Report Number 94-05

Research

Institutional Barriers to the Adoption of Electronic Data Collection and Interchange as it Relates to Commercial Vehicles

Minnesota Guidestar

6. Please indicate whether your company uses any of the following tools. (Check all that apply)

Telecommunications:

__14_	Fax machines	__17_	Two-Way Radios
___9_	800 Numbers	__10_	Cellular Phones
___2_	On-Board Computers	___3_	Networked PCs
___0_	Satellite Communications		
___1_	Vehicle Location/Tracking Transponders.		

Computerized Applications

__15_	*	Word processing
__11_	*	Spread sheets such as Lotus 123, Excel
___9_	*	Data base software, e.g., DBase or others.
___4_	*	Specialized Applications Designed for Specific Business Problems.
__10_	*	Preparing invoices and related documents.
___3_	*	Transmitting files and messages, e.g., via modem, to other computers either within the home office or to other firms.
__10_	*	Maintaining various records such as vehicle maintenance, hours of service, or driver qualification and drug testing records.
___9_	*	General payroll and record keeping
___2_	*	Costing model(s)
___3_	*	Other (please indicate)_____

The questions which follow relate to the interactions you've had with units of Mn/Dot or The Department of Public Safety over the past year.

7. Is your company aware of the location of the Administrative Truck Center in South St. Paul? Y 20: N 1

8. Approximately how frequently does a representative of your firm find it necessary to physically visit the Truck Center? (Check only one)

___0_ Weekly
___1_ Monthly
___3_ At Least Once a Quarter
___2_ Two - Four Times a Year
___4_ Once per Year
__12_ No Visits Necessary

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16. Abstract (Limit: 200 words)

This study examines the interface between state and regulatory agencies and commercial vehicle operators regarding the application of electronic technology.

The various processes followed by the state agencies are documented. In addition, a survey of both freight and passenger commercial vehicle operators (CVO) is analyzed. Significant findings are that CVOs are capable of exchanging information with the state electronically although formal EDI methods appear somewhat distant. A significant portion of CVOs are also prepared to adopt basic IVHS technology which would allow trucks to bypass weigh stations. A summary of barriers to the widespread adoption of these technologies is also included as is a literature review.

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Institutional Barriers To The Adoption of Electronic Data Collection and Interchange as It Relates to Commercial Vehicles

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There were several motor carriers who assisted the research team in pretesting and evaluating questionnaires. These were Mr. Bill Elsholtz of Overnight Express, Mr. Rick Jordahl of Stem Transfer and Storage, Mr. Jim Deike of Deike Transfer and Mr. George Wilson of Wilson Refrigerated. In addition, the research team appreciates the assistance of the many representatives of agencies who supplied data for this effort and served on the study's advisory committee. The committee was very constructive in its feedback and observations. The members of the committee are Mark Berndt, Mn/DOT; Gordy Boldt, Mn/DOT; Eugene Cannon, Mid-American Transportation; Pierre Carpenter, Minnesota Department of Public Safety (DPS); Marilyn Gaiovnik, DPS; Major Gene Halverson, State Patrol; Richard Helgeson, Transportation Regulation Board (TRB); Bob Johns, Center for Transportation Studies, University of Minnesota; Dennis Kroeger, Federal Highway Administration; Michael McKay, TRB; Betsy Parker, Mn/DOT; Andy Piilola, Minnesota Trucking Association; Chuck Sanft, Mn/DOT; and Darrell Schierman, Mn/DOT. The critical review of early drafts of this report by the committee has been extremely helpful.

Finally, the anonymous motor carriers who participated in the survey are owed a debt of gratitude. Without their participation this study would not be possible.

EXECUTIVE SUMMARY

This study has tested the presence of institutional barriers to the application of electronic technology to transactions between the state and commercial vehicle operators (CVOs). It has also documented the processes currently followed by the major state agencies dealing with CVOs and surveyed carriers relative to their capabilities to adopt such technology.

In general, freight and passenger carriers appear to be capable of exchanging information electronically. Formal electronic data interchange (EDI) programs are still somewhat distant, however, if for no other reason than transactions are not yet uniform among the states and software is not readily available. In order for CVOs to increasingly participate in electronic transactions, the state will need to demonstrate the benefits of doing so, e.g., develop programs for the electronic filing of tariffs, or electronic templates of various forms. Unfortunately, the current processes followed by the state reflect a resource starved environment. The consequence is the state will probably find it difficult to assume the necessary leadership, i.e., it will be difficult for the state to work toward electronic communication when many of its departments are not adequately equipped and trained.

In regard to intelligent vehicle highway systems (IVHS), there appears to be more promise. Freight carriers in particular are receptive to this technology if it can be demonstrated to contribute to profits. Interstate freight carriers can easily identify IVHS technology as a means of bypassing additional weigh stations. A significant proportion of carriers would even be willing to make a modest investment to equip vehicles. (In a similar vein, passenger carriers are not as enthusiastic about this technology in part because Minnesota carriers are not required to pass through weigh stations.) The implementation of other types of IVHS by CVOs, e.g., integrating automatic collection of driver logs and state registration procedures, will also require leadership on the part of the state. It will have to demonstrate how and why the carrier should make investments in such technology.

Aside from the general barrier of shrinking state resources, this study has identified the following barriers:

different and often ambiguous objectives between the state and CVO, making it difficult to identify opportunities to simplify transactions;

organizational structures within the state which have no apparent purpose from the perspective of the CVO;

state-CVO transactions are necessarily complex and involve multiple jurisdictions;

CVOs are a diverse group with the result that the state will find it difficult to communicate and train significant portions of them;

there is an absence of user friendly state-CVO transaction oriented software available to apply to an EDI format.

In general, recommendations focus on incremental changes such as pilot programs and experiments with selected groups of carriers. Such efforts should not consume enormous

resources and will give the state valuable experience in dealing with CVOs. Examples of such efforts are related to the potential objective of the state to promote transparent borders. After discussions were held with the Wisconsin DOT this study concludes that there is no systematic pattern of interaction between these two states in order to discuss joint programs. Substantial progress could be made toward establishing transparent borders if Minnesota and Wisconsin could institutionalize a dialogue format involving a variety of departments or agencies. The state should also adopt a similar strategy with a representative sample of commercial carriers to make sure that it stays close to its constituents.

Additional recommendations are made to counteract the inertia caused by the barriers identified above.

INTRODUCTION

The development of electronic technology as applied to the collection, manipulation, and exchange of information has allowed government and industry to reduce transaction costs and improve productivity. An example of the application of such technology is the use of electronic data interchange (EDI) between commercial carriers of freight and their clients, i.e., shippers. Such an application creates value because it drives out costly repetition from a transaction as well as improving the currency and quality of information available to decisionmakers. The fact that EDI makes repetitive transactions more efficient often justifies necessary investments. However, it is often the case that the improvement in information quality also enhances the quality of service. Thus, for example, just-in-time inventory systems have been developed which lead to additional savings for both shipper and carrier.

In the field of transportation there are many technologies which deal with the collection and exchange of information. In addition to EDI, two examples are Intelligent Vehicle Highway Systems (IVHS) and satellite technology. In the former case, information is collected at the interface of the vehicle and the way. In the latter case, satellites are a surrogate for the way, i.e., communication takes place directly and continuously with the vehicle. In either case, data is collected which relates to the current position, progress, and operation of the vehicle. The management of such information has allowed transportation enterprises to improve service reliability as well as capture efficiencies in operations-- leading to lower costs and/or prices.

In reality, transportation carriers interface with a wide network of interests beyond consignors and consignees. In particular they face a variety of government regulations which

include economic and safety enforcement, licensing, and taxation among others. Often, governmental requirements create the architecture for complex transactions between regulators and those who are regulated. Further, such requirements may be based on traditional methods of communication and designed in a period when time was not measured with the premium of today. Thus, the interface between regulators and freight carriers also represents a productive application of

technology, i.e., promising to drive down transaction costs and improve productivity. Since many of the costs of regulation are borne by the regulated, carriers should also benefit from this transformation.

