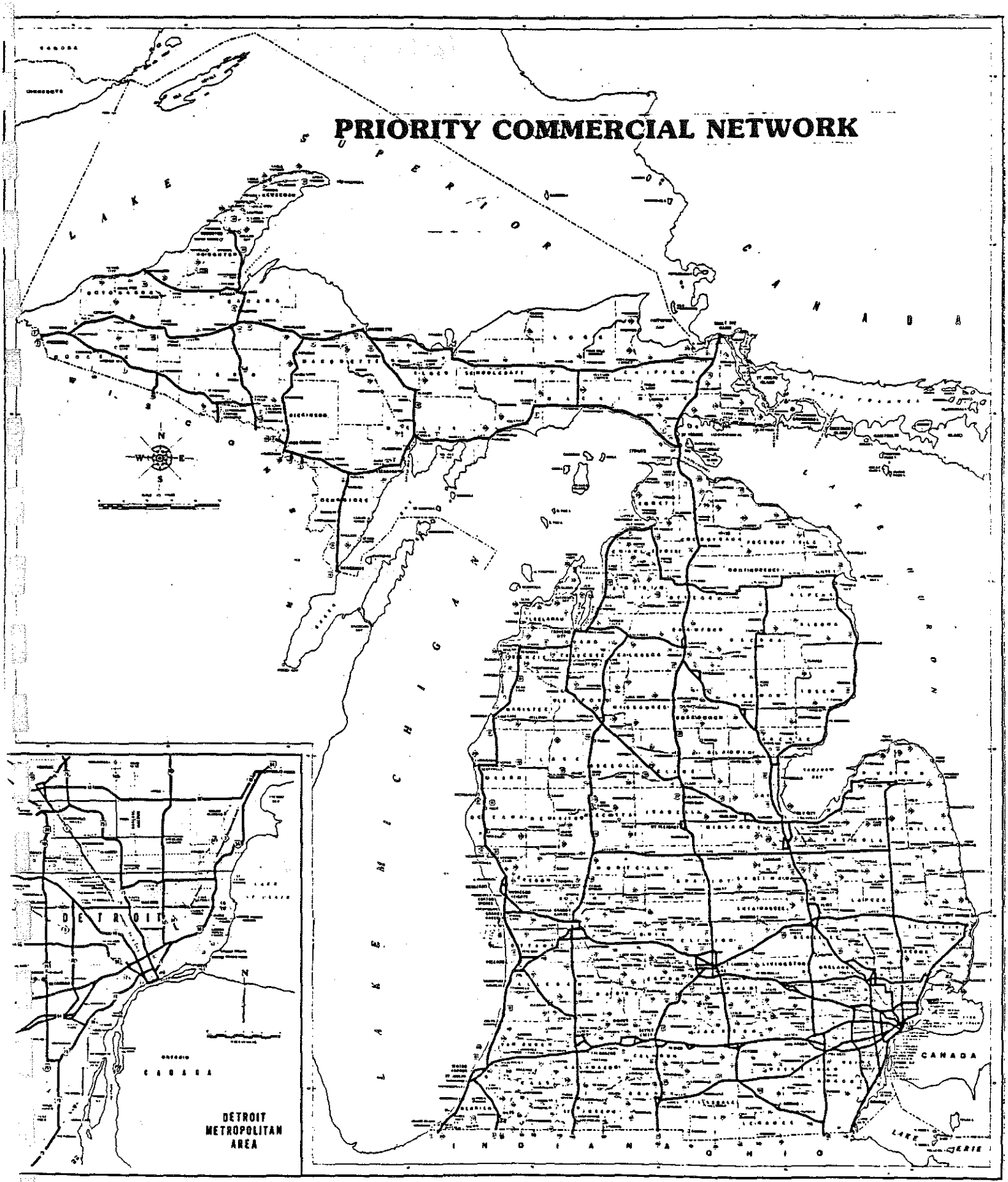
highway system for traffic, safety, capacity, and route maintenance problems as they relate to the formulation of transportation policies, plans, and programs. There is insufficient revenue to meet all highway needs, which consequently requires the establishment of priorities for maintenance and improvement programs. This is accomplished through use of the PCN. The PCN is a set of road segments that are deemed most important for development and maintenance of Michigan's economic strength. (See Figures II-2 and II-3).

The PCN was developed utilizing the transportation planning modeling process as initial input. Five areas of industrial and commercial activity considered important to Michigan's economy were analyzed: agriculture, forestry, wholesale trade, manufacturing, and tourism. The priority commercial network was not designed to exclusively deal with truck movement, but with all statewide traffic related to commerce. For example, the tourist industry was also considered essential to the state's economy and therefore the importance of major tourism routes was included as a factor in the selection of a final PCN.

The intent of the PCN development process was to include links that best served Michigan's commerce and industry. One assumption used was that the PCN should include the entire interstate system (including associated business routes). Connectivity and reasonableness of the system was also considered using population and employment center information.

Development of the PCN also relied on analysis of historical major and minor origin-destination studies. Commercial traffic data were

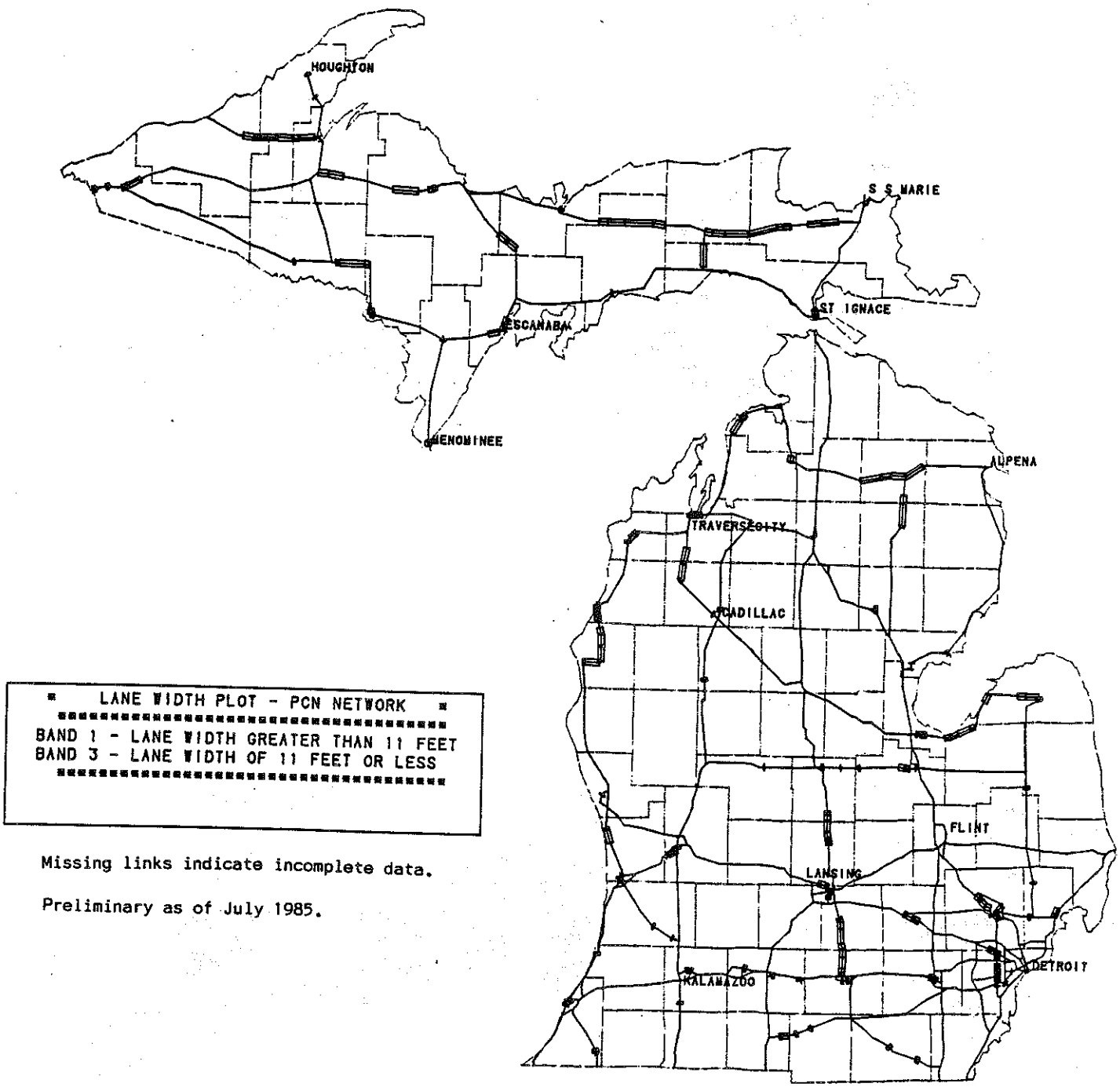
FIGURE II-2



9/95

FIGURE II-3

Priority Commercial Network Routes



Missing links indicate incomplete data.

Preliminary as of July 1985.

Prepared by: Transportation Planning Procedures Section , MDOT

Source: 1984 Sufficiency Master

plotted in order to depict interstate and intrastate commercial traffic, and the plots showed interstate highways to be the primary commercial routes.

Analysis of the resulting PCN shows that the system comprises 48% of the total trunkline system mileage but carries 77% of total trunkline commercial VMT. The concentration of state highway improvement resources on the PCN will be of significant benefit to the trucking industry in Michigan. Those highways most important to the trucking industry for the movement of commerce will be given priority for maintenance and improvement programs.

A major example and concern relative to monitoring and maintaining the condition of Michigan's highway systems to satisfy the demands of commerce is the relatively new just-in-time (JIT) delivery concept. This concept is becoming increasingly more popular, especially in the auto industry, which in turn affects the use and needs for Michigan highways in the future. JIT, developed to cut costs and improve profits, emphasizes quick shipping and closely timed input of manufacturing components to reduce inventory and increase dependence on quality components being delivered for assembly. As a result, some shippers and receivers are altering their traditional modes of transport by switching from rail to truck. JIT has created much tighter delivery schedules and deadlines depending on the delivery of the optimum quantity at the optimum time which generally emphasizes a high commitment to motor carriers. JIT appears to be successful and subject to more

widespread adoption outside the auto industry. This is likely to increase concentrations of truck traffic on major trunklines such as I-75, I-94, I-96, etc. The success and commitment of JIT dictates a major monitoring effort and sensitivity on the part of MDOT in order to be a positive contributor to maintaining a healthy climate for industry in Michigan.

E. Commercial Traffic Flows

Commercial vehicles are defined as any vehicle operated for the transportation of persons or property by any commercial or industrial enterprise, for hire or not for hire. Table II-3 shows registrations for the years 1977 through 1984 with the year 1980 unavailable.

The weight class 0-24,000 lb. includes only those vehicles in commercial use. Private vehicles such as personal vans not used in commercial activities are not included.

The 72,001-80,000 lb. class has a large number of tractor trailer units used in interstate commerce by Michigan corporations that fall into this range.

Michigan also has the highest weight limits allowed in the U.S., and the number of units which are registered above the national allowable weight of 80,000 lb. has increased from 7,828 units in 1977 to 10,409 in 1984. This represents an increase of 33 percent compared to a 12 percent increase in total registrations (73,811 to 82,851).

TABLE II-3

COMMERCIAL REGISTRATION BY WEIGHT CATEGORY

1977-1984[3/]

Weight Class (lb)	1977	1978	1979	1981	1982	1983	1984
0- 24,000	22,671[1/]	25,449[1/]	25,644[1/]	24,773	19,044	20,752	22,066
24,001- 28,000	9,538	10,647	10,717	10,408	8,199	9,389	9,534
28,001- 32,000	3,992	4,435	4,369	4,390	3,636	3,881	4,243
32,001- 36,000	1,745	1,965	1,892	1,889	1,410	1,704	1,753
36,001- 42,000	2,875	3,112	3,181	3,079	2,377	2,856	2,982
42,001- 48,000	5,106	5 827	6,124	6,456	4,643	6,143	6,196
48,001- 54,000	3,123	3,542	3,549	3,548	2,773	3,356	3,473
54,001- 60,000	3,744	4,398	4,409	4,134	2,796	4,044	3,844
60,001- 66,000	2,202	2,446	2,648	2,210	1,514	2,592	2,025
66,001- 72,000	3,869	4,612	4,756	3,919	2,331	3,975	3,805
72,001- 80,000	7,118	9,081	9,892	11,094	8,386	12,818	12,521
80,001- 90,000	1,741	2,064	2,078	2,160	1,565	2,032	1,975
90,001-100,000	2,068	2,602	2,817	3,123	1,923	3,015	3,070
100,001-115,000	1,058	1,279	1,269	1,232	690	1,122	1,156
115,001-130,000	604	750	1,049	972	499	764	713
130,001-145,000	2,557	2,754	673	796	467	769	831
	-0-[2/]	76[2/]	1,682[2/]	1,486	828	2,023	2,065
+160,000				722	356	685	599
TOTAL	73,811	85,039	86,749	86,391	63,437	81,920	82,851

1/ 20,001-24,000 lb - Weight Class
2/ 145,000+ lb - Weight Class (no breakdown @ 160,000 lb)
3/ 1980 data not available

1. Vehicle Miles of Travel

Vehicle miles of travel on Michigan streets and highways has fluctuated within a relatively narrow range since about 1976. Table II-4 indicates 61.6 BVMT (billion vehicle miles of travel) in 1976 and 65.7 BVMT in 1984. The peak year was 1978 with 67.4 BVMT, and the low was 61.3 BVMT in 1982. This decline can be related to fuel cost increases as well as problems in the national and state economy. Since 1982, travel has again been increasing and indications are that the increase continued into 1985 with commensurate improvements in the economy and reductions in fuel costs. Commercial travel has generally followed overall VMT trends. In 1984, commercial travel represented 9.4 percent of total trunkline travel and about 5 percent of non-trunkline travel. About 68.4 percent of all commercial travel occurs on the state trunkline system.

2. Commercial Traffic Flows

Figure II-4 shows that truck traffic flows are concentrated in the southern half of the Lower Peninsula; very few highways north of US-10 carry between 500 and 1,000 trucks daily. In southern Michigan, highways such as I-94 carry between 5,000 and 10,000 trucks per day. Other highways such as I-96 between Lansing and Brighton carry between 2,000 and 3,000 trucks, I-75 south of Saginaw carries about 5,000, and US-23 south of Flint carries about 3,000. (See Figure II-5).

TABLE II-4

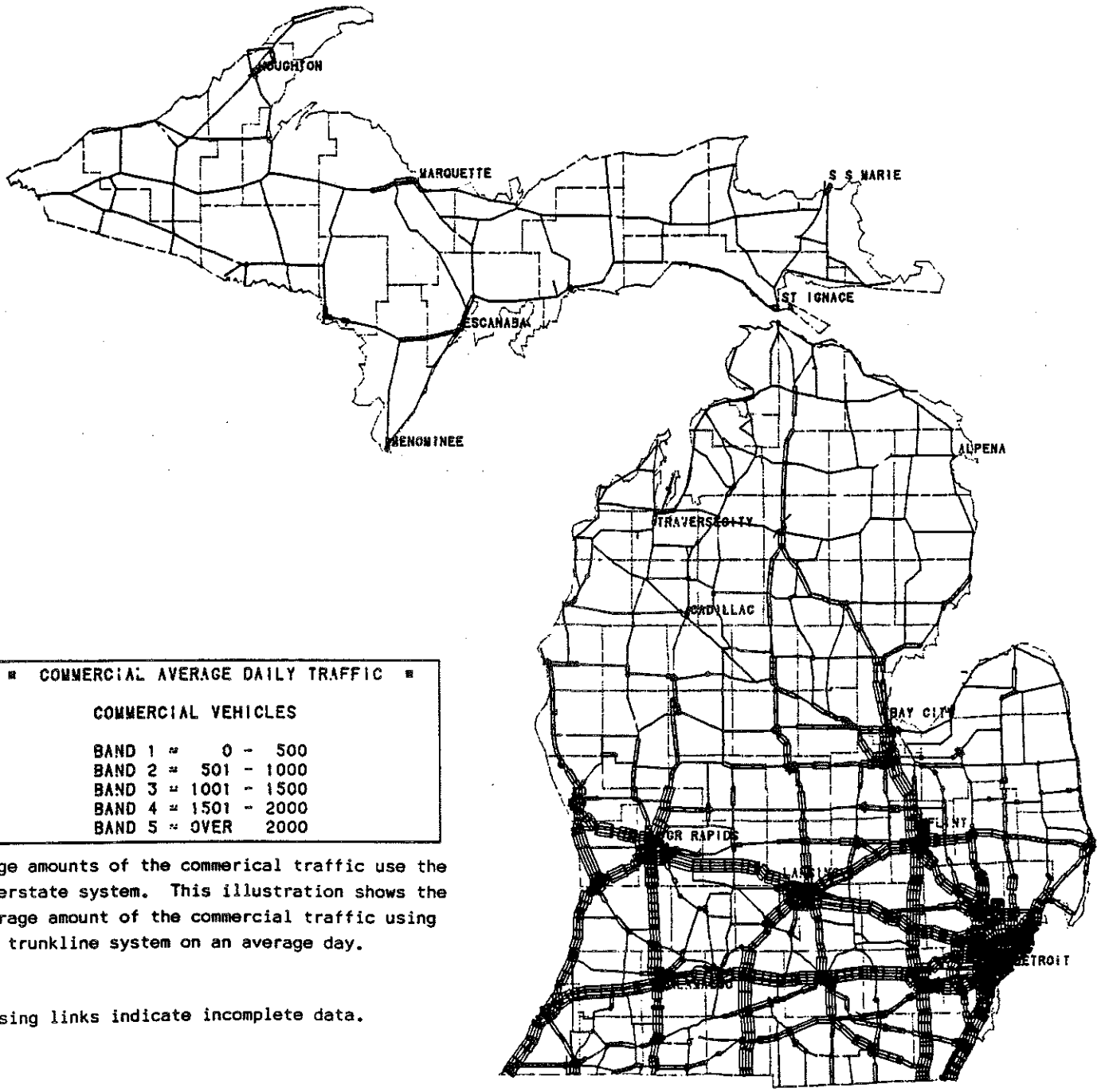
COMMERCIAL VEHICLE MILES OF TRAVEL (Billions)

1973-1984

	Total Trunkline VMT	% Commercial	Non-Trunkline VMT	% Commercial	Total VMT	% Commercial	Total Commercial VMT
1973	29.6	9.7	28.9	5.0	58.5	7.4	4.3
1974	29.5	9.8	25.9	5.0	55.4	7.3	4.0
1975	29.5	9.5	28.7	5.0	58.2	7.3	4.2
1976	31.1	9.6	30.5	5.0	61.6	7.3	4.5
1977	31.6	9.5	31.8	5.0	63.4	7.3	4.6
1978	33.0	9.4	34.4	5.0	67.4	7.2	4.9
1979	33.6	9.2	31.3	5.0	64.9	7.1	4.6
1980	31.2	9.6	30.3	5.0	61.5	7.3	4.5
1981	31.7	9.1	30.3	5.0	62.0	7.1	4.4
1982	31.3	9.3	30.0	5.0	61.3	7.2	4.4
1983	33.1	9.4	30.5	5.0	63.6	7.2	4.6
1984	34.2	9.4	31.5	5.0	65.7	7.2	4.7

FIGURE II-4

Commercial Average Daily Traffic



COMMERCIAL AVERAGE DAILY TRAFFIC	
COMMERCIAL VEHICLES	
BAND 1 =	0 - 500
BAND 2 =	501 - 1000
BAND 3 =	1001 - 1500
BAND 4 =	1501 - 2000
BAND 5 =	OVER 2000

Large amounts of the commerical traffic use the interstate system. This illustration shows the average amount of the commercial traffic using the trunkline system on an average day.

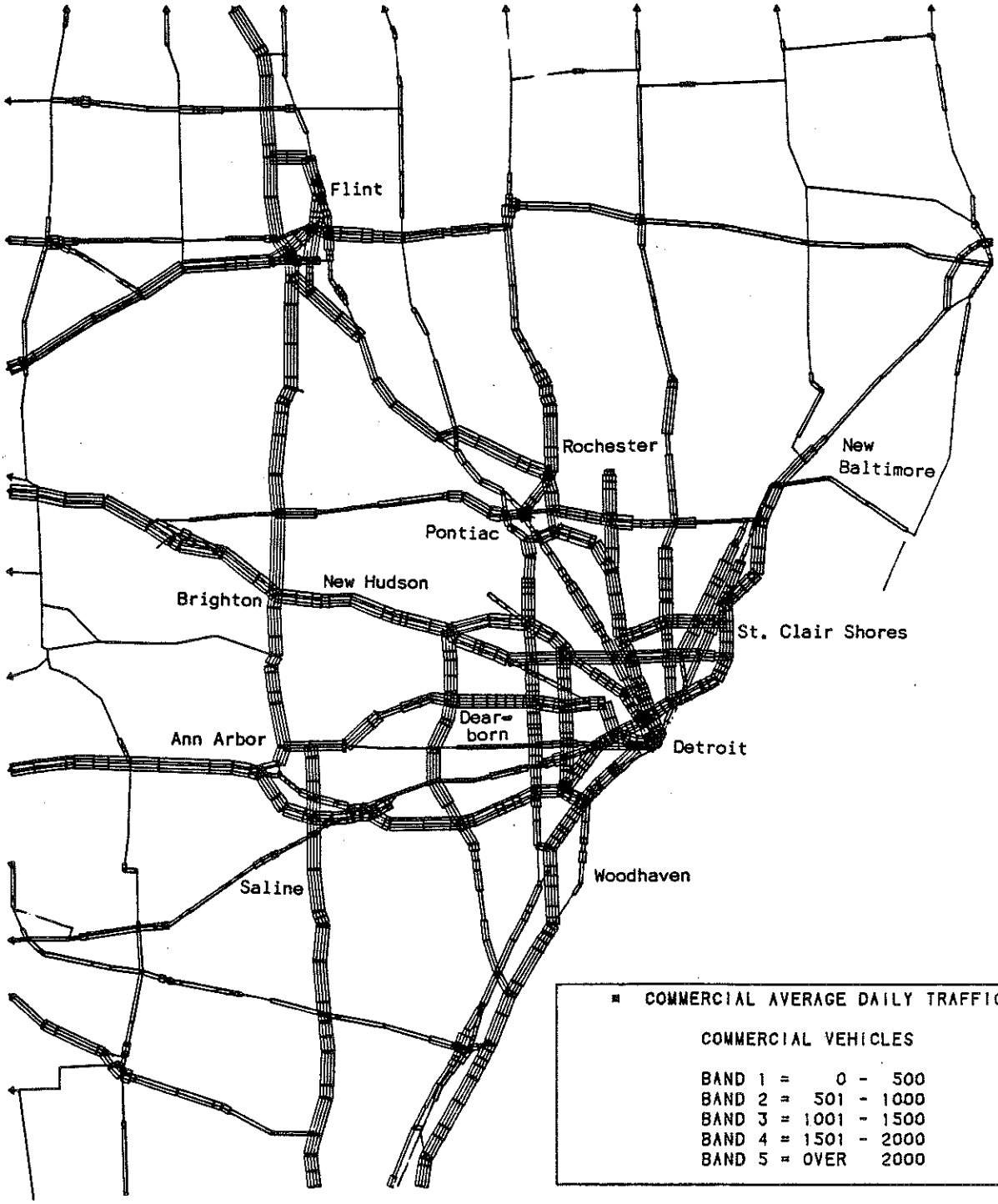
Missing links indicate incomplete data.

Prepared by: Transportation Planning Procedures Section, MDOT
Source: 1984 Sufficiency Master (1983 A.D.T.)

FIGURE II-5

Commercial Average Daily Traffic

SOUTHEASTERN MICHIGAN AREA



Missing links indicate incomplete data.

Prepared by: Transportation Planning Procedures Section, MDOT
Source: 1984 Sufficiency Master (1983 A.D.T.)

F. Commercial Traffic Data Base

Some very important information relative to commercial vehicle travel in Michigan emanates from the statistical traffic information collected by the Surveys Section of the MDOT. There are basically three distinct aspects of the Department's surveying efforts that relate to commercial vehicles.

- the Truck Weight Study
- the Truck Weight Classification Study
- the Statewide Classification Study

These studies fall under the Truck Classification and Weight Programs which are primarily funded by the FHWA. The data is utilized for highway bridge design and for allocation of each state's interstate and federal aid route funds.

1. The truck weight program study is composed of two parts and is required by the federal government as part of an overall vehicle/traffic monitoring effort. Quarterly surveys are administered at 18 locations, four times per year for all vehicular traffic. These studies provide commercial counts and weights by vehicle type and axle configuration (see sample form 1722, Figure II-6). The counts are currently done manually but have the potential to be mechanized as more sophisticated counting devices are produced and marketed.

2. The truck weight/classification study is done biennially and results in the collection of more voluminous and specific

VEHICLE CLASSIFICATION COUNT

1722 (4/84) ROUTE _____ LOCATION _____

☐ DO NOT ACCUMULATE
Use these columns only by instructions from your supervisor

CONTROL SECTION	MILEAGE POINT	SW STA. NO.	TWS NO.	YEAR	MONTH	DATE	DAY	DIR.	HOUR

Hour Begin.	Hour Ending	PASSENGER VEHICLES			BUSES	SINGLE UNIT TRUCKS				
		CARS	MOTORCYCLES	All Other Passenger Vehicles Not Otherwise Classified	City Interstate School Charter	2 Axle 4 Tires	2 Axle 6 Tires	3 Axle	4 Axle	All Other Single Unit Trucks Not Otherwise Classified

Hour Begin.	Hour Ending	TRUCK/TRACTOR W/SINGLE TRAILER COMB.				TRUCK/TRACTOR W/DOUBLE TRAILER COMB.				OTHER VEHICLE CLASS.		
		4 Axle or less	5 Axle	6 Axle or more	All Other Single Trailer Comb. Not Otherwise Classified	5 Axle or less	6 Axle	7 Axle or more	All Other Double Trailer Comb. Not Otherwise Classified			

NAME _____

Figure II-6

commercial traffic data. This study provides for manual classification at all stations (locations) shown in Figure II-7. The classification of vehicles by vehicle type and axle configuration, as with the quarterly studies, are done for 24 hour periods. The additional information shown on example form 1719 is collected for an eight hour period at the 13 platform scale locations (Figure II-8). Some of the information collected is axle weight, axle spacing, origin/destination information, etc. (overall length and width information is anticipated to be collected in the near future in order to answer questions regarding increasing truck sizes).

The annual statewide classification study emphasizes identification of the vehicle mix in the trunkline traffic stream at 400 locations statewide. This information is collected for use by MDOT in highway and bridge design, for input to planning, and for calibration/verification of automated counting devices. This effort is undertaken between November and March each year at sites where traffic information is collected mechanically three other times of the year. The level of detail regarding this statewide classification data is much more general than the two studies previously described. The major emphasis relating to commercial vehicles classification is to record a percent commercial figure for the 400 sites where traffic is recorded on a quarterly basis.

