Citizens League Report

BIG TRUCKS:

A Small Piece Of a Larger Problem

January 24, 1991

Public affairs research and education in the Twin Cities metropolitan area

CITIZENS LEAGUE REPORT

BIG TRUCKS:

A Small Piece of a Larger Problem

Prepared by

Large Trucks Committee

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January 24, 1991

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EXECUTIVE SUMMARY

BACKGROUND

Large trucks constitute only a small part of the Twin Cities metropolitan area road traffic. Minnesota Department of Transportation (MnDOT) traffic counts indicate that about 93 percent of the vehicles are automobiles, pickup and panel trucks, and vans; 3.4 percent are buses and single-unit trucks; and 3.4 percent large trucks -- semi-trailers and truck-trailers.

Autos, pickup trucks, and vans accounted for 96.8 percent of the total vehicle miles traveled in the metropolitan area in 1989, with heavy commercial vehicles (buses and small, as well as large, trucks) contributing the remaining 3.2 percent, according to a Minnesota Department of Public Safety analysis of MnDOT data. On freeways and major highways, the respective proportions were 94.5 and 5.5 percent.

Heavy commercial vehicles are involved in somewhat more accidents and cause more incident-related congestion in the metropolitan area than would be expected, on a proportional basis, given their share of total vehicle miles.

Nevertheless, because autos constitute such a large percentage of total vehicles, freeway traffic and congestion during peak travel periods are caused far more by the area's diffuse development pattern than by trucks. Jobs, homes, and other trip origins and destinations, such as retail locations, are distributed widely throughout the region, creating an economic system heavily dependent upon autos and trucks for its flow of people and goods.

Under these and similar conditions, some economists and transportation experts advocate peak-hour pricing -- imposing a charge for use of heavily traveled sections of road at peak travel times -- to allocate scarce highway resources. The resulting revenue can help provide alternatives for drivers who choose other routes during contested periods.

While the traveling public appears to perceive large trucks as greatly contributing to congestion and accidents, despite data to the contrary, truckers believe strongly that one cause of truck-related accidents is the public's lack of knowledge about how to drive safely with large trucks.

A detailed 1990 Minnesota highway cost-allocation study compared highway-related costs with highway-user revenues, by classes of vehicles traveling on the state's roads. This study found that, while several classes of vehicles pay approximately their full shares, the largest trucks do not -- combination trucks with five axles pay only 66 percent of their full costs, and combination trucks with six or more axles only 50 percent of theirs.

A MnDOT voluntary metro truck management plan instituted in 1988 to reduce truck traffic on congested freeway links has shifted a small number of truck trips per day to less-busy times or routes. Improved public management of highway incidents (from collisions to single-vehicle roll-overs) could reduce clearance times and the resulting congestion.

The committee found no conclusive evidence in existing research about the accident rates of either conventional twin trailers or longer combination vehicles, compared with semi-trailers; consequently, the committee reached no recommendation on whether or not triple trailers and/or longer combination vehicles should be permitted or banned in the Twin Cities area, particularly during peak travel hours.

Inter-modal transportation of freight (using containers and truck-trailers on railroad cars) is increasing, both nationally and in the Twin Cities, where some 86,000 containers and piggy-back trailers are shipped, received, or moved through the area each month. Even so, a significant portion of railroad capacity in the Twin Cities is not used.

CONCLUSIONS AND RECOMMENDATIONS

Among the committee's principal conclusions: Large trucks do not significantly reduce Twin Cities freeway capacity, because they represent only a small part of total traffic. Trucks are and will continue to be an important component of the movement of goods in the Twin Cities metropolitan area. However, large trucks and autos operating in mixed, heavy traffic present safety and capacity problems that will compound in the future. A number of small steps each promise to produce marginal improvements and, collectively, have the potential to alleviate future safety and congestion problems.

We recommend:

- **MnDOT should renew and expand its voluntary Metro Truck Management Program to divert trucks from congested corridors during peak travel times.**
- **The Minnesota Legislature should act on the results of the 1990 Minnesota highway cost-allocation study.**
- **MnDOT and DPS should cooperatively develop and institute a more aggressive incident-management program in order to reduce delays and congestion.**
- **MnDOT should conduct a thorough evaluation of peak-hour pricing on the most congested sections of metropolitan freeways and other major roads.**
- **The Minnesota Senate and House Transportation committees should seek innovative ways to increase freight movement on the under-utilized capacity of railroads in the Twin Cities area.**

INTRODUCTION

The Citizens League Board of Directors, responding to a perception that large trucks were a growing source of metropolitan freeway congestion, asked a committee to study how changes in truck traffic could reduce freeway accidents and congestion in the Twin Cities metropolitan area. The complete charge is appended to the report.

The committee focused primarily on interstate and other freeways in the metropolitan area. We did not consider proposals for toll highways in the region, nor did we examine the impact of large trucks on the remainder of the road system or on land development. Because changes to ease congestion or improve safety on freeways might create problems on other roads or adversely affect land development, they should not be implemented without proper evaluation.

Minnesota in 1989 registered 3.4 million autos and other vehicles, including some 128,000 trucks of various kinds (excluding pickups and family-type vans); of these, about 16,000 were truck-tractors -- the power units that pull semi-trailers.