Purpose

The purpose of this study is to examine the current pattern of interactions between commercial vehicle operators (CVO) and the State of Minnesota and identify those factors which effectively inhibit the application of potentially productive information technology to simplify those transactions. Expressed differently, the purpose of this study is to identify those barriers which inhibit the application of such technologies as EDI or IVHS as carriers and the state deal with each other. As a result, there are three aspects to this study. One is to examine how the state and CVO interact, and another is to look at how certain regulations impact the operations of the carrier, e.g., at weigh stations. Respectively, data to support conclusions in each of these areas was gathered through interviews with state agencies and carrier surveys. The third aspect is to examine the issues related to creating transparent borders between neighboring states. Analysis for this area is based on interviews with the State of Wisconsin DOT and is discussed in the Conclusions and Recommendations section.

Scope

The project focused on state agencies most directly involved in CVO regulation and major segments of the motor carrier industry. On the state side, the target group included units of the Department of Public Safety and the Department of Transportation. The relevant Department of Public Safety units include the State Patrol and two sections from Driver and Vehicle Services, Prorate and Reciprocity and Licensing and Records. The Department of Transportation units include the Office of Motor Carrier Services and the Office of Road and Vehicle Information and Services. A third state agency, the Transportation Regulation Board, also is part of the study. On the carrier side, the study focused on intra- and interstate carriers of freight and passengers, not including school buses, limousines, express companies, and cartage companies. Geographically, the primary focus of the study is on the State of Minnesota and the I-94 corridor which links Minnesota and Wisconsin.

Methodology and Outputs

The primary methodology for data collection included interviews with representatives of state agencies and the trucking industry and the application of questionnaires to selected samples of commercial vehicle operators. The samples are described more completely in the questionnaire section of this report. The research team also met with representatives from the Wisconsin Department of Transportation to discuss possible IVHS applications and barriers in the I-94 corridor linking Minnesota and Wisconsin. The discussion focused on how a transparent border between the states could be achieved. Results of the discussion are included in the Conclusions and Recommendations.

The primary outputs of this study include the following:

* a documentation of the processes used by state regulators;

* an identification of technologies and/or types of software which appear to have the greatest potential for state-CVO transactions;

* an assessment of the average carrier's capabilities to employ such technologies;

* an identification of barriers which prevent the adoption of the appropriate technologies and discussion of strategies which should be adopted to reduce their impact; and

* a literature review is presented in Appendix E.

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MINNESOTA AGENCY INTERACTION WITH CVOs

The state agencies which interact with commercial vehicle operators (CVO) in Minnesota are organized into the Department of Public Safety (DPS) and the Department of Transportation (Mn/DOT). Specifically, Prorate and Reciprocity, Licensing and Records, and the State Patrol are in the Department of Public Safety. The Office of Motor Carrier Services and the Office of Road and Vehicle Information and Services are in Mn/DOT. Independent of either organization is the Transportation Regulation Board (TRB) which deals with economic intrastate regulation.

Despite the separate organizations, the state recognizes the need for close coordination between the agencies. Therefore, Minnesota has established the Administrative Truck Center in South St. Paul which houses both Mn/DOT offices, the Commercial Vehicle Enforcement Section of the State Patrol and the Transportation Regulation Board. (The Administrative Truck Center was also established to provide more of a "one-stop shopping" opportunity for carriers.) Other Department of Public Safety activities are conducted in St. Paul or via deputy registrars located around the state.

The following discussion documents the major regulatory processes of each of the above agencies. It is presented as background information and as a foundation for recommendations contained later in this report. The discussion looks first at the Department of Public Safety units. The TRB is discussed next because it represents the framework for some of the enforcement activities of the Office of Motor Carrier Services (OMCS) which follows. Discussion of the Office of Road and Vehicle Information and Services concludes the section.

Department of Public Safety: Driver and Vehicle Services

Prorate and Reciprocity (P&R)

The two programs which dominate the activities of the Prorate and Reciprocity Section of the Department of Public Safety are the International Registration Plan (IRP) and the International Fuel Tax Agreement (IFTA). These are both cooperative programs with other states. The significance of this is that Minnesota is not the sole architect of the procedures which support these programs. In addition to these two programs the office issues titles, trip permits and 30-day base permits. A summary of the annual number of transactions for these programs is as follows:

IRP Vehicle Registrations	20,200
IRP Renewals	4,800
IFTA Licenses	4,000
IFTA Quarterly Reports	16,000
Vehicle Titles	10,000
Trip, Fuel, and 30-day Permits	12,000

In general, P&R deals with interstate carriers. Intrastate carriers obtain their licenses much the same as automobiles, i.e., through state registrars. Minnesota does have some reciprocal agreements concerning registration with all of its neighboring states, e.g., intrastate carriers from Wisconsin or Minnesota may enter the other state as much as 30 miles. However, the only time P&R becomes directly involved with these carriers is when they wish to make partial payments on the cost of registration. There are no reciprocal agreements relative to fuel taxes.

International Registration Plan (IRP)

In general IRP is designed to simplify the complexity associated with a carrier's need to register in all of the states in which it will operate. The program now provides for the carrier's home state, i.e., its base state, to collect the appropriate registration taxes from the carrier and distribute them to the appropriate states. Thus, instead of dealing with many states a carrier need only deal with its base state. Currently 46 states participate in IRP and, according to the Intermodal Surface Transportation Efficiency Act (ISTEA), all states will be required to participate by 1996.[1] There are approximately 5,000 carriers for which Minnesota is the base state.

It should be noted, however, that not all of the states which participate in IRP follow similar procedures. Consequently, the registration process remains a combination of requirements from all states and is considered complex. P&R staff indicate that a major challenge of the program is educating the user as well as being familiar with all of the regulations in other states.

There are a number of vendors which sell information services designed to facilitate the clearinghouse effect of IRP. In Minnesota's case, it relies on Lockheed IMS, as do approximately 20 other states, to facilitate implementation of IRP. Other states either have another information vendor or choose to supply the service themselves. A difficulty in the case of Lockheed is that they have not made progress in allowing electronic collection or

[1]The states not currently in IRP are Rhode Island, Massachusetts, Arkansas, and Hawaii.

dissemination of IRP-related data. This presents a formidable barrier to the simplification of the IRP process.

Generally, a carrier's registration fee is a function of weight and distance traveled in each state in which it operates. In general, once a vehicle is registered, its weight code remains fixed in each state until carriers request changes. Therefore, the principal variable of the IRP program is the total distance traveled by vehicles by state or the aggregate distance traveled by fleets.[2] Where the vehicles or fleets have their miles traveled on record, preprinted renewal forms are sent to each carrier based on this information. For simple transactions the IRP calculation can be made in a few minutes. For larger carriers the calculations will be done over a few days and may require processing at night. Carriers' estimates of mileage are periodically audited by the state. See the discussion of IFTA below.

When vehicles are added to fleets, i.e., there is no IRP history for the vehicle, the carrier must supply the state with estimates of distances for the coming year. The carrier is then expected to prepay the registration taxes associated with the vehicle in order to receive a plate, sticker and provisional 60-day cab card. In subsequent years, the vehicle will be included in the preprinted renewal forms.

When a vehicle is eliminated from a fleet, the carrier is responsible for physically returning the cab card, plate and sticker to the state. This requirement holds the carrier responsible for changes in its use of owner-operators.

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[2]Carriers may organize a number of vehicles into fleets which, for IRP purposes, are designated to serve only a subset of states. This is done to simplify the registration process. For example, IRP is interested in the total number of miles the fleet traveled in each state as opposed to reporting the mileage for each vehicle in the fleet, state by state. Fleets can also consist of a single vehicle.

New enabling legislation will allow the carrier to keep the plate and reissue it as new pieces of equipment are added to the fleet. This will eliminate the need for the carrier to physically surrender the plates if they plan to add new equipment in the future. This process is currently being designed. The carrier will submit a supplemental application deleting the previous vehicle and adding the description of the new vehicle along with copies of proof of ownership. P&R will then send a temporary letter of authority, by return fax, which can be used while the supplemental application is being processed. The net result is that the carrier need not make a special visit to physically surrender license plates unless they want to receive credit until the new equipment is added.

Prorate and Reciprocity has also enacted a new program in which it issues a temporary registration, i.e., a paper document, which would be used in lieu of a plate. This can be faxed back and forth and eliminates the need for trips to a registrars office. In creating this program, P&R has combined three forms into one and simplified the transaction.

Of the IRP transactions, 25% arrive by mail and 75% in-person. Of the latter, 50% are handled at St. Paul and 50% at the (20) deputy registrars. The more complicated transactions are handled by the St. Paul office. Mail transactions are of lesser priority and are processed as time permits. Mail transactions are typically renewals which have a deadline of March 1.