FIGURE II-7

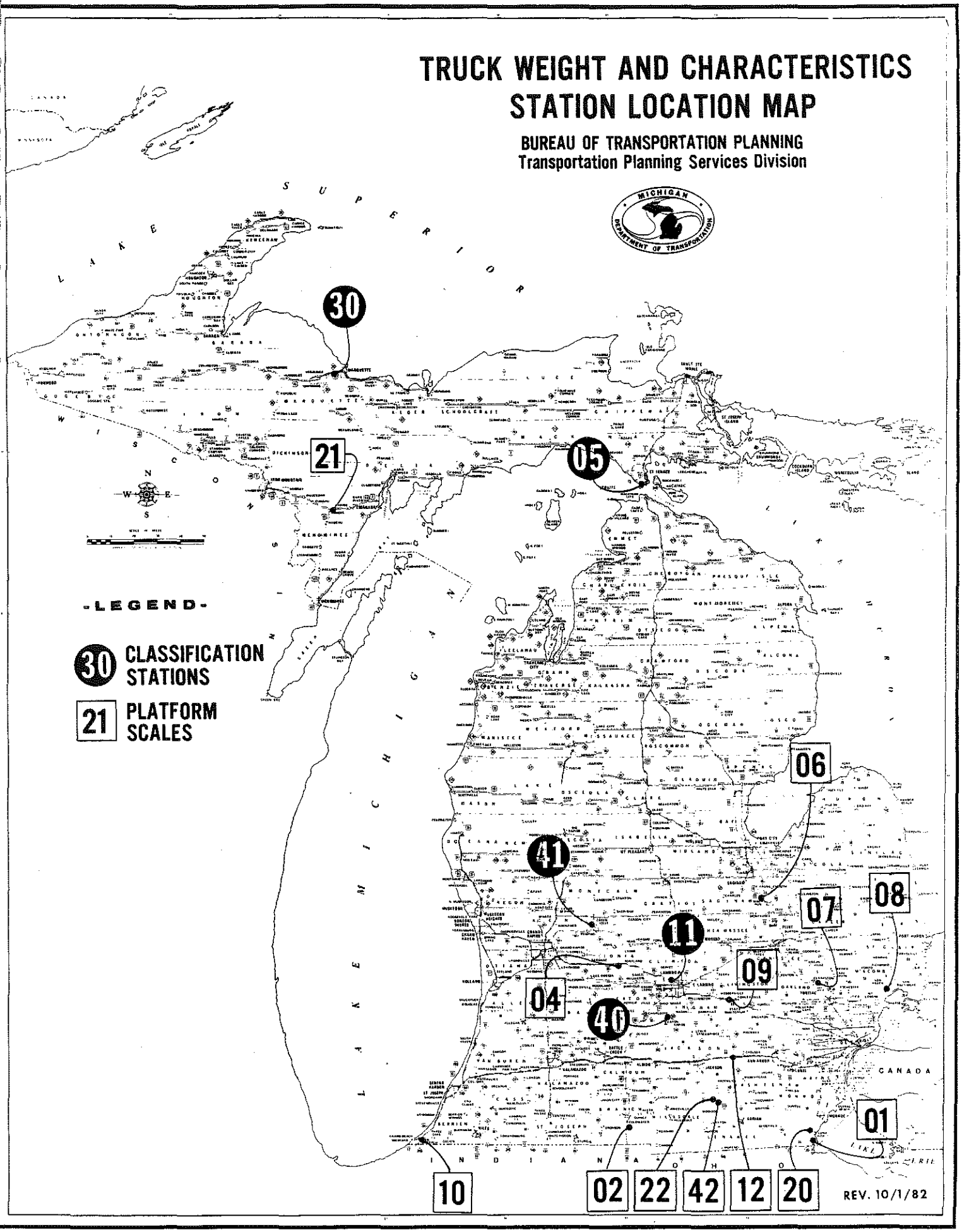

TRUCK WEIGHT AND CHARACTERISTICS
STATION LOCATION MAP
BUREAU OF TRANSPORTATION PLANNING
Transportation Planning Services Division
MICHIGAN DEPARTMENT OF TRANSPORTATION
LAKE SUPERIOR
LAKE MICHIGAN
-LEGEND-
30 CLASSIFICATION STATIONS
21 PLATFORM SCALES
30
21
05
06
41
07
08
11
09
04
40
01
10
02
22
42
12
20
CANADA
REV. 10/1/82

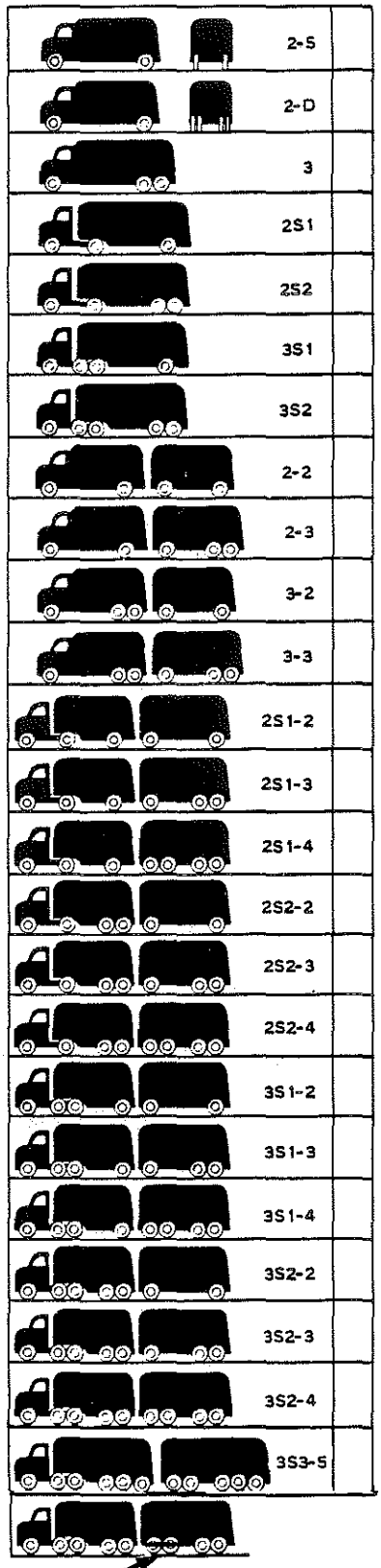
FIGURE II-8

1719 (11/83)

TRUCK WEIGHT STUDY REPORT

NW 8 N1 NE 2
W7 E3
SW 6 S5 SE 4

DIRECTION OF TRAVEL _____



INDICATE TANDEM AXLE ASSEMBLY

RECORDER _____

CONTROL NUMBER _____ L D 1-2 / 3-4 / 0 5

STATION NUMBER _____

DATE _____

HOUR PERIOD _____

SERIAL NO., FIELD _____ OFFICE 6-8 / 9-12

VEHICLE DESIGNATION _____ 13-14

BODY TYPE _____

COMMODITY CARRIED _____ 15-19

FUEL: [1] GAS [2] DIESEL STATE BASED _____

OTH. LIC. PLATES _____ REG. WGT _____

LOADING E [1] L [2] W/COMMODITY L [2] MOUNTED EQUIP. 20

21

CLASS OF OPERATION PVT [1] ICC [2] OFH [3] 22-23

TRIP ORIGIN-STATE _____ 24-29

COUNTY _____ CITY _____

TRIP DESTINATION-STATE _____ 30-31

COUNTY _____ CITY _____ 32-37

AXLE WEIGHT IN POUNDS

A _____ 38-40
B _____ 41-43
C _____ 44-46
D _____ 47-49
E _____ 50-52
F _____ 53-55
G _____ 56-58
H _____ 59-61
I _____ 62-64
J _____ 65-67
K _____ 68-70

CARD NUMBER 1 78

OVERLOAD 79

CARD #2 DUPLICATE CARD #1 THROUGH 14

HIGHWAY SYSTEM _____ 15-16

AXLE SPACINGS

A-B _____ 17-19
B-C _____ 20-22
C-D _____ 23-25
D-E _____ 26-28
E-F _____ 29-31
F-G _____ 32-34
G-H _____ 35-37
H-I _____ 38-40
I-J _____ 41-43
J-K _____ 44-46

CODER _____ HIGHWAY SYSTEM CATEGORY 77

CHECK CODE _____ CARD NUMBER 2 78

G. Future Data Collection Requirements

General data collection requirements for commercial vehicles traveling on state trunklines fall into a number of categories: weight, length, width, speed, class, volume, commodity, accident data, and origin/destination. Within each category, there may be sub-categories. For example, weight data may include not only gross vehicle weight (GVW), but individual axle weights, axle spacing, and bridge compliance information. Length data may be axle to axle, or overall chassis length including overhang dimensions. In general, needs define how many sub-categories of data are necessary, and also dictate the definition of the main categories, depending on whether data is required for enforcement, planning, safety, or economic development purposes.

Currently, no single state department systematically collects all categories of commercial vehicle data on a regular basis. The Michigan State Police, Motor Carrier Division, is primarily interested in enforcement; the Secretary of State records vehicle registration data, including basic vehicle weights, but does not estimate miles of usage, weight miles, exposure for various truck lengths, or other similar data. Accident information is also limited.

While data-gathering has been limited because of competing needs, the MDOT has collected a substantial amount of design oriented commercial vehicle data. Additionally, origin/ destination studies have been conducted which include commodity information, vehicle class, axle length, and GVW. The substantial personnel requirements

and associated high costs have limited the past number of commercial vehicle origin and destination (O&D) studies and, therefore, their statistical viability for predictive purposes. Regular vehicle classification studies have broken down the total vehicular volumes into broad categories and give general percentages of commercial flow for trunklines in the state based on total vehicle counts. Width data, related speed data, and related accident data has not been systematically collected and is therefore limited.

This summarily suggests that if a solid data base is needed for the purposes of determining safety standards, pavement/bridge design, equitable taxation policies, and the answers to other related issues, certain changes in overall commercial vehicle data collection and departmental coordination efforts are necessary. However, any major change in collection procedures, and/or study methods, must be sensitive to funding availability. Even within current restraints, however, changes are currently being implemented by MDOT to enhance the overall data base for truck information based on current requests and perceived future needs. Technological advances in automated data collection are facilitating these advances.

CHAPTER III

TRUCK SAFETY

III. TRUCK SAFETY

The fundamental purpose of the Michigan Department of Transportation is to provide superior transportation facilities and services. To accomplish this and to allow the safe and efficient movement of people and goods, several state agencies participate in a cooperative effort.

A. INVOLVEMENT OF MICHIGAN STATE AGENCIES

1. MDOT Involvement in Truck Safety

(a) Special Permits

Because it is necessary to move oversize and/or overweight truck shipments over the state's highway network, the MDOT has a special office staffed by technical experts who consider each permit request and the circumstances within which it is made. When such permits are issued they are provided subject to strict conditions designed to protect the public and the integrity of the state's transportation facilities.

(b) Geometric Design Standards

The MDOT has a fundamental responsibility to assure that all state and federal highways in Michigan are designed and constructed using the proper geometric design standards. This responsibility also requires that the department have an ongoing accident surveillance system and a safety improvement program. By performing these functions. the MDOT contributes to the safety of truckers and other road users alike.

(c) Accident Monitoring

The MDOT's Traffic and Safety Division continuously monitors and analyzes truck accident statistics as part of the statewide accident surveillance effort. The analysis seeks to identify adverse trends early so that proper corrective action may be taken. Efforts are now underway to correlate vehicle dimensions with accident experience to enable a more consistent designation of truck routes. The MDOT receives raw accident data, on a statewide basis, from the Department of State Police. Two major problems have been encountered in using this data to analyze truck accidents. First, vehicle dimensions are not included on the accident report; the vehicle is described only in broad terms. Second, measures of exposure of vehicles of different sizes and configurations on different types of highways are not available.

2. Michigan State Police

The Michigan Department of State Police has three principal truck-related functions. First, the department's Motor Carrier Division operates the weigh stations located at various points on the state trunkline system. Second, the division performs truck inspections to ensure that trucks are properly equipped and operated safely. Third, the division has an active statewide enforcement program in which driver and vehicle compliance with various truck laws and regulations are ensured. These truck responsibilities

were recently transferred to the Department of State Police from the Public Service Commission, Department of Commerce. Under the State Police, for FY 1984-1985, 43,000 inspections resulted in over 20,500 out-of-service violations and nearly 11,000 vehicles being removed from service.

The Department of State Police's Motor Carrier Division, now includes new computer capabilities to provide:

- Comprehensive data base for technical and legislative needs.
- Fitness information on license applicants.
- Criteria for management and safety audits.
- Early warning on carriers with high accident/mileage ratios.
- Information to combat criminal activities.

B. TRUCK ACCIDENT TRENDS

During the early 1980's, the number of truck accidents nationwide was relatively constant. Then, from 1983 to 1984, they increased 18 percent[1/] This trend was echoed in Michigan where trucking accidents increased 20 percent. During the same period, total accidents in Michigan increased 11 percent.

1. Michigan Accident Trends

In discussing truck accidents it is essential to clearly define the various truck and accident types for which

1/ "Big Trucks and Highway Safety", Insurance Institute for Highway Safety, 1985, Washington, D.C. (Page 1)

accident statistics are collected, analyzed, and presented. Table III-1 contains such definitions.

In comparisons of past accident statistics, percentage changes rather than changes in the actual number of accidents should be used. Changes in accident counts by themselves are not as meaningful for two reasons: (1) changes in the number of accidents would be due in part to changes in the exposure of trucks; accurate truck exposure data were not available for this analysis; and (2) the trunkline highway system, as used for accident analysis purposes, was not consistent during the period studied.

For the seven-year period from 1978 to 1984, the number of accidents, traffic volumes, and accident rates generally followed a U-shaped trend, i.e., they declined to a minimum in 1982 and have since been increasing. These trends are shown graphically in Figures III-1, & III-2, and in the following tables.

Total Statewide Accidents

	1978	Minimum	(Year)	1984
Accidents (1000's)	389.6	295.2	(1982)	335.3
Billion Vehicle-Miles	67.4	61.3	(1982)	65.7
Accidents/BVMT[1/]	5,780	4,730	(1983)	5,100

Truck Accidents

	1978	Minimum	(Year)	1984
Accidents (1000's)	20.1	12.9	(1982)	16.5
Billion Vehicle-Miles	4.9	4.4	(1982)	4.7
Accidents/BVMT	4,100	2,930	(1982)	3,510

1/ BVMT = Billion Vehicle Miles of Travel

Table III-1

Types of Truck and Truck-Related Accidents

TRUCK (Excludes Pickup and Panel Trucks)

Includes: Stake trucks (open platform)
Dump trucks (enclosed sides)
Step vans
Motor homes
Truck or road tractors
Truck or road tractors

SINGLE UNIT TRUCK

Truck without a trailer
Truck without a trailer

SINGLE BOTTOM TRUCK (Semi Trailer)

Truck tractor or road tractor with a single trailer

DOUBLE BOTTOM TRUCK

Single unit truck with a single trailer or
Truck tractor/Road tractor with two trailers

CAR

All other motorized road vehicles including:
Pickup and panel trucks
Motorcycles and bicycles
Farm and construction equipment

TRUCK ONLY ACCIDENT

All vehicles (or only vehicle) trucks

CAR-TRUCK ACCIDENT

At least one car and one truck

CAR-ONLY ACCIDENT

No trucks involved

FIGURE III-1

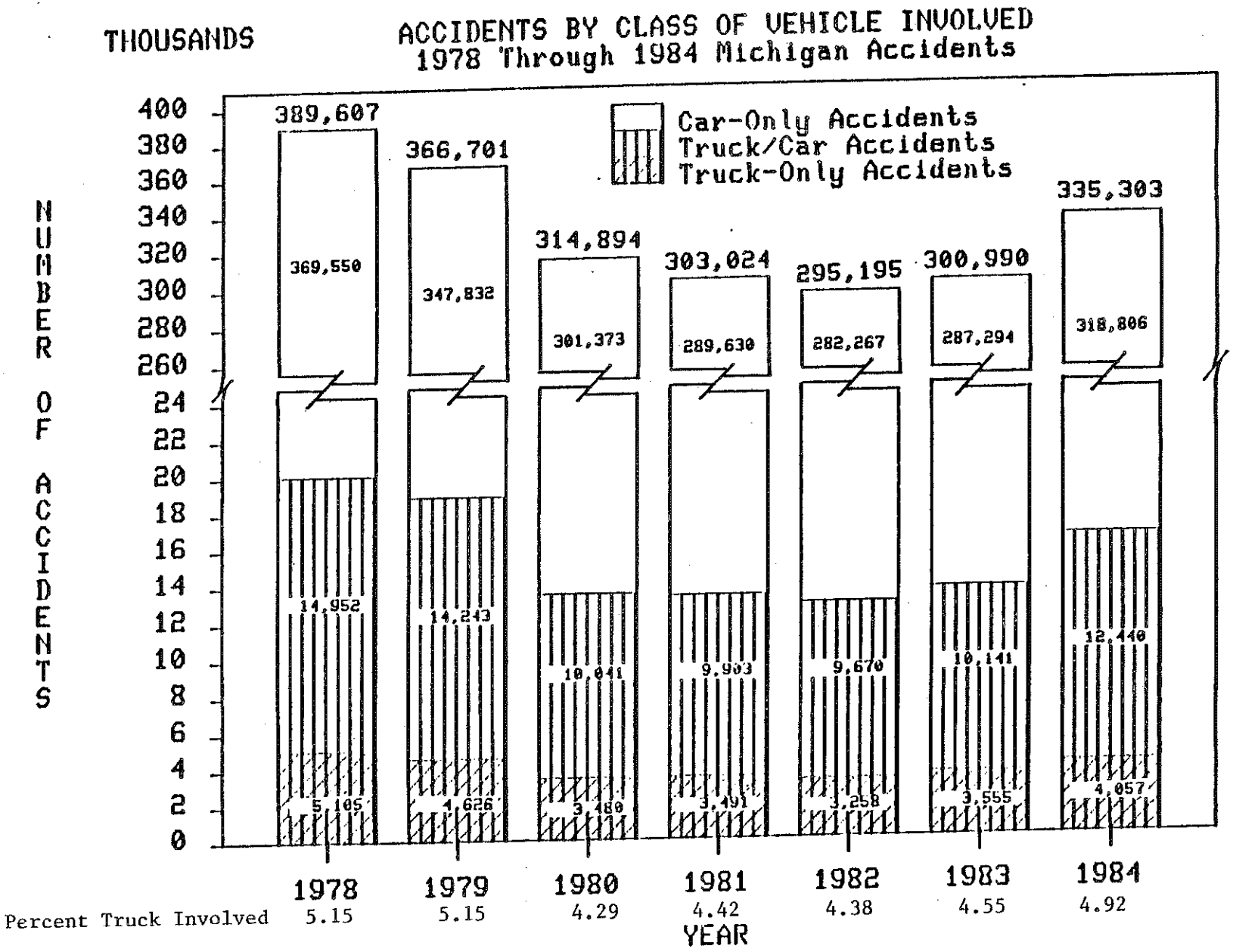

THOUSANDS
ACCIDENTS BY CLASS OF VEHICLE INVOLVED
1978 Through 1984 Michigan Accidents
Car-Only Accidents
Truck/Car Accidents
Truck-Only Accidents
NUMBER OF ACCIDENTS
400
380
360
340
320
300
280
260
24
22
20
18
16
14
12
10
8
6
4
2
0
389,607
366,701
314,894
303,024
295,195
300,990
335,303
369,550
347,832
301,373
289,630
282,267
287,294
318,806
14,952
14,243
10,041
9,903
9,670
10,141
12,440
5,105
4,626
3,480
3,491
3,258
3,555
4,057
1978
1979
1980
1981
1982
1983
1984
Percent Truck Involved
5.15
5.15
4.29
4.42
4.38
4.55
4.92
YEAR

FIGURE III-2

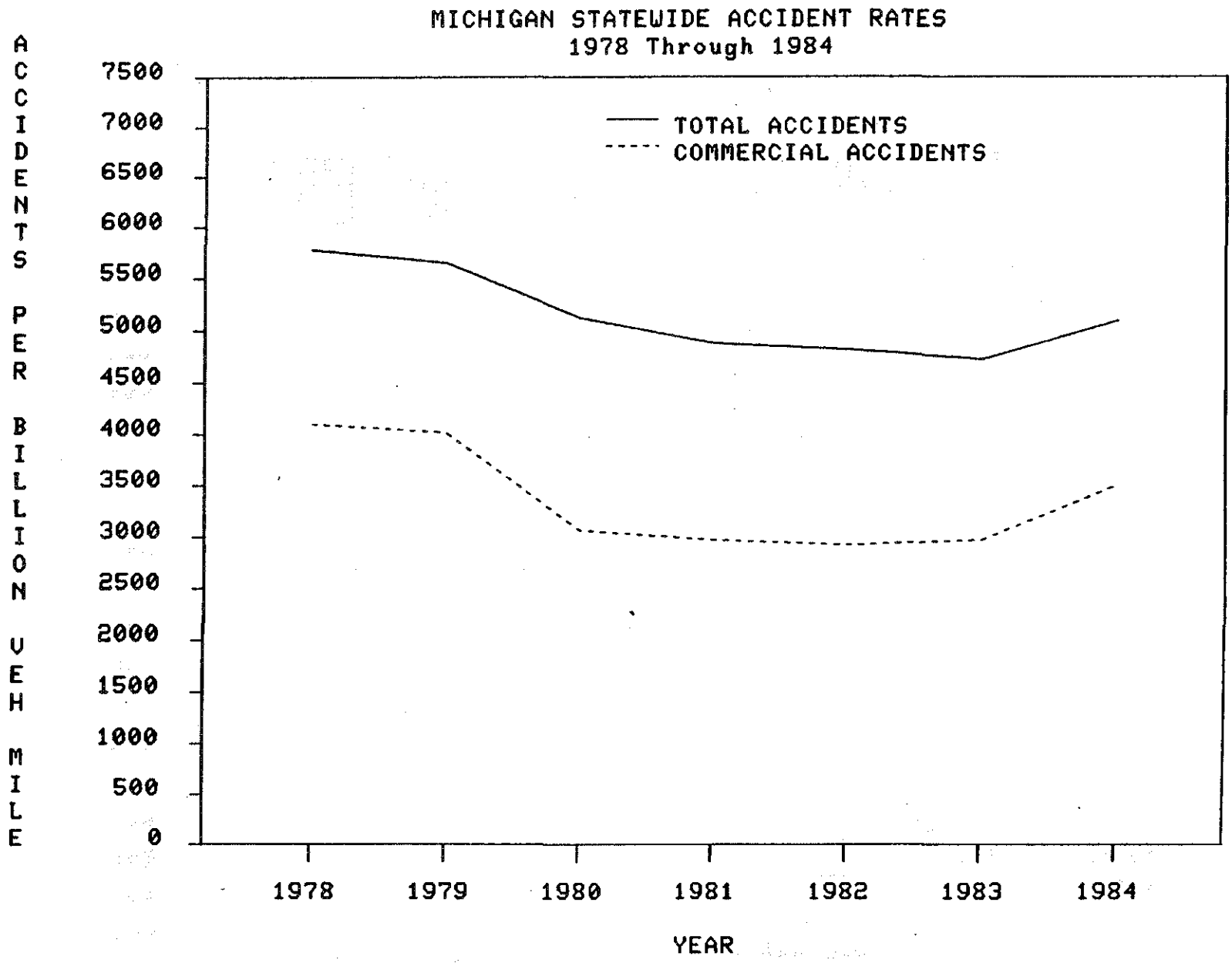
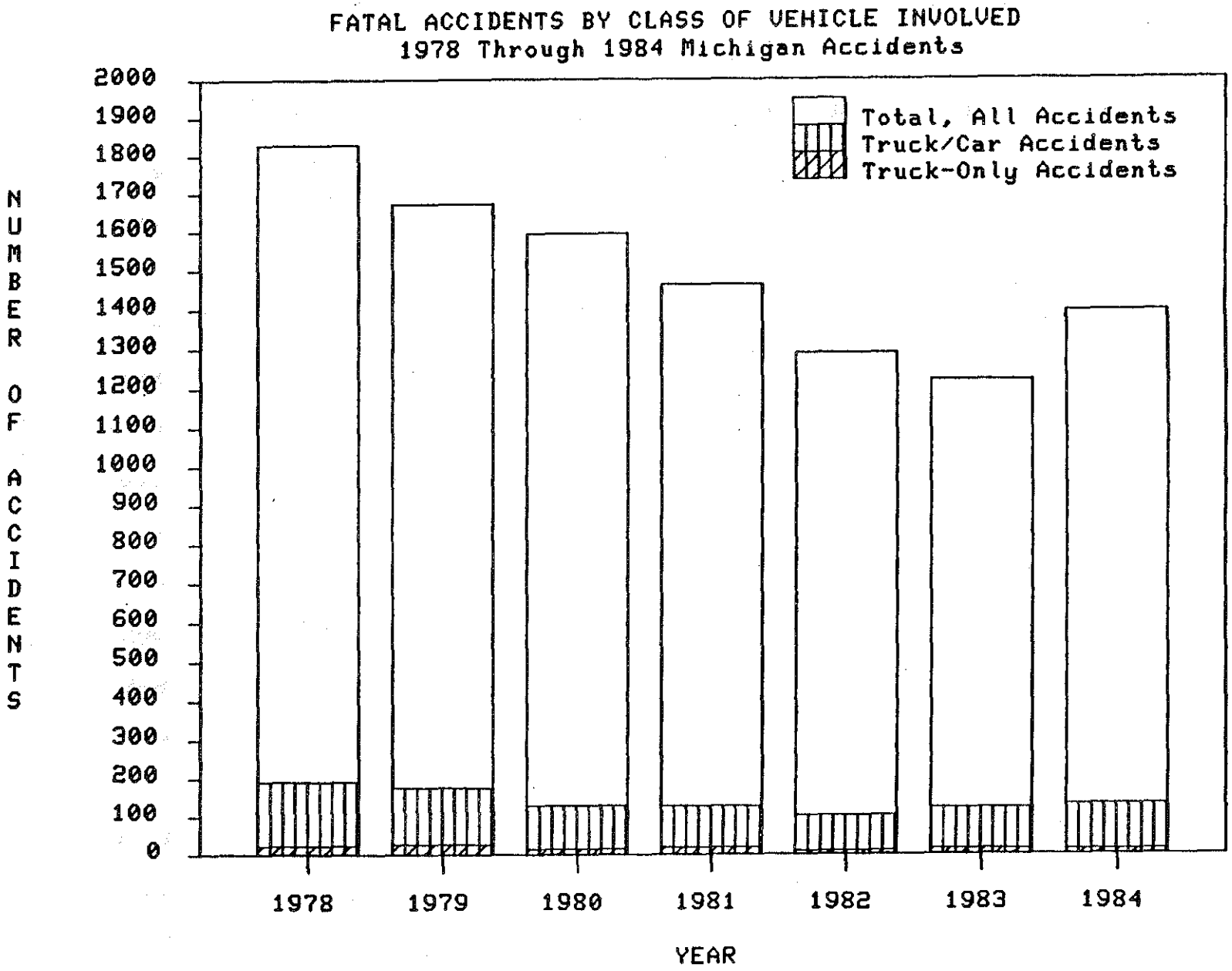

MICHIGAN STATEWIDE ACCIDENT RATES
1978 Through 1984
ACCIDENTS PER BILLION VEH MILE
7500
7000
6500
6000
5500
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
TOTAL ACCIDENTS
COMMERCIAL ACCIDENTS
1978
1979
1980
1981
1982
1983
1984
YEAR

FIGURE III-3


FATAL ACCIDENTS BY CLASS OF VEHICLE INVOLVED
1978 Through 1984 Michigan Accidents
Total, All Accidents
Truck/Car Accidents
Truck-Only Accidents
NUMBER OF ACCIDENTS
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
1978
1979
1980
1981
1982
1983
1984
YEAR

Michigan's statewide accident rate for all vehicles increased from 4,730 per billion vehicle miles of travel (BVMT) in 1983 to 5,100 per BVMT in 1984, an increase of 8 percent. In the same period, the statewide truck accident rate rose from 2,930 accidents per BVMT to 3,510; an increase of 18 percent. This accident rate increase is continuing. Total accidents for the first four months of 1985 (121,824) are 20 percent higher than the four month count in 1984 and 41 percent higher than the total for the first four months of 1983. This pattern is also reflected in truck accidents, which totalled 6,612 for the first four months of 1985, an increase of 28 percent over the corresponding period of 1984 and 90 percent over 1983. The sizable increases over 1983 data are partly due to the fact that accident counts for January and February 1983 were unusually low.

2. Truck-Related Fatal Accidents

Since 1978, fatal accidents involving trucks decreased steadily both in actual numbers and in fatalities per BVMT. Figure III-3 shows this trend, which continued until 1982. From 104 fatal truck accidents (121 fatalities) in 1982, the trend shifted upward as 132 fatal truck accidents (150 fatalities) were recorded in 1984. Over the seven-year span, trucks were involved in 10 percent of all fatal accidents.

3. Discussion

There has been a definite increasing shift in the accident trend, more pronounced for truck accidents than for all

accidents. It is too early to determine if this shift is a change, a temporary departure from the long-term trend, or an improvement in the level of reporting. However, the increase in accidents is cause for concern and warrants close monitoring. As forecasted traffic volumes increase in the state, and with corresponding potential vehicle conflicts increasing geometrically, accident trends may increase significantly.

C. STATE TRUNKLINE ACCIDENT TRENDS

As shown in Table III-2, the Michigan state trunkline system experienced 121,556 reported accidents in 1984, of which 9,337 (8 percent) involved trucks. Approximately 36 percent of all traffic accidents and 57 percent of all truck accidents occurred on state trunklines.