Autos, trucks, and other vehicles traveled some 37.5 billion miles on the state's 132,000 miles of total roads in 1989, according to the MnDOT. Nearly half of this distance, or 17.6 billion miles, was in the seven-county Twin Cities metropolitan area. Of this 17.6 billion miles of travel, less than 600 million was by commercial trucks. Automobiles and other personal vehicles of similar size -- pickup and panel trucks and small (family-type) vans -- constitute an overwhelming majority of traffic in the Twin Cities metropolitan area.

The metropolitan area contains a total of 13,419 miles of roads, slightly more than 10 percent of the statewide figure. Freeways and other major highways (expressways and principal arterials with speed limits of 40 miles per hour or more) account for 490 miles of this metropolitan total.

Chapter 1 of this report presents our findings on the role of large trucks in this metropolitan area's transportation system. Chapter 2 presents our conclusions and recommendations.

CHAPTER 1

FINDINGS

LARGE TRUCKS' SHARE OF TRAFFIC VOLUME

Automobiles, pickup and panel trucks, and small vans constitute more than 90 percent of the Twin Cities metropolitan area traffic.

This is true for both the number of vehicles and for the number of miles that various classes of vehicles travel, according to MnDOT data. It is also true for the over-all total of roadways throughout the entire metropolitan area as well as for freeways and other major highways, considered separately.

MnDOT commonly distinguishes between what it terms "heavy commercial vehicles" (HCVs), on the one hand, and all other vehicles, such as cars, pickup trucks, and small vans, on the other. The department defines HCVs as vehicles with two or more axles and six or more tires. The HCV category thus includes buses and small as well as large trucks.

VEHICLES

MnDOT's manual traffic counts in the metropolitan area in 1989 indicate that the vast majority of the vehicles on Twin Cities roads are autos, pickup and panel trucks, and vans:

Type of Vehicle	Percentage
Autos, pickup and panel trucks, vans	93.2
Buses and single-unit trucks (with two, three or four axles)	3.4
Semi-trailers (with three or more axles) and truck-trailers (with four or more axles)	3.4

Within the latter two groups, the largest single category is five-axle semi-trailers, which constitute 2.4 percent of the total vehicles. The proportion of trucks that represents inter-urban (through) traffic, with trips that neither start nor end in the metropolitan area, is not known.

VEHICLE MILES

An analysis of MnDOT data, which the Minnesota Department of Public Safety (DPS) conducted for the committee, shows that autos, pickup trucks and vans accounted for 96.8 percent of the total vehicle miles traveled in the entire Twin Cities metropolitan area in 1989. Heavy commercial vehicles contributed the remaining 3.2 percent.

On freeways and major highways, the respective proportions are 94.5 percent and 5.5 percent, indicating that HCVs are more likely to use the freeways and major highways than roads and streets with lower speed limits and capacities.

THE TREND IN VEHICLE MILES

The number of vehicle miles that heavy commercial vehicles travel on metropolitan area freeways and other major highways is rising, but the rate of increase is less than that of autos, pickup trucks, and small vans.

Consequently, HCVs account for a slightly smaller proportion of the total vehicle miles traveled on these roadways than in past years, according to the DPS analysis:

Year	Total VMT*	HCV VMT	%	Autos, pickups, vans VMT	%
1984	6,206,510	372,260	6.0	5,834,250	94.0
1985	6,736,467	393,408	5.8	6,343,059	94.2
1986	7,147,230	420,968	5.9	6,726,263	94.1
1987	7,514,095	421,068	5.6	7,093,027	94.4
1988	7,992,879	439,924	5.5	7,552,954	94.5
1989	8,099,706	446,030	5.5	7,653,676	94.5
1984-89 Increase	**30.5%**	**19.8%**		**31%**	

* Vehicle miles traveled in 000s

THE PATTERN OF METROPOLITAN DEVELOPMENT INFLUENCES CONGESTION

The amount of traffic on Twin Cities metropolitan freeways and the congestion during peak travel periods are caused far more by the area's diffuse development pattern than by trucks.

Jobs, homes, and other trip origins and destinations, such as retail locations, are distributed widely throughout the region. The Minneapolis and St. Paul central business districts together contain only 10 percent of the region's jobs, for example. This development pattern has resulted in a large and diffuse number of sites producing, receiving, shipping, and selling goods -- an economic system that depends heavily upon autos and trucks for its flow of people and goods.

The region has some 8 million daily weekday trips. Only about 3 percent of these are by mass transit; most are made by persons driving alone in autos. Taking into consideration the modest capacity expansion that is expected, MnDOT forecasts significantly increased congestion on Twin Cities area freeways and expressways by the year 2000.[1]

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1 Year 2000 System Forecast, MnDOT, 1986

In 1984, 132 miles of Twin Cities metropolitan area freeways and expressways reached 90 percent or more of capacity for two or more hours daily; by the year 2000, the department estimates, that condition will be reached on 206 miles -- a 56 percent increase. Much of this increase will occur in outer suburban areas, in keeping with past trends in the spread of area congestion. It will occur on Interstate Highways 35W, 494, and 694 and State Highways 280, 36, 62, 100, and 169.