Experience suggests many carrier applicants have difficulty in filling out the forms. Thus far, attempts to train carriers in this regard have been unsuccessful. Counter staff in St. Paul help applicants complete forms and provide whatever help they can. Telephone calls

from carriers also are frequent. There are three options for new registrants:

Carriers can wait while the bill is calculated and receive the permanent plate, sticker and cab card. This is usually preferred by small carriers and can be accomplished quickly by the counter staff for simple transactions.

Carriers can prepay an estimated bill, receive a plate and sticker and a 60-day provisional cab card. The balance is billed later when the final registration costs have been calculated. This is typical of more complex transactions and allows the carrier to avoid waiting.

Carriers may receive a temporary registration which is kept in the cab. No plate or sticker is issued until the total bill is calculated and paid. The carrier need not prepay any money. This is designed to simplify the transactions involving very large carriers who operate many fleets and hundreds of units.

Experience also suggests that carriers have difficulty producing the necessary data to easily complete the forms. If there is potential for the eventual simplification of the IRP registration process through technology such as EDI, this problem needs to be addressed. One option for the simplification of the IRP process is the use of service bureaus. These are organizations which will actually fill out the registration materials for the carriers. (Service bureaus will perform similar services under the IFTA program.) At least five such service bureaus operate in the Twin Cities metropolitan area. The Prorate and Reciprocity office estimates that of the 25,000 IRP transactions, 1,600 are currently submitted by service

bureaus and as many as 800 of the state's carriers, out of a population of 5,000, have some relationship with service bureaus. When IRP forms are submitted by bureaus P&R interacts directly with them rather than with the carrier.

International Fuel Tax Agreement (IFTA)

IFTA is similar in purpose to IRP. It is a base state program designed to reduce the number of transactions for a carrier while satisfying different states' fuel taxes. In general, if a carrier travels 10% of its miles in a state it is expected to buy 10% of its fuel there or pay the tax equivalent. There are currently 24 states actively participating in IFTA although ISTEA mandates participation for all states by 1996.

Carriers apply for an annual IFTA license which allows them to travel in all of the member jurisdictions. Vehicles are required to display decals which identify them as IFTA-licensed. There are approximately 3,800 carriers who hold Minnesota-issued IFTA licenses. Approximately 50,000 decals are issued per year.[3] Carriers not displaying IFTA decals are required to purchase fuel trip permits.

Each licensee is required to file quarterly reports which include aggregate mileage and fuel purchased by jurisdiction. While the quarterly reports rely on aggregate data by fleet, the carrier is required to maintain records by vehicle in order to develop accurate summaries. The P&R office mails each licensee a filing notice 30 days before it is due. This notice

[3]Starting in 1994 each vehicle will have to display 2 decals. Currently the requirement is one.

contains instructions and current per gallon fuel taxes for each of the jurisdictions. Using this information, the carrier is expected to complete the report and submit the appropriate tax payment. While quarterly reports can be faxed to the P&R office, payment checks must still be sent in separately.

As in the case of the IRP program, the carrier is subject to periodic audits regarding the accuracy of mileage estimates. Minnesota combines the IRP and IFTA audits and both programs have standards in terms of the frequency of audits. The most significant audit problem is the poor records or source documents maintained by the carriers.

The repository for information generated by the IFTA program is also maintained by Lockheed IMS. They currently have a contract with IFTA to provide support through 1997. Data is sent to Lockheed by hard copy.

Trip Permits

Minnesota is not a port of entry state so carriers are required to have everything in order before they enter the state. For example, if carriers are not registered under IRP or licensed under IFTA, they require trip permits before entering the state. Brokers who are licensed by Minnesota serve this function by maintaining agents at border locations, e.g., truck stops. A trucker can pay the appropriate fee and have the trip permit issued before entering the state. The broker then settles with the state.

Department of Public Safety: Driver and Vehicle Services

Licensing and Records

This unit of the Department of Public Safety handles the administration and renewal of the commercial drivers license (CDL). There are 70 testing stations around the state which administer written and road tests. The CDL is valid for four years and may be qualified in terms of the size of truck and type of commodities, e.g., hazardous materials. Applicants for a CDL are screened by a national data base designed to determine if the applicant has had any prior licenses and/or prior convictions. The only enforcement activity of Licensing and Records is to update records relative to any convictions of drivers.

Licensing and Records also supports a program of third party examiners. This program allows an employee of an enrolled company to become trained and certified to administer the road test portion of the CDL examination to would-be company drivers.[4] Only in very large firms would more than one employee be trained and certified. Approximately 50 companies currently participate in the program including private firms, e.g., NSP and carriers such as UPS. Most of the participants, however, are school bus companies. The benefits of the program are greatest when companies experience high turnover of drivers. Firms which have not administered an examination in a year are dropped from the program.

Driver and Vehicle Services (DVS) offers training to would-be examiners once a year, covering a two-day period. Certified examiners are expected to attend an annual review session as well. No charge is made for the training or the review. DVS also conducts spot checks at

[4]The road test is given only after the applicant has passed the written test.

each company at least once a year. Third party examiners conduct road tests on their own DVS-approved courses and use official testing forms. After the road test is successfully completed the form is submitted to a DVS regional supervisor for approval. The applicant may then apply for the CDL.

Department of Public Safety: State Patrol
Commercial Vehicle Enforcement Section

The Commercial Vehicle Enforcement Section operates fixed and portable weigh stations in the state, conducts roadside safety inspections, manages the mandatory inspection program for trucks and buses, and conducts civil weight enforcement.

Weigh Stations

Minnesota has eight fixed weigh scales and a number of portable scales. Approximately 1.5 million trucks will pass over the fixed scales and 30,400 trucks are scaled on the portables each year. Experience suggests that portable scales are more effective in finding overweight violations than the fixed scales.

The more modern stations, such as St. Croix on I-94 near St. Paul, are able to sort trucks in motion to allow some vehicles to bypass the static weighing process. As trucks pass over the weigh-in-motion (WIM) sorter some of them will cause a signal to be sent to the station office. Potentially overweight trucks, trucks that have missed the WIM scale and trucks that tailgated all send signals to the station office. These trucks are directed to the static scale.

In addition, a random selection process programmed by the staff selects a variable number of additional trucks for weighing and safety inspection. The proportion of trucks is a function of available staff and level of traffic. Note that St. Croix is the only Minnesota station with a WIM sorter.

Two kinds of new technology will be installed at the St. Croix station, a license plate reader and a brake tester. The license plate reader will identify trucks with out-of-service (OOS) violations in the last six months, and these will be given a level 1 (most stringent) inspection. The license plate will be read as the vehicle approaches the WIM sorter. When such a vehicle is identified, the inspection report documenting the previous violation(s) is reproduced on the station's computer within .4 of a second. The technology will read only Minnesota-based trucks. A portable reader is also being purchased for use at portable scale sites. St. Croix has also been selected as a test site for the Hunter brake tester which was developed at the Federal testing grounds in Ohio. The Hunter consists of a concrete embedded platform over which the truck is driven. As the driver applies the brakes, measurements of weight transfer indicate if and which brakes are not working. Trucks will also be inspected manually.

Approximately 34,000 roadside safety inspections are performed statewide, primarily at weigh stations.[5] Inspections performed on the highway are not random, i.e., they tend to be stimulated by either the appearance or operation of the vehicle. Of the vehicles inspected, approximately 30% have been placed "out of service" in 1993. The percentage for all of 1992

[5]Data are not available which break down the proportion of inspections accomplished at a weigh station and those conducted on the highway.

was 36%. For all of 1992 and the third quarter of 1993 the percentage of drivers placed out of service relative to those inspected was 13% and 8% respectively.[6] Driver violations typically relate to hours of service rules. See the discussion under Enforcement, IRAP, in the Office of Motor Carrier Services section.

Results of the inspections are entered into a national safety data base, Safetynet, using a batch process between the State Patrol and OMCS. The weigh stations are not networked nor are there any current test programs which would allow vehicles to bypass weigh stations completely.