For the Michigan state trunkline system between 1978 and 1984, a number of accident trends appear relevant. The percentage of truck-car accidents is increasing by about 0.2 percentage points per year, starting in 1980. However, the percentage of truck-truck accidents for the same period is much higher, roughly 2 percent per year. From Figure III-4, the distribution of accidents by trucks of various sizes show that:

- The percentage of single unit truck accidents has declined from 53 percent in 1978 and 47 percent in 1984 (approximately 1 percent per year).
- The percentage of single bottom truck accidents has increased from 42 percent in 1978 to 49 percent in 1984.

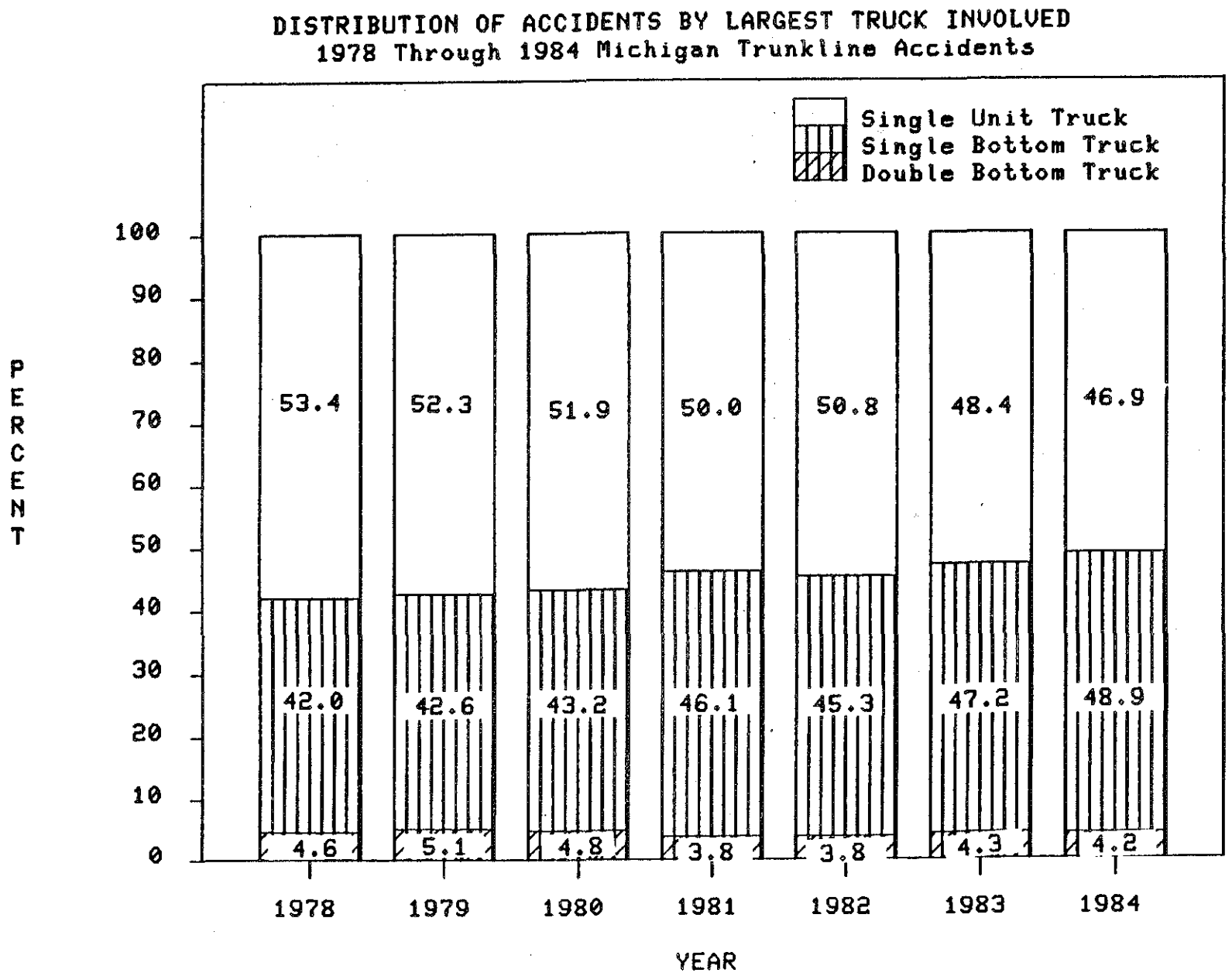
ACCIDENT TYPE BY VEHICLE TYPES INVOLVED

[Number of Accidents and Column Percentages]

	Trucks Only	Truck/Car Acc	Cars Only	TOTAL
Overturned	299 (12.7)	10 (0.1)	3,386 (3.0)	3,695 (3.0)
Train	2 (0.1)	0 (0.0)	36 (0.0)	38 (0.0)
Parked Vehicle	170 (7.2)	9 (0.1)	2,908 (2.6)	3,087 (2.5)
Pedestrian	0 (0.0)	25 (0.4)	1,095 (1.0)	1,120 (0.9)
Fixed Object	849 (36.1)	61 (0.9)	14,039 (12.5)	14,949 (12.3)
Other Object	41 (1.7)	8 (0.1)	608 (0.5)	657 (0.5)
Animal	352 (15.0)	3 (0.0)	10,646 (9.5)	11,001 (9.1)
Bicycle	0 (0.0)	15 (0.2)	909 (0.8)	924 (0.8)
Other Single Veh.	356 (15.2)	1 (0.0)	814 (0.7)	1,171 (1.0)
Head On	14 (0.6)	302 (4.3)	2,192 (2.0)	2,508 (2.1)
Sideswipe, Passing	8 (0.3)	197 (2.8)	848 (0.8)	1,053 (0.9)
Sideswipe, Meeting	2 (0.1)	20 (0.3)	246 (0.2)	268 (0.2)
Angle, Straight	15 (0.6)	525 (7.5)	9,147 (8.2)	9,687 (8.0)
Angle, Turning	7 (0.3)	310 (4.4)	5,481 (4.9)	5,798 (4.8)
Angle, Driveway	5 (0.2)	209 (3.0)	3,179 (2.8)	3,393 (2.8)
Left Turn, Head On	2 (0.1)	154 (2.2)	5,080 (4.5)	5,236 (4.3)
Left Turn, Dual	3 (0.1)	94 (1.3)	311 (0.3)	408 (0.3)
Right Turn, Dual	3 (0.1)	132 (1.9)	238 (0.2)	373 (0.3)
Rear End, Straight	189 (8.0)	3,667 (52.5)	37,862 (33.7)	41,718 (34.3)
Rear End, Left Trn	6 (0.3)	225 (3.2)	2,523 (2.2)	2,754 (2.3)
Rear End, Rght Trn	6 (0.3)	287 (4.1)	1,299 (1.2)	1,592 (1.3)
Rear End, Driveway	8 (0.3)	330 (4.7)	4,943 (4.4)	5,281 (4.3)
Backing	3 (0.1)	253 (3.6)	1,001 (0.9)	1,257 (1.0)
Parking	4 (0.2)	37 (0.5)	546 (0.5)	587 (0.5)
Other Driveway	3 (0.1)	112 (1.6)	2,862 (2.6)	2,977 (2.4)
Other Multi-Veh.	2 (0.1)	2 (0.0)	20 (0.0)	24 (0.0)
TOTALS	2,349 (100.0)	6,988 (100.0)	112,219 (100.0)	121,556 (100.0)

TABLE III-2

FIGURE III-4


DISTRIBUTION OF ACCIDENTS BY LARGEST TRUCK INVOLVED
1978 Through 1984 Michigan Trunkline Accidents
Single Unit Truck
Single Bottom Truck
Double Bottom Truck
PERCENT
100
90
80
70
60
50
40
30
20
10
0
53.4
52.3
51.9
50.0
50.8
48.4
46.9
42.0
42.6
43.2
46.1
45.3
47.2
48.9
4.6
5.1
4.8
3.8
3.8
4.3
4.2
1978
1979
1980
1981
1982
1983
1984
YEAR

- The percentage of double bottom truck accidents has remained fairly stable, around 4 percent and 5 percent since 1978.

The statistics collected and tabulated for 1984 are for the state trunkline system. The most predominant accident type involving trucks are rear end collisions, which account for 65 percent of all car-truck accidents.

The most prevalent truck-only accident type is collision with fixed objects, which accounts for 36 percent of all truck-only accidents. Truck-only accidents are primarily single vehicle accidents such as a truck leaving the highway and striking a tree, sign, or utility pole. Single unit trucks are involved in more multi-vehicle accidents which reflects their greater use of city and local streets, where their exposure to other vehicles is greater. Accidents involving overturned trucks are most common for double bottoms, where overturning occurs in about 10 percent of the accidents. This rate of overturning is several times that experienced by single units and single bottoms.

Cargo spillage, particularly fuel which poses a risk of fire, is a factor in some truck accidents. Of 9,300 trunkline truck accidents in 1984, cargo spillage was confirmed in 673 cases (7 percent). In the remaining accidents, approximately half had no cargo spillage and whether there was spillage in the rest is unknown. In 492 (5 percent) of the accidents, fuel leaked from the vehicle but did not catch fire. In 74 accidents (less than 1 percent), either the vehicle or fuel caught fire. In all remaining accidents, there was neither a fuel leak nor fire. The pattern

of cargo spillage and fire for 1984 is typical of experience in previous years.

As would be expected, fatalities are more likely to result from truck-related accidents than car-only accidents. The proportion of fatalities for car-truck accidents are three times that experienced in truck-only or car-only accidents. Single and double bottom accidents have about twice the number of fatal accidents as do single units. (See Fig. III-5).

In all three accident types, property damage only is the most common outcome resulting in approximately 70 percent to 80 percent of cases. Property damage tends to be higher for truck-only accidents (78 percent).

Personal injury is most common in car-only accidents (31 percent) and least common in truck-only accidents (0.6 percent).

State trunkline truck accident data have been further analyzed in an attempt to arrive at causal factors for the increase noted in the latest full year of data, 1984 compared to 1983. Large truck accidents increased from 7,653 in 1983 to 9,337 in 1984, an increase of 22 percent. Statewide truck-involved accidents rose 20 percent while total accidents rose 11 percent. On state trunklines, total accidents rose 17 percent. Table III-3 shows the increase in total and truck-involved accidents by district for state trunkline highways in Michigan. Clearly, the largest increase was in the metropolitan area of southeast Michigan where an increase of 47 percent in truck involved accidents was reported.

FIGURE III-5

DISTRIBUTION OF FATAL ACCIDENTS BY LARGEST TRUCK INVOLVED
1978 Through 1984 FATAL Michigan Trunkline Accidents

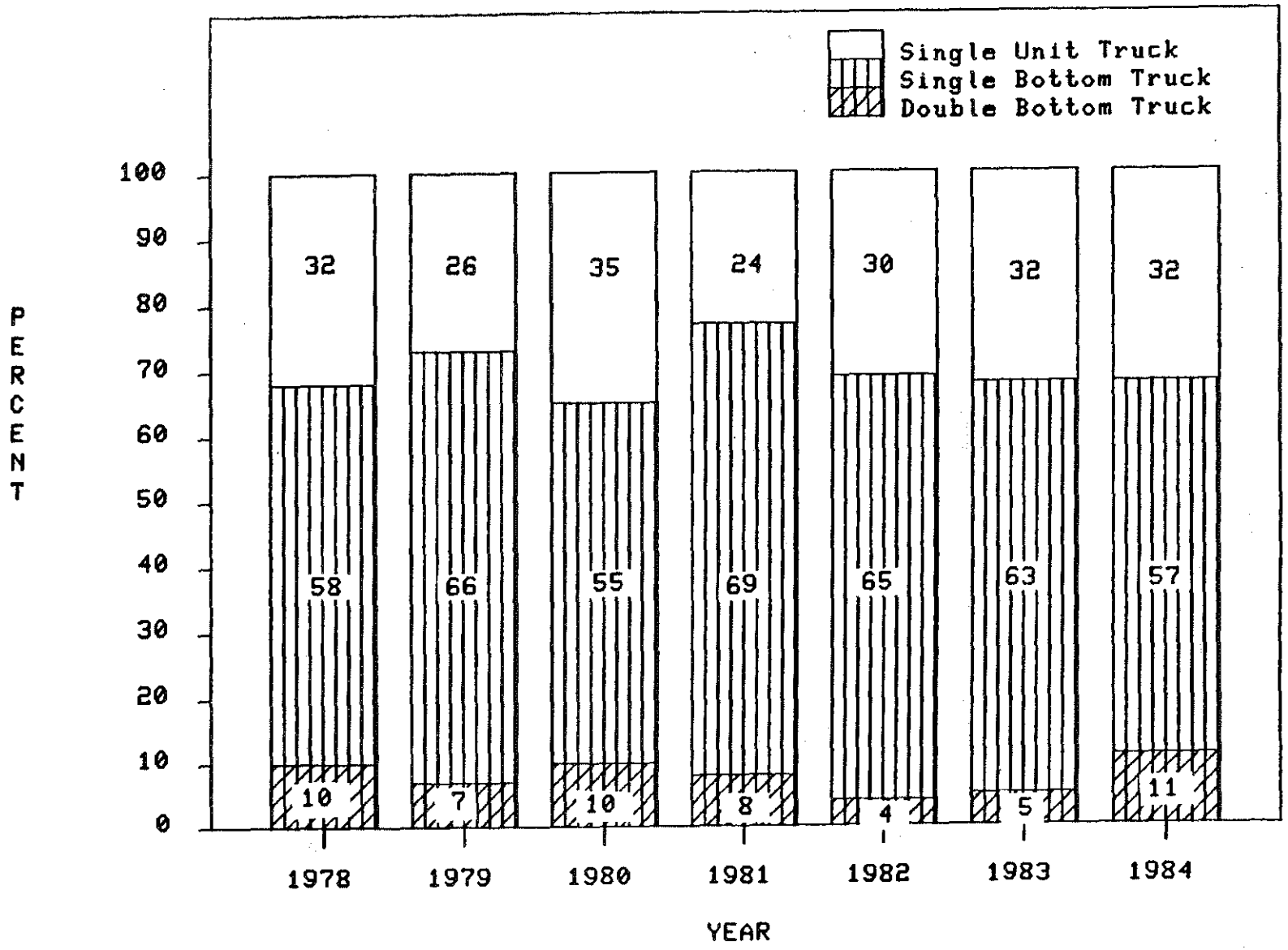


Table III-3

COMPARISON OF LARGE-TRUCK INVOLVED ACCIDENTS

1983 vs. 1984

(Trunkline Only)

District	1983 Accidents TOTAL	1983 Accidents TRUCK	1984 Accidents TOTAL	1984 Accidents TRUCK	Percent Increase TOTAL	Percent Increase TRUCK
1	3,475	190	3,685	196	6.0	3.2
2	1,644	130	1,823	135	10.9	3.8
3	4,732	330	5,247	328	10.9	.6
4	3,622	237	4,152	237	14.6	0.0
5	12,788	914	14,089	1,005	10.2	10.0
6	12,692	840	14,572	893	14.8	6.3
7	10,652	1,039	11,710	1,152	9.9	10.9
8	14,630	1,305	16,581	1,475	13.3	13.0
Metro	39,423	2,668	49,697	3,916	26.1	46.8
TOTAL	103,658	7,653	121,556	9,337	17.3	22.0

Source: MDOT, Traffic and Safety Division

Figures III-6 and III-7 show the distribution of 1984 truck accidents graphically on various routes in the state, while the Appendix contains three distributions of accidents by time of day. The predominant pattern is for daytime accidents, but the distribution of accidents by hour of day differs for trucks, probably due to the distribution of hours of operation.

Returning to the comparison of 1983 and 1984 truck involved accidents, Table III-4 shows the distribution of accidents by route for the two years, by type of truck; single unit, single bottom, or double bottom. Truck accidents on Interstate routes increased over 32 percent while the increase on US and M routes was slightly over 17 percent. The increases differed among the types of truck with the most notable being that single unit truck accidents increased more on interstates than did single bottoms despite the fact that trunklines experience more single bottom accidents than single unit accidents. This relationship does not hold for statewide data on all roads where there are significantly more single units involved than single bottoms. There was an increase of over 60 percent in accidents involving double bottoms on US routes.

Analysis was performed relating the increase to area population. Table III-5 shows the increase for ten population groupings by type of truck. Note the increase of nearly 50 percent for population areas of 50,000 to 100,000 for all trucks. Note also that single bottom accidents increased 55 percent in areas over 250,000 population.

FIGURE III-6

1984 HEAVY TRUCK ACCIDENTS

1984 NUMBER OF HEAVY TRUCK ACCIDENTS

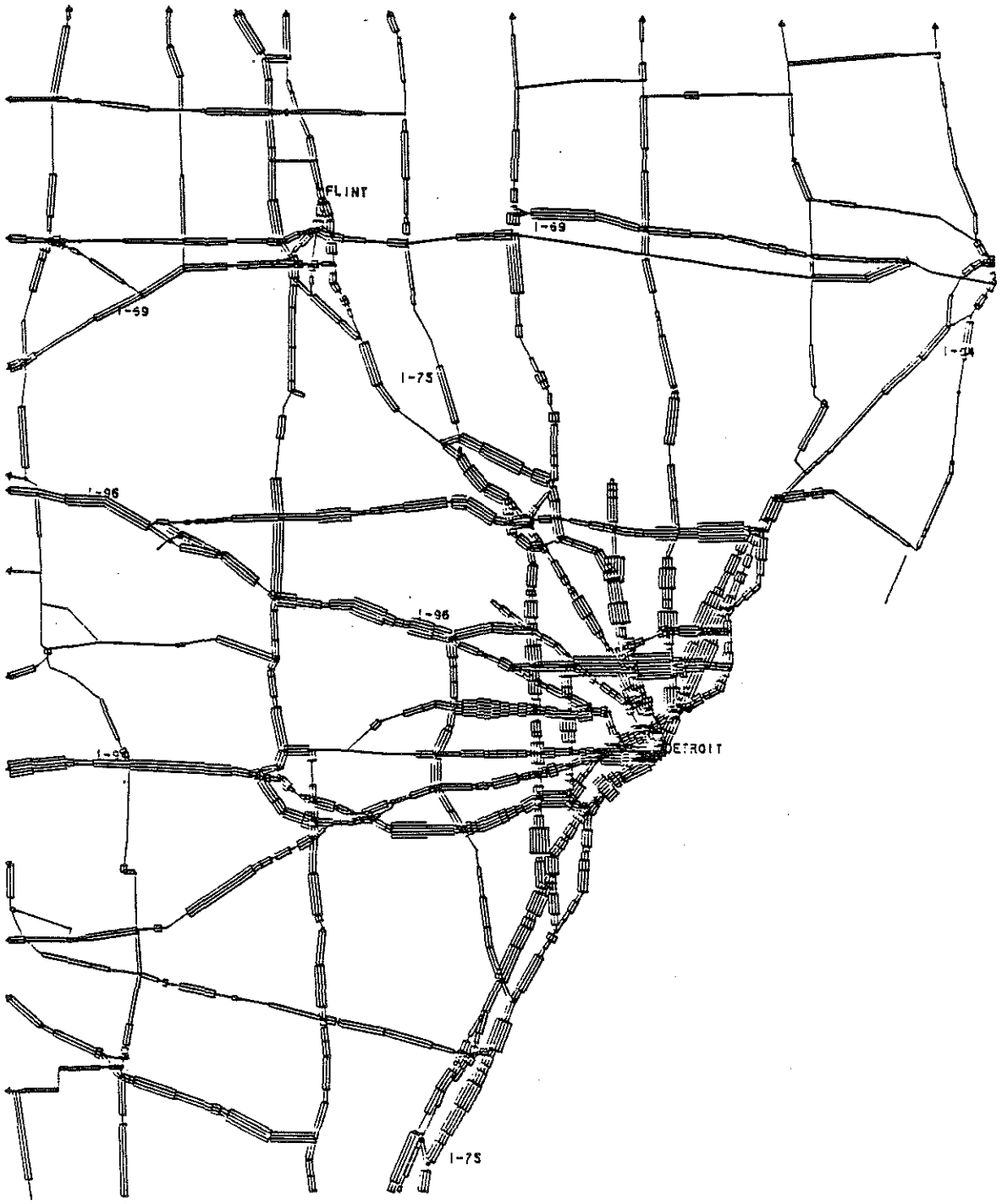
1 BANDS = 0	4 BANDS = 6 TO 10	7 BANDS = 21 TO 30
2 BANDS = 1	5 BANDS = 11 TO 15	8 BANDS = 31 TO 50
3 BANDS = 2 TO 5	6 BANDS = 16 TO 20	9 BANDS = 51 TO 9999

239 ACCIDENTS OUT OF 9337 NOT ASSIGNED

Prepared by: Transportation Planning Procedures Section-MDOT
Traffic and Safety Division-MDOT

FIGURE III-7

1984 HEAVY TRUCK ACCIDENTS



1984 NUMBER OF HEAVY TRUCK ACCIDENTS

1 BANDS = 0	4 BANDS = 6 TO 10	7 BANDS = 21 TO 30
2 BANDS = 1	5 BANDS = 11 TO 15	8 BANDS = 31 TO 50
3 BANDS = 2 TO 5	6 BANDS = 16 TO 20	9 BANDS = 51 TO 9999

239 ACCIDENTS OUT OF 9337 NOT ASSIGNED

Prepared by: Transportation Planning Procedures Section-MDOT
Traffic and Safety Division-MDOT

TABLE III-4

Comparison of 1983 and 1984 Large Truck Accidents by Route Type

ROUTE	All 1983	All 1984	ROW TOTAL	Single Unit 1983	Single Unit 1984	ROW TOTAL	Single Bottom 1983	Single Bottom 1984	ROW TOTAL	Double Bottom 1983	Double Bottom 1984	ROW TOTAL
Interstate Route	2273	3011	5284	679	941	1620	1447	1911	3358	147	159	306
	43.0	57.0	31.1	41.9	58.1	20.0	43.1	56.9	41.1	48.0	52.0	42.0
	29.7	32.2		18.3	21.5		40.0	41.9		44.1	40.3	
US Route	1869	2199	4068	937	1051	1988	871	1050	1921	61	98	159
	45.9	54.1	23.9	47.1	52.9	24.6	45.3	54.7	23.5	38.4	61.6	21.8
	24.4	23.6		25.3	24.0		24.1	23.0		18.3	24.8	
M Route	3000	3519	6519	1804	2010	3814	1084	1382	2466	112	127	239
	46.0	54.0	38.4	47.3	52.7	47.2	44.0	56.0	30.2	46.9	53.1	32.8
	39.2	37.7		48.7	45.9		30.0	30.3		33.6	32.2	
Interstate BL/BS	228	259	487	131	179	310	93	75	168	4	5	9
	46.8	53.2	2.9	42.3	57.7	3.8	55.4	44.6	2.1	44.4	55.6	1.2
	3.0	2.8		3.5	4.1		2.6	1.6		1.2	1.3	
US Business Rte	133	133	266	82	79	161	44	51	95	7	3	10
	50.0	50.0	1.6	50.9	49.1	2.0	46.3	53.7	1.2	70.0	30.0	1.4
	1.7	1.4		2.2	1.8		1.2	1.1		2.1	0.8	
M Business Route	33	32	65	22	26	48	11	6	17	0	0	0
	50.8	49.2	0.4	45.8	54.2	0.6	64.7	35.3	0.2	0	0	0
	0.4	0.3		0.6	0.6		0.3	0.1		0	0	0
Connectors	23	51	74	8	25	33	14	25	39	1	1	2
	31.1	68.9	0.4	24.2	75.8	0.4	35.9	64.1	0.5	50.0	50.0	0.3
	0.3	0.5		0.2	0.6		0.4	0.5		0.3	0.3	
Service Drive	94	133	227	43	67	110	50	64	114	1	2	3
	41.4	58.6	1.3	39.1	60.9	1.4	43.9	56.1	1.4	33.3	66.7	0.4
	1.2	1.4		1.2	1.5		1.4	1.4		0.3	0.5	
COLUMN TOTAL	7653	9337	16990	3706	4378	8084	3614	4564	8178	333	395	728
	45.0	55.0	100.0	45.8	54.2	100.0	44.2	55.8	100.0	45.7	54.3	100.0

TABLE III-5

Comparison of 1983 and 1984 Large Truck Accidents by Population of Area

POPULATION	All Trucks 1983	All Trucks 1984	ROW TOTAL	Single Unit 1983	Single Unit 1984	ROW TOTAL	Single Bottom 1983	Single Bottom 1984	ROW TOTAL	Double Bottom 1983	Double Bottom 1984	ROW TOTAL
	3489	4155	7644	1468	1709	3177	1831	2223	4054	190	223	413
Township	45.6	54.4	45.0	46.2	53.8	39.3	45.2	54.8	49.6	46.0	54.0	56.7
	45.6	44.5		39.6	39.0		50.7	48.7		57.1	56.5	
	70	74	144	39	37	76	30	35	65	1	2	3
Less Than 1,000	48.6	51.4	0.8	51.3	48.7	0.9	46.2	53.8	0.8	33.3	66.7	0.4
	0.9	0.8		1.1	0.8		0.8	0.8		0.3	0.5	
	236	254	490	108	129	237	120	110	230	8	15	23
1,000 to 2,500	48.2	51.8	2.9	45.6	54.4	2.9	52.2	47.8	2.8	34.8	65.2	3.2
	3.1	2.7		2.9	2.9		3.3	2.4		2.4	3.8	
	266	257	523	138	138	276	116	107	223	12	12	24
2,500 to 5,000	50.9	49.1	3.1	50.0	50.0	3.4	52.0	48.0	2.7	50.0	50.0	3.3
	3.5	2.8		3.7	3.2		3.2	2.3		3.6	3.0	
	310	325	635	187	174	361	108	137	245	15	14	29
5,000 to 10,000	48.8	51.2	3.7	51.8	48.2	4.5	44.1	55.9	3.0	51.7	48.3	4.0
	4.1	3.5		5.0	4.0		3.0	3.0		4.5	3.5	
	470	557	1027	261	298	559	198	246	444	11	13	24
10,000 to 25,000	45.8	54.2	6.0	46.7	53.3	6.9	44.6	55.4	5.4	45.8	54.2	3.3
	6.1	6.0		7.0	6.8		5.5	5.4		3.3	3.3	
	583	685	1268	311	362	673	248	304	552	24	19	43
25,000 to 50,000	46.0	54.0	7.5	46.2	53.8	8.3	44.9	55.1	6.7	55.8	44.2	5.9
	7.6	7.3		8.4	8.3		6.9	6.7		7.2	4.8	
	607	907	1514	318	485	803	265	392	657	24	30	54
50,000 to 100,000	40.1	59.9	8.9	39.6	60.4	9.9	40.3	59.7	8.0	44.4	55.6	7.4
	7.9	9.7		8.6	11.1		7.3	8.6		7.2	7.6	
	682	793	1475	416	448	864	251	319	570	15	26	41
100,000 to 250,000	46.2	53.8	8.7	48.1	51.9	10.7	44.0	56.0	7.0	36.6	63.4	5.6
	8.9	8.5		11.2	10.2		6.9	7.0		4.5	6.6	
	940	1330	2270	460	598	1058	447	691	1138	33	41	74
Over 250,000	41.4	58.6	13.4	43.5	56.5	13.1	39.3	60.7	13.9	44.6	55.4	10.2
	12.3	14.2		12.4	13.7		12.4	15.1		9.9	10.4	
COLUMN	7653	9337	16990	3706	4378	8084	3614	4564	8178	333	395	728
TOTAL	45.0	55.0	100.0	45.8	54.2	100.0	44.2	55.8	100.0	45.7	54.3	100.0

Table III-6 shows truck accident severity by route for the different types of trucks for 1983 and 1984 combined. Forty-two percent of the fatal trunkline accidents involving trucks in the two years occurred on M routes, 30 percent on U.S. routes, and 24.5 percent on Interstate routes. For double bottoms, 10 (62 percent) of the 16 fatal accidents occurred on M routes. More than half (54 percent) of the single unit fatal accidents (total of 63) occurred on M routes.

Again, in an effort to determine causal effects of this apparent dramatic increase in truck-involved accidents between 1983 and 1984, the trends in driver hazardous action and contributing circumstances were analyzed for a large sample of trunkline accidents involving tractor/trailer combinations (single and double bottoms) for the years 1977 through 1984. These data are displayed in Table III-7. No strong pattern of increased incidence of defective equipment, unsecure load, or speeding can be found. There was a slight increase in the later years in driving while intoxicated and careless driving, but the totals of these occurrences for 1983 and 1984 are virtually equal. It is arguable that law enforcement officers are not always aware of defective equipment or other contributing circumstances.