Under such conditions, some economists and transportation experts have long advocated peak hour or congestion pricing -- imposing a charge for use of heavily traveled sections of road at peak travel times -- as an efficient way to allocate scarce highway resources. Proponents of congestion pricing assert that the major social cost of vehicles using a road is the congestion they cause, and regardless of what other policies are implemented (special lanes for cars with passengers, for example), congestion will remain. The solution, they argue, is to set a price for use that varies with the amount of traffic. The resulting revenue can help provide alternatives for users who choose other routes during congested periods.

TRUCKS ARE VITAL TO THE MOVEMENT OF GOODS IN THE METROPOLITAN AREA

The Twin Cities area depends heavily on trucks for its movement of goods; this activity includes operating on freeways and other major highways during peak traffic hours, as well as at other times.

Changing the area's travel patterns is inevitably difficult, whether this involves personal trips or freight movement. Individuals and business depend on freeways -- individuals use them for personal and work travel; retailers depend on early morning delivery of goods to stock shelves; manufacturers and retailers say they use "just-in-time" delivery to minimize inventory costs and, presumably, consumer prices; shoppers depend on a steady flow of goods (including food) to the stores they patronize. Every truckload of goods delivered to retail stores ultimately leaves those stores in literally hundreds of individual automobiles after consumer purchases.

Trucking representatives repeatedly told the committee that the preferences of their customers -- shippers and receivers -- govern the hours and location of truck operations.

Typically, the local movement of goods overlaps congested freeway hours; trucks routinely deliver in the morning and pick up shipments in the afternoon, when most retail and manufacturing establishments are open. Retailers, manufacturers, and other shippers and receivers prefer this pattern for several reasons: it makes use of existing personnel, avoids the cost of extended operating hours and reduces pilferage. In addition, some cities encourage this pattern with local ordinances prohibiting certain truck operations at night.

Inter-city truck shipments, on the other hand, more commonly move overnight, sometimes overlapping morning and evening hours of peak travel and sometimes not.

ACCIDENTS AND CONGESTION

Heavy commercial vehicles are involved in more metropolitan-area accidents[2] and cause more incident-related[3] congestion than would be expected, on a proportional basis, given their share of total vehicle miles. MnDOT has not quantified the precise extent of incident-related congestion attributable to these occurrences.

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2 Most accidents involving trucks also involve one or more autos; no causation is implied.

3 "Incidents" include accidents, stalls, flat tires, fires, rollovers, spilled loads, spinouts, and mechanical failures.

Accidents involving HCVs on Twin Cities freeways require 47 percent more time to clear, on average, than those involving other vehicles, and incidents involving larger trucks, especially, are more likely to block multiple traffic lanes than those involving other vehicles, according to a MnDOT study. In this study, the department logged all accidents between 6 a.m. and 6 p.m. weekdays throughout 1986 on 47 miles of freeway (mainly I-35W and I-694) visible on closed-circuit TV from its Traffic Management Center (TMC) in downtown Minneapolis. It recorded the time required to clear each accident.

In 1989, the TMC logged all weekday incidents during the year. Of the total 2,237 incidents, 337, or 15 percent, involved trucks; about two-thirds were semi-trailers and one-third straight (single-unit) trucks.

HCVs are involved in a small but disproportionate number of accidents, based on vehicle miles traveled, according to the DPS analysis of MnDOT data for 1989:

	TOTAL TWIN CITIES METRO AREA		FREEWAYS, MAJOR HIGHWAYS ONLY	
	Number of Vehicles in Accidents	Accident Rate/Million Miles Traveled	Number of Vehicles in Accidents	Accident Rate/Million Miles Traveled
HCVs	5,773	9.94	1,646	3.69
Autos, pickup trucks, vans	108,894	6.38	25,317	3.31

This comparison shows that for the entire Twin Cities area, the accident rate per million miles traveled for HCVs is 155 percent of that for autos (9.94/6.38), and that on freeways and other major highways, the HCV accident rate is 111 percent of that for autos (3.69/3.31).

MnDOT data on accidents within the I-494/I-694 ring on interstate highways and expressways (State Highways 36, 100, 169, 61, 3, 62, and 77) for the three-year 1986-88 period show that HCVs were involved in 20.4 percent of fatal accidents, 9.9 percent of personal injury accidents and 11 percent of property-damage accidents. These vehicles account for about 5.5 percent of the miles traveled on those roads.

OTHER TRUCK EFFECTS ON CAPACITY

In addition to incident-related congestion, trucks also affect highway capacity because of their size, relative to other vehicles, and lesser operating performance (ability to accelerate, brake, and maintain speed on grades).