Annual Vehicle Safety Inspection Program

Each vehicle in excess of 26,000 pounds must be inspected annually by a certified inspector.[7] The cost of this inspection to the carrier is $35-$50 per vehicle. Carriers who receive a federal inspection need not get a Minnesota inspection. There are approximately 8,000 inspectors certified by the State Patrol to perform these inspections. Inspectors may be independent mechanics as well as employees of trucking firms. All of them are periodically recertified.

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[6]Recall that the number of inspections is at least in part a function of available staff at the station. Thus, these statistics need to be interpreted with some caution.

[7]In a separate program, approximately 12,000 school buses are inspected by the State Patrol directly. This program is outside the scope of the current report.

Civil Weight Enforcement Program

The activities of the Civil Weight unit include visiting consignees and pulling bills of lading which represent shipments of purchased materials. The bills are audited for weight violations and civil penalties may be levied against the carrier and perhaps the shipper. The enabling legislation allows the Patrol to go anywhere shipments are made and records are kept.[8] Typically the program focuses on port areas, grain elevators and terminals, wood processors and sand and gravel operations. This appears to be an important feature of the enforcement framework since it represents an established surrogate for physically weighing each vehicle while still providing the necessary oversight.

Minnesota Transportation Regulation Board (TRB)

The mission of the TRB is to:

> insure safe and efficient movement of passengers and commodities, and to further insure fair and equitable rates for the public as well as the carriers through the granting of authority based on fitness, ability and need.
>
> The Board, acting in a quasi-judicial function, has the authority in the determination of adequacy of transportation services, the reasonableness of rates, and the issuing of franchises to common carriers and all other categories of commercial haulers.[9]

The following discussion concentrates on the TRB's activities relative to intrastate operating authorities and rates.

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[8]This is apparently unique among states. Wisconsin, for example, does not have this authority. Texas has had this authority but it has been suspended.

[9]1994-1995 Biennial Budget of the Transportation Regulation Board.

Authorities

The TRB issues two types of authority, certificates and permits. Certificated carriers include:

Class I Freight Carriers
Regular Route (Intercity) Passenger Carriers
Petroleum Carriers

Permitted carriers include:

Class II-T Carriers
Class II-L Carriers
Armored Car Carriers
Charter Passenger Carriers
Contract Carriers
Courier Service
Household Goods Carriers
Livestock Carriers
Local Cartage Carriers
Temperature-Controlled Carriers

Class I carriers own, lease or control more than one terminal. These carriers were formerly classified as regular route. Class II-L and II-T carriers are new classifications for either truckload (T) or less than truckload (L) shipments. These authorities restrict carriers to a single terminal and no interline service.

The primary difference between certificated and permitted carriers is that the former are regulated more stringently. In order to become certificated a carrier must satisfy more comprehensive criteria of public need and rates must be compensatory. This difference is discussed below in more detail.

The process for receiving operating authority from the TRB includes the following steps:

1. Carrier fills out an application with Mn/DOT's Office of Motor Carrier Services (OMCS) and pays a fee of $150 for permits, $300 for certificates, and $150 for livestock. Included with the application are letters of support from one or more shippers.

2. The carrier making application is checked for any violations and the application is reviewed for completeness. This is done by Mn/DOT staff.

3. The application is forwarded to the TRB and placed in its calendar. The calendar is published every Friday and mandates a 20-day public notice period before the case can be considered by the Board. This allows for any protests to be filed by a competing carrier or other party of interest.

4. If no protests are made, the Board decides the petition at its weekly scheduled meeting.

5. If protests are lodged, the TRB encourages face-to-face negotiations between the parties or mediation. If this does not produce reconciliation then the issue is heard by an Administrative Law Judge (ALJ).

6. The ALJ will forward a recommendation to the Board which will then make the final decision.

Experience suggests that a vast number of petitions are protested but these cases do not advance beyond the negotiation or mediation stage. The entire process takes approximately 45-60 days.

Rates

Rates filed by permitted carriers must be just and reasonable which means that rates cannot be discriminatory, preferential or prejudicial.[10] Rates for certificated carriers must also be compensatory but not excessive. As a result these rates are "prescribed" by the TRB, i.e.,

[10]The exception is for local cartage and armored car carriers who are not subject to rate regulation.

rates for certificated carriers are submitted to the TRB which determines if the rates are compensatory. The Board uses ICC Highway Costing standards as one means of examining the compensatory nature of certificated rates. In the future it also intends to use a computerized costing model. Normal processing time for reviewing prescribed rates is one to three weeks.

Permitted carriers file rates directly with the OMCS which determines if they are just and reasonable. These rates are not examined further unless protested. Protests can be filed by the shipping public and/or a competing carrier. If a protest is filed it is referred to the TRB for negotiations or mediation. If reconciliation is not reached, a hearing is held to determine if the rates are excessive or if they are so low as to be considered predatory pricing.

Both certificated and permitted carriers are required to have rates on file, and OMCS is the repository for this requirement. Refer to the discussion of Economic Audits under Enforcement in the Office of Motor Carrier Services section which follows.

Petroleum carriers provide an exception to the above process in that the rate level for all petroleum carriers is the same. Because of this, any changes in these rates usually require a hearing before the Board and sometimes an ALJ.

Mn/DOT

Office of Motor Carrier Services

The OMCS has responsibility for a variety of activities related to commercial vehicle

operators (CVO). Among these are registering interstate carriers, implementation and enforcement of TRB requirements, issuing licenses to certain categories of carriers, education, and additional enforcement.

Administering Authorities

It is a requirement of Minnesota Statute 221.141 that all carriers operating in the state be adequately insured, i.e., as a condition to operate. Therefore, one of the primary means for OMCS to administer operating authorities is to receive insurance certificates from insurers for different carriers. This process applies to both interstate and intrastate motor carriers.

Interstate Carriers. In order to monitor the insurance status of interstate carriers, OMCS requires these carriers to complete an annual registration. For example, OMCS registers approximately 40,000 interstate vehicles annually, 16,000 carriers, and as part of that process receives insurance filings from each carrier. The registration is for a calendar year and takes place in the fall. It is done with a hard copy form.

The number of registrations will decline since the Federal Government has mandated that insurance filings of interstate carriers be a base state program by 1994. Only 39 states currently register interstate vehicles and the base state program will obviously be limited to this number. The new program will be similar to the existing process of registering in each state. According to ISTEA and ICC rules based on that legislation, a motor carrier will register its operating authority, an insurance certificate, and list of agents for service of

process for all states in which it travels with one state, and that state will distribute the collected fees to other participating states in which the carrier operates.

Currently insurance companies, and not the ICC, provide notification to the state if a carrier's coverage has lapsed. It is not clear if this activity will be assumed by the ICC or not. It is anticipated that the insurer will notify the base state and the ICC and the ICC will begin the process of revoking the carrier's authority.

Minnesota collects a registration fee of $5.45 per vehicle from interstate carriers based in non-reciprocal states and $0.45 per vehicle from those interstate carriers based in reciprocal states. No state will be allowed to raise fees for the base state program. The carriers will simply indicate to their base state the number of vehicles which will operate in Minnesota and pay fees for each vehicle. The fees will be distributed by the base state. Regarding intrastate carriers, most permitted and certificated carriers are assessed an annual fee of $40.00 per vehicle per authority.

Intrastate Carriers. All regulated carriers, both certificated and permitted, are required to provide an insurance certificate (form E) as a condition of their operating authority. As presently is the case for interstate carriers, the insurance company is to notify the state if coverage lapses for any certificated carrier. The OMCS suspends and then cancels the carrier's authority. Hazardous waste transporters, building movers, and special transportation services for the elderly and handicapped must also provide certificates of insurance. Private and exempt carriers, are not required to offer any evidence of insurance beyond that of the typical motorist, i.e., identification of an insurance company and policy number on the back of the vehicle registration license plate form.

The threshold liability insurance coverage for intrastate freight carriers who do not transport hazardous materials is $300,000 per incident. For interstate carriers the threshold level is $750,000 for non-hazardous and $1 to $5 million for hazardous material transporters depending on the commodity. For intrastate passenger carriers required per accident coverage ranges from $300,000 - $450,000 depending on the capacity of the vehicle. Coverage of $100,000 per person and $50,000 for property damage must also be maintained. The range for interstate passenger carriers is $1.5 to $5 million depending on the capacity of the vehicle.