Figure III-8 illustrates the trend in statewide truck-involved accidents for all accidents rather than fatal accidents only as shown in Figure III-9. Single unit trucks have consistently more accidents than single bottom, but have fewer fatal accidents.

TABLE III-6

Comparison of 1983 and 1984 Large Truck Accidents
Severity by Route

ROUTE		All Trucks				Single Unit				Single Bottom				Double Bottom			
	COUNT ROW PCT COL PCT	Fatal	Personal Injury	Property Damage	ROW Total	Fatal	Personal Injury	Property Damage	ROW Total	Fatal	Personal Injury	Property Damage	ROW Total	Fatal	Personal Injury	Property Damage	ROW Total
Interstate Route		48	1507	3729	5284	9	437	1174	1620	36	991	2331	3358	3	79	224	306
		0.9	28.5	70.6	31.1	0.6	27.0	72.5	20.0	1.1	29.5	69.4	41.1	1.0	25.8	73.2	42.0
		24.5	34.0	30.2		14.3	21.3	19.7		30.8	45.4	39.7		18.8	39.7	43.7	
US Route		59	1055	2954	4068	15	523	1450	1988	41	490	1390	1921	3	42	114	159
		1.5	25.9	72.6	23.9	0.8	26.3	72.9	24.6	2.1	25.5	72.4	23.5	1.9	26.4	71.7	21.8
		30.1	23.8	23.9		23.8	25.5	24.3		35.0	22.4	23.6		18.8	21.1	22.2	
M Route		83	1660	4776	6519	34	964	2816	3814	39	623	1804	2466	10	73	156	239
		1.3	25.5	73.3	38.4	0.9	25.3	73.8	47.2	1.6	25.3	73.2	30.2	4.2	30.5	65.3	32.8
		42.3	37.5	38.6		54.0	47.0	47.2		33.3	28.5	30.7		62.5	36.7	30.4	
Interstate BL/BS		2	97	388	487	1	65	244	310	1	31	136	168	0	1	8	9
		0.4	19.9	79.7	2.9	0.3	21.0	78.7	3.8	0.6	18.5	81.0	2.1	0.0	11.1	88.9	1.2
		1.0	2.2	3.1		1.6	3.2	4.1		0.9	1.4	2.3		0.0	0.5	1.6	
US Business Rte		1	48	217	266	1	28	132	161	0	18	77	95	0	2	8	10
		0.4	18.0	81.6	1.6	0.6	17.4	82.0	2.0	0.0	18.9	81.1	1.2	0.0	20.0	80.0	1.4
		0.5	1.1	1.8		1.6	1.4	2.2		0.0	0.8	1.3		0.0	1.0	1.6	
M Business Route		0	11	54	65	0	9	39	48	0	2	15	17	0	0	0	0
		0.0	16.9	83.1	0.4	0.0	18.8	81.3	0.6	0.0	11.8	88.2	0.2	0.0	0.0	0.0	0.0
		0.0	0.2	0.4		0.0	0.4	0.7		0.0	0.1	0.3		0.0	0.0	0.0	
Connectors		1	20	53	74	1	8	24	33	0	12	27	39	0	0	2	2
		1.4	27.0	71.6	0.4	3.0	24.2	72.7	0.4	0.0	30.8	69.2	0.5	0.0	0.0	100.0	0.3
		0.5	0.5	0.4		1.6	0.4	0.4		0.0	0.5	0.5		0.0	0.0	0.4	
Service Drive		2	33	192	227	2	15	93	110	0	16	98	114	0	2	1	3
		0.9	14.5	84.6	1.3	1.8	13.6	84.5	1.4	0.0	14.0	86.0	1.4	0.0	66.7	33.3	0.4
		1.0	0.7	1.6		3.2	0.7	1.6		0.0	0.7	1.7		0.0	1.0	0.2	
COLUMN TOTAL		196	4431	12363	16990	63	2049	5972	8084	117	2183	5878	8178	16	199	513	728
		1.2	26.1	72.8	100.0	0.8	25.3	73.9	100.0	1.4	26.7	71.9	100.0	2.2	27.3	70.5	100.0

TABLE III-7

Trunkline Truck Accidents With Semi as Vehicle 1

Driver Hazardous Action

	1977		1978		1979		1980		1981		1982		1983		1984	
	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %
None	779	32.5	891	28.1	876	28.9	634	28.9	680	29.2	637	28.7	728	28.2	821	25.6
Speed Too Fast	730	30.4	575	18.3	482	15.9	338	15.4	378	16.2	318	14.4	358	13.9	456	14.2
Speed Too Slow	1	0.0	6	0.2	1	0.0	0	0.0	2	0.1	1	0.0	1	0.0	1	0.0
Fail To Yield R.O.W.	134	5.6	186	5.9	159	5.2	103	4.7	139	6.0	119	5.4	130	5.0	183	5.7
Improper Pass Or Lane Use	229	9.5	335	10.7	339	11.2	247	11.3	303	13.0	298	13.4	343	13.3	426	13.3
Improper Turn Or No Signal	137	5.7	196	6.2	192	6.3	124	5.7	146	6.3	140	6.3	142	5.5	231	7.2
Improper Backing	47	2.0	85	2.7	83	2.7	52	2.4	53	2.3	54	2.4	87	3.4	91	2.8
Follow Too Close	233	9.7	623	19.9	651	21.5	487	22.2	490	21.0	520	23.5	593	23.0	750	23.4
Other Or Unknown	109	4.5	237	7.6	244	8.1	206	9.4	139	6.0	127	5.7	197	7.6	245	7.6
Wrong Way	0	0.0	3	0.1	2	0.1	0	0.0	2	0.1	2	0.1	0	0.0	0	0.0
TOTAL	2,399	100.0	3,137	100.0	3,029	100.0	2,191	100.0	2,332	100.0	2,216	100.0	2,579	100.0	3,204	100.0

Contributing Circumstance

	1977		1978		1979		1980		1981		1982		1983		1984	
	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %	Abso. Freq.	Rel. Freq. %
DWI, Alcohol Or Drug	4	0.2	7	0.2	10	0.3	12	0.5	7	0.3	8	0.4	11	0.4	14	0.4
Reckless, Careless	26	1.1	24	0.8	25	0.8	34	1.6	46	2.0	47	2.1	65	2.5	61	1.9
Ill, Inattentive	26	1.1	27	0.9	25	0.8	24	1.1	33	1.4	11	0.5	7	0.3	19	0.6
Obscured Vision	48	2.0	33	1.1	24	0.8	29	1.3	38	1.6	44	2.0	30	1.2	30	0.9
Defective Equipment	178	7.4	153	4.9	171	5.6	139	6.3	134	5.7	108	4.9	144	5.6	154	4.8
Shifting Load Or Wind	65	2.7	52	1.7	50	1.7	63	2.9	58	2.5	66	3.0	49	1.9	67	2.1
None	565	23.6	692	22.1	697	23.0	478	21.8	512	22.0	469	21.2	547	21.2	651	20.3
Skidding	231	9.6	283	9.0	199	6.6	138	6.3	130	5.6	140	6.3	109	4.2	122	3.8
Other Or Unknown	1,256	52.4	1,866	59.5	1,828	60.3	1,274	58.1	1,374	58.9	1,323	59.7	1,616	62.7	2,086	65.1
Violated License Restr.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0
TOTAL	2,399	100.0	3,137	100.0	3,029	100.0	2,191	100.0	2,332	100.0	2,216	100.0	2,579	100.0	3,204	100.0

12-23-85 REM:jsm(TS-4-61)-2 Technical Services Unit

FIGURE III-8

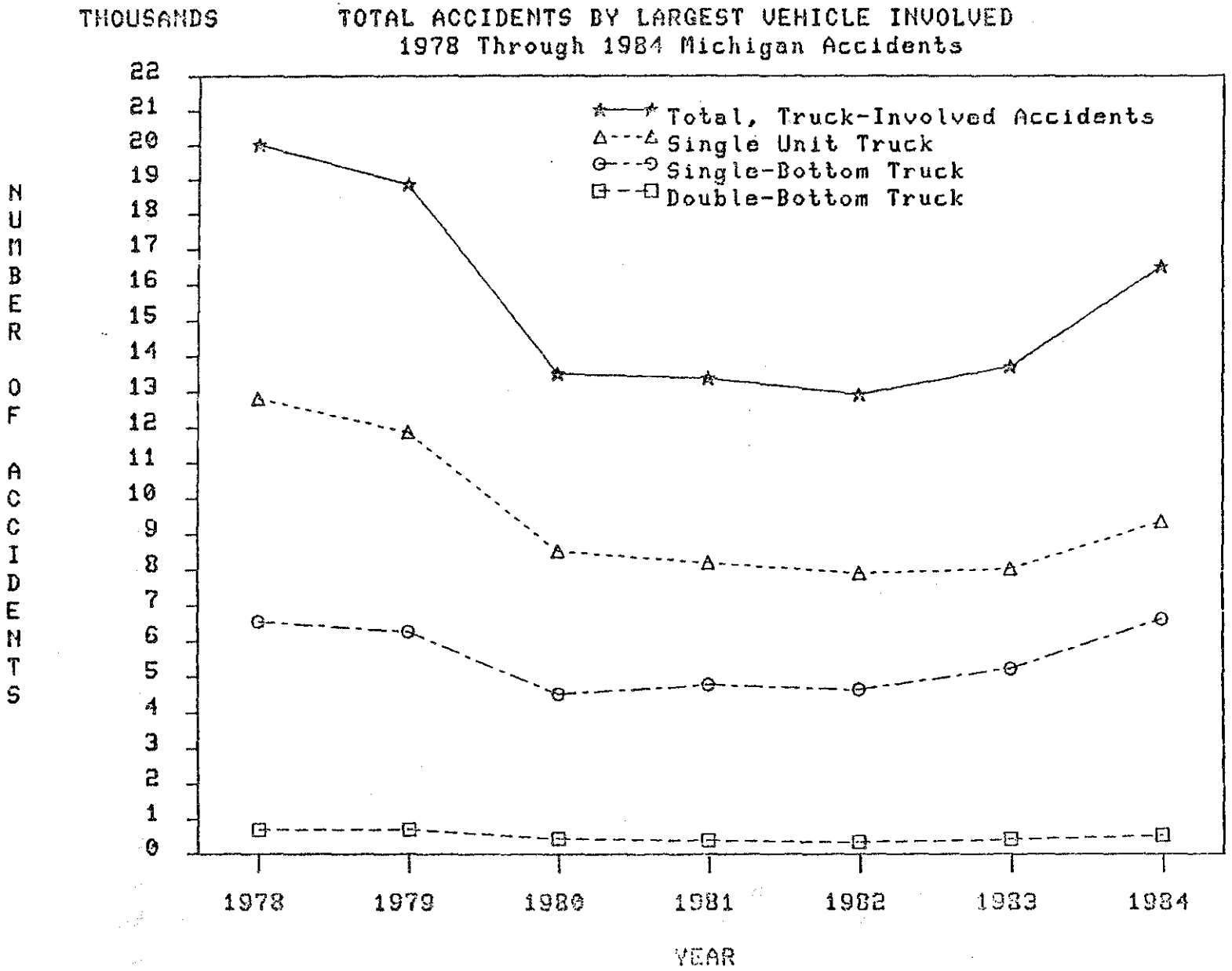
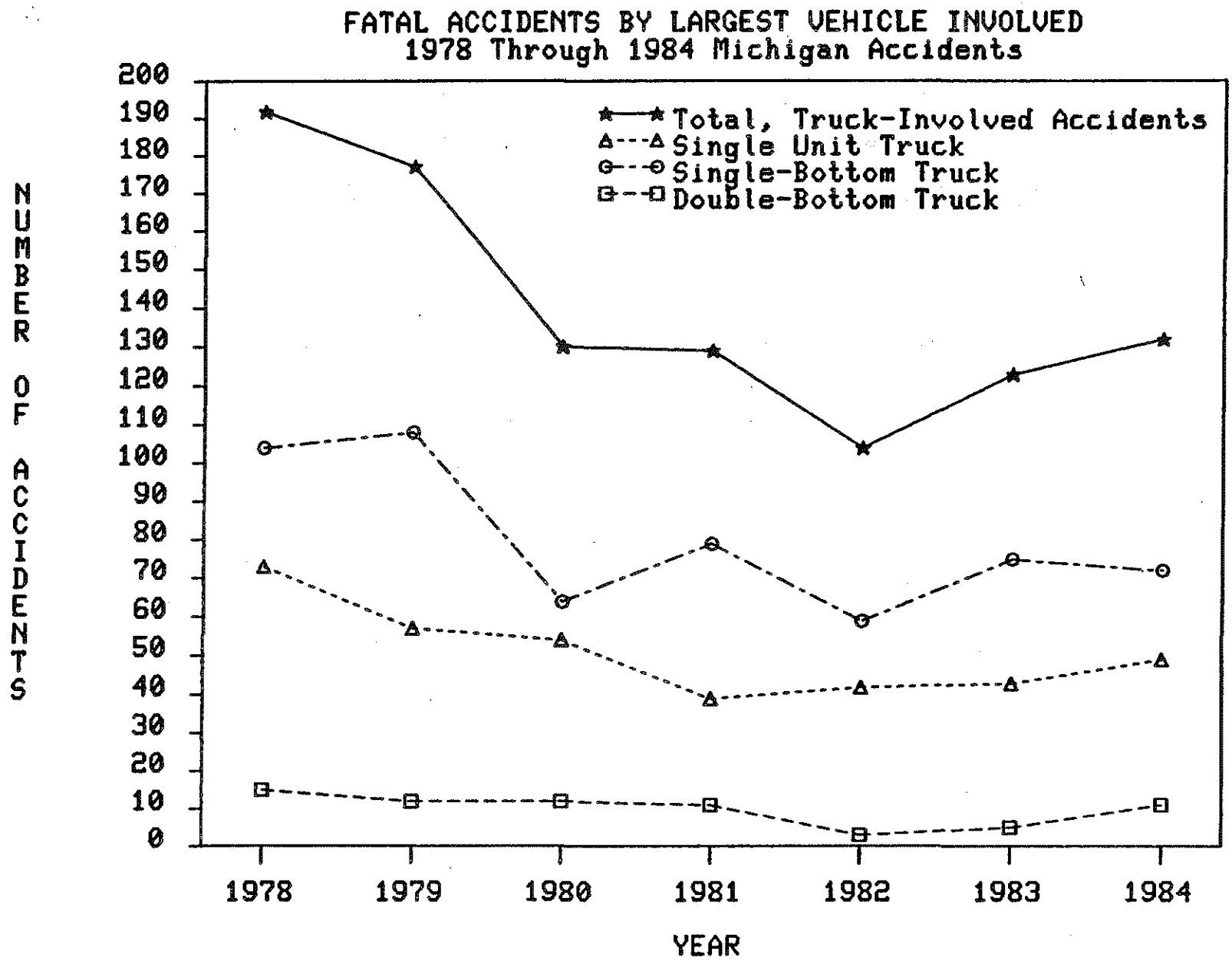

THOUSANDS
TOTAL ACCIDENTS BY LARGEST VEHICLE INVOLVED
1978 Through 1984 Michigan Accidents
Total, Truck-Involved Accidents
Single Unit Truck
Single-Bottom Truck
Double-Bottom Truck
NUMBER OF ACCIDENTS
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1978
1979
1980
1981
1982
1983
1984
YEAR

FIGURE III-9


FATAL ACCIDENTS BY LARGEST VEHICLE INVOLVED
1978 Through 1984 Michigan Accidents
NUMBER OF ACCIDENTS
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Total, Truck-Involved Accidents
Single Unit Truck
Single-Bottom Truck
Double-Bottom Truck
1978
1979
1980
1981
1982
1983
1984
YEAR

While much analysis has been conducted to determine the cause for the increase between 1983 and 1984 in truck-related accidents, the large reduction in accidents between 1979 and 1980 when a 28 percent reduction was observed remains largely unexplained. The incidence of 16,497 truck-related accidents in 1984 is still 13 percent less than that observed in 1979 and 18 percent less than the 20,057 that occurred in 1978.

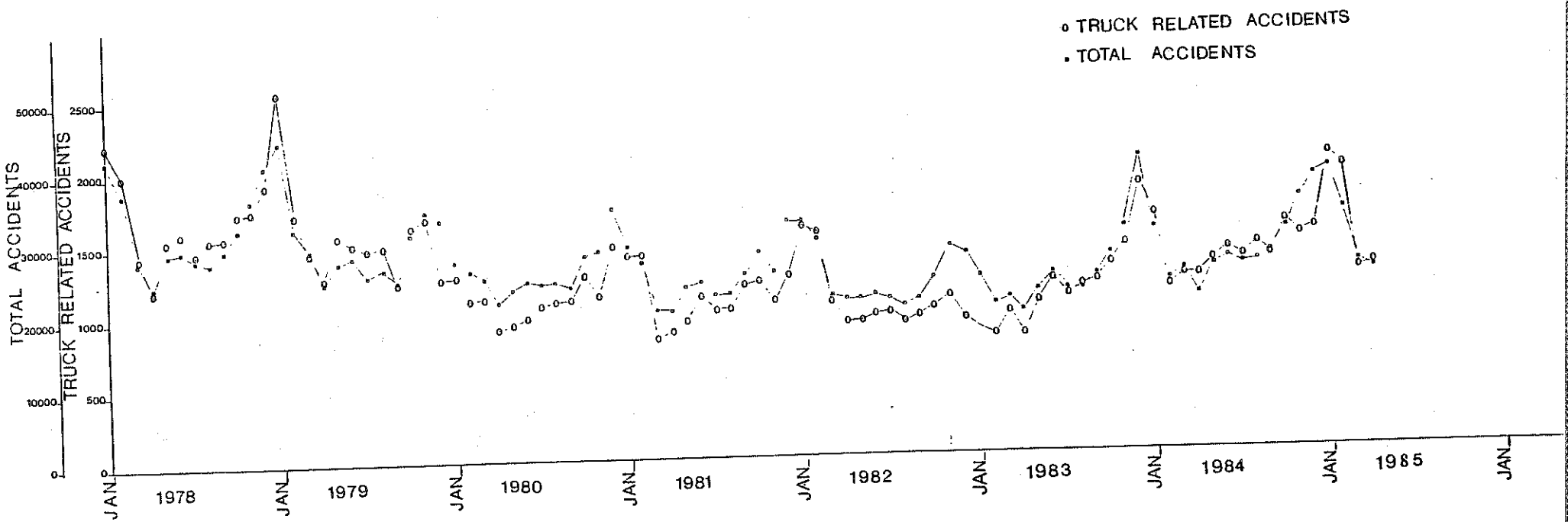
The relationship of truck-accident trends to that of total accidents is shown in Figure III-10. (See detailed Truck Accident profiles in the Appendix)

D. Summary

The preceding data do not permit clear conclusions to be drawn about the cause(s) of the recent increase in truck-related accidents. There is some evidence that a portion of the increase in truck accidents and accident rates is due to truck traffic levels significantly in excess of estimates. For example, commercial traffic estimates show an increase of about two percent between 1983 and 1984 while other indices suggest that this might be an understatement. These indicators include diesel fuel sales which increased by 14 percent and oversize vehicle permits which were up by 16 percent. A careful review of commercial traffic count procedures is being undertaken by the department to assure that estimates accurately reflect truck travel in the state.

The question of how trucking deregulation contributed to truck accident increases is also unanswered. However, truck accidents

FIGURE III-10



did begin to trend upward after the Motor Carrier Act of 1980 deregulated the trucking industry at the national level. Restrictions on rates, routes, and entry into markets were greatly reduced. An applicant for a motor carrier certificate must only establish that the applicant is "fit, willing, and able to provide service" and that the proposed service will serve a "useful public purpose, responsive to a public demand or need."

The relatively low capital costs associated with trucking have enabled many new companies and independent operators to enter the business. These new operators may have lower operating costs than more established companies faced with higher salary and benefit packages, more indebtedness, more facilities to operate and maintain, and greater commitment to a range of services. These competitive forces have tended to reduce motor carrier rates and revenues which in turn require costs to be reduced if adequate profit margins are to be maintained. This can be achieved, at least in the short run, by operating above allowable weight limits or by reduced maintenance, or less frequent vehicle replacement. The degree to which safety is affected by this is difficult to determine. However, the problem of truck safety has been the subject of hearings, at the federal level, by the House Subcommittee on Government Activities and Transportation. In fact, the Subcommittee's Chairman Cardiss Collins of Illinois, has said:

> In today's deregulated, highly competitive trucking environment, more pressure than ever is being felt by truck companies to violate federal safety regulations.

> Truckers who can run overweight, over hours, or with less maintenance can make greater profits. When safety audits occur, truck companies can be expected to resist more than they did when profits were assured in a regulated market. This is why the Department has to take steps to protect its inspections.

Some support for this may be found in a recent study by the AAA Foundation for Traffic Safety which indicated that approximately 60 percent of all heavy truck accidents involve a fatigued truck driver. The report estimates that one of every three drivers on the road exceeds the 10 hour per day limit set by the FHWA's Bureau of Motor Carrier Safety. It further estimates that 6.5 percent of all heavy truck drivers are on duty for more than 16 consecutive hours. This situation cannot be supported from an analysis of Michigan data. However, this may be partially due to the difficulty in determining fatigue as the cause of an accident.

Despite the large quantity of accident and volume data available, the cause(s) of changes in truck accident experience remains elusive. More accurate vehicle exposure data and better data on truck types are needed as a first step in finding this answer. In addition, careful review of the several state and national level studies currently underway is needed. Continued cooperation of all agencies with an interest in truck safety, imporovements in data accuracy, and more incisive analysis will result in a better understanding of the relationship.

E. TRUCK SAFETY STUDIES

1. NHSAC Report - July 1985

In July 1980, the National Highway Safety Advisory Committee (NHSAC) presented a report on commercial vehicle safety to the U.S. Secretary of Transportation. The committee recommended new approaches in several critical areas including, the following.

- Truck driver training and licensing should be tailored and more closely related to commercial truck operating requirements.
- A National Driver Register is urgently needed to enable the identification and removal of unsafe drivers.
- Truck type-specific accident data are needed as an aid in reducing accidents.
- More effective roadside safety inspections are needed.
- States should be encouraged to adopt the critical items inspection practice of the Commercial Vehicle Safety Alliance.

2. Current Federal Studies

Current federal truck-related research is proceeding in several areas, including the following:

- Improvement of interchange designs.
- Operation of large trucks on local roads and streets.
- Improvements in coupling systems.

Reports on the above subjects should be available within the next year. The following areas are the subjects of longer term research.

- Truck lane roadway restrictions.

- Near term size and weight limit changes as influences on truck design.
- Controls needed for safe operation of longer combinations on the interstate system.

3. National Academy of Sciences

With passage of the Surface Transportation Assistance Act of 1982, Congress mandated a study of twin trailer trucks. The Transportation Research Board was given responsibility for the study whose scope was later broadened to address safety issues associated with 48-foot long trailers and 102-inch wide trailers. MDOT participated in this study and a report is due in June, 1986.

4. Michigan Office of Highway Safety Planning

This office has provided a grant to Michigan State University to perform research on various trucking issues including exposure, accident trends and truck safety as it relates to heavy versus super heavy trucks. A report is expected later in 1986.

5. University of Michigan Transportation Research Insititue (U.M.T.R.I.)

MDOT has contracted with UMTRI to perform computer simulation studies of semi-trailer stability and off-truck characteristics for various trailer lengths. The study will also compare Michigan truck accident characteristics with data from neighboring states and national statistics.

CHAPTER IV

TRUCK REVENUE AND TAXATION

IV. TRUCK REVENUE AND TAXATION

A. Introduction and Background

Current debate on truck related taxes and policy focuses on concerns regarding 1) cost responsibility and 2) state tax and registration requirements and procedures. The issue of cost responsibility addresses the questions of whether heavy vehicles pay sufficient user charges to compensate their costs in terms of wear and tear and damage resulting from their use of highway facilities. Concern for greater efficiency and equity in state tax and registration policy is a result of the increasing burden on interstate trucking arising from non-uniformity across states.

Cost responsibility refers to the proportionate share of highway costs legitimately assignable to a given vehicle class. The term also refers to the general principle that payments by road users should be in proportion to the road costs for which they are responsible. Highway cost allocation studies are used to compare the share of user taxes paid by various classes of vehicles with the costs of highway construction and maintenance that may be attributable to each group. The costs for highway construction and maintenance are assigned to the various motor vehicle categories according to systematic criteria that vary depending on the cost allocation methodology selected for use.

Comparison of cost responsibilities and user tax payments for each vehicle type and weight group identify those vehicle groups that may

be paying more or less than their calculated responsibility. The results of a cost allocation study can provide a basis to adjust total highway user revenues equitably by increasing user taxes on specific vehicle groups that may be paying less than their equitable share.

The information in this chapter is summarized from several sources, representing a considerable body of work completed by the federal government and others. The principal sources of material for information were:

- Final Report on the Federal Highway Cost Allocation Study, U.S. Department of Transportation, Washington, D.C., May 1982.
- AASHTO Study of Motor Carrier Taxation and Registration Issues: System Design Concepts, Inc., et al; American Association of State Highways and Transportation Officials, Washington, D.C., 1983.
- Alternatives to Tax on Use of Heavy Trucks (Section 513 Report; U.S. Department of Transportation, Washington, D.C., 1984.

1. Cost Responsibility

On January 6, 1983, the President signed the Surface Transportation Assistance Act (STAA) of 1982 into law. This legislation was a major milestone in highway financing as federal highway user fees were increased for the first time in over 20 years. Until 1956, federal-aid highways were financed from the general revenues of the Treasury. Excise taxes on fuels, vehicles, and other vehicle-related products had little relationship to highway appropriations. However, the passage of the Federal-Aid Highway Act of 1956 represented a significant change in financing methods.

The 1956 Act created the Highway Trust Fund and also served as the genesis of modern highway user charges. Several highway-related taxes were earmarked for the fund and the receipts dedicated to highway improvements. From the federal perspective, the highway program became self-supporting where users paid for the costs of the road improvements.

At the same time the Highway Trust Fund was formed, Congress increased several of the existing highway fees and imposed a tread rubber tax and a use tax on heavy vehicles. The taxes reflect congressional intent in providing for equity among the various classes of highway users. The concern for equity has remained as a major element of the highway program -- that the distribution of the tax burden should be in proportion to the benefits received (more recently the costs occasioned) by the classes of highway users. The determination of an equitable distribution of fees among user classes has been controversial since that time.

The last significant change in federal highway taxation on trucks prior to the STAA of 1982 was enacted in 1961 (see Table IV-1). In the intervening years, however, many attempts were made to increase the fees imposed on heavy vehicles.

In 1965, a supplemental report to the cost allocation study mandated in 1956 was completed. It indicated insufficient user payments by heavier vehicles and overpayment by single-unit trucks. Higher tax rates on diesel fuel than gasoline, and

increases in the heavy truck use tax and the tread rubber tax were proposed by President Johnson, but these heavy truck tax increases were not included in the revenue bills reported.

TABLE IV-1

Comparision of the Tax Rates of the Federal-Aid Highway Act of 1961 with Pre-1961 Rates

	Pre-1961 Act Rates	1961 Act
Gasoline and Diesel Fuel	4 cents/Gal.	4 cents/gal.
Highway tires	8 cents/lb.	10 cents/lb.
Inner tubes	9 cents/lb.	10 cents/lb.
Tread rubber	3 cents/lb.	5 cents/lb.
Excise tax on new trucks	5 percent	10 percent
Trucks over 26,000 lb	$1.50/1,000 lb.	$3/1,000 lb.

Again, in 1966, the Administration proposed raising the diesel fuel tax from 4 to 6 cents a gallon and increasing the vehicle use tax from $3 to $8 per thousand pounds. However, the bill that was enacted did not contain these provisions. Instead, it transferred all revenues from the federal taxes on fuels, tires, new trucks, truck parts, lubricating oils, and heavy vehicles to the Trust Fund.

Later in 1970, an updated cost allocation study also concluded that significant differences existed between tax payments and the cost responsibilities of heavy and lighter vehicles. Lighter vehicles were shown to be overpaying and the largest trucks underpaying.