Highway engineers express the traffic volume that trucks generate in terms of passenger-car equivalents (PCEs) -- the number of passenger cars that would consume the same proportion of a road's capacity. The Transportation Research Board describes this effect in the following way:

> PCEs for trucks vary as a function of grade, road type, traffic volume, and traffic distribution...They range from 1.7 PCE on a level, multi-lane freeway to four on rolling to right on mountainous terrain. This is a broad gauge of truck effect and does not differentiate by truck type.[4]

This effect is not an important factor in Twin Cities-area freeway congestion, according to a 1987 MnDOT study. This is partly because trucks represent only a small percentage of traffic flow during peak periods (7-9 a.m. and 4-6 p.m.) and partly because the department assumes that autos or other vehicles would replace trucks that were removed. The 1987 MnDOT study involved a computer

4 Transportation Research Board, Special Report No. 223, National Research Council, 1989

simulation of traffic on I-35W south of the Minneapolis central business district; it showed that if all trucks were removed, the average traffic speed would increase by only .5 miles per hour.

PERCEPTIONS ABOUT CONGESTION AND TRUCK SAFETY

The traveling public appears to perceive trucks as greatly contributing to congestion and accidents. The committee bases this judgment on personal experience and the remarks of resource persons who addressed the committee. This judgment is reinforced by the Transportation Research Board:

> Truck safety is a serious (public) concern...Truck crashes are frequently spectacular and severe, can cause massive traffic tie-ups and commonly receive media coverage. Motorists are aware that freight trucks are getting bigger and more common, and may feel intimidated when driving in truck traffic...The perception that highway safety has deteriorated as a consequence of more and larger trucks has been a principal basis for opposition to liberalized truck limits.[5]

Truckers believe strongly that one cause of truck-related accidents is the public's lack of knowledge about how to drive safely with large trucks. Truckers commonly cite motorists' risky practice of cutting directly in front of large trucks, which are unable to slow or stop as quickly as automobiles. Procedures for safe operation of autos in mixed truck traffic are not required in Minnesota driver-education courses, set out in its driver-training manual, or tested in the driver's license examination.

Improved communication and education have the potential to relieve the uneasiness that accompanies the public's perceptions about trucks and improve the behavior of automobile drivers in relation to large trucks.

HIGHWAY COST ALLOCATION IN MINNESOTA

Highway cost-allocation studies compare estimated highway and highway-related costs with highway-user revenues, by selected classes of vehicles. Cost responsibility depends upon vehicle weight, axle loadings, miles of travel, and class of roads used. The theory underlying cost-allocation studies is that classes of vehicles paying less than their full shares of cost are being subsidized.

A 1990 highway cost-allocation study for the Minnesota Transportation Study Board estimates that single-unit trucks with three or more axles pay 31 percent more than their full share of highway costs in Minnesota state highway-user taxes and fees, while combination five-axle trucks pay only 66 percent and combination six-axle trucks about 50 percent of their full shares. At 100 percent of their full shares, single-unit trucks with three or more axles would pay $4.1 million ***less*** annually, while five- and six-axle combination trucks would pay a total of $65.6 million ***more***. Revenue-to-cost ratios computed in the Minnesota study are:

Automobiles	1.05
Pickups and Vans	1.06
Single-Unit Trucks	
2 axle	.99
3+ axle	1.31
Combination Trucks	
3 axle	1.13
4 axle	1.04
5 axle	.66
6+ axle	.50

5 Transportation Research Board, Special Report No. 211, National Research Council, 1986

NEW TRUCK SAFETY REQUIREMENTS

Driver performance probably is the single most important element of truck safety, and several speakers told the committee that independent, self-employed commercial drivers too often do not pay sufficient attention to safety. Similarly, the Transportation Research Board (Special Report No. 211) found that "the greatest gains in combination truck safety may lie in stricter requirements for their drivers."

Expectations are that three recent sets of requirements should improve driver performance and truck safety, according to committee resource speakers:

- Federal requirements for examination and licensing of commercial drivers, including requirements for one commercial license (as opposed to multiple licenses in various states), a national commercial-license registry and stricter safety standards, with revocation of the commercial license for violations.
- New federal drug-testing requirements and penalties for drug and alcohol use by commercial vehicle drivers.
- A 1990 Minnesota statute requiring annual inspections of all commercial vehicles by the State Patrol or certified fleet operators and pre-operational, on-the-road, and post-trip inspections by commercial drivers.

Even so, the state allows a variety of exceptions from truck-safety requirements, mostly for farm vehicles. For example, operators of farm trucks of less than 10,000 pounds gross weight are not subject to the new blood-alcohol limit of .04 percent; grain trucks moving directly from a farm are not subject to brake-capability laws; and farm trucks can be operated up to 150 miles from their home farms on a regular motor vehicle drivers' license.

FEDERAL PREEMPTION OF STATE REGULATION

Federal law preempts state and local restrictions on certain trucks' use of interstate freeways.

The Surface Transportation Assistance Act of 1982 (STAA) allows trucks up to 102 inches wide and weighing up to 80,000 pounds, semi-trailers up to 48 feet long, and twin trailers up to 28 feet long to travel without restriction on the interstate system. It also requires states to provide "reasonable access" from this network to service facilities (food, fuel, repairs, and rest), allowing the states to decide where to provide such access; many now allow the trucks to travel distances ranging from one to three miles to reach service facilities.

The 1984 federal Tandem Trailer Safety Act allows states to petition the U.S. Secretary of Transportation to exempt a segment of the interstate system from this preemption. The state must demonstrate that an exemption is necessary to avoid substantial safety problems.