Issuing of Carrier Licenses

The OMCS also issues licenses to certain specialized carriers who are not required to have TRB authority. These are as follows with the number of annual licenses in parenthesis:

Building Movers (100)
Specialized Transportation Services (75)
Limousines (estimated at 500-600)
Hazardous Waste Carriers (175)[11]

The OMCS is in the process of implementing a schedule in which annual renewals for all the above groups will be staggered so as not to conflict with fall registration of interstate carriers.

There are no economic entry requirements for any of the above licensed carrier categories except intrastate hazardous waste carriers. The criteria are whether they can pay the

[11]Hazardous material (hazmat) is distinguished from hazardous waste. Hazmat carriers are currently registered by the Federal Government, and OMCS will also register them by July 1, 1994.

registration fee and have a certificate of insurance. Specialized Transportation Services (STS) carriers are audited and inspected annually for safety before the license is renewed. There are no requirements for filing rates and tariffs for any of these carriers. (Limousine service is not within the scope of this study and will not be discussed further.)

Building Movers have an annual renewal, $100 per company plus $10 per vehicle cab card and/or $100 for a floater card which can be interchanged among vehicles. The insurance certificate is specially designed to include both motor vehicle liability (>$500,000) and comprehensive general liability (>$500,000). Cities check with OMCS to verify that building movers have coverage before a job is done.

Specialized Transportation Services (STS) provide services to the handicapped and elderly. They are subject to an annual audit of carrier records and vehicle inspection including conforming to wheel chair securement standards. Relevant carrier records include driver qualifications and required training in first aid, passenger assistance, abuse prevention, and defensive driving. A criminal background check is also made. Periodically OMCS audits the courses which carriers use to satisfy these requirements in order to verify that they have the proper content. There are no fees for registration. Carriers need only insurance, vehicles which pass inspection and trained drivers.

OMCS is expected to randomly inspect 5% of the STS vehicles each quarter. This has proven difficult because the vehicles are not always available. As an alternative OMCS has focused on randomly selecting firms and inspecting all available vehicles in the fleet. The inspections are not scheduled.

Hazardous Waste carriers are renewed every three years ($500 per firm) and must secure an annual decal for $25 per vehicle. The firm is subject to a criminal background check. The Midwest Environmental Enforcement Association exchanges information about companies on an organized basis. The carrier also certifies the necessary insurance coverage and hazardous waste training for the drivers.

Education

The OMCS offers a number of educational programs described below. The classes are generally free of charge and with the exception of the Initial Motor Carrier Contact (IMCC) course, are offered throughout the state. The IMCC course is offered only at the Administrative Truck Center on alternate Mondays and is the only course required of the carrier.[12] In the past, OMCS has offered many programs on demand. In the future, courses will be scheduled monthly to cope with shrinking resources.

> Initial Motor Carrier Contact (IMCC)--for either newly permitted or certificated carriers. The purpose of this course is to help the new carrier learn the laws and rules which apply to for-hire operations and to motor carrier safety.
>
> Safety--which includes how to earn acceptable evaluations on safety reviews (discussed below) as well as ad hoc requests by carriers to have the state determine the adequacy of its compliance with motor carrier safety regulations or hazardous materials transportation regulations.
>
> Intrastate Economic Regulation--requirements for filing tariffs, adding operating authorities, etc.

[12]The Legislature makes it a condition for the granting of a new operating authority that the new carrier take the IMCC course within 90 days of the service date. OMCS will follow up with carriers that do not conform.

A handbook detailing all of the educational programs has been sent to 4,000 intrastate carriers throughout the state. This is augmented by press releases announcing programs as well as fact sheets which are sent to industry groups and trade associations.

Enforcement

Enforcement is a major responsibility of the OMCS and encompasses both safety and economic issues.

Terminal Inspections. These are conducted both randomly and in response to specific complaints or requests from the Federal Government. Terminal inspections take place at the carrier's terminal and can take any of the following forms:

Safety Reviews. The OMCS performs safety reviews on interstate carriers. This program is funded by the Federal Government through the Motor Carrier Safety Assistance Program (MCSAP). These reviews occur when a company is interested in an evaluation, has been the object of a complaint or is selected randomly by the Federal Government.

Compliance Reviews. These follow safety reviews and are triggered by a poor safety rating or complaint. Carrier records are examined (driver and vehicle) to make sure the carrier is conforming to the recommendations of the safety review or to the law. The Federal Government pays for and schedules compliance reviews.

Economic Audits. This program focuses on intrastate carriers. OMCS will select bills of lading from the carrier and analyze them for rate and authority violations. Approximately 20-50 bills of lading are selected and analyzed manually. Deviation from published rates will result in either a ticket or administrative penalty order. Records are also checked for insurance violations. Authority violations may result in a civil administrative penalty order assessing a fine. Future plans include adding a safety component to the economic audit and a rating system which will allow OMCS to target specific carriers. At the present carriers are randomly selected.

Hazmat Inspections. Under the Cargo Tank Variance Program, OMCS inspects cargo tanks used for the intrastate transport of flammable or combustible liquids. The state focuses on tanks less than 3,000 gallon capacity. There is no fee and the inspections are scheduled every two years.

Dock Audits. This is a federally-funded program which focuses on hazmat shipments. These audits are scheduled at night in order to inspect hazmat shipments at carrier terminals. Each hazmat shipment is inspected for packaging, labeling and documentation violations. Federal enforcement officials will notify shippers who are improperly preparing such shipments. They may be subject to a shipper review.

Inspection Repair Audit Program (IRAP). This is a federally-funded program under MCSAP and is currently being implemented on OMCS' computer system. IRAP is designed to follow up on the State Patrol's roadside inspections more systematically including a physical reinspection of the subject vehicle. When the State Patrol places

a vehicle out of service after a roadside inspection, the carrier is to send OMCS a vehicle inspection report, certifying that violations were corrected and signed by an appropriate mechanical officer. This would be inserted in the carrier's file. If the carrier does not submit the report in a timely fashion, OMCS sends out two reminder letters separated by 15 days. If there is no response a specific contact will be made.

Complaints. Currently, the OMCS responds to all complaints about carriers. Approximately 50% of the complaints relate to safety and 50% to rates and authority. In the last year there has been a 33% increase in the number of complaints about carriers, up from 624 complaints in 1992. In the future OMCS will only respond to serious complaints, currently estimated at approximately 100-150 per year. Less important complaints will be handled by correspondence and OMCS will no longer respond to anonymous complaints.

Mn/DOT

Office of Road and Vehicle Information and Services

This office is primarily concerned with disseminating road information, including spring weight restrictions, and issuing oversize/overweight permits. The office will also issue emergency permits when conditions warrant, for example in response to specific needs of moving a perishable crop. Road information is transmitted from the Administrative Truck Center in South St. Paul and 15 Mn/DOT district offices throughout the state. District offices will also post restrictions on state highways. Mn/DOT's central office in St. Paul publishes summaries of acceptable 10-ton roads for carrier information.

The oversize/overweight program has three objectives:

Protect the Public Safety

Protect the "Road Plant"

Assist Industry in Moving Oversize/Overweight Loads.

Permits are either single trip or annual. Single trip permits are generally issued at the Administrative Truck Center.[13] Forms may be completed by telephone and/or fax. Permits may also be faxed to the carrier.

Annual permits are an attempt to reduce the amount of repetition involved in the permitting process. Such permits can be issued for oversize, overweight or both. Carriers are required to call one of the offices in order to receive a specific route through the state for the load. The carrier is expected to log the route on a special form before the move and keep the log and a copy of the annual permit in the truck at all times. Under certain conditions, where the load is confined to specific dimensions or weight, the carrier may route itself. In order to facilitate this process maps showing road restrictions and lists of highway projects are continuously sent to annual permit holders.

A number of states are also cooperating in a program which issues regional permits. The Multi-Jurisdictional Oversize/Overweight Organization (MOOO) was established in October, 1991 by Iowa, Kansas, Missouri, and Wisconsin. Since then six other states have declared

[13]The exception is when a "house" is moved. These permits are issued by the relevant district office which is assumed to have more local control.

an intention to participate. In addition to Minnesota these states are Illinois, Indiana, Kentucky, Michigan, and Ohio. As of late summer, Minnesota was awaiting the necessary software to link in with the other states.