While the conclusions of the 1970 study were used to support the repeal of the federal sales taxes on trucks less than 10,000 pounds in 1971, other truck taxes were not increased. At the same time, the federal sales tax on autos was repealed. This was the last change in highway-related user fees until 1982.

The federal highway cost allocation study submitted to the Congress in May 1982 again found that a substantial disparity existed between different classes of vehicles in the ratio of payments to allocated costs. The user fee structure enacted by the STAA of 1982 did not eliminate the disparities identified by the 1982 study, but it did shift more of the tax burden to heavier vehicles, and it contained fewer tax instruments, as four of the previous excises were eliminated.

2. Uniformity in Registration and Taxation

In the Motor Carrier Act of 1980, Congress addressed the issue of the increasing burden on interstate trucking due to non-uniformity among the states' tax and registration systems. The U.S. Department of Transportation and the Interstate Commerce Commission were directed to study the issues involved and report to the Congress with recommendations on ways to reduce the compliance burden of the trucking industry.

After submitting the report, the Administration drafted legislation in early 1982, which would have directed the Secretary of Transportation to establish a working group of state representatives to advise on regulations to be promulgated

within 18 months to address uniform state registration and taxation procedures. The group was to address criteria related to:

- Base state certification.
- Payment to the base state of fees and taxes due other states.
- An equitable distribution of revenue among the states.
- The standardization and consolidation of forms.
- A single contact point within each state for applications and filings.
- A limit on fees paid for identification stickers, plates, or other indices.

The draft legislation passed the Senate in slightly modified form as part of the STAA of 1982, but was eliminated from the final bill in conference. There was considerable concern and opposition from state representatives over the preemptive authority it would give the Secretary, and the precedent it would set for potential future actions in other areas of state taxation.

Recently, the National Governors' Association (NGA) has joined with the U. S. DOT and other interested organizations and groups, to work toward interstate cooperation in a number of interstate motor carrier activities, including registration, motor carrier fuel use taxes, other taxes, and uniformity of reporting, trip permitting, and audit standards and enforcement. A primary thrust of these activities is to promote equity and administrative ease for motor carriers and to simplify the administrative burden borne by states.

B. Summary of Cost Allocation and Cost Responsibility Issues

1. Federal Highway Cost Allocation Study

The issue of equity in highway user charges has many dimensions. Within cost allocation studies, the two commonly used measures for equity are cost-occasioning -- those who give rise to costs should bear the costs and benefits received -- those who receive the larger benefits should pay the larger costs. For the most recent federal Highway Cost Allocation Study, the cost-occasioning method was stipulated by the STAA of 1978 and Congressional Budget Office guidelines. This section will summarize the approach and results from the 1982 Federal Highway Cost Allocation Study and the efforts of a number of states.

The recommended overall cost allocation approach consists of an improved, and, in some cases, substantially altered version of the traditional incremental method for new facility costs and newly developed cost-occasioned methods for rehabilitation and reconstruction costs on existing facilities.

The recommended approach in the new federal study allocates new pavement costs by a modified incremental method. This approach, referred to as the minimum pavement thickness method, allocates all new pavement costs above the cost of a minimum feasible pavement thickness on the basis of the relative Equivalent Single Axle Loads contributed by each axle weight class. The cost of the minimum pavement thickness is considered

to be a residual cost and is shared by all vehicle classes on the basis of their relative miles of travel.

The most important determinant of the overall cost allocation outcome in the federal study is the treatment of pavement rehabilitation costs. These costs account for a significant portion (38.4%) of total projected federal program costs.

Under the incremental approach, major pavement rehabilitation costs were assigned in the same way as new pavement costs. The new approach, however, utilizes damage functions which address the different types of pavement distresses attributable to each vehicle class, and the significance of each type of distress to the decision process for capital outlays. Each major type of pavement distress is modeled separately as a function of traffic and other variables. This method is similar to the approach used in many recent state cost allocation studies.

New and replaced structure costs are assigned incrementally in the federal study. In the case of replaced structures, the cost of each increment is partially assigned in proportion to the degree to which the replaced structure has deficient load-bearing capacity. The cost of rehabilitating existing bridges is considered as a residual or common cost. Many of the recent state cost allocation studies have attributed at least some portion of these costs directly to trucks. It is likely that the federal study treatment of bridge repair costs as residual

costs understates the cost responsibility of heavy vehicles. The effect on the overall results of the study, however, is probably minor.

The federal study assigns all residual or common costs on the basis of vehicle miles traveled (VMT). This differs somewhat from the earlier 1965 federal study where axle miles of travel were used to assign residual pavement costs and vehicle miles were used in the assignment of all other residual costs. Similarly, most recent state studies have assigned some portion of residual costs on the basis of axle miles of travel and/or passenger car equivalent-weighted VMT. The federal study's use of VMT to assign all residual costs probably understates the cost responsibility of heavy vehicles to some extent, although the effect is relatively minor.

Most of the cost responsibility assigned to heavy trucks in the federal study is for pavements. Table IV-2 shows 1985 cost responsibilities by vehicle class for pavement and for other costs on a per vehicle mile basis. Almost 80 percent of the cost responsibilities for the heaviest combinations is for pavements.

TABLE IV-2

ESTIMATED FEDERAL HIGHWAY COST RESPONSIBILITIES OF SELECTED VEHICLE CLASSES
(Cents per Mile, 1985)

	Pavement Cost Responsibility	Other Cost Responsibility	Total Cost Responsibility
Automobiles and Motorcycles	0.08	0.39	0.47
Pickups and Vans	0.16	0.40	0.56
Single Unit Trucks Less Than 26,000 lbs.	0.52	0.57	1.09
Single Unit Trucks 26,000 lbs. and above	1.83	0.81	2.64
Combination Trucks Less Than 50,000 lbs.	2.25	1.11	3.36
Combination Trucks 50,000 to 70,000 lbs.	2.77	1.30	4.07
Combination Trucks 70,000 to 75,000 lbs.	3.97	1.52	5.49
Combination Trucks 75,000 lbs. and Above	5.71	1.58	7.29

Assumes a $12.8 billion program; $1.1 billion transit cost allocated to vehicles based on urban VMT; $11.7 highway cost allocated to vehicles based on the highway cost allocation study.

SOURCE: FHWA, Working Paper on Alternatives to Tax on Use of Heavy Trucks.

The 1982 federal study was a major consideration in the revisions to federal highway user tax structures and rates implemented by the STAA of 1982. Table IV-3 shows FHWA projections of federal tax payments by vehicle class under the previous tax structure and under the 1982 STAA. While the 1982 STAA did not result in tax rates which precisely match federal study estimates of cost responsibility by vehicle class, they did move a substantial distance in that direction.

2. State Highway Cost Allocation Studies

An American Association of State Highway Transportation Officials (AASHTO) Study reports that since 1977, 21 states have initiated highway cost allocation studies to assist in the determination of highway user tax rates and structures. These studies vary widely in terms of the methods used, the definition of vehicle classes, and the types of expenditures considered. In addition to all of the methodological questions faced by the Federal Study, states also faced some unique questions such as treatment of in-state vs. out-of-state vehicles and the allocation of pavement maintenance costs.

Table IV-4 summarizes the results reported by AASHTO from 17 state studies, in terms of the percentage of highway costs allocated to three vehicle classes. The cost responsibility assigned to light vehicles ranged from about 50 percent to about 80 percent.

The Maryland study is interesting in that cost responsibilities

TABLE IV-3

COMPARISON OF 1982 STAA AND PREVIOUS TAX STRUCTURES

Vehicle Class	1985 Revenue By Vehicle Type (Millions of Dollars) Previous Tax Structure	1982 STAA* (1988 Rates)	Revenue To Cost Ratio**
Autos & Motorcycles	$2,966.5	$ 5,684.8	1.04
Buses	1.4	0.0	.00
Pickups/Vans	1,416.8	2,515.3	1.15
Single Units	1,024.0	1,089.7	1.16
Less Than 26 Kips***	398.9	453.3	1.08
More Than 26 Kips	625.1	636.4	1.22
Combinations	1,720.7	3,355.8	.87
Less Than 50 Kips	220.7	305.7	.95
50 to 70 Kips	415.4	770.1	1.27
70 to 75 Kips	473.4	975.1	.90
More than 75 Kips	611.2	1,304.9	.71
All Vehicles	$7,129.4	$12,645.6	1.00

* 1982 STAA: Surface Transportation Assistance Act of 1982.

** Ratio of revenue to cost responsibility: A ratio of less than 1.0 indicates underpayment. $11.5 billion was allocated based on the Highway Cost Allocation Study recommended methodology. The remaining $1.1 billion was distributed among all vehicle classes based on urban VMT.

*** Kip = a unit of weight, equal to 1000 lb, used to express deadweight load.

SOURCE: FHWA, Working Paper on Alternatives to Tax on Use of Heavy Trucks, July 1983.

TABLE IV-4

RESULTS FROM RECENT STATE HIGHWAY COST ALLOCATION STUDIES

State	Scope of Cost Allocation: Analysis Period	Scope of Cost Allocation: Expenditures of State Hwy. User Funds For	Scope of Cost Allocation: Expenditure of Federal-Aid Transfers	Share of Cost Responsibility (%): Automobiles and Lt. Trucks*	Share of Cost Responsibility (%): Other Single Unit Trucks** and Buses	Share of Cost Responsibility (%): Combinations
Colorado	1979	All Highways	Excluded	63.0	37.0***	
Florida	FY78	Const. & Maint. of State Hwys.	Excluded	77.1	6.6	16.3
Georgia	FY78	Const. & Maint. of State Hwys.	Included	63.2	9.9	26.9
Iowa	1980	All Highways	Included	50.9	49.1	
Kentucky	1980	All State Maintained Hwys.	Included	51.5	48.5	
Maine	1981	All Highways	Included	69.9	16.5	13.6
Maryland	1979-84	All Highways	Excluded			
- Incremental Method				83.4	8.9	7.7
- Federal Method				72.7	14.6	12.7
Maryland	1979-84	State Highways	Excluded			
- Incremental Method				80.5	9.6	9.9
- Federal Method				69.4	14.3	16.3
Mississippi	FY79	State Highways	Included	61.0	39.0	
Missouri	1978	All Highways	Excluded			
- Incremental Method				70.8	29.2	
- Vehicle-Mile/Ton Mile Method****				67.1	32.9	
North Carolina	1982	State Highways	Included	70.0	7.0	23.0
Ohio	FY81	State Highways	Excluded	68.5	5.5	26.0
Oregon	1983	All Highways	Excluded	53.7	46.3	
Virginia	FY80	All Highways	Included	70.9	12.8	16.3
Virginia	FY80	Interstate and Primary	Included	62.0	12.0	26.0
Washington	1978-81	All Highways	Excluded	72.9	12.1	15.0
Wisconsin	FY83	All Highways	Excluded	74.1	9.0	16.9
Wyoming	1981	All Highways	Excluded			
- Incremental Method				61.2	38.8	
- Vehicle-Mile/Ton Mile Method****				55.0	45.0	

Source: AASHTO Study of Motor Carrier Taxation and Registration Issues; December, 1983; pp. I-24,25.

* Light trucks are defined as trucks with four tires, except for Colorado, Kentucky, Oregon, and Maryland where light trucks are defined as trucks with a gross weight of 10,000 pounds or less and for Missouri where light trucks are defined as having a gross weight of 12,000 pounds or less. In Wyoming, which registers trucks by empty weight, light trucks are defined as having an empty weight of 6,500 pounds or less.

** Includes two axle trucks with six tires and all single unit trucks with three or more axles.

*** Seven states did not explicitly differentiate combinations from other heavy trucks in reporting results. Combined results are shown in this column for these states.

**** In this method, costs are allocated in proportion to both vehicle miles and ton-miles. The two cost allocations are then averaged.

were estimated using both the Incremental Method and the Federal Method. Cost responsibility for all combinations is about 40 percent less under the Incremental Method than under the Federal Method. The difference is even more pronounced for selected vehicle classes. Under the Incremental Method, the cost responsibility of a 65,000 pound dump truck is 60 percent less than under the Federal Method.

The scope of the state studies has a substantial effect on cost responsibility. For all highways in Virginia, the cost responsibility of combinations is 16.3 percent. For just interstate and primary highways, however, their cost responsibility is 26 percent. Similar differences are noted in the Maryland estimates for all highways and the State Highway System. These differences exist primarily because combinations are a greater percentage of total traffic on higher functional classes, and thus are assigned a greater percentage of cost responsibility for these highways.

AASHTO analysis to adjust state assignments of cost responsibility to account for differences across states in the distribution of VMT by vehicle class is reported in Table IV-5. In this table, cost responsibilities are expressed on a per vehicle mile basis. The cost responsibility per vehicle mile for light vehicles is assigned an index value of 1.00 and cost responsibilities of other vehicles are calculated on a relative basis. Even with this adjustment, however, there are still

TABLE IV-5

RELATIVE COST RESPONSIBILITIES FROM STATE COST ALLOCATION STUDIES

State	Cost Responsibility Per Vehicle Mile Relative* to Automobiles and Light Trucks			
	Automobiles and Light Trucks**	Other Single Unit Trucks and Buses	Combi-nations	All Heavy Vehicles
Colorado	1.00	N/A	N/A	13.42
Florida	1.00	2.79	6.57	4.72
Georgia	1.00	3.01	5.85	4.67
Iowa	1.00	N/A	N/A	6.58
Kentucky	1.00	N/A	N/A	7.92
Maine	1.00	4.41	5.56	4.87
Maryland***				
Incremental	1.00	1.91	2.34	2.09
Federal	1.00	3.59	4.39	3.93
Missouri				
Incremental	1.00	N/A	N/A	3.24
Vehicle-Mile/Ton-Mile	1.00	N/A	N/A	3.87
North Carolina	1.00	2.09	5.73	4.05
Ohio	1.00	1.75	3.58	3.02
Oregon	1.00	N/A	N/A	10.12
Virginia***	1.00	3.99	4.72	4.36
Washington	1.00	2.90	5.43	3.90
Wyoming				
Incremental	1.00	N/A	N/A	2.13
Vehicle-Mile/Ton-Mile	1.00	N/A	N/A	2.96

* Cost responsibility per vehicle mile is scaled so that it equals 1.0 for automobiles and light trucks.

** Light trucks are defined as trucks with four tires, except for Colorado, Kentucky, Oregon, and Maryland where light trucks are defined as trucks with a gross weight of 10,000 pounds or less and for Missouri where light trucks are defined as having a gross weight of 12,000 pounds or less. In Wyoming, which registers trucks by empty weight, light trucks are defined as having an empty weight of 6,500 pounds or less.

*** Results for all highways were used in calculating relative cost responsibility in Maryland and Virginia.

substantial differences across states in the assignment of cost responsibility to vehicle classes.

3. Equity Evaluation of Tax Alternatives

The Surface Transportation Assistance Act (STAA) of 1982 provided for further study to ensure that highway taxes be collected in a manner that is not only equitable to all users, but also within practical limits of administrative feasibility.

Section 513(g) of the STAA of 1982 directed the U.S. DOT to study: 1) alternatives to the heavy vehicle use tax (HVUT) and 2) plans for improving the collection and enforcement of the tax and its alternatives. Alternative taxes are to include those based either singly or in combination on: 1) vehicle size or configuration, 2) vehicle weight, both registered and actual operating weight, and 3) distance traveled.

The Alternatives to Tax on Use of Heavy Trucks, Report to Congress, January 1984, concluded that:

> For the purpose of highway system finance, equity requires that those who are responsible for the costs should pay for them. Tax administration is another important factor. One of the benefits of indirect approaches to charging for highways, such as the current excise taxes, is that administrative costs have been kept very low ...
>
> ... The present structure of taxes, ... generally reflects the costs occasioned by the user while allowing for administrative ease and high compliance.
> ... Presently, they do so in a limited way based on averages of large groups of taxpayers. Some groups, such as trucks over 75,000 pounds GVW, pay significantly less than costs attributed to them; while others, such as pickups and vans, pay significantly more ...

> ... Although the present taxes have been shown to be less than equitable for some users, immediate major alteration of the tax structure to achieve near-perfect equity is not practical. Improvements to equity might be made, however, by adjusting the level and structure of certain excises ...
>
> ... Short-term considerations ... do not solve the major equity concerns with the current tax structure. The current fees do not fully measure the two principal variables: weight and distance. To measure them directly and more equitably requires a comprehensive change, specifically, a weight-distance tax.
>
> The principal and compelling advantage of a weight-distance tax is that it taxes directly those characteristics that should be taxed as a measure of costs imposed upon the highways by users. It is the only tax instrument that addresses precisely the trucking industry's major criticism of the heavy vehicle use tax -- that is, its insensitivity to mileage variation. There appear to be no insurmountable reasons why a simple-weight distance tax could not be imposed at the national level.
>
> ... The Department believes that application of a weight-distance tax instrument at the Federal level may be possible at some time in the future, depending on the results of further analysis. The Department will continue to investigate potential benefits and problems of a weight-distance tax with an eye to its future use as a major component of the highway user charge structure.

The principal federal tax alternatives were also studied for AASHTO, and reported in the AASHTO Study. As for the U.S. DOT analysis, the basis for equity evaluation in the AASHTO analysis are the conclusions of the Federal Highway Cost Allocation Study. AASHTO findings are generally consistent with the Section 513 Report on equity issues for the principal alternatives. The findings are reported here as they appeared in the AASHTO Study, Executive Summary.

The pros and cons of each of the options studied by AASHTO are summarized below:

Base Case: Existing STAA and Heavy Vehicle Use Tax (HVUT)

Advantages:

- Provides an improvement in equity [1/] among vehicle classes compared with the previous tax structure.
- Reporting requirements are modest and administrative costs are relatively low.

Disadvantages:

- Because the HVUT is not related to usage, it is highly inequitable within vehicle classes.
- Does not provide a good basis for assuring compliance because IRS examines filings at a relatively low percentage rate and performs the examinations many months after the filings.
- Lump sum payment requirement is a burden on small operators with cash flow problems.
- The 5,000 mile exemption provides an incentive for misreporting of mileage and this will likely lead to an increased perception of unfairness of the HVUT.

Flat Diesel Differential

Advantages:

- Pay-as-you-go basis reduces burden on small operators with cash flow problems.
- Improves equity within vehicle classes compared with the STAA.
- Reporting requirements are reduced and administrative costs are modest.

1/ For the sake of brevity in this section, all statements about equity will avoid reference to the Federal Highway Cost Allocation Study (FHCAS) which should be taken as the basis for all statements about equity unless otherwise noted.

Disadvantages:

- o Reduces equity among vehicle classes more than any other alternative.
- o Creates greater incentive for evasion of taxes by use of heating oil and other means of avoiding the tax.
- o Increases government's dependence on the fuel tax, which may become a problem in the future as alternative fuels come into wider use.
- o Creates inequities for special types of vehicles which have low fuel economy (e.g., trash compactors).
- o Requires filing of claims for refunds for all diesel passenger cars and other vehicles under 10,000 pounds, through deductions on federal income tax filings, thus causing substantial delays in rebates of taxes paid.

Graduated Diesel Differential

Advantages:

- o Achieves greater equity among vehicle classes -- equivalent to a weight-distance tax.
- o Achieves greater equity within vehicle classes -- comparable to a weight-distance tax, but slightly less equitable because of variations in fuel economy within weight classes.

Disadvantages:

- o A large number of claims for refunds and additional tax payments would have to be made through a new filing system.
- o Has high administrative costs.
- o Greatly increases incentives for evasion for heaviest vehicles.
- o Would cause concern in trucking industry over the potential ease with which specific tax rates might be changed in response to updates of the FHCAS.
- o Reporting and record keeping requirements would be much greater than for the HVUT.
- o A high evasion rate would lead to a poor perception of the fairness of the tax, despite the equity principle on which the tax structure would be based.

Weight-Distance Tax Substituting for the HVUT Only

Advantages:

- Improves equity among vehicle classes and within classes.
- Substantial improvements in equity can be achieved without extending the tax to vehicles below 70,000 pounds.
- Provides flexibility in setting specific rates for weight groups to achieve equity and/or other criteria.

Disadvantages:

- Increases reporting requirements.
- Would cause concern in trucking industry over the potential ease with which specific tax rates might be changed in response to updates of the FHCAS.
- Increases incentive for evasion for heaviest vehicles.
- Because it would not be a pay-as-you-go tax but would require quarterly payments, it could cause some burden on small operators with cash flow problems.

Weight-Distance Tax Substitutes for Three Excise Taxes

Advantages:

- Provides greatest improvement in equity among vehicle classes and within vehicle classes.
- Eliminates the truck sales tax, which has the greatest impact on small operators' cash flow, which is poorly related to cost responsibility and which has relatively high administrative costs since it was changed to a retail tax in the 1982 STAA.
- Provides flexibility in setting specific rates for weight groups to achieve equity and/or other criteria.
- Reduces initial lump sum burden of truck sales and tire taxes.

Disadvantages:

- Increases reporting requirements.
- Trucking industry concern over ease with which specific tax rates could be changed would be even greater than for the "Weight-Distance Tax Substituting for the HVUT Only" (at top of this page).
- Further increases the incentive for evasion for heaviest vehicles.

- Could cause some burden on small operators with cash flow problems because of quarterly payments (which could be higher than for the "HVUT Substitute".

- Might have to be extended to all weight classes for combination vehicles and to single unit trucks over 26,000 pounds if it was considered necessary to achieve the most equitable tax structure, because of the elimination of the truck sales and tire taxes.

States Administer a Federal Weight-Distance Tax

Advantages:

- Most of the available expertise and experience already exists within state agencies.

- Evasion rates could be dramatically reduced by comparision with federal administration.

- Could lead to elimination of most retaliatory taxes.

- Provides states with the opportunity to enact piggyback weight-distance tax increments with their own tax rates at very little added administrative cost.

- Would encourage states to achieve greater equity in their tax structure, both among vehicle classes and within vehicle classes.

- Such a program could be integrated with other state truck tax programs, providing improved administrative efficiency and greater effectiveness in enforcement.

- Such a program would provide an opportunity to eliminate carrier fuel use taxes by adding an incentive for states to do so.

Disadvantages:

- Would require a major organizing and training effort over about a two year period to implement an effectively coordinated program with uniform standards.

- Substantial software development effort would be required to support the required system of information exchange among the states.

- Very little precedent exists for having the states administer a federal tax.

Federal Government Administers a Weight-Distance Tax

Advantages:

- Relatively little change would be required in terms of the role that the states will be playing in helping to enforce the HVUT by verifying filing of federal tax forms.
- Compliance costs would be very little because truckers would be required to report only total highway mileage rather than mileage for each state.
- Administrative costs are expected to be moderate because IRS would not be likely to initiate a program of field checking such as is now undertaken by many of the states.
- The tax would be administered uniformly throughout the country.

Disadvantages:

- The evasion rate is expected to be quite high because of the probable lack of a program of field checking.
- A high evasion rate would lead to a poor perception of the fairness of the tax, despite the equity principle on which the tax structure would be based.

C. Truck Tax Registration Procedures and Issues

1. Inventory of Existing Truck Tax Procedures

This section describes the existing procedures for the taxation of trucks, and identifies issues which help to determine the need for revisions. The principal source of the information presented below is the AASHTO Study of Motor Carrier Taxation and Registration Issues, 1983, Chapter 1. The three major categories of taxes discussed are registration fees, fuel taxes, and usage taxes. Mechanisms for coordination among the states for registration fees and carrier fuel use taxes are addressed. Issues are identified which concern administrative costs to the states, compliance costs to the trucking industry, and tax evasion.

(a) Registration Fees

All states collect fees for the registration of trucks based within their state. The treatment of registration fees or permits for trucks operating within the state, but not registered within the state, differs widely. However, the states can be generally categorized as to their requirements for out-of-state trucks which operate within their boundaries. Registration is required in each state for interstate truck operators who wish to operate within that state unless there is an agreement between the respective states where the vehicle is registered and the state in which it wishes to operate, or unless a temporary permit is acquired for a fee.

Registration fees and the basis on which they are collected vary widely from state to state. A majority of the states rely upon the declared gross weight of the truck or combination as the basis for registration, while eight jurisdictions (including the District of Columbia) set fees on the basis of unladen weight. A few have more complicated fee structures that include age, number of axles, or load capacity. Fee schedules vary enormously among the states, with no common basis for either weight groupings or the rates applied to the vehicles of a particular weight.

(b) Fuel Taxes and Carrier Fuel Use Taxes

All states have some form of tax on diesel fuel or a substitute fee or usage type of tax which replaces the revenues that the diesel fuel tax would otherwise generate.

Because large trucks have the capability of traveling for a substantial range without refueling, it is possible for truck operators to traverse a state without purchasing fuel and paying fuel taxes within the state. Forty states have, therefore, instituted motor carrier fuel use taxes under which the truck operator is responsible for reporting on mileage traveled and calculating fuel consumed within the state and paying taxes calculated as due on fuel consumed.

The forty states that tax motor carriers' use of fuel follow a multitude of administrative procedures. State

laws differ in terms of which fuels and vehicles are subject to the tax, what scope of operation is covered, filing periods and due dates for reporting, and policies towards crediting and refunding overpayments. There has been less cooperation among the states in the area of fuel taxes than in the area of registrations. As described in the next section, the International Fuel Tax Agreement is now in operation in three states.

(c) Usage Taxes

Usage, or third structure taxes, related to weight and distance include a weight-distance tax (registered weight times miles traveled) and a ton-mile tax (loaded weight times miles traveled for each trip). A motor fuel surtax on vehicle travel, based on weight of the vehicle, is another means of collecting a weight-mileage tax. Other taxes such as a gross receipts tax are also levied in some states. These types of taxes are more a financial measure than a measure of the impacts of highway use as is a weight and mileage related tax.

2. Inventory of Mechanisms

(a) International Registration Plan

The International Registration Plan (IRP) is now the most widely used cooperative mechanism for collecting registration revenues from interstate motor carriers. When a jurisdiction joins IRP, the IRP agreement supersedes previous bi-state and multi-state agreements covering the same topics. At this time, 34 states and the Canadian

province of Alberta have become members of the IRP. Michigan became the 30th state to join the IRP as of March 1, 1984. The distinguishing features of the IRP are base state registration and auditing, one license plate, and one Cab Card showing IRP registration. Fees due each state are sometimes calculated by the base state and sometimes by the state where they are due, depending on the complexity of the registration schedule in the state where fees are due.

(b) Uniform Vehicle Registration Proration and Reciprocity Agreement The Uniform Vehicle Registration Proration and Reciprocity Agreement (UPRA) is a predecessor agreement which has been superseded by IRP in most jurisdictions. UPRA applies among the states of New Mexico, Nevada, California, and Washington, and the province of British Columbia. UPRA also applies between these jurisdictions and jurisdictions which were members of UPRA and have since joined IRP. The distinguishing characteristic of UPRA is that it requires registration in each state, although fees are prorated based upon mileage. A base state license plate is required and additional stickers from other states are affixed to a plate.

(c) Multistate Reciprocity Agreement

The Multistate Reciprocity Agreement (MRA) was begun in 1948. Under this agreement, registration revenues are

collected by the base state, and privileges for interstate travel are granted by other states which belong to the agreement. The base state is defined as the state where the vehicle "is most frequently dispatched, garaged, serviced, maintenanced, operated, or otherwise controlled." If the bases are in more than one state, the MRA allows registrations to be distributed among the base states in accord with mileage accrued.

The basic reason why many states chose not to participate in MRA was that those states had small base vehicle populations relative to the miles traveled by motor carriers and, therefore, believed that they would not receive sufficient fees as the base state to make up for the use of their highways by out-of-state trucks.

(d) Other Mechanisms

Other cooperative interstate mechanisms include the recently proposed National Truck Plate Method, and the International Fuel Tax Agreement. The National Truck Plate (NTP) method has been proposed for study and possible implementation by the Northeast Association of State Highway and Transportation Officials. The NTP would provide for a single registration for all interstate trucks, with a fee to be collected based on weight and distance traveled. The fee would be set at the same rate per mile for all trucks in a weight class in all states. The NTP proposal would involve a national weight-distance

tax with an allocation of revenues to the states based on reported mileage.

The International Fuel Tax Agreement (IFTA) was implemented in 1983 by the states of Arizona, Iowa, and Washington. It is intended to encourage uniform administration of the motor carrier fuel taxation laws, and to establish a base state arrangement for the purpose of administering and collecting fuel taxes.

3. Administrative and Compliance Issues

One of the important administrative issues with regard to each tax or cooperative mechanism is the cost to the state of administering the tax and the cost to the motor carrier of complying with reporting requirements.