Federal courts have upheld the STAA preemption after attempts in at least four states -- Tennessee, Connecticut, Florida, and New York -- to restrict or ban trucks, and the Transportation secretary has rejected two Kentucky proposals to restrict truck use of a freeway near Cincinnati.

At least two additional bans exist unchallenged. In Atlanta, the state of Georgia in 1978 restricted through trucks with three or more axles to a perimeter freeway route for safety reasons. (Trucks with deliveries or pickups within the perimeter ring are not affected.) The interstate system was being substantially rebuilt in the downtown area. The ban remains, although the rebuilding is complete. And Minnesota, before passage of STAA, gained federal approval to ban trucks of more than 9,000 pounds gross weight from the four-mile section of I-35E built as a parkway between I-94 in downtown St. Paul

and State Hwy. 5 at the Mississippi River. (Minnesota also bans vehicles carrying hazardous materials from the I-94 tunnel southwest of the Minneapolis central business district.)

Trucking industry representatives and other speakers told the committee that truck restrictions would be uneconomic and are unnecessary. They emphasized that truckers regularly and willingly avoid congested sections of freeways whenever possible, since they are consistently concerned about losing time and about the increased accident potential of crowded roadways.

VOLUNTARY TRUCK MANAGEMENT EFFORTS

The Minnesota Department of Transportation took the initiative in 1988 and began a voluntary Metro Truck Management Plan to reduce truck traffic on congested freeway links. This program had three main thrusts:

- Posting advisory signs at freeway and state highway locations at the I-494/694 perimeter encouraging through trucks to by-pass the central portions of the metropolitan area rather than drive through it;
- Encouraging trucking companies to divert trips from congested corridors during rush hours;
- Encouraging shippers and receivers to adopt shipping and delivery schedules that would shift truck travel to non-peak hours.

The department estimates that the plan shifted some 520 HCV trips per day to less-busy times or routes, leaving some 5,000 trucks on metro freeways between 7-9 a.m. and 4,000 between 4-6 p.m.

The committee heard conflicting opinions about whether a voluntary approach has the potential to shift additional truck use. However, the committee's resource persons who addressed this subject were unanimously of the opinion that no voluntary program can be effective unless it involves shippers and receivers (not simply trucking companies).

After MnDOT's initial work with this program, the department was unable to maintain it as a continuing, operating program due to lack of staff.

IMPROVED INCIDENT MANAGEMENT ACTIVITIES

The various public agencies involved at the scene of freeway incidents could reduce the congestion and delay that incidents trigger by working expressly to achieve shorter clearance times. This will require improved coordination and cooperation among MnDOT, DPS, and cities.

Several speakers, including representatives of both trucking and motorist interests, suggested to the committee that improved incident management is possible and desirable. A 1988 California study covering the San Francisco, Los Angeles, and San Diego metropolitan areas estimated that an aggressive incident-management program could yield a 25 percent reduction in the vehicle hours of delay attributable to accidents involving trucks.[6]

A 1989 MnDOT workshop on incident management identified numerous methods to improve clearance times. Among the obstacles noted: A lack of communication among the key state and local accident-response agencies (MnDOT, DPS, cities, firefighters); the fact that each agency -- along with private

6 Urban Freeway Gridlock Study, California DOT, 1988

tow-truck operators -- has its own set of priorities, procedures, and requirements, some of which conflict with the others'.

RESEARCH ON ACCIDENT RATES BY TYPE OF TRUCK

The committee found no absolutely conclusive evidence about the accident rates of either (1) conventional twin trailers (double trailers up to 28 feet long each) or (2) longer combination vehicles (LCVs), compared with semi-trailers.[7] The lack of evidence convincing enough to make an informed decision should not be taken as an endorsement by this committee of the use of triple trailers or other LCVs in the Twin Cities area, particularly during peak travel hours.

Research does appear to indicate insignificant differences in relative accident rates of twin trailers and the semi-trailers they have replaced. The Transportation Research Board (Special Report No. 211) reviewed research through 1983 and concluded:

> The increased use of (conventional) twins will have little overall effect on highway safety because a reduction in miles of truck travel will approximately offset the small possible increase in accident involvements per mile traveled. Twins probably have slightly more accident involvements per mile traveled than tractor semi-trailers operated under identical conditions at highway speeds.
>
> The information available for comparing the relative safety...is imperfect. The three most reliable pre-1983 analyses comparing accident rates for twins and tractor semi-trailers on rural highways estimated rates for twins that were two percent less, six percent more, and 12 percent more than the rates for tractor semi-trailers. In the three most reliable analyses of accidents resulting in fatalities, rates for twins of involvement were estimated to be seven percent less, five percent more, and 20 percent more than the rates for tractor semi-trailers.
>
> Comparisons of accident rates for twins and tractor semi-trailers are necessarily imprecise because they do not reflect identical operating conditions -- weather, drivers, routes, types of highways, times of day. When all factors are considered, despite the uncertainty in comparing accident rates of twins and tractor semi-trailers, twins clearly appear to be about as safe a method of hauling freight per ton-mile of travel as the tractor semi-trailers they replace.[8]