Regional permitting is similar to the base state programs discussed above. The trucker makes one application to the agency in its base state which then contacts the other states involved in the itinerary. Each state approves a route and communicates, electronically, to the base state which also collects and disburses any fees. The network used is IBM's Infonet (AAMVAnet for government applications) and the entire process takes less than an hour. Application can even be made by telephone. Regional permitting covers vehicles less than 95 feet long; 14 feet wide; 13 feet, 6 inches high; 20,000 pounds on a single axle; and 120,000 pounds gross weight. It is estimated that this will include 60% of permits issued by Minnesota.

The primary enforcement point for oversize/overweight movements is at weigh stations where all such permit holders are required to stop. Should conditions change, e.g., high winds or stormy weather, these carriers may be required to remain at the weigh station until allowed to proceed.

SURVEY OF COMMERCIAL VEHICLE OPERATORS

Background

Two surveys were constructed as part of this study, i.e., for freight and passenger carriers. The freight survey was the more comprehensive and served as the model for the passenger survey. Both surveys were designed to extract information relative to the application of technology to various transactions with the State of Minnesota. In addition to asking a number of classification questions, the surveys focused on the following transactions:

* Enforcement, e.g., weigh stations, roadside safety inspections and terminal inspections
* Annual Vehicle Safety Inspection Program
* Operating Authorities and Tariff Publication
* Oversize/Overweight Permits and Road Information
* Vehicle Registration and International Fuel Tax Agreement
* Educational Programs Offered by the State.

Methodology

A survey was drafted based on interviews with representatives from the Minnesota Department of Public Safety, the Minnesota Department of Transportation, the Transportation Regulation Board and the trucking industry. This draft was then sent to a select number of carriers who were asked to review it for clarity and completeness. The

observations from these carriers were gathered by telephone. After the survey was adjusted to incorporate suggestions from all sources it was sent to all petroleum carriers based in Minnesota as a pretest.[14] Following the pretest, final adjustments were made and the survey was sent to a randomly selected sample of freight carriers based in Minnesota. Approximately 680 surveys were sent and 214 useable surveys were returned for a response rate in excess of 31%. A tabulated version of the freight survey results is in Appendix A. A listing of the general comments by respondents is contained in Appendix B. A tabulated version of the passenger survey is in Appendix C. Passenger comments are in Appendix D.

A discussion of each survey follows.

Freight Carrier Survey

General Characteristics

Demographics. For detailed demographic characteristics of the survey data refer to Appendix A. In general, respondents were dominated by for-hire carriers (88%), irregular route (92%) and contract carriers (67%). The two dominant commodity characteristics were general commodities (35%) and agricultural commodities (30%). Only 3.4% of the respondents indicated fleet size greater than 100 power units. Of the remaining carriers the average fleet size was 10 power units. Finally, carriers from 71 of Minnesota's 86 counties were represented in the data.

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[14]Petroleum carriers were selected because they were an easily identified homogeneous group. This facilitated analysis of how they interpreted questions. The pretest had a response rate of 38.5%.

Table 1 contains a breakdown of the primary commodity transported by each of the respondents.[15]

TABLE 1

Primary Commodity of Responding Carriers

CARRIER TYPE	NUMBER OF RESPONSES
General Commodities	80
Agricultural Commodities	68
Temperature-Controlled Commodities	21
Petroleum Carriers	12
Household Goods	10
Other	37

Profile of Computing and Telecommunications Capability. One objective of the survey was to measure the ability of the freight carrier to participate in some form of Electronic Data Interchange (EDI) and/or IVHS technology. This objective followed from the desire to investigate methods by which transactions between the carrier and the state could be made more transparent. Thus, questions were asked relative to the carriers' use of various electronic communications and computer devices and whether they attached any value to the application of these devices in their various transactions with the state.

Table 2 contains a listing of the telecommunications resources used by respondents. A large number of carriers provide 1-800 and fax service. Cellular phones and two-way radios also appear to be a strong option for voice communication. Networked PCs suggest some ability

[15]The total number of responses exceeds 214 since a small number of carriers chose more than one "primary" commodity. The petroleum carriers identified in Table 1 do not include those carriers who participated in the pretest.

for computer to computer communication. However, the data indicate limited ability for automatic data collection and transmission in that only a small number of respondents use technology such as on-board computers and satellite location systems.

TABLE 2

Profile of Telecommunications Resources
Available to Respondents

RESOURCE	RESPONSES Number	%[16]
1-800	130	69.9
FAX	127	68.3
Cellular Phones	104	55.9
2-Way Radio	86	46.2
Networked PCs	28	15.1
On-Board Computers	15	8.1
Satellite/Loc.	12	6.5

Table 3 contains a similar listing focused on computer applications. As in the case of telecommunications, carriers could select as many items as were relevant. In this case, approximately 43% of survey respondents (92/214) did not answer any part of the question and some caution should be used in interpreting the results. In general, the assumption is that there is no systematic reason why respondents fail to answer a particular question. This assumption becomes more suspect as the proportion of nonrespondents increases. For example, it may be the case that many of the nonrespondents have no or very little computer capability. Therefore, the reader is reminded that, while 66.4% of the respondents to this question use word processing, 43% of survey respondents are not represented in the data.

[16]"% Responses" should be interpreted as the percent of those responding to this particular question rather than all respondents to the survey. In this case, 13% of respondents (28/214) did not answer any part of this question, for whatever reason, and the "% Response" omits these nonrespondents.

The data suggest a general familiarity with application software such as word processing and spread sheets. These are on a par with standard applications such as payroll and document preparation. Note, however, that 42 respondents indicated some experience with computer communications.

TABLE 3

Computer Applications Currently in Use
by Survey Respondents

APPLICATION	RESPONSES Number	%[17]
General Payroll & Records	90	73.8
Document Preparation	86	70.5
Word Processing	81	66.4
Spread Sheets	70	57.4
Maintaining Records	64	52.5
Data Base Programs	53	43.4
Specialized Applications	50	41.0
Computer Communications	42	34.4
Transportation Costing Models	22	18.0
Other	13	10.7

Attitudes Toward EDI

EDI as a Source of Savings. The survey contains both good and bad news relative to participation by carriers in EDI. The bad news is that approximately 88% of respondents indicate no experience of any kind with EDI programs and 56% expect no savings to be produced by EDI communication with the state. The good news is that approximately 37%

[17]% Responses should be interpreted as the percent of those responding to this particular question rather than all respondents to the survey.

of respondents remain uncertain whether EDI would lead to any significant savings.[18] Thus, there appears to be a critical mass of carriers who would consider EDI once shown how it would lead to savings. This interpretation is supported by the observation that the "EDI Uncertain" group has a better telecommunications and computer applications profile than those carriers who do not see EDI as a source of savings. That is, carriers who "don't know" if EDI would lead to savings have considerably more telecommunications and computer capabilities than carriers who say EDI would not lead to savings. For example, of those carriers who don't know if EDI would lead to savings, over 55% of them already use cellular phones; of carriers indicating EDI would not lead to savings, 30% use cellular phones. Similarly, the "don't know" group dominates the "no" group in terms of computer applications, suggesting a better understanding of the technology. See Figures 1 and 2.

A detailed analysis of the "EDI Uncertain" group reflects the following characteristics:

* Carriers who hold Interstate Authority[19]
* A Fleet Size Greater than 5 Power Units and 15 Trailers
* Primary Business is Contract Carriage
* Primarily a General Commodities Carrier.

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[18]Approximately 7% of respondents indicate that more EDI transactions with the state would lead to significant savings. The literature verifies the difficulty for carriers to recognize the benefits of EDI. See Robert A. Millen, "Utilization of EDI by Motor Carrier Firms: A Status Report," Transportation Journal, Vol. 32, No. 1, Winter 1992, pp. 5-13 and specifically p. 9.

[19]They may also hold intrastate authority but this is less of a predictive characteristic.