Administrative issues arise both within a single state and between states. Within states, different agencies responsible for different tax sources, or for regulation, may not communicate frequently or even have knowledge of each other's requirements or procedures. In addition, administration of the various fees and taxes within a state is complicated by several factors. The following were identified by AASHTO:

- Although much of the same information (e.g., mileage within each state and registered weight) is required for administration of prorated registration fees, fuel use taxes, and some types of usage taxes, there has been no agreement on a single form for reporting mileage and other data necessary for administering each tax.
- Many state officials believe that revenue collection should operate separately from functions designed to regulate or provide

services to motor carriers because there is an inherent conflict between the state's fiscal interest in collecting more revenue and its role of being fair in regulating or providing services to commerce and industry.

- The separation of responsibility for various functions within a state may make it more difficult to bring togehter information from weight stations, state police, or state DOTs which would make it easier to administer the collection of revenues as well as to ensure efficient administration of truck safety, truck size and weight, and hazardous materials.

Administrative issues arise between states with regard to each type of tax or cooperative mechanism. Among the issues of concern are:

- The differences in registration fee structures and rates among the states, and the differences in the frequency of audits of registration, fuel use, or other taxes create incentives for carriers to "shop around" for states with low fees and/or lax enforcement.

- The differences in fee structures among the states not only result in "shopping around", but also contribute to the proliferation of retaliatory taxes which are complicated to administer and enforce.

- Administrators in many states, particularly fuel tax administrators, have been traditionally quite mistrustful of the capability of other states to audit or administer the collection of taxes.

- The differences in registration fee structures among the states make it very complicated for a base state to calculate proportional registration fees due to other states.

- Uniformity of auditing procedures among the states would add to the administrative costs and efforts for states which are currently performing few audits.

- The varying importance of particular industries within the different states has contributed to the degree of non-uniformity, and special exemptions from taxes or reporting requirements for various types of carriers. This greatly complicates multistate understanding and cooperation in administering taxes.

- There has been substantial concern about whether other states will adequately or consistently assure that the vehicles they register are safe. A particular issue cited is "mail-order" registration of trailers by a state to which reciprocity is granted by other states.

- Non-uniformity of reporting dates can add substantially to a carrier's difficulties. A recent example is that a requirement of a single state that fuel use tax reports be filed by the

15th day after the end of the reporting period causes a carrier to have to complete all his calculations on fuel use taxes by that date even though other states don't require that paperwork to be completed until the end of the month.

- The use of temporary permits is widespread. Since temporary permits are fees collected in lieu of other taxes, the mileage traveled under permits is not considered in the calculation of the distribution of a tax among the states. This complicates record keeping by the carrier as well as auditing by the states.

- As discussed more fully in the next section, the burden of complying with all the reporting requirements may fall differentially upon smaller carriers.

Compliance is a major concern to both the states and the industry. The approach to preventing evasion now applied by most states centers around voluntary compliance and the potential for audit. Since different agencies in the same state may be responsible for registration fees and carrier fuel use taxes, the administration of audits is an issue at the state level as well as being an important issue among the states.

Major issues identified in the AASHTO Study with regard to encouraging compliance with motor carrier taxes and fees include the following:

- If heating oil is diverted to use as diesel fuel, it is unlikely to have entered the tax records of the federal government or of any of the states. State level audits aimed at assuring that the state is allocated its "fair share" of taxable fuel may not result in the discovery of fuel used on which taxes were not paid to any jurisdiction.

- The incentives for evasion of federal and state diesel fuel taxes have increased because the additional five cents federal tax on diesel fuel has widened the price differential between untaxed heating oil and taxable diesel fuel.

- States follow very different practices with regard to auditing, and this is particularly true for fuel use taxes. Some states do not audit out-of-state motor carriers' use of fuel within their states. In other states for which information is available, the frequency of audits of out-of-state carriers ranges from one percent to 15 percent per year.

- If a state performs audits on a small percentage of carriers, it focuses its efforts on the large carriers. Some large carriers believe that there is a high level of evasion among small carriers, because the small carriers realize they will not be audited.

- Many state tax collection agencies focus their audit resources on income taxes or state sales taxes, because these are their most important sources of revenue.

- Many types of information that would be helpful in assuring compliance are not brought into an integrated file or data set in all states. The potentially useful data include weigh station records and police citations. This makes it more difficult to assure adequate records for auditing.

In addition, trucking firms face an increasingly confusing array of state-level tax and regulatory requirements, as well as the prospect of significant increase in the Heavy Vehicle Use Tax (HVUT) mandated by the STAA of 1982. Truckers are concerned with potential changes in state taxation and regulation and with the impacts of such changes on their economic well-being.

D. Industry Issues and Concerns

1. Cost Responsibility

There is near unanimity among truckers in opposition to the HVUT enacted in the STAA of 1982. However, there is broad and strong support within the trucking industry for the diesel fuel differential form of taxation.

Just as trucking industry interests are strongly in favor of a diesel differential approach, they are strongly opposed to any weight-distance tax. Again, arguments regarding problems with the Federal Highway Cost Allocation Study are used to defend their position against this approach to taxation.

The AASHTO Study summarized the industry position on these issues as follows:

" ° Opposition to the HVUT is based primarily on two factors: the large dollar amount of taxes required, and the financial hardship caused by requiring upfront payment, particularly among smaller carriers and owner-operators facing serious cash flow problems.

° Support for a form of diesel differential taxation is based on the perception that the balance between equity and ease of compliance is best achieved through a "pay-as-you-go" form of taxation.

° Opposition to a weight-distance tax appears to be based upon the perception of increased administrative burden, in time and dollars, and on the contention that the Federal Highway Cost Allocation Study is seriously flawed and, therefore, the proposed weight-distance tax rates are inequitable."

2. Uniformity in Taxes and Regulation

Virtually all trucking interests support reforms designed to achieve greater uniformity across states in taxation and registration policies. There is a widespread support for the IRP among all trucking-related interests and the railroads. The only issue which raises controversy is whether or not membership should be voluntary or mandatory. Some trucking interests have expressed a preference for a federal plate as the best approach to achieve the same end. These firms do not support the National Truck Plate proposal as a whole, since it includes a weight-distance tax. Their support reflects a conceptual preference for centralized registration at the federal level.

The AASHTO Study summarized the industry position on these issues as follows:

" ° The strong support for the IRP (or a similar arrangement) is based on truckers' desire for uniformity among the states, administratively simplified complicance, and the potential elimination of very costly retaliatory taxes.

° The American Trucking Association (ATA), as well as individual firms contacted, generally support the International Fuel Tax Agreement as the fuel tax complement to the IRP. They do not believe that the two can be brought together because they perceive that in most states (IFTA states and a few others excluded), it would be impossible to see two separate bureaucracies merge and lose some of their respective authority. However, they clealy would support any increase in common reporting.

° With increasing pressure to control costs, trucking firms want to see regulatory compliance costs decreased through uniformity, tax compliance costs decreased by lowering the number of reports and eliminating the cost of out-of-state audits, and operting costs decreased by avoiding time delays associated with obtaining the multiplicity of licenses, decals, etc.

° There is some sentiment among truckers that early and equitable resolution to the registration and tax problems is more important than which alternative is selected. Some believe that perhaps more federal pressure is needed, as was the case in the early days of the IRP, before the states will take the necessary actions."

3. Industry Characteristics

Analysis of the trucking industry's structure, economics, future prospects, and perspectives on taxation and regulation must be based on information from a wide variety of sources to provide the generalizations necessary to weigh policy alternatives. The many interests in the trucking community have different, and at times competing, concerns. to develop a single solution to tax and regulatory problems which will satisfy all interests is likely impossible. However, a full understanding of a number of

key observations which have been derived through an intensive review by AASHTO of the major issues articulated by or about the industry should strengthen the basis for crucial policy decisions. The following observations are quoted from the AASHTO Study:

" ° The trucking industry is undergoing a significant structural change. The full results are yet to be seen. How individual firms position themselves in a new, competitive, multimodal freight transportation market will depend in part on the constraints imposed by tax and regulatory policies.

° Investors in the motor carrier sector (bankers, brokers, analysts, etc.), while not able to focus on particular alternatives, tend to agree that it is likely the future will see a small number of huge firms providing "cradle to grave" service. Large front-end costs, whether for tax payments, acquisition of new technology to take advantage of changing operating regulations, or for amortization of debt, if debt capital is even available to cash-poor firms -- will cause further concentration of the market.

° Unionized labor faces a continuing decline in membership. Between 1978 and 1982, the Teamsters working for regular route common carriers declined from 84 percent of the total work force to 70 percent. Establishment of more intermodal service will accelerate this, as will the now evident shifts towards private carriage and full service leasing. As a consequence, strong political pressure based on job retention can be expected on any proposals which would shift freight transportation away from the large, unionized national motor carriers.

° Owner-operators and small carriers face both problems and opportunities. On the one hand, lack of management skills, cash reserves, and access to debt markets will make it difficult to contend with any tax increases, given their current market position. On the other hand, the increasing number of piggyback operations and freight consolidation terminals provides opportunities for these carriers to offer feeder services which may prove more lucrative.

° The trucking industry remains in poor economic health. Although there have been significant improvements in

1983 over 1982, trucking has lost freight to railroads, close to 300 firms have closed or filed for Chapter 11 bankruptcy, and rates remain artificially low in trucking firms' eyes due to the large influx of small new entrants resulting from deregulation. The industry claims that any additional pressure on costs will make them the longest term victim of the recent national recession.

- While no firm or sector wants to pay more in taxes, there is a differential ability to pass through the increases to shippers, with the small carrier and owner-operator in the most vulnerable position.

- The costs of compliance with various regulatory and tax requirements are more easily borne by larger firms with extensive administrative staffs and mechanisms in place, resulting in the cost of compliance being a greater burden for the small firm and owner-operator.

- Taxes which burden the heaviest trucks (which are most rail-competitive) will be most vigorously opposed since the potential is higher for loss of business than with lighter trucks which are not rail-competitive.

- Almost all firms, associations, and individuals specifically emphasize that the current state-level paperwork burden is excessive and truly unnecessary. Uniformity is a consistent and overriding concern.

- Many firms feel that their own strategic planning ability has been constrained by government delays in resolving crucial tax and regulatory issues. This inability to make and then implement strategic, competitive decisions is costing the industry and the economy substantial improvements in near term productivity increases."

E. Federal Truck Taxes and Michigan Payments To The National Highway Trust Fund

1. Federal Taxes

Table IV-6 portrays federal highway user taxes and rates in effect before and after enactment of the STAA of 1982. For FY 1983, the last year for which statistics are available, Michigan

Table IV-6

COMPARISON OF FEDERAL USER FEE STRUCTURES

Tax	Pre-STAA 1982	Enacted in STAA of 1982*
	T A X R A T E	
Gasahol	NA	$0.03/gallon
Gasoline	$0.04/gallon	$0.09/gallon
Lubricating Oil	$0.06/gallon	$0
Trucks and trailers	10% at manufacturer's level for vehicles over 10,000 lb GVW	12% at retail for trucks over 33,000 lb GVW; trailers over 26,000 lb; all tractors
Truck parts	8% for parts used on all trucks	$0
Tires	9.75 cents/lb	$0, first 40 lb of tire weight $.15/lb, next 30 lb of tire weight $.30/lb, next 20 lb of tire weight $.50/lb, balance of tire weight
Tread rubber	$0.05/lb	$0
Inner tubes	$0.10/lb	$0
Diesel and special motor fuels	$0.04/gallon	$0.15/gallon
Annual use tax on heavy motor vehicle	$3/1,000 lb for vehicles over 26,000 lb	$0 for vehicles less than 55,000 lb GVM $100 + $22/1,000 lb for vehicles 55,000 - 75,000 lb GVW $550 for vehicles over 75,000 lb GVW

* Data updated to 1986.

Source: Alternatives to Tax on Use of Heavy Trucks (Section 513 Report); U.S. Department of Transportation, Washington, D.C. 1984.

highway users paid the following in federal taxes deposited in the Federal Highway Trust Fund:

Tax	Amount
Gasoline	$202,182,000
Special Fuels	21,688,000
Subtotal Fuels	$223,870,000
Lubricating Oil	$ 312,000
Heavy Vehicle Use Tax	5,748,000
Trucks & Trailers	8,247,000
Parts & Accessories	1,662,000
Tires & Tubes	21,019,000
Tread Rubber	669,000
Total	$261,527,000*

* SOURCE: Pg. 42, Highway Statistics 1983, FHA, U.S. DOT

It should be noted that four of these taxes were eliminated as a result of the STAA of 1982: lubricating oil, truck parts, tread rubber, and inner tubes. No receipts from these sources will exist in subsequent fiscal years. It should also be noted that federal tax on diesel fuel was $.04 for the first six months and $.09 for the second six months of FY1983. In 1984, the tax was increased to $.15.

Michigan plays no part in the collection of federal fuel taxes. Federal excise taxes for fuel, tires, and truck and trailer sales are all reported on Internal Revenue Service (IRS) Form 720. The HVUT is reported on Form 2290. The federal diesel tax is levied at the retail level and generates about 158,000 annual tax returns whereas gasoline taxes are paid at a wholesale level and generate only about 35,000 returns. Thus, compliance

is more easily enforced with the gasoline tax than with the diesel tax.

The HVUT is regarded as an excise tax and is paid by the truckers directly to the IRS. However, STAA of 1982 draws the states into enforcement by mandating that states require vehicle owners to show proof of filing a federal excise tax return in order to register their trucks.

STAA of 1982 raised the HVUT threshold from 26,000 to 33,000 lbs. This tax is levied in two strata -- between 33,000 and 54,999 lbs. and between 55,000 and 80,000 lbs. GVW. Vehicles used less than 5,000 miles per year on public roads are exempt and credits are issued for wrecked or stolen vehicles.

2. Michigan Truck Tax Revenues

Motor vehicle taxes collected in Michigan are deposited in the Michigan Transportation Fund (MTF). The Appropriations Act for FY 1986, estimates total collections from these taxes as follows:

Gasoline	$582,900,000
Liquified Petroleum	1,900,000
Diesel Fuel	29,800,000
Motor Carrier Diesel Fuel	16,000,000
Motor Carrier Diesel Fuel Licenses	8,900,000
Motor Vehicle Licenses	283,500,000
Other Fees	19,916,000
TOTAL	$942,416,000

Of these taxes, only two are levied exclusively on trucks -- the motor carrier diesel fuel tax ("road tax"), and the motor

carrier fuel license tax (sticker fee for fuel tax discount). These two exclusive sources are estimated to yield 2.6 percent of the total MTF. Diesel fuel tax revenues generate an additional 3.2 percent of MTF revenues. They include tax collected on fuel purchased from non-permit trucks and from fuel used in diesel automobiles; hence, the figure shown above overstates the tax contribution of trucks. If past trends continue, roughly 36 percent of motor vehicle license revenue will be generated through the registration of commercial vehicles. This includes, however, small trucks, cars, and pickups in commercial use. This results in $103 million in revenues generated by commercial vehicle registrations (10.9 percent of MTF revenues). These three sources total 16.7 percent (2.6 + 3.2 + 10.9) of MTF revenues on approximately $157 million.

Table IV-7 is a detailed description of the Michigan truck tax structure.

TABLE IV-7

MICHIGAN TRUCK TAX STRUCTURE

Trucks in Michigan are subject to fuel, privilege and weight/registration taxes. The characteristics of these taxes are sumarized in the chart below.

Charcteristic	Gasoline	Diesel Fuel	Motor Carriers Privilege	Weight Vehicle Registration
Basis of Tax	Privilege of using highways.	Privilege of using highways.	Privilege of using highways.	In lieu of general property and other taxes.
Measure of Tax (Base)	Gasoline sold or used in operating vehicles on public highways.	Diesel fuel sold or used in operating vehicles on public highways.	Vehicles operated on public highways by common and contract carriers.	Weight/type/sales price of vehicle; elected gross vehicle weight for large trucks.
Rate	$.15/gallon ($.14/ gallon for gasohol).	$.15/gallon; $.06 discount for commercial vehicles.	$50/vehicle used exclusively for household goods; $100/vehicle for all others.	Graduated rate based upon weight ranges (for units used in truck/trailer combinations, a flact rate by elected gross weight ranges).
Administration	Department of Treasury, Revenue Division.	Department of Treasury, Revenue Division.	Department of Commerce, PSC.	Department of State.
Report & Payment	Monthly by 20th.	Monthly by 20th; road tax quarterly by 20th; diesel license on May 1.	Annually by December 1.	February 28/29.
Disposition	Michigan Transportation Fund.	Michigan Transportation Fund.	Michigan Transportation Fund.	Michigan Transportation Fund.

Source: Michigan Department of Transportation

CHAPTER V

STATE AND FEDERAL INVOLVEMENT

V. STATE AND FEDERAL INVOLVEMENT

A large number of state and federal agencies are involved with various aspects of the trucking industry, creating a complex and somewhat fragmented system. The complexity of the relationships are most evident to the trucking firm which provides interstate services. The firm must comply with both federal law and the laws of the different states through which the truck operates.

This chapter provides an overview of federal and state level involvement in the trucking industry.

A. Federal Involvement

1. Interstate Commerce Commission

The Interstate Commerce Commission (ICC) was created as an independent regulatory agency in 1887 to bring stability to, and curb abuses in, the railroad industry. In 1935, Congress passed the Motor Carrier Act which brought the trucking industry under regulation of the ICC.

The ICC's current responsibilities include regulation of carriers engaged in transportation in interstate commerce and in foreign commerce within the United States. Surface transportation modes under the commission's jurisdiction are:

railroads, motor carriers, bus companies, water carriers, transportation brokers, and freight forwarders.

While recent legislation has reduced the regulatory role of governmental agencies, the ICC continues to regulate all goods carried by for-hire motor carriers in interstate commerce. Excepted are movements within specified commercial districts of urban areas that cross state boundaries or goods specifically mentioned as exempt commodities. A company carrying its own goods is not subject to regulation unless it enters for-hire operations carrying nonexempt products.

Carriers under ICC jurisdiction must comply with certain regulations on matters of entry into the industry, routes or areas served, commodities handled, rates charged, finance, and mergers and acquisitions. Common carriers are required to obtain authority to make certain services available to all shippers, and contract carriers must have specified contracts in force to provide service to shippers. Such certificates are granted by the ICC upon demonstration that there is need for the services to be performed, and that the applicant is fit, willing, and able to perform the service. The certificate is restricted as to territory, routes, services, and commodities to be carried. The role of the ICC in trucking regulation was greatly diminished with the passage of the Motor Carrier Act of 1980. Its' role will be virtually eliminated, except for certain regulatory functions relating to finance and safety, if pending federal legislation is passed.

2. U.S. Department of Transportation

On April 1, 1967, after extended hearings, the U.S. Department of Transportation (U.S. DOT) was officially established. It consolidated 30 existing transportation agencies that employed nearly 100,000 persons. It is responsible for leadership in the development, direction, and coordination of transportation policies, functions, and operations of the federal government. Safety functions of the transportation regulatory bodies were transferred to the Department, but not economic regulatory functions.

The U.S. DOT is the focal point within the Executive Branch for federal activities relating to transportation policy, research, safety, and administration. Original objectives set forth in 1968, were economic efficiency, environmental quality, safety, and the support of other national interests (defense, economic growth, social development, scientific research, etc.). Later, another was added: "to facilitate the process of local determination by decentralizing decision making and fostering citizen participation."

National Highway Traffic Safety Administration

The National Highway Traffic Safety Administration is one of the eight major operating divisions of the Department of Transportation. It has responsibility for highway safety

including vehicles, drivers, passengers, and pedestrians, and establishes standards for newly manufactured vehicles and their components. Additionally, the Administration issues state program standards to assist states in implementing their safety programs for drivers and vehicles.

Federal Highway Administration

The Federal Highway Administration (FHWA) administers the Federal-Aid Highway Program and the national traffic and highway safety programs. The FHWA administers the program of financial assistance to the states for highway construction and preservation of the 42,500 mile National System of Interstate and Defense Highways, and the improvement of 800,000 miles of other Federal-aid primary, secondary, and urban roads and streets.

The FHWA is responsible for several of the highway safety programs undertaken by the federal government including highway construction programs administered through grants to the states. FHWA also administers highway-related safety standards which provide for the identification and surveillance of accident locations: highway design, construction, and maintenance; traffic engineering services; and highway-related aspects of pedestrian safety.

Under the authority of the motor carrier safety provisions, and the Hazardous Materials Transportation Act, the Bureau of Motor Carrier Safety exercises federal regulatory jurisdiction over the safety performance of all commercial motor

carriers engaged in interstate or foreign commerce. Safety management audits are conducted at the carrier's facilities, checks of vehicles and drivers are conducted at roadside, and compliance investigations are conducted with a view toward enforcement action. The Bureau currently has 130 inspectors conducting nationwide compliance checks, with 150 more programmed for FY 86/87. A division of Michigan's State Police, by comparison, has 127 such inspectors within the state.

B. State of Michigan Involvement

The State of Michigan is involved in the regulation of trucks through five departments: the Department of Commerce, Department of State, Department of State Police, Department of Transportation, and the Department of Treasury.

In summary, these five state departments are involved as follows:

The Department of Commerce regulates:

- the transportation of property which moves wholly within the state by truck
- authority to commence operations
- acquisition of an existing motor carrier
- rates
- routes or territories of operation
- commodities transported
- minimum liability insurance
- accounting systems and other financial matters

The Department of State Police is responsible for:

- safety compliance
- enforcement of various state rules, regulations and requirements
- size and weight compliance

The Department of Treasury is responsible for:

- diesel fuel permits

The Department of Transportation is responsible for:

- oversize permits
- passenger carriers

The Secretary of State is responsible for:

- drivers licenses
- vehicle registration based on gross vehicle weight (license plates)

1. The Department of Commerce

The Michigan Public Service Commission (MPSC) of the Department of Commerce regulates gas, electric, telephone, and water companies and intrastate motor transportation. This includes establishing safety standards and setting specific rates and profit levels for services provided by the state's public utilities. The primary task of the Commission's regulatory function is to assure consumers of adequate services at reasonable rates from businesses, which, by their nature,

must be non-competitive. Essentially, the MPSC performs the investigation and compliance roles of the motor carrier regulation function in Michigan.

The Office of Motor Transportation Affairs (OMTA) is the administrative subdivision of the MPSC responsible for the enforcement of the Motor Carrier Act in Michigan. The scope of OMTA's authority encompasses all intrastate and interstate motor carriers operating for hire on Michigan's highways. In executing its regulatory function, OMTA is organized into five divisions:

a. The Motor Carrier Authorities and Registration Division which is responsible for:

   - Review and processing of applications for authority to conduct intrastate operations in Michigan.
   - Preparation and issuance of certificates for common, and common restricted, carriers and permits for contract carriers.
   - Review, updating, and compilation of equipment inventory submitted by regulated motor carriers.
   - Collection and accounting of fees.
   - Examination and processing of applications for permanent or temporary discontinuance or reinstatement of service.
   - Other responsibilities.

b. The Motor Carrier Rates and Standards Division is generally responsible for evaluation of the financial stability of those carriers subject to MPSC regulation and for an evaluation of whether or not rate proposals filed by carriers

are reasonable, given their revenues and expenditures. The division also has the responsibility for scrutinizing the financial records and statements filed by carriers for the purpose of justifying those rate changes proposed for adoption before the MPSC. The primary goal is to insure the completeness, accuracy, and veracity of financial information submitted by carriers so as to provide the Commission with reliable data upon which to base their decisions. Functional areas managed by this division include rates and tariffs, rate bureaus, annual reports, and auditing.

c. The Motor Carrier Complaints and Enforcement Division is responsible for some of the duties handled by the old Field Operations Division. It provides information to motor carriers and the general public of the state and federal laws regarding the operations of motor carriers for hire. The Michigan State Police are now responsible for enforcement of the Motor Carrier Act and for state statutes relative to commercial vehicles. The Motor Carrier Complaints and Enforcement Division acts as State Police liaison, involving the trucking industry and the general public. The division also does the actual "legwork" for the identification and accumulation of evidence concerning possible improprieties in financial reporting techniques that may be employed by a motor carrier. This division also monitors compliance actions arising out of investigation and enforcement.

d. The Administrative Services Division performs the routine administrative chores for the Office of Administration and Motor Carrier Regulation including: budgeting, financial control, procurement, office services, personnel, labor relations, and training. It also distributes the "Motor Carrier Bulletin."

e. The Management Information Systems Division is responsible for data processing, office automation, and the various system design components of the overall office.

The two key elements of the MPSC's regulatory authority over motor carriers relate to the granting of authority to operate within the State of Michigan, and the supervision and regulation of rates charged by motor carriers.

The MPSC, through its Office of Motor Transportation Affairs, exercises regulatory control of entry into the motor carrier industry, and exit from, pursuant to the provisions of Act 254 of 1933.

There are several types of authority under which a carrier may operate within the State of Michigan. The terms, conditions, and scope of a grant of authority primarily establish the route pattern to be traveled by the carrier and the type of cargo that it will be permitted to transport.

Rates are those charges assessed by motor carriers for transporting property (commodities) ~~or passengers~~ from one point

to another by motor vehicle. Regulated carriers must submit a schedule of their rates, collectively known as tariffs, to the Commission upon initiation of service and each time they change such rates.

The Michigan Public Service Commission is empowered with the authority to supervise and regulate rates submitted by motor carriers of property ~~and passengers~~ for hire.

2. Department of State

The Michigan Department of State was created by the Executive Organization Act of 1965. The major duties of this department are titling motor vehicles, issuing vehicle license plates, and driver licenses. Vehicle licensing and drivers licenses are areas which impact the motor carriers specifically.

A special class of license is required to operate heavy trucks in Michigan. This license requires a basic knowledge of heavy truck operations with a license being issued by the Secretary of State upon successful completion of a written and road test at one of the 89 test sites.

As the following table illustrates, Michigan's commercial trucks are licensed on a weight basis with yearly fees ranging from $316.00 for a 24,000 lb. gross vehicle weight (GVW) up to $2,070.00 for a 160,001 lb. GVW.

TABLE V-1

Michigan License Fees - 1985

Gross Vehicle Weight	Yearly License Fee
24,000	$ 316.00
28,000	360.00
32,000	421.00
36,000	484.00
42,000	571.00
48,000	659.00
54,000	746.00
60,000	835.00
66,000	922.00
72,000	1,010.00
80,000	1,097.00
90,000	1,197.00
100,000	1,326.00
115,000	1,474.00
130,000	1,624.00
145,000	1,773.00
160,000	1,923.00
160,001	2,072.00

Source: Department of State

Michigan is a member of the International Registration Plan (IRP) which is a registration plan agreement currently among 34 states and one Canadian province. It provides for the payment of license fees based on the miles operated in the various states and provinces by each truck.

The main feature of the IRP is that while license fees are paid on an apportioned basis to the various jurisdictions in which the truck operated, only one license plate and one cab card is required for each vehicle. The carrier files an application with the state or province in which it is home based and the state or province, in turn, issues a base "apportioned" license plate and cab card. The base state or province bills and collects the registration fee for each jurisdiction at one time and divides the money among the other states or province based on miles traveled in each state. A vehicle under the IRP may operate both interstate and intrastate provided it has the proper operating authority.

3. Department of State Police

The Michigan Department of State Police has been responsible for truck enforcement since October 1982 when the bulk of the Field Operations Division of the Michigan Public Service Commission, Department of Commerce, was transferred to the State Police and became the Motor Carrier Division.

The Motor Carrier Division is responsible for the actual enforcement of the federal motor carrier safety regulations

and state statutes as they relate to commercial vehicles. The uniformed officers in this division, currently 127, have the same law enforcement authority as State Police officers for commercial vehicles and are responsible for:

- Enforcement of the Michigan Public Service Commission rules and regulations; enforcement of the Department of Treasury diesel fuel tax requirements; enforcement of the Department of State licensing requirements; enforcement of the Department of Transportation ovesize and overweight permits.
- Patrolling state highways for enforcement of laws and statutes governing commercial vehicles.
- Operation of 19 scales at 11 permanent locations in the state.
- Inspection of commercial vehicles for proper licenses, permits, registrations, and drivers' logs.
- Inspection of freight bills, bills of lading, and leases to insure compliance.
- Inspection of commercial vehicles to insure their size and weight compliance, and safety inspection standards set forth by the Commercial Vehicle Safety Alliance.
- Truck terminal audits to ensure compliance with employment standards, maintenance facilities, and record keeping.
- Issuing of citations and warning notices to violators and the impounding of vehicles and arrest of violators, if required.