The Transportation Research Record compared singles' and doubles' accident rates for a random sample of trucks traveling between identical terminal points in southwestern, southern, midwestern, and eastern states. It involved 355 different origin-destination pairs, 127 million semi-trailer vehicle miles and 209 million double-trailer vehicle miles. Single trucks recorded 2.95 accidents/million vehicle miles, doubles 2.42. When these routes were separated into categories -- controlled-access highways, non-controlled access highways, local streets, and parking lots -- the accident rates for doubles were less than for singles in each category.[9]

A study for the Trucking Research Institute and American Trucking Association Foundation reported these "approximate estimates" of accident rates/million vehicle miles from "state sources and industry:" Semi-trailers, 2.3; twin 28s, 1.7; turnpike doubles, 1.5; Rocky Mountain doubles, 1.5; triples, 1.1.[10]

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7 LCVs are configurations larger than STAA authorizes for the interstate freeway system. The most common types are twin trailers, each up to 34 feet; triple trailers, each of 28 feet; turnpike double trailers, each up to 48 feet; and Rocky Mountain doubles, with one 48-foot and one 28-foot trailer.

8 Transportation Research Board, Special Report No. 211

9 Transportation Research Record, Report No. 1249, Transportation Research Board, 1989

10 Trucking Research Institute and American Trucking Association Foundation, *Productivity and Consumer Benefits of LCVs*, 1990

MnDOT, in a background paper on triples prepared in 1989, cited various safety concerns about triples and said: "Safety experience by western states which allow triples, however, has not supported these concerns. Under controlled conditions specifying routes, qualifications for operating firms, driver training, and permissible weather conditions, triples have accumulated a safety record in western states which appears good."

A study for the Association of American Railroads uses combinations of national data sets to show that fatal accident rates per million vehicle miles are 2.91 for single-unit trucks, 4.33 for single-trailer combinations and 6.35 for multi-trailer combinations. It also found that in truck-auto collisions, the auto occupants are far more likely to be killed or seriously injured than the truck driver. This report also argues that accurate data are not available on LCV safety because such trucks are not common, states do not collect uniform data, and information from some states is inaccurate or incomplete.[11]

In addition, railroads and other LCV critics assert that such vehicles are more dangerous than the data would indicate because their operation has been restricted largely to rural highways, where volume is low, and to the safest highways with the highest design standards, and because they are assigned the best, most experienced drivers.

THE TREND IN TRUCK SIZE

The maximum allowed lengths and weights of trucks have grown progressively larger, over time, in the nation and in Minnesota, as the industry has sought greater operating efficiencies. This trend most likely will continue, given the industry's continuing drive to increase efficiency, the prospects for high oil prices, the recent federal gas tax increase and the likelihood of additional federal and/or state gasoline tax increases.

The maximums allowed vary considerably by state, and often these maximums are not permitted throughout an entire state. For example, Minnesota's truck limits of 80,000 pounds gross weight, 65 feet in length and 28 feet each for twin trailers are exceeded in a majority of states to the west. Eleven of the 17 western states, including North and South Dakota, allow lengths of 105 feet or more and gross weights of 105,000 pounds or more. Nine of these 17 states allow double trailers 48 feet long and a tenth permits doubles 45 feet long.

The trucking industry asserts that larger trucks will increase efficiency and are no less safe than those permitted today. Opponents maintain that larger trucks are not in the public interest because (1) their safety is unproven or, in some cases, they exacerbate safety concerns; (2) they cause more congestion; (3) trucks already receive preferential treatment in public policy (trucks use streets and highways that the public builds and maintains, for example, while railroads must acquire their own rights of way and construct and maintain their own tracks); and (4) the increased price competition would shift additional freight from rail to truck and weaken or destroy the railroads.

INTER-MODAL FREIGHT TRANSPORT

The use of inter-modal (piggy-back and container) freight transportation, which combines the flexibility of trucks with the long-haul, over-the-road capacity of trains, is increasing.

The number of trailers and containers loaded nationally increased from just over 3 million in 1980 to 5.7 million in 1988. In the Twin Cities, the Soo Line each month handles some 9,000 containers and piggy-back trailers with Twin Cities origins or destinations, and the Burlington Northern about 12,000. These shipments reduce -- but do not totally replace -- truck use, because they require local cartage. In addition, monthly movement of through containers and piggy-backs totals 1,450 for the Soo Line and

11 Association of American Railroads, *Safety of Multi-Unit Combination Vehicles*, 1990

64,900 for the Burlington Northern. Presumably, these through inter-modal movements completely replace trucks on Twin Cities freeways. (Even so, the railroads point out that they have a significantly under-used capacity.)

INFORMATION NEEDS

More complete, thorough, accurate, and comparable information on a variety of truck matters is needed to help state policy-makers and regulators, such as the Legislature, MnDOT, and the DPS, make informed decisions on some truck-related issues.

The state does not know, for example, how many of the trucks on metropolitan freeways start or end their trips here and how many represent through traffic. It lacks completely reliable information on the number of vehicle miles traveled by the various classes of trucks.