FIGURE 1
TELECOMMUNICATIONS CAPABILITIES

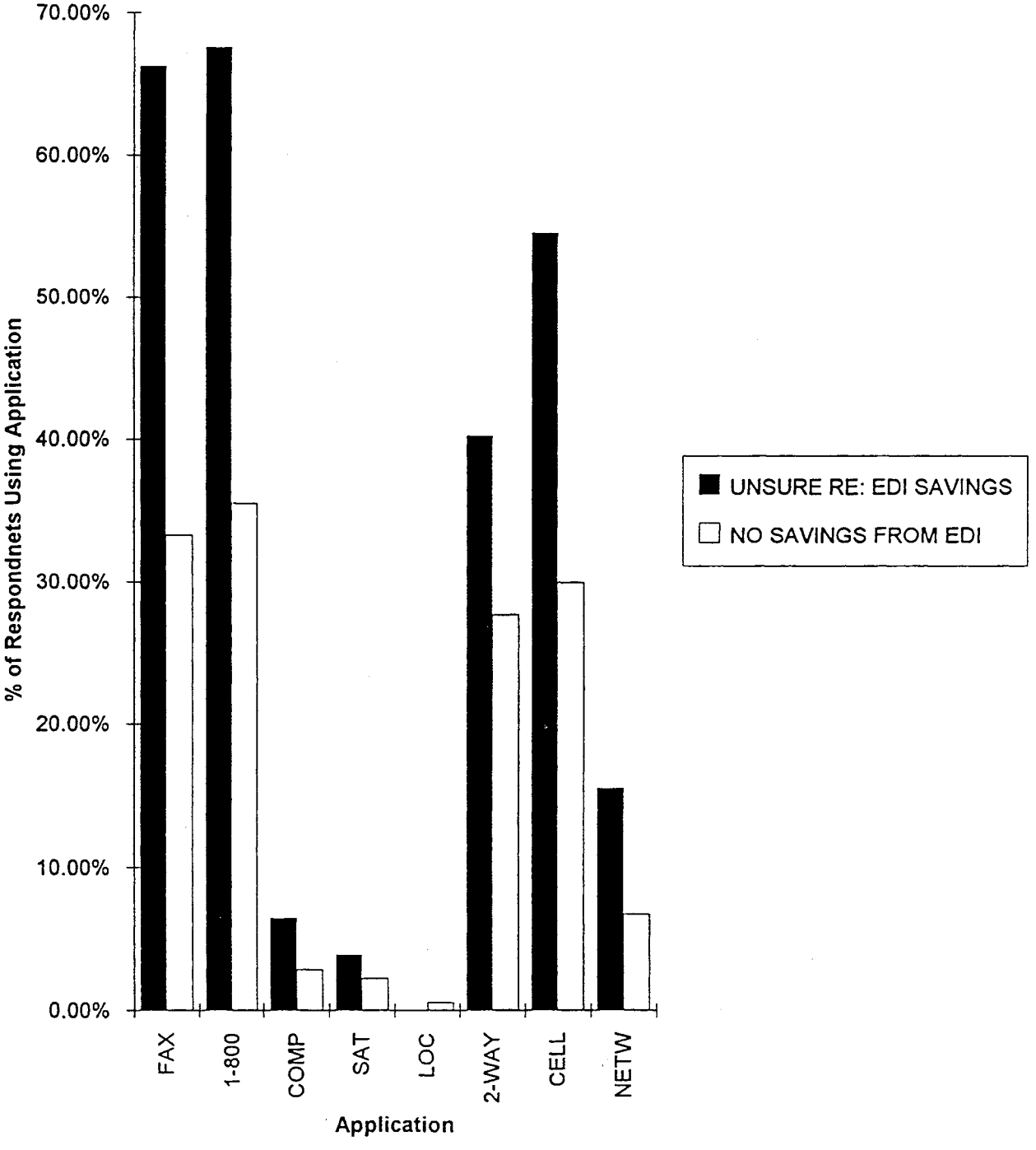
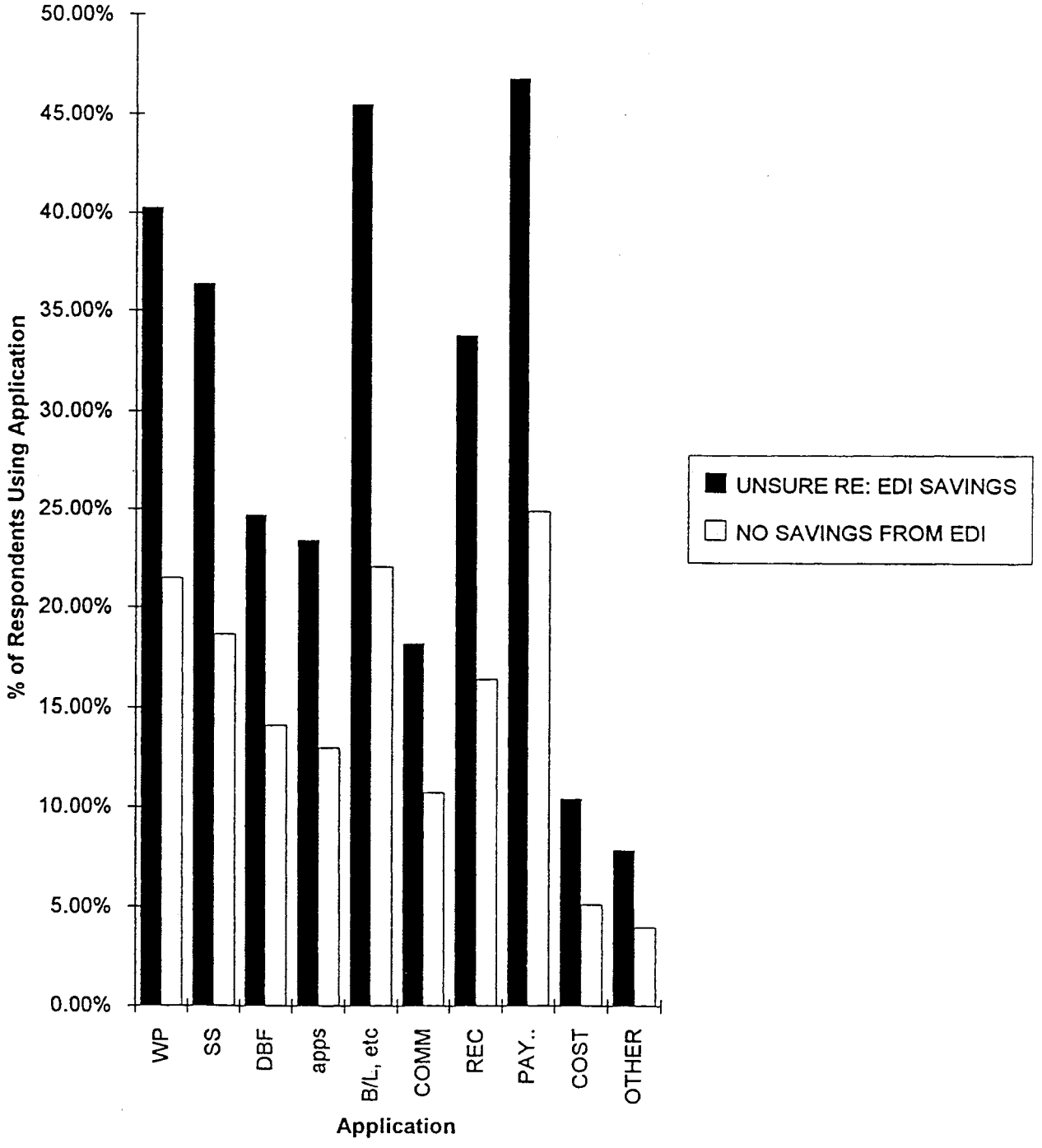


FIGURE 2
COMPUTER CAPABILITIES



The data also reflect a wide difference between the responses of agricultural and general commodities carriers relative to EDI. Ag carriers are much more negative about the benefits of EDI while general commodities carriers are more positive.

EDI and Filing Tariffs. Carriers were asked whether filing tariffs using EDI could lead to savings. These responses were cross-tabulated with how carriers responded to the benefits of EDI in general. Those carriers who are either uncertain or positive about EDI savings, a total of 44% of survey respondents, perceive tariff filing as a major application of EDI and a source of savings. It is somewhat surprising that the perceived benefit of filing tariffs with EDI has no relationship with the current method of filing used by carriers. Nor does it have any direct relationship with the type of carrier or primary commodity. The promise of EDI and tariff filing is associated almost exclusively with the frequency of filing. Frequent tariff filers, in turn, are characterized as holding both intra- and interstate authorities, having a fleet size greater than five power units, and being both a contract and general commodities carrier.