The Motor Carrier Division also enforces bus regulations as developed by the Bureau of Urban and Public Transportation, MDOT. The division also has the responsibility of inspecting public and private school buses, and annually inspects the equipment used in the transportation of hazardous material. They also respond to hazardous material spills.

4. Michigan Department of Transportation

Although involved in various facets of regulating commercial motor transportation, e.g., passenger carriers, the MDOT's primary truck responsibility relates to the issuance of special permits for the movement of oversize/overweight vehicles and loads on Michigan's trunklines. State statutes authorize MDOT to issue such permits for vehicles/loads which exceed size or weight limitations specified by law. The following general policies are considered when requests are received.

- Protection of the motoring public from potential traffic hazards.
- Protection of highway surfaces, structures, and private property.
- Provisions for a normal flow of traffic with a minimum of interference.

Specific conditions and limitations are as follows:

- Only issued to business entities or individuals actually doing the transporting. Vehicles must be owned by the applicant or operated under a lease or rental agreement.
- Limited to vehicles and/or loads which cannot reasonably be divided, dismantled, reduced, etc. Such permits will not be issued to double-bottoms, except for certain overlength loads, or those divisible loads meeting certain limitations/parameters.
- Efforts should be made to move such oversize loads by some means other than highway, or to dismantle the object/load to meet limitations. Written explanations are mandatory.
- Request for overweight permit will not be approved for a load consisting of more than one object, and for any wheel load exceeding 700 lb. per inch of wheel width, except that permits will be approved for empty, self-propelled earth-moving equipment with less than 850 lbs. per inch of tire width.

- Permits will not be issued for widths in excess of 14 feet, during the spring weight restriction period, except in a case of public emergency.
- Any application where the overall height exceeds 13 feet, 6 inches will merit careful consideration because of possible overhead restrictions. All such applications shall certify that the proposed route has been traveled to assure vertical clearance.
- The issuance of single trip and extended permits for divisible loads will be considered if the vehicle or loads do not exceed 8' 10" in width and the person or firm requesting the permit provides in writing, substantial economic justification. Vehicles and loads must be legal height, length, and weight, and permits will be issued for a maximum distance of 75 miles. Permits will be valid for movement between work sites of a single business entity only.

The legal limits specifying width, weight, height, and length for single trip and extended trip permits vary by the type of load being carried. In general, prefabricated items, boats, and construction equipment loads are limited to a maximum of 14 feet in width, 15 feet in height, and 150 feet in overall combination length. Farm equipment is limited to 15 1/2 feet in width, with height and weight being the same as previously mentioned. Weight generally varies by axle numbers and by other factors. Other common permit requests are for mobile homes, sectional buildings, pre-fab buildings, mobile home frames, poles, pipe, and similar loads. Any movement of a building exceeding 14 feet in width is considered a "building move" and is subject to relatively detailed and complex limitations.

The Michigan Department of Transportation also has an interest in assuring that shippers throughout the state

have truck service available at reasonable costs and frequencies. In addition, the MDOT has basic responsibility for the construction and maintenance of a state trunkline highway system. These issues are discussed elsewhere in this report.

5. Department of Treasury

The Department of Treasury was established by the Executive Organization Act of 1965 which merged the functions of six agencies into one department.

The Bureau of Collections is responsible for the collection, refunding, auditing, and enforcement of the major tax laws including motor fuel taxes.

The Motor Carrier Fuel Tax Act (amended 1980) is the current legislation governing taxation on motor fuel consumed by commercial motor vehicles within the State of Michigan. The current tax rate is set at fifteen (15) cents per gallon which is paid at the time of purchase less a discount of six (6) cents per gallon on properly licensed commercial vehicles. The tax is based on the number of gallons of motor fuel consumed in Michigan operation only. The gallons consumed in Michigan are calculated by dividing the miles traveled in Michigan by the average miles per gallon of fuel. Average miles per gallon is calculated by dividing the total miles traveled by the truck by the total number of gallons of fuel consumed both in and out of

Michigan. Tax form C-3678 and instruction sheet appear in the Appendix , as does Form C-3673. .

The tax law also requires the purchase by commercial motor vehicles of a fuel license to legally operate on Michigan roads. The applicant may obtain a license or a trip permit and meet the requirements of the law. A license is applied for by providing all information on the application, as shown in the Appendix, and paying the applicable fee as shown on line 14 of the application. The Department issues a decal which is affixed to the vehicle and is valid through the remainder of the license year. This license authorizes the operator to legally operate a commercial vehicle in the state. This also allows the operator to receive the motor fuel discount at the point of fuel purchase. In fiscal year 1984-85, the Department of Treasury issued 46,000 fuel licenses to Michigan-based operators, and 401,000 to out-of-state operators.

If a motor carrier operates on Michigan highways no more than three times in one calendar year, he may purchase a trip permit. The permit authorizes an unlicensed motor carrier to operate a specific commercial motor vehicle in the state for a period of five (5) consecutive days for a fee of twenty ($20) dollars. Taxes and reporting of mileage is not required under a trip permit. In fiscal year 1983-84, the Department of Treasury issued 27,000 5-day permits.

CHAPTER VI

CONCLUSIONS

VI. RECOMMENDATIONS

The department proposes to undertake a number of initiatives relating to the trucking industry in Michigan. Recommended actions are highlighted by underlining.

1. The department recognizes the importance of truck transportation and will strengthen its involvement in truck transportation issues through an improved data base and analytical capability, expanded inter- and intra- departmental communication, state and federal legislative monitoring, and development of a cooperative working relationship with truck companies and industry representatives.

2. Several parts of the department are involved in trucking issues. The Bureau of Transportation Planning will serve as the principal clearinghouse for truck related issues and information including:

   - truck movement data collection and analysis
   - industry operating and financial structure issues
   - revenue and taxation issues
   - service availability and tariff issues
   - truck network and facility issues
   - state and federal legislation monitoring
   - development of increased communciation with trucking industry representatives

   The Bureau of Highways will continue to provide specialized services including:

   - Traffic and Safety Division. Truck accident data collection and analysis. Geometric design and route evaluation.

- Utilities & Permits Division. Oversize, overweight permits.
- Materials and Technology Division. Special engineering studies.

3. A number of state agencies, including the departments of State Police, Commerce, State, Treasury, and Transportation, are involved in trucking issues. An Interagency Truck Work Group has been established to provide interdepartmental coordination of truck matters. This group is chaired by MDOT. The department will utilize this organization to address and resolve truck issues involving the several state departments.

4. The Michigan Public Service Commission, Department of Commerce established a Motor Carrier Advisory Board in 1983 to provide for the exchange of information between the state, private trucking companies, and shippers. The department will request ex officio membership on this board.

5. The Federal Highway Administration (FHWA) is responsible for federal level research and for the administration of Federal-aid highway funding programs. The department will work closely with FHWA at both the state and national level on commercial traffic count issues and on federal studies such as the Weight Distance Tax Study.

6. The department is supportive of rail, water, and truck transport modes. Each plays a vital role in providing freight transportation services. The department takes a comprehensive view toward freight planning and program development and will assist shippers and local communities to meet their needs in the most appropriate manner. An

example of this would be departmental assistance to shippers who must switch to truck service when rail services are discontinued.

7. The Surface Transportation Assistance Act of 1982 deregulated interstate trucking from most route and rate constraints. The quantity, quality, and price of truck service to rural areas and small communities remains a concern. The department will periodically survey shippers to determine service or rate changes or other problems being encountered with truck services.

8. The department recently identified a priority commercial network (PCN) which includes the most important commercial routes in the state. The department will assign priority to the PCN for improvement funding to assure that the state's commerce will move over a well maintained and comprehensively developed highway network.

9. Truck traffic volumes are increasing in several major corridors in the state. Changes in manufacturing and distribution patterns may accelerate this increase. The department will undertake a special review of major commercial corridors to determine if previous forecasts, plans, and strategies are consistent with current trends.

10. There are indications that commercial traffic estimates may have been understated. The Bureau of Transportation Planning will review existing data collection activities relating to truck weight and movement information. A comprehensive plan to meet truck data needs will be developed and implemented. This will include installation during 1986, of automated vehicle classification and weigh-in-motion equipment.

11. The Michigan Department of Transportation receives raw accident data, on a statewide basis, from the Department of State Police. The department will work closely with the Department of State Police to obtain more specific accident information (including information on truck dimensions) and to analyze its significance.

12. A large part of the truck accident increase between 1983 and 1984 occurred in southeast Michigan. The department will undertake a special review of southeast Michigan accident experiences as part of its ongoing program of analyzing high accident locations.

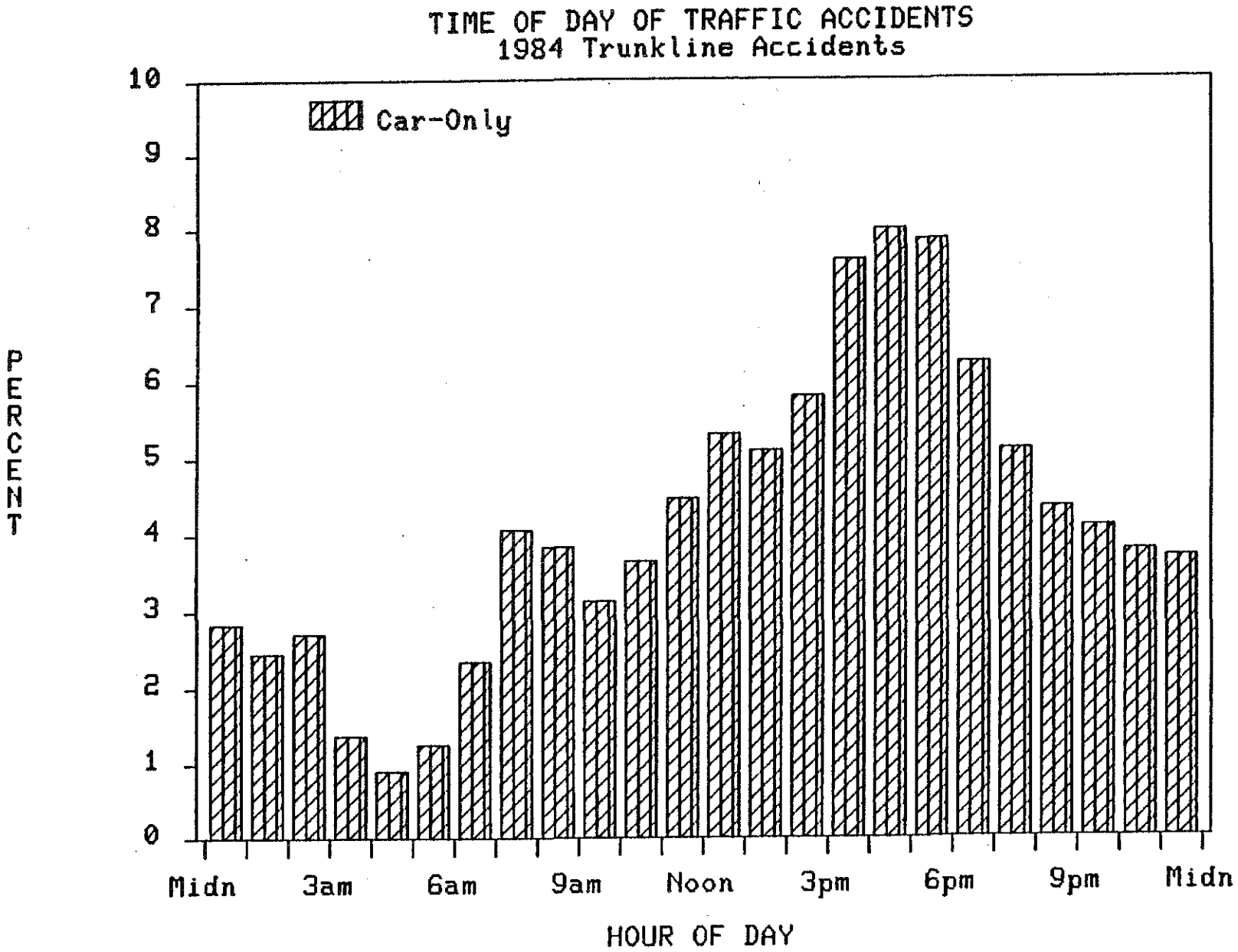
13. The Department of State Police has basic responsibility for truck safety enforcement activities. The department will work more closely with the Department of State Police regarding safety inspections, hours of service log inspections, overweight vehicle enforcement and other safety related issues.

14. Truck related accidents have been increasing at both the state and national level since 1983. The department has already accelerated its efforts to obtain more complete accident information and to draw conclusions which can be a basis for state level actions to address this problem. Within the last month, the MDOT initiated discussions with the Department of State relative to possible changes in driver licensing procedures. In addition, the department recently contracted with the University of Michigan Transportation Research Institute to examine the safety issues associated with 53' trucks and to compare Michigan truck accident experience with national truck accident experience. These and other studies will be carefully reviewed by the department to determine causal factors for accidents and a basis for improvements.

15. The federal government, and certain states, are currently engaged in studies to determine whether heavy trucks pay their proportionate share of highway costs. The department will carefully monitor these studies to determine if state level studies are warranted.

16. The wide variance among states in taxing and registration procedures causes inefficiencies and confusion for interstate truck operators. The department will continue to work with the National Governors Association, the U.S. DOT, and other interested organizations to achieve a greater degree of cooperation and uniformity between states on truck taxation and revenue issues. The Interagency Truck Work Group will be the focal point for these activities.

APPENDIX


TIME OF DAY OF TRAFFIC ACCIDENTS
1984 Trunkline Accidents
Car-Only
PERCENT
10
9
8
7
6
5
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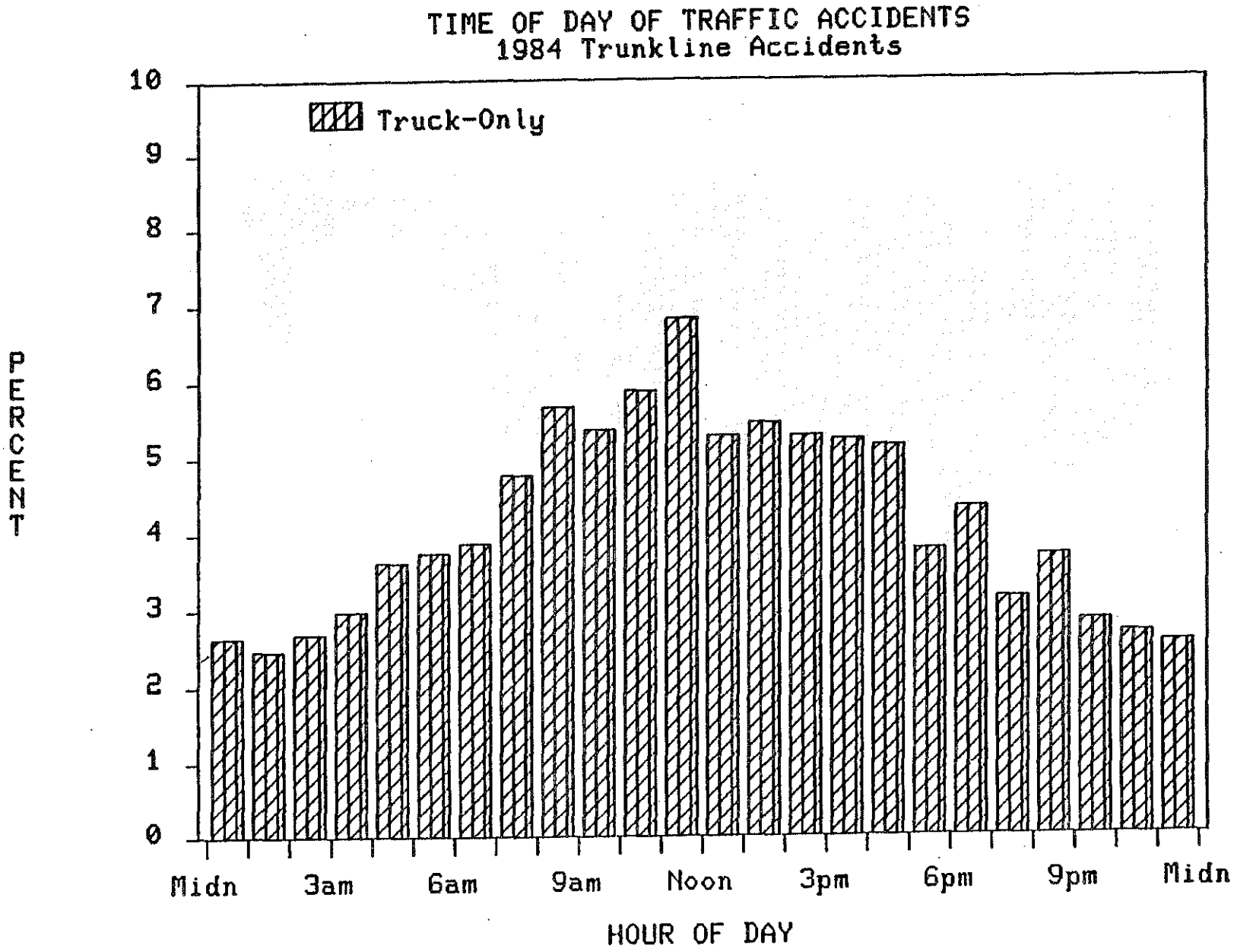
3
2
1
0
Midn
3am
6am
9am
Noon
3pm
6pm
9pm
Midn
HOUR OF DAY


TIME OF DAY OF TRAFFIC ACCIDENTS
1984 Trunkline Accidents
Truck-Only
PERCENT
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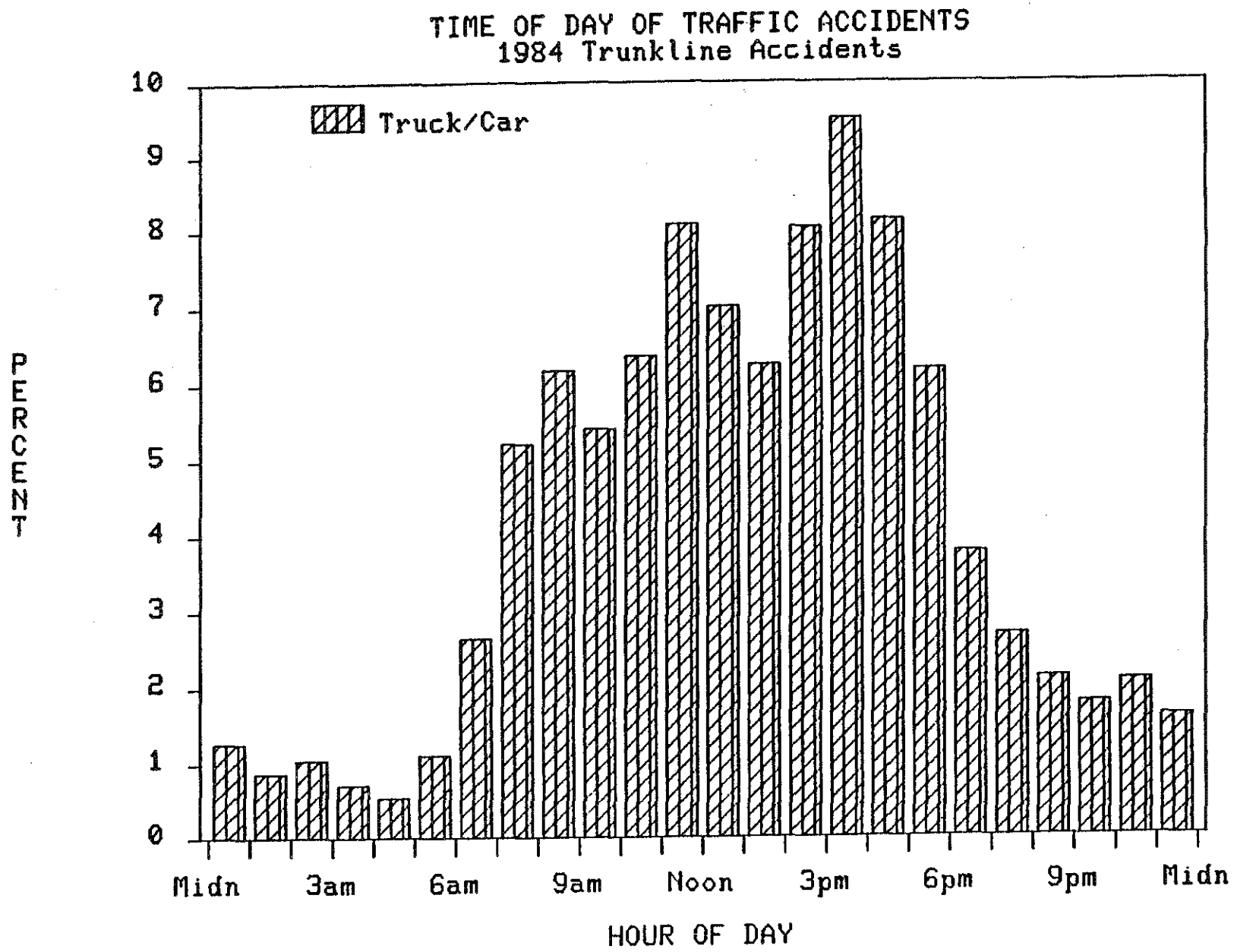
HOUR OF DAY


TIME OF DAY OF TRAFFIC ACCIDENTS
1984 Trunkline Accidents
Truck/Car
PERCENT
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3am
6am
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Noon
3pm
6pm
9pm
Midn
HOUR OF DAY

TRUCK ACCIDENT PROFILE 1978

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
		TRUCK-ONLY Accidents				
Fatal	23	26	7	6	7	28
	Inj / Acc	*1.130*	*0.30*	*0.26*	*0.30*	*1.22*
Personal Injury	868		196	363	460	275
	Inj / Acc		*0.23*	*0.42*	*0.53*	*0.32*
Prop. Damage Only	4,214					5,521
	Inj / Acc					*1.31*
TOTALS	5,105	26	203	369	467	5,824
	Inj / Acc	*0.005*	*0.04*	*0.07*	*0.09*	*1.14*
		TRUCK/CAR Accidents				
Fatal	169	202	64	39	40	363
	Inj / Acc	*1.195*	*0.38*	*0.23*	*0.24*	*2.15*
Personal Injury	3,919		917	1,597	3,188	6,624
	Inj / Acc		*0.23*	*0.41*	*0.81*	*1.69*
Prop. Damage Only	10,864					30,626
	Inj / Acc					*2.82*
TOTALS	14,952	202	981	1,636	3,228	37,613
	Inj / Acc	*0.014*	*0.07*	*0.11*	*0.22*	*2.52*
		CAR-ONLY Accidents				
Fatal	1,647	1,854	1,010	523	242	2,855
	Inj / Acc	*1.126*	*0.61*	*0.32*	*0.15*	*1.73*
Personal Injury	107,864		22,653	51,462	86,726	155,100
	Inj / Acc		*0.21*	*0.48*	*0.80*	*1.44*
Prop. Damage Only	260,039					671,391
	Inj / Acc					*2.58*
TOTALS	369,550	1,854	23,663	51,985	86,968	829,346
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.24*	*2.24*
		T O T A L S				
Fatal	1,839	2,082	1,081	568	289	3,246
	Inj / Acc	*1.132*	*0.59*	*0.31*	*0.16*	*1.77*
Personal Injury	112,651		23,766	53,422	90,374	161,999
	Inj / Acc		*0.21*	*0.47*	*0.80*	*1.44*
Prop. Damage Only	275,117					707,538
	Inj / Acc					*2.57*
TOTALS	389,607	2,082	24,847	53,990	90,663	872,783
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.23*	*2.24*

TRUCK ACCIDENT PROFILE 1979

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	27	28	9	3	4	19
	Inj / Acc	*1.037*	*0.33*	*0.11*	*0.15*	*0.70*
Personal Injury	795		168	328	430	224
	Inj / Acc		*0.21*	*0.41*	*0.54*	*0.28*
Prop. Damage Only	3,804					4,908
	Inj / Acc					*1.29*
TOTALS	4,626	28	177	331	434	5,151
	Inj / Acc	*0.006*	*0.04*	*0.07*	*0.09*	*1.11*
TRUCK/CAR Accidents						
Fatal	150	173	66	44	35	209
	Inj / Acc	*1.153*	*0.44*	*0.29*	*0.23*	*1.39*
Personal Injury	3,820		944	1,539	3,053	6,555
	Inj / Acc		*0.25*	*0.40*	*0.80*	*1.72*
Prop. Damage Only	10,273					28,687
	Inj / Acc					*2.79*
TOTALS	14,243	173	1,010	1,583	3,088	35,451
	Inj / Acc	*0.012*	*0.07*	*0.11*	*0.22*	*2.49*
CAR-ONLY Accidents						
Fatal	1,494	1,658	854	385	268	1,603
	Inj / Acc	*1.110*	*0.57*	*0.26*	*0.18*	*1.07*
Personal Injury	104,192		21,491	49,238	83,843	149,206
	Inj / Acc		*0.21*	*0.47*	*0.80*	*1.43*
Prop. Damage Only	242,146					621,700
	Inj / Acc					*2.57*
TOTALS	347,832	1,658	22,345	49,623	84,111	772,509
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.24*	*2.22*
T O T A L S						
Fatal	1,671	1,859	929	432	307	1,831
	Inj / Acc	*1.113*	*0.56*	*0.26*	*0.18*	*1.10*
Personal Injury	108,807		22,603	51,105	87,326	155,985
	Inj / Acc		*0.21*	*0.47*	*0.80*	*1.43*
Prop. Damage Only	256,223					655,295
	Inj / Acc					*2.56*
TOTALS	366,701	1,859	23,532	51,537	87,633	813,111
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.24*	*2.22*

Traffic & Safety Division

TRUCK ACCIDENT PROFILE 1980

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	15	15	5	1	0	7
	Inj / Acc	*1.000*	*0.33*	*0.07*	*0.00*	*0.47*
Personal Injury	633		137	260	354	184
	Inj / Acc		*0.22*	*0.41*	*0.56*	*0.29*
Prop. Damage Only	2,832					3,657
	Inj / Acc					*1.29*
TOTALS	3,480	15	142	261	354	3,848
	Inj / Acc	*0.004*	*0.04*	*0.08*	*0.10*	*1.11*
TRUCK/CAR Accidents						
Fatal	115	134	56	33	21	106
	Inj / Acc	*1.165*	*0.49*	*0.29*	*0.18*	*0.92*
Personal Injury	2,727		634	1,098	2,218	4,634
	Inj / Acc		*0.23*	*0.40*	*0.81*	*1.70*
Prop. Damage Only	7,199					20,057
	Inj / Acc					*2.79*
TOTALS	10,041	134	690	1,131	2,239	24,797
	Inj / Acc	*0.013*	*0.07*	*0.11*	*0.22*	*2.47*
CAR-ONLY Accidents						
Fatal	1,463	1,636	797	414	217	930
	Inj / Acc	*1.118*	*0.54*	*0.28*	*0.15*	*0.64*
Personal Injury	93,677		19,916	45,370	73,629	127,070
	Inj / Acc		*0.21*	*0.48*	*0.79*	*1.36*
Prop. Damage Only	206,233					509,404
	Inj / Acc					*2.47*
TOTALS	301,373	1,636	20,713	45,784	73,846	637,404
	Inj / Acc	*0.005*	*0.07*	*0.15*	*0.25*	*2.12*
T O T A L S						
Fatal	1,593	1,785	858	448	238	1,043
	Inj / Acc	*1.121*	*0.54*	*0.28*	*0.15*	*0.65*
Personal Injury	97,037		20,687	46,728	76,201	131,888
	Inj / Acc		*0.21*	*0.46*	*0.79*	*1.36*
Prop. Damage Only	216,264					533,118
	Inj / Acc					*2.47*
TOTALS	314,894	1,785	21,545	47,176	76,439	666,049
	Inj / Acc	*0.006*	*0.07*	*0.15*	*0.24*	*2.12*