Data comparability among states also is a problem, one that helps account for the difficulty of reaching consensus on such issues as the relative safety of twin trailers and LCVs. The Transportation Research Board (Special Report No. 211) has concluded that "closer coordination among the various data producers and users who participate in the programs that collect nationwide information on truck travel, safety, and highway impacts would greatly enhance the ability of these programs to provide reliable data addressing key truck-related policy questions."

The Research Board recommends that the federal Department of Transportation "work with state agencies to improve the quality and consistency of state-collected data" and that state governments "adopt more uniform practices in the collection of travel and accident data, including...consistent vehicle classification systems for accident reporting."

CHAPTER 2

CONCLUSIONS AND RECOMMENDATIONS

During our study we reached a variety of conclusions that led it to make the recommendations below. Principal among these conclusions are:

- Large trucks do not significantly reduce Twin Cities freeway capacity, because they represent only a small part of total traffic. In short, the problem -- when and where congestion exists -- is not too many trucks; it is too many automobiles.

- Large trucks and autos operating in mixed, heavy traffic present highway safety and capacity problems that will compound in the future. More vehicles of all kinds, including larger trucks, will share an essentially fixed supply of highway capacity, since significant over-all expansion of freeways and expressways in the developed portion of the metropolitan area is unlikely.

- Because federal courts have repeatedly struck down state and local efforts to overturn or evade the federal Surface Transportation Assistance Act of 1982, it would be pointless for Minnesota to seek to ban or restrict truck operations permitted under that law.

- There is no apparent congestion panacea involving trucks; they are and will continue to be an important component of the movement of goods in the metropolitan area, which itself is a vital part of our economy.

- Even so, multiple separate, small steps each promise to produce marginal improvement; collectively, they possess the potential to alleviate future safety and congestion problems. State authorities -- the Legislature and other officials -- should pursue the following efforts.

We recommend:

- ❒ **MnDOT should renew and expand its voluntary Metro Truck Management Program to divert trucks from congested corridors during peak travel times and conduct the program on an ongoing basis.**

MnDOT should focus much more extensively in this program on shippers and receivers than it has in the past. The effort should include corporations, such as large retailers, that own and operate their own trucks.

Another major goal should be to identify through trucks and their owners/operators and to encourage their routing around the central metropolitan area on the less congested segments of the I-694/494 ring, particularly during peak travel hours.

A night shipping and receiving strategy should be an important part of this program, beginning with companies that are most able to adopt night schedules, such as large corporations and establishments that are open 16 to 24 hours a day. MnDOT also should work with major shopping centers to promote flexible work hours (to allow goods receipt at off-peak hours) and to encourage pooled deliveries.

- **The Minnesota Legislature should act on the results of the 1990 Minnesota highway cost-allocation study.**

The Legislature should adjust highway-user taxes and fees so that each vehicle class pays its full share of highway-related costs (as defined in the study). The goal of such adjustment should be to assure that the movement of freight by truck is not subsidized by other classes of vehicles.

- **MnDOT should increase and improve its collection and analysis of the information it will find increasingly necessary for managing truck traffic.**

As the department moves increasingly to solve transportation problems by managing traffic on existing infrastructure, it will need new and different information -- more extensive, accurate data on truck size, type, origin and destination, function, and ownership, for example.

The department should seek funding for a thorough study of truck incidents (including accidents) on metro freeways, including the types of trucks and companies involved, specific causes of incidents and quantification of the resulting congestion and lost time, in economic terms.

- **MnDOT and DPS should cooperatively develop and institute a more aggressive incident-management program in order to reduce delays and congestion.**

The departments should involve appropriate local government (police, firemen, traffic managers, emergency medical staff) and private (trucking and tow-truck company) personnel in the program.

Such a program might include expanded highway surveillance and communication; improved positioning and availability of heavy-duty tow trucks; prompt video-taping and clearance of incident scenes; clear inter-agency (including local government) understandings and agreements on roles; a program involving regular State Highway Patrol monitoring of CB channels for incident reports that truckers would be encouraged to make; and the installation and more effective use of electronic informational signs warning about upcoming congestion at numerous strategic freeway locations.

- **MnDOT should conduct a thorough evaluation of peak-hour pricing on the most congested sections of metropolitan freeways and other major roads.**

Peak-hour or congestion pricing should, if adopted in the Twin Cities metropolitan area, apply to all vehicles, including trucks. The department should investigate alternative methods for applying peak-hour pricing, including the use of simple auto sticker arrangements and more sophisticated electronic scanner systems.

- **The Minnesota Senate and House Transportation committees should seek innovative ways to increase freight movement on the under-utilized capacity of railroads in the Twin Cities area.**

One appropriate general goal of such an effort would be a comprehensive plan to preserve and more effectively use transportation assets already in place in Minnesota and avoid further atrophy of railroad capacity.

- **The Legislature should consider repealing unnecessary or undesirable exceptions to truck-safety laws, such as those cited in this report.**

- **The DPS and state school districts should take advantage of various opportunities to educate the public about the value of driving safely in truck traffic.**

The department could broadcast safe-driving techniques in a variety of messages on the 88.5 FM radio station that carries traffic information, and it could seek other ways, such as newspaper features and television public-service announcements, to communicate such information.

The department and school districts should include safe driving procedures in relation to trucks in driver-education courses for beginning drivers, defensive driving classes, classes for older drivers seeking insurance premium benefits, the state driver-training manual, and the state drivers' test. Where appropriate, the Department of Education should aid such efforts.

AN ADDITIONAL APPROACH

The recommendations above are designed to help correct a series of inadequacies in the current situation. An **additional approach** to correcting these inadequacies could be to develop a picture of an ideal metropolitan-area transportation and goods-movement system.

This might involve:

- Convening a forum of people representing segments of society directly affected by congestion and highway-capacity problems, who would be aware (and appreciative) of each others' concerns, as a means to coordinate short-range solutions.
- Involving policy-makers and action-oriented advocates in a visionary process in order to specify creatively what society would like in the movement of goods and people.

WORK OF THE COMMITTEE

CHARGE TO THE COMMITTEE

The Citizens League Board of Directors adopted the following charge to the committee.

Large Trucks: Metropolitan Road Safety and Congestion and Movement of Goods

Large trucks carry a large proportion of the goods to and from the metro area and within the region. As a result, they make up a growing percentage of traffic on interstate freeways and other major roads in the metro area. Informal surveys suggest that these trucks are disproportionately involved in accidents, particularly during peak-hour traffic and that those accidents result in particularly long delays.

The committee should study how changes in truck traffic could reduce accidents and traffic congestion in the metropolitan area. It should also consider creative approaches to efficiently moving goods within the metropolitan area.

The committee should:

- Determine the extent to which large trucks reduce road capacity.
- Review Minnesota accident reports to determine the extent to which large trucks are involved in accidents on metropolitan area freeways.
- Survey the experiments and efforts in other major metropolitan markets to regulate truck use of metropolitan roads to reduce the accident rates.
- Review the experience of other states allowing large trucks, including triple trailers, on their roads.
- Review possible new approaches to efficiently moving goods in urban centers.
- Recommend steps to improve safety and move goods more efficiently

COMMITTEE MEMBERSHIP

Led by Ellen Benavides, chair, and Rob Fulton, vice-chair, 26 Citizens League members participated actively in the committee's work. They are:

John Bartlett
Dennis Cavanaugh
Roger Conant
Ann Duff
Hugh Faville
Ruth Hass
David Hols
Curt Hubbard
James Krause
Fred Lange
Larry Long
Gail Lorenz
Alan Mingo
Valdemar Olson
Calvin Pipal
Larry Schmitz
Minnie Schroeder
Linda Schutz
William Smith
Karen Swenson
William Tarbell
Robert Teetshorn
Ronald Tomczik
Roger Urban
Jane Vanderpoel
Chris Welsh

MEETINGS/RESOURCE SPEAKERS

The committee met weekly from July 31 to November 6 and on November 27. As part of its study process, the committee heard from the following speakers:

Fred Beier, associate dean, Carlson School of Management, and professor, marketing and logistical management, University of Minnesota
Tom Boerner, director, Office of Traffic Safety, Minnesota Department of Public Safety
Jake Crandall, counsel, Minnesota State Automobile Association
David Carruthers, general manager, Preferred Translocation Systems
Judy Cook, president, Minnesota Retailers Association
Willis Croonquist, United Transportation Union
James Denn, president, Minnesota Trucking Association
Darryl Durgin, assistant commissioner for program management, Minnesota Department of Transportation
James Larsen, vice president for marketing, Preferred Translocation Systems
Ron Redding, customer service area manager, United Parcel Service
Alan Rodgers, research analyst, Office of Traffic Safety, Minnesota Department of Public Safety
Abe Rosenthal, president, Minnesota Transport Services Association
Mike Ternus, feeder division manager, United Parcel Service
Rosemary Wilson, director of government affairs, Burlington Northern Railroad

In addition, the committee visited the Soo Line Intermodal Terminal in northeast Minneapolis and the Hyman Freightways truck terminal in Roseville. Personnel from both companies, including Marc S. Bernhardson, assistant vice president for industrial development and regional lines, and Judy Mitchell, director of intermodal pricing, both of the Soo Line, and Scott Pikovsky of Hyman Freightways, were exceptionally helpful in discussing how the facilities operate.

The committee also devoted one meeting to participating in a visioning process led by Prof. Arthur Harkins of the University of Minnesota. This exercise culminated in constructing visions of what the ideal movement of goods might be like in both the short-range and longer-term futures.

The major themes that committee members suggested for expected traffic in 1995 concerned traffic mix, traffic flow, and noise and air quality. The major themes elicited for the movement of people and goods in 2000 were inventive technology, coordination of vehicle types, and different mixtures of the movements of goods and people.

Inventive technology possibilities cited by committee members were electric trains, subways, undergrounds tunnels, guided vehicles, airfoils, conveyor vehicles, Hovercraft, trucks powered by natural gas, and improved roadways. The coordination of vehicle types involved the use of computers and satellite guidance systems to dispatch trucks and take advantage of staggered work hours. Nine committee members envisioned the separation of goods and people movement, while 11 saw those movements mixed in some fashion.

COMMITTEE STAFF

This report was prepared by Peter Vanderpoel. Dawn Latulippe and Joann Latulippe provided staff support to the committee.

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