TRUCK ACCIDENT PROFILE 1981

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	19	20	4	1	5	4
	Inj / Acc	*1.053*	*0.21*	*0.05*	*0.26*	*0.21*
Personal Injury	610		127	267	321	195
	Inj / Acc		*0.21*	*0.44*	*0.53*	*0.32*
Prop. Damage Only	2,862					3,773
	Inj / Acc					*1.32*
TOTALS	3,491	20	131	268	326	3,972
	Inj / Acc	*0.006*	*0.04*	*0.08*	*0.09*	*1.14*
TRUCK/CAR Accidents						
Fatal	110	121	46	31	32	121
	Inj / Acc	*1.100*	*0.42*	*0.28*	*0.29*	*1.10*
Personal Injury	2,698		691	1,128	2,112	4,511
	Inj / Acc		*0.26*	*0.42*	*0.78*	*1.67*
Prop. Damage Only	7,095					19,701
	Inj / Acc					*2.78*
TOTALS	9,903	121	737	1,159	2,144	24,333
	Inj / Acc	*0.012*	*0.07*	*0.12*	*0.22*	*2.46*
CAR-ONLY Accidents						
Fatal	1,333	1,457	746	392	209	911
	Inj / Acc	*1.093*	*0.56*	*0.29*	*0.16*	*0.68*
Personal Injury	88,248		18,303	41,916	70,196	119,513
	Inj / Acc		*0.21*	*0.47*	*0.80*	*1.35*
Prop. Damage Only	200,049					491,952
	Inj / Acc					*2.46*
TOTALS	289,630	1,457	19,049	42,308	70,405	612,376
	Inj / Acc	*0.005*	*0.07*	*0.15*	*0.24*	*2.11*
T O T A L S						
Fatal	1,462	1,598	796	424	246	1,036
	Inj / Acc	*1.093*	*0.54*	*0.29*	*0.17*	*0.71*
Personal Injury	91,556		19,121	43,311	72,629	124,219
	Inj / Acc		*0.21*	*0.47*	*0.79*	*1.36*
Prop. Damage Only	210,006					515,426
	Inj / Acc					*2.45*
TOTALS	303,024	1,598	19,917	43,735	72,875	640,681
	Inj / Acc	*0.005*	*0.07*	*0.14*	*0.24*	*2.11*

TRUCK ACCIDENT PROFILE 1982

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	9	9	2	0	1	3
	Inj / Acc	*1.000*	*0.22*	*0.00*	*0.11*	*0.33*
Personal Injury	521		121	220	288	147
	Inj / Acc		*0.23*	*0.42*	*0.55*	*0.28*
Prop. Damage Only	2,728					3,486
	Inj / Acc					*1.28*
TOTALS	3,258	9	123	220	289	3,636
	Inj / Acc	*0.003*	*0.04*	*0.07*	*0.09*	*1.12*
TRUCK/CAR Accidents						
Fatal	95	112	34	23	23	105
	Inj / Acc	*1.179*	*0.36*	*0.24*	*0.24*	*1.11*
Personal Injury	2,517		670	1,087	1,931	4,222
	Inj / Acc		*0.27*	*0.43*	*0.77*	*1.68*
Prop. Damage Only	7,058					19,556
	Inj / Acc					*2.77*
TOTALS	9,670	112	704	1,110	1,954	23,883
	Inj / Acc	*0.012*	*0.07*	*0.11*	*0.20*	*2.47*
CAR-ONLY Accidents						
Fatal	1,184	1,303	633	335	192	721
	Inj / Acc	*1.101*	*0.53*	*0.28*	*0.16*	*0.61*
Personal Injury	84,546		17,029	38,933	68,659	118,313
	Inj / Acc		*0.20*	*0.46*	*0.81*	*1.40*
Prop. Damage Only	196,537					489,916
	Inj / Acc					*2.49*
TOTALS	282,267	1,303	17,662	39,268	68,851	608,950
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.24*	*2.16*
T O T A L S						
Fatal	1,288	1,424	669	358	216	829
	Inj / Acc	*1.106*	*0.52*	*0.28*	*0.17*	*0.64*
Personal Injury	87,584		17,820	40,240	70,878	122,682
	Inj / Acc		*0.20*	*0.46*	*0.81*	*1.40*
Prop. Damage Only	206,323					512,958
	Inj / Acc					*2.49*
TOTALS	295,195	1,424	18,489	40,598	71,094	636,469
	Inj / Acc	*0.005*	*0.06*	*0.14*	*0.24*	*2.16*

TRUCK ACCIDENT PROFILE 1983

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	14	14	2	0	1	2
	Inj / Acc	*1.000*	*0.14*	*0.00*	*0.07*	*0.14*
Personal Injury	618		137	255	341	159
	Inj / Acc		*0.22*	*0.41*	*0.55*	*0.26*
Prop. Damage Only	2,923					3,749
	Inj / Acc					*1.28*
TOTALS	3,555	14	139	255	342	3,910
	Inj / Acc	*0.004*	*0.04*	*0.07*	*0.10*	*1.10*
TRUCK/CAR Accidents						
Fatal	109	131	45	34	23	104
	Inj / Acc	*1.202*	*0.41*	*0.31*	*0.21*	*0.95*
Personal Injury	2,659		691	1,123	2,129	4,307
	Inj / Acc		*0.26*	*0.42*	*0.80*	*1.62*
Prop. Damage Only	7,373					20,128
	Inj / Acc					*2.73*
TOTALS	10,141	131	736	1,157	2,152	24,539
	Inj / Acc	*0.013*	*0.07*	*0.11*	*0.21*	*2.42*
CAR-ONLY Accidents						
Fatal	1,098	1,198	574	308	183	717
	Inj / Acc	*1.091*	*0.52*	*0.28*	*0.17*	*0.65*
Personal Injury	87,779		18,150	40,114	71,806	119,980
	Inj / Acc		*0.21*	*0.46*	*0.82*	*1.37*
Prop. Damage Only	198,417					487,987
	Inj / Acc					*2.46*
TOTALS	287,294	1,198	18,724	40,422	71,989	608,684
	Inj / Acc	*0.004*	*0.07*	*0.14*	*0.25*	*2.12*
T O T A L S						
Fatal	1,221	1,343	621	342	207	823
	Inj / Acc	*1.100*	*0.51*	*0.28*	*0.17*	*0.67*
Personal Injury	91,056		18,978	41,492	74,276	124,446
	Inj / Acc		*0.21*	*0.46*	*0.82*	*1.37*
Prop. Damage Only	208,713					511,864
	Inj / Acc					*2.45*
TOTALS	300,990	1,343	19,599	41,834	74,483	637,133
	Inj / Acc	*0.004*	*0.07*	*0.14*	*0.25*	*2.12*

TRUCK ACCIDENT PROFILE 1984

STATEWIDE

NUMBER OF INJURIES BY TYPES OF VEHICLES INVOLVED

Accident Severity	Number of Accidents	Number of Fatalities	Number of Injuries by Type Type A	Type B	Type C	Uninjured Persons
TRUCK-ONLY Accidents						
Fatal	13	14	3	3	0	6
	Inj / Acc	*1.077*	*0.23*	*0.23*	*0.00*	*0.46*
Personal Injury	698		150	261	412	212
	Inj / Acc		*0.21*	*0.37*	*0.59*	*0.30*
Prop. Damage Only	3,346					4,361
	Inj / Acc					*1.30*
TOTALS	4,057	14	153	264	412	4,579
	Inj / Acc	*0.003*	*0.04*	*0.07*	*0.10*	*1.13*
TRUCK/CAR Accidents						
Fatal	119	136	36	38	41	116
	Inj / Acc	*1.143*	*0.30*	*0.32*	*0.34*	*0.97*
Personal Injury	3,294		830	1,277	2,705	5,467
	Inj / Acc		*0.25*	*0.39*	*0.82*	*1.66*
Prop. Damage Only	9,027					24,503
	Inj / Acc					*2.71*
TOTALS	12,440	136	866	1,315	2,746	30,086
	Inj / Acc	*0.011*	*0.07*	*0.11*	*0.22*	*2.42*
CAR-ONLY Accidents						
Fatal	1,264	1,410	613	326	223	772
	Inj / Acc	*1.116*	*0.48*	*0.26*	*0.18*	*0.61*
Personal Injury	96,808		19,666	42,832	81,310	134,798
	Inj / Acc		*0.20*	*0.44*	*0.84*	*1.39*
Prop. Damage Only	220,734					542,927
	Inj / Acc					*2.46*
TOTALS	318,806	1,410	20,279	43,158	81,533	678,497
	Inj / Acc	*0.004*	*0.06*	*0.14*	*0.26*	*2.13*
T O T A L S						
Fatal	1,396	1,560	652	367	264	894
	Inj / Acc	*1.117*	*0.47*	*0.26*	*0.19*	*0.64*
Personal Injury	100,800		20,646	44,370	84,427	140,477
	Inj / Acc		*0.20*	*0.44*	*0.84*	*1.39*
Prop. Damage Only	233,107					571,791
	Inj / Acc					*2.45*
TOTALS	335,303	1,560	21,298	44,737	84,691	713,162
	Inj / Acc	*0.005*	*0.06*	*0.13*	*0.25*	*2.13*

78 (Rev. 9-84)

MICHIGAN DEPARTMENT OF TREASURY
MOTOR FUEL TAX DIVISION

DO NOT WRITE ABOVE THIS LINE

Report of

MOTOR CARRIER DIESEL FUEL TAX

IMPORTANT: *All licensed motor carriers must file a Report of Motor Carrier Diesel Fuel Tax along with the remittance due for the preceeding report period. Reports are due on or before the 20th of each month following the end of the report period.*

INSTRUCTIONS: See line-by-line instructions on the reverse of the stub at left. Please complete all items.

(1) NAME, DBA, ADDRESS (City, State, Zip)	(2) ACCOUNT NO. (FE, TR or ME)	(3) REPORT FOR THE MONTH(S) OF:
	4. TELEPHONE NUMBERS a. BUS. _____ b. HOME _____	5. DO YOU MAINTAIN STORAGE IN MICH? a. ☐ YES b. ☐ NO

CALCULATION OF TAX DUE

6. Fleet average miles per gallon (all miles for all states) ..... (6) _____
7. Total miles traveled in Michigan ..... (7) _____
8. Total gallons of diesel fuel used in all vehicles in Michigan. Divide line 7 by line 6 ..... 8. _____
9. Tax due at cents. Multiply line 8 by cents ( ) ..... 9. _____
10. Gallons included in line 8, used in vehicles having the current year Michigan motor carrier fuel decal displayed (Cannot exceed total of line 8) ..... (10) _____
11. DISCOUNT. Multiply line 10 by cents ( ) and enter here ..... 11. _____
12. TOTAL TAX DUE. Subtract line 11 from line 9 ..... (12) _____

CALCULATION OF NET TAX DUE OR REFUND

STOP. READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING THIS SECTION.

13. Enter ONLY those gallons purchased at retail stations IN MICHIGAN, for which the TAX DISCOUNT was received (vehicles with current year fuel decal displayed) ..... Enter gallons .. (13) _____ X = $ _____
14. Enter ONLY those gallons purchased at retail stations IN MICHIGAN, for which NO TAX DISCOUNT was received (you must complete the schedule on the back of this return to receive credit for line 14) ..... Enter gallons .. (14) _____ X = $ _____

GALLONS ON LINES 13 AND 14 CANNOT EXCEED GALLONS PURCHASED IN MICHIGAN

15. TOTAL TAX CREDIT. Add lines 13 and 14 ..... (15) $ _____
16. REFUND. If line 15 is greater than line 12, enter refund due ..... REFUND ▶ (16) $ _____
17. NET TAX DUE. If line 15 is less than line 12, enter tax due ..... NET TAX DUE ▶ (17) $ _____

PENALTY, INTEREST AND REMITTANCE

18. PENALTY — The greater of $5.00 or 5% of the net tax due for each month or portion of month late. Maximum 25% ..... (18) $ _____
19. INTEREST — 3/4 of 1% of net tax due per month from date due until paid. ..... (19) $ _____
20. TOTAL TAX, PENALTY AND INTEREST DUE. Add lines 17, 18 and 19 ..... 20. $ _____
21. TOTAL REMITTANCE. Make check payable to "State of Michigan" ATTN. Canadian licensees: Remittance must be payable in U.S. funds ..... REMITTANCE ▶ (21) $ _____

SIGNATURE

Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief it is true, correct and complete. If prepared by a person other than the taxpayer, his declaration is based on all information of which he has any knowledge.

Signature of Taxpayer	Date	Signature of Preparer other than Taxpayer	Date
Title		Business Address	

TO ASSURE PROPER CREDIT, WRITE YOUR ACCOUNT NUMBER ON YOUR CHECK. MAIL REMITTANCE AND REPORT TO:
Michigan Department of Treasury, Motor Fuel Tax Division, Treasury Building, Lansing, MI 48922

TAXPAYER — KEEP THIS STUB FOR YOUR RECORD

11/84

Report of

MOTOR CARRIER DIESEL FUEL TAX

This form is issued as provided by Act 119, P.A. 1980, as amended. Filing of this form is mandatory for licensed motor carriers. Failure to file and pay tax timely is punishable by penalty of the greater of $5.00 or 5% of the tax due per month to a maximum of 25%. Interest will be charged at 3/4 of 1% per month from date due until date paid.

Report for the months of:	Due date even if no tax due	Account Number

NOTICE OF CHANGE *IF YOUR NAME, ADDRESS OR ACCOUNT NUMBER ON THE REPORT IS INCORRECT, DRAW A LINE THRU THE INCORRECT INFORMATION AND NOTE CORRECTION(S).*

CALCULATION OF TAX DUE

6. Fleet average miles per gallon ..... 6. _____
7. Total miles traveled in Michigan ..... 7. _____
8. Total gallons of diesel fuel used in all vehicles in Michigan ..... 8. _____
9. Tax due at cents ..... 9. _____
10. Gallons included in line 8, used in vehicles with current year fuel decal displayed ..... 10. _____
11. Discount. (Line 10 X cents) ..... 11. _____
12. TOTAL TAX DUE ..... 12. _____

CALCULATION OF NET TAX DUE OR REFUND

STOP. READ INSTRUCTIONS

13. Gallons purchased at Michigan retail stations for which TAX DISCOUNT was received. Enter gallons ..... _____ X = 13. _____
14. Gallons purchased at Michigan retail stations for which NO TAX DISCOUNT was received. Enter gallons ..... _____ X = 14. _____

15. TOTAL TAX CREDIT ..... 15. _____
16. REFUND ..... 16. _____
17. NET TAX DUE ..... 17. _____

PENALTY, INTEREST AND REMITTANCE

18. Penalty ..... 18. _____
19. Interest ..... 19. _____
20. TOTAL TAX, PENALTY AND INTEREST DUE ..... 20. _____

21. TOTAL REMITTANCE ..... 21. _____

PERRY PRINTING COMPANY

REPORT MUST BE FILED EVEN IF NO TAX IS DUE.

Taxpayers Check Number	Date of Check	Check Amount

TAXPAYER'S RECORD

SCHEDULE OF GALLONS PURCHASED AT MICHIGAN RETAIL STATIONS
FOR WHICH NO DISCOUNT WAS RECEIVED

DATE OF PURCHASE	NAME AND ADDRESS OF RETAIL STATION WHERE PURCHASED	GALLONS PURCHASED
	TOTAL. Enter on line 14	

INSTRUCTIONS

Line 1: If the report form is not preidentified, enter your name, business name and business address.

Line 2: If not preidentified, enter your account number. This may be a Federal Employer (FE), Treasury (TR) or Michigan Establishment (ME) number.

Line 3: If not preidentified, enter the month(s) covered in the report. When using preidentified reports, be sure to use the correct form for the reporting period.

Line 4: Enter your business and home telephone numbers.

Line 5: Check the box to indicate if you maintain bulk fuel storage in Michigan.

Line 6: Compute your fleet average miles per gallon by dividing the total mileage for all states by the total gallons of fuel used. Carry the figure to two decimal places (example 4.01). If you do not have adequate records of miles and gallons necessary to make this calculation, use 4.00 miles per gallon as your fleet average on line 6.

Line 7: Enter total miles traveled in Michigan, in all diesel powered highway vehicles, including mileage of all diesel powered 2 axle vehicles.

Line 8: Compute the total gallons used in Michigan by dividing total miles traveled in Michigan (line 7) by your fleet average miles per gallon (line 6).

Line 9: Enter tax due. Compute the tax by multiplying Michigan gallons (line 8) by the rate that is machine printed on line 9.

Line 10: Enter the total gallons of diesel fuel consumed in Michigan in vehicles having the current Michigan motor carrier fuel decals displayed. The Act identifies vehicles requiring the motor carrier fuel decal as all diesel powered road tractors, truck tractors or any other diesel truck having 3 or more axles. Total gallons on line 10 cannot exceed the total gallons entered on line 8.

Line 11: A tax discount is allowed on all diesel fuel consumed in motor vehicles having the current year Michigan motor carrier fuel decal displayed. Compute the discount by multiplying the gallons on line 10 by the discount rate. The rate is machine printed on line 11. Enter the total discount.

Line 12: Compute the total tax due by subtracting the discount (line 11) from the full rate tax (line 9). Enter here.

LINES 13, 14 AND 15 ARE NECESSARY TO ALLOW CREDIT FOR PURCHASES OF DIESEL FUEL FROM RETAIL SOURCES ON WHICH TAX WAS PAID TO THE SELLER.

Line 13: Enter only the gallons purchased at retail stations in Michigan on which tax was paid at the discounted rate. The discount rate is machine printed on line 13. Compute the tax paid by multiplying the gallons by the rate. Enter tax paid.

Line 14: Enter only gallons purchased at retail stations in Michigan on which tax was paid at the full rate. You must complete the purchases schedule on the back of the return to receive credit for line 14. The full rate is machine printed on line 14. Compute the tax paid by multiplying the gallons by the rate. Enter tax paid.

NOTE: THE TOTAL OF GALLONS ENTERED ON LINES 13 AND 14 CANNOT EXCEED TOTAL GALLONS PURCHASED IN MICHIGAN ON WHICH TAX HAS BEEN PAID.

Line 15: Add the tax amounts on lines 13 and 14 and enter total tax credit here.

Line 16: If line 15 is greater than line 12, enter the difference here. This amount is your refund.

Line 17: If line 15 is less than line 12, enter the difference here. This amount is the tax due the State of Michigan.

Line 18: If your report is late, calculate your late penalty as follows:
The greater of $5.00 or 5% of the tax due (line 17) for each month or portion of a month late. The maximum late penalty is 25% of the tax due. Enter late penalty here.

Line 19: If your report is late, calculate your interest due at a rate of 3/4 of 1% (.0075) per month from date due until paid. Calculate interest on a daily basis for partial months.

Line 20: Add lines 17, 18 and 19 to calculate the total amount to be paid with your report. Enter the total here.

Line 21: Remit the amount on line 19. Write the amount of your payment on line 21. **Remittance must be payable in U.S. funds.** Make your check payable to the "State of Michigan". To assure proper credit, write your account number (line 2) on your check.

BE SURE TO SIGN YOUR REPORT.

Michigan Department of Treasury
C 3673 (Rev. 3-84)

MOTOR CARRIER DIESEL FUEL TAX LICENSE APPLICATION

OFFICE USE ONLY

IMPORTANT — This form is issued under authority of Act 119, P.A. 1980, which requires that each commercial motor vehicle operated on Michigan highways have an annual vehicle identification decal. Failure to comply is a misdemeanor punishable by a fine of up to $100 or imprisonment for 90 days or both. The annual decal fee can be prorated for periods of less than one year. See the Decal License Fee section below for proration schedule. If this form is not filled out completely, processing of your application will be delayed.

(2) NAME/DBA/ADDRESS

(3) FEDERAL EMPLOYER (FE), TR or ME NUMBER

FOR DEPARTMENTAL USE

4. ADDRESS OF PRINCIPAL OFFICE IF DIFFERENT THAN ABOVE — AREA CODE AND PHONE NUMBER

5. ADDRESS WHERE RECORDS ARE KEPT FOR AUDIT — AREA CODE AND PHONE NUMBER

(6) CHECK ONE
☐ 1. INDIVIDUAL ☐ 2. HUSBAND AND WIFE ☐ 3. PARTNERSHIP ☐ 4. DOMESTIC CORPORATION ☐ 5. FOREIGN CORPORATION ☐ 6. TRUST OR ESTATE

7. NAME OF RESIDENT AGENT — AREA CODE AND PHONE NUMBER

8. ON THE REVERSE OF THIS FORM, list partners if a partnership or officers if a corporation.

(9) IF YOU ARE A NEW APPLICANT, give the date you became liable for the payment of road use tax on diesel fuel ..... ● _____

10. WHAT IS YOUR ANTICIPATED QUARTERLY TAX LIABILITY? ..... $ _____

(11) DO YOU MAINTAIN DIESEL BULK STORAGE IN MICHIGAN? IF YES, GIVE LOCATION.
☐ NO ☐ YES – Location:

(12) DO YOU SELL FUEL AT RETAIL?
☐ NO ☐ YES

13. MAJOR BUSINESS ACTIVITY

DECAL LICENSE FEE — Decals are available at a prorated fee for the remainder of the license year on August 1, November 1 and February 1. They may be applied for by mail from the Department beginning 15 days before the above dates or in person at the district offices on or after those dates. **No decals will be issued early.**

(14) LICENSE PERIOD (Check ONLY ONE box below to indicate when license period begins.)	RATE PER VEHICLE REGISTERED IN MICHIGAN (Insert on line 15 below)	RATE PER VEHICLE REGISTERED OUTSIDE OF MICHIGAN (Insert on line 16 below)
☐ a. Quarter 1 — May 1 through April 30	$92.00	$12.00
☐ b. Quarter 2 — August 1 through April 30	$69.00	$ 9.00
☐ c. Quarter 3 — November 1 through April 30 .	$46.00	$ 6.00
☐ d. Quarter 4 — February 1 through April 30 ..	$23.00	$ 3.00

15. Number of commercial motor vehicles registered in Michigan ..... ● _____ × Rate _____ = Total $ _____

16. Number of commercial motor vehicles operating in Michigan, but registered in some other state ..... ● _____ × Rate _____ = Total $ _____

17. REMITTANCE. Make check payable to "State of Michigan" ..... ● $ _____

18. A SURETY BOND MAY BE REQUIRED. THE DEPARTMENT OF TREASURY WILL REQUEST A BOND IF REQUIRED.

SIGNATURE Must be signed by OWNER - Two (2) Partners - Two (2) Corporate Officers - Authorized Representative.

Under penalty of perjury I declare that I have examined this application, including accompanying schedules, if any, and to the best of my knowledge, it is true, correct and complete.

SIGNATURE	TITLE	DATE
SIGNATURE	TITLE	DATE

MAIL APPLICATION AND DECAL FEE TO:
Michigan Department of Treasury
Motor Fuel Tax Division
Treasury Building
Lansing, MI 48922

8. LIST PARTNERS IF A PARTNERSHIP OR OFFICERS IF A CORPORATION

NAME	TITLE	RESIDENCE ADDRESS	TELEPHONE	SOCIAL SECURITY NO.

NOTICE:
CLARIFICATION OF THE DEFINITION OF "COMMERCIAL MOTOR VEHICLE"

A "**road tractor,**" regardless of the number of axles, is a commercial motor vehicle' and is subject to be licensed as a Motor Carrier.

A "**truck tractor,**" regardless of the number of axles, is a 'commercial motor vehicle' and is subject to be licensed as a Motor Carrier.

A "**truck**" having more than two axles is a 'commercial motor vehicle' and is subject to be licensed as a Motor Carrier.

All of the above are entitled to the 6 cent per gallon tax discount on diesel fuel if the vehicle is properly licensed.

MICHIGAN

GENERAL SIZE RESTRICTIONS FOR STATE HIGHWAYS

1. Length/single vehicle and load - 40 feet, all routes.

2. Length/truck tractor, semi-trailer combination.

   a. Semi-trailer including load, 50 feet on all routes - No overall length.

   b. Trailers exceeding 50 feet provision will be cited for that length in excess of 50 feet.

3. Length/truck and trailer.

   a. All non-designated routes (black/red) - 59 feet overall length.

   b. Designated routes (green) - 59 feet overall length. In lawfull use on or before December 1, 1982 - 65 feet overall length.

4. Length/truck tractor, semi-trailer and trailer.

   a. All non-designated routes (black/red) - 59 feet overall length.

   b. One or both trailers greater than 28 1/2 feet, in lawfull use on December 1, 1982, designated routes (green) - 65 feet overall length. In use after December 1, 1982 - 59 feet overall length.

   c. Trailers including loads not greater than 28 1/2 feet (not to include coupling devices), designated routes (green) - No overall length restriction. Trailers exceeding the 28 1/2 feet provision will be cited for that length in excess of 28 1/2 feet.

5. Length/truck tractor, semi-trailer and trailer or truck and semi-trailer, or truck and trailer. Designated routes (green).

   a. Designed and used exclusively to transport assembled automobiles, automobile bodies, recreational vehicles or boats - 65 feet.

   b. Front projection - 3 feet.

   c. Rear projection - 4 feet.

   d. Maximum overall length - 72 feet.

6. Length/mobile homes, all routes.

   a. Body length, not to include tongue - 45 feet.

   b. When in combination with a towing unit - 60 feet overall length.

7. Height/all vehicles and loads - 13 feet, 6 inches, all routes.

   a. Exception - all vehicles manufactured after July 27, 1978 used to transport liquid in bulk, having a flash point of 70° or below - 11 feet, 8 1/2 inches, all routes.

   b. Mobile homes - without permit - 12 feet, 6 inches.

8. Width/all vehicles and loads - 8 feet.

   Exceptions:

   a. Vehicles traveling on designated routes (green) - 8 feet, 6 inches.

   b. Mobile homes - 8 feet, 4 inches, all routes.

   c. Log, pulpwood, bolts, agricultural products, concrete pipe - 9 feet, all routes.

   d. Busses - 8 feet, 6 inches, all routes.

   e. Farm equipment, towed or self-propelled (sun-up to sunset, cannot extend across center line of a state highway) - 186 inches - Prohibited on limited access highways.

   f. Farm equipment, towed or self-propelled (sunset to sunrise, cannot extend across center line of a state highway) - 9 feet - Prohibited on limited access highways.

9. Special Permit Information - Vehicles or loads which exceed legal dimensions or weights require a permit for travel. Application for a permit on Michigan Department of Transportation forms (No. 2258, Application) obtained from and sent to Michigan DOT, Highway Permit Section, Lansing, Michigan 48913 - 517/373-2120.

MICHIGAN

WEIGHT AND AXLE LOADS FOR STATE HIGHWAYS

Act 300, PA 1949, Sec. 722 (MSA 9.2422)

1. These allowable axle weights apply to all state trunklines except certain designated highways will be allowed higher axle weights. For more information on designated highways a current year's truck operators map is imperative. Maps are available from the Michigan Department of Transportation. The maximum load shall not exceed the number of pounds designated.

   a. When axle spacing is nine feet or more, center to center between axles, the maximum load shall not exceed 18,000 pounds.

   b. Axle spacing less than nine feet between two axles, but more than three and one-half feet (center to center), the maximum load shall not exceed 13,000 pounds per axle.

   c. When two axles are less than three and one-half feet apart, the maximum load shall not exceed 9,000 pounds per axle.

   d. Subsections a, b, and c shall be known as the normal loading maximum.

2. On any legal combination of vehicles only one tandem assembly shall be permitted 16,000 pounds for any axle of the assembly. No other tandem axle assembly in the combination shall exceed 13,000 pounds per axle.

   When the gross weight of a combination does not exceed 73,280 pounds, two tandem axle assemblies shall be permitted 16,000 pounds per each axle of the tandem axle assemblies.

3. The maximum wheel load for any axle operating single tires shall not exceed 700 pounds per inch of tire width.

4. On designated routes (those routes shown in green on the truck operators map) including off route points not to exceed five miles on state trunklines only, a vehicle or combination of vehicles having a gross weight not exceeding 80,000 pounds gross weight or in excess of the vehicle gross weight determined by application of the formula will be allowed the following axle weights:

   a. 20,000 pounds on any one axle with nine foot spacings.

   b. One tandem weight of 17,000 pounds per axle having at least nine feet axle spacing on both sides of the tandem axles. 5 axle tandem tandem with less than 36 feet between #2 and #5 axles, second tandem cannot exceed 16,000 pounds per axle.

   c. Two tandems weighing 17,000 pounds per axle if there is 36 feet between #2 and #5 axles. (5 axle tandem tandem only)

d. An overall gross weight on a group of two or more consecutive axles equaling:

$$W = 500 \frac{LN}{N-1} + 12N + 36$$

The gross weight will be divided by the number of axles in the group to determine the maximum axle weight.