EDI in Lieu of Visits. The data were also analyzed relative to the perceived value of EDI as a surrogate for making visits to various state offices. Respondents indicated they visited the Administrative Truck Center (ATC) an average of seven times per year and suggested that almost 19% of these visits could have been eliminated through more effective communication. Similarly, respondents indicated they visited a state or deputy registrar an average of 4.85 times annually and 23% of these visits could be eliminated.

There is a stronger statistical relationship regarding EDI and visits to registrars than visits to the Administrative Truck Center.[20] For example, frequent visitors to the office of Prorate and Reciprocity were significantly more likely to see EDI as a source of savings than frequent visitors to the ATC.

As counterpoint, those carriers able to minimize visits are intrastate carriers of agricultural commodities and, as a group, expresses the least concern about EDI. By process of elimination, carriers who find it necessary to visit may be more receptive to the benefits of EDI than generally thought. Such visits could be used as an opportunity to provide information and training about EDI, e.g., literature instructions or computer templates.

Enforcement

The survey explored a number of dimensions related to enforcement. One is related to weigh stations and the value of bypassing more than one weigh station on any particular trip. Other enforcement issues were roadside inspections and the convenience of the annual safety inspection program. All of these enforcement tools are administered by the State Patrol. The final enforcement issue relates the various types of terminal inspections and audits conducted by the Office of Motor Carrier Services.

Weigh Stations. The survey attempts to place a value on the magnitude of investment carriers are willing to make in some type of automatic vehicle identification (AVI) device.

[20]The chi-square values are .085 and .032 for the ATC and the office of Prorate and Reciprocity respectively.

Approximately 55% of survey respondents indicate that being able to avoid more than one weigh station would lead to significant savings. Further, 31% of respondents indicate a willingness to invest in the capability to do so. Specifically, 47 carriers were willing to spend between $1-$100 and 8 were willing to spend $100-$500 per vehicle. A total of 123 respondents indicated that they were not willing to invest in such capability.

More detailed analysis of those carriers willing to make investments in an AVI device failed to identify any distinguishing characteristics relative to the entire sample. For example, there is no significant statistical relationship between type of carrier or size of fleet and the perception that bypassing weigh stations is a source of savings. The same is true for the willingness to invest in AVI devices. Therefore, this appears to be a characteristic of all carriers rather than any particular subgroup.

Roadside Inspections. Respondents were asked how frequently the State Patrol performed a roadside inspection on their vehicles. It is understood that such inspections can take place at weigh scales as well as along the highway. As one would expect, there is a significant statistical relationship between size of fleet and the number of vehicles inspected per year. However, purely intrastate carriers are inspected significantly less than expected. The explanation for this is that weigh stations, where many such inspections take place, are oriented toward state borders especially the high-volume stations. This orientation also explains why general commodities carriers are inspected more and agricultural carriers are inspected significantly less than expected.

The magnitude of the actual versus expected inspection rates by carrier type is presented in

Table 4. The expected values were calculated using a chi-square procedure. The actual values are those reported by the survey respondents. The number of data points representing household goods and petroleum carriers in this data set were too small to produce reliable chi-square results. The differences for temperature-controlled, general commodities, and agricultural carriers are all statistically significant.

Note that temperature-controlled and general commodities carriers are inspected 90% and 21% more than expected, respectively, while agricultural carriers are inspected about one-half as many times as expected. One of the explanations for this phenomenon is noted above, i.e., that the weigh stations are oriented toward interstate shipments. A broader generalization is that the differences noted in Table 4 could be the result of a network of weigh stations which are not strategically located relative to the total flow of traffic in the state.

TABLE 4

Number of Annual Vehicle Inspections
by Carrier Type

CARRIER TYPE	# of Expected Inspections	# of Actual Inspections
Household Goods	N/A	64
Temperature-Controlled	222	422
General Commodities	848	1,026
Agricultural Commodities	706	344
Petroleum	N/A	144
Other	369	354

Annual Safety Inspections. The State Patrol administers a program where each vehicle is required to undergo an annual safety inspection. Inspectors are periodically certified by the State Patrol and inspections are widely available throughout the state. Larger motor

carriers will also have their own mechanics certified so that the inspection can be done in-house. A decal is issued which signifies that the vehicle has passed inspection.[21]

Respondents were asked to rate the relative convenience of this program. A 5-point scale was created with 5 being "very convenient" and 1, "not convenient." The average of all responses was 3.34 with a standard deviation of 1.22. A total of 22 respondents indicated the annual vehicle inspection program was not convenient, i.e. a score of 1. Further analysis of this response group failed to reveal any substantial characteristics which would set these carriers apart. For example, this group reflects the same characteristics as the entire sample relative to type of carrier, attitudes toward EDI, type of authority and fleet size.

Terminal Inspections. The OMCS conducts a number of inspections at the carrier's terminal. The inspections range from auditing intrastate rates to assuring that carriers are complying with the recommendations of earlier safety reviews. See the discussion in the Processes section of this report concerning enforcement.

For purposes of the survey, all types of terminal inspections were lumped together. This was done primarily to avoid confusion on the part of the respondent. Over one-third (36%) of the respondents indicated that they had such an inspection over the last 12 months. There was no significant statistical relationship between the incidence of inspections and either size of fleet or whether a carrier had contract authority or not. Interstate carriers were inspected

[21]It should be noted that Wisconsin does not have a similar program. They rely on roadside inspections and compliance with federal safety standards as a surrogate for an annual inspection program. Wisconsin has a much denser network of weigh stations than does Minnesota.

significantly more than purely intrastate carriers, but this is explained by the fact that many inspection programs are funded by the Federal Government. That is, the focus of these programs is on interstate carriers--some of whom may also hold Minnesota intrastate authority. Except for the orientation toward interstate carriers the survey data do not suggest any systematic process where the burden of inspections is falling on one group of carriers or another.

Carriers reported that they were given sufficient notice of the inspection, that it was conducted with a minimum amount of disruption, and the results were clearly explained to representatives of the company. Overall, 87% of those who received an inspection in the last year responded that it was a helpful and informative experience.

Carriers indicated inspections consumed an average of 10.3 staff hours of time. This is time spent gathering data and working with the inspection team. Approximately 50% of respondents indicated that some portion of the records required by the inspection was computerized. When the data are divided according to whether records were computerized, the results place a premium on developing the appropriate computerized information systems. Specifically, where records were computerized carriers invested an average of 7.9 staff hours in the inspection. Otherwise, carriers invested 11.33 hours in the inspection.[22] The difference of almost 3.5 staff hours of effort can be viewed as the return to the carrier associated with anticipating the information needs of the inspection process and making the data accessible by computer. This is an area where the state can be proactive and

[22]The respective standard deviations for these two groups are 9.34 and 12.24 staff hours. Thus, the non-computerized group experiences a greater variance in the amount of time spent on inspections.

demonstrate to the carriers what information will be required for the inspection process.

Oversize/Overweight Permits

Efforts have been made to reduce the transaction cost associated with securing oversize/overweight permits including the issuance of annual permits, taking applications by telephone, and making permits available by fax. For those carriers who regularly need these permits a personal visit was required in only 38% of the cases. Otherwise (62% of the time) a permit was secured without a visit to a state office. Somewhat surprisingly, only 46% of the relevant carrier group was aware that such permits could be secured by fax although this information is included on the permit form. This may be an indication that more promotion needs to be done relative to the availability of these services.

Registration and Fuel Licensing

Convenience. The registration process is dominated by the IRP and IFTA programs, and these are described in the Processes section of this report. Respondents were asked to rank the convenience of the registration process and the payment of fuel taxes. Again a 5-point scale was used where 5 = very convenient and 1 = not convenient. The mean ranking for the entire sample was 3.21 with a standard deviation of 1.15. The ranking falls between "somewhat" and "very convenient" and is compatible with the ranking of the annual safety inspection program discussed under Enforcement. While there appears to be general satisfaction with the current system, carriers also perceive that things could be better.

Simplification of Transactions. The survey asked what transactions in particular could be simplified. Respondents were given a menu of options and were encouraged to check as many as were relevant. Approximately 57% of the carriers responding to the questionnaire answered this series of questions. In other words, 43% did not respond to any part of the question and, as noted above, care should be taken not to attribute any characteristics to this group. Table 5 contains a summary of the responses to the simplification question.

TABLE 5

Registration Transactions Which Carriers Believe Could be Simplified

TRANSACTION	RESPONSES Number	%[23]
Registration (IRP)	83	68.0%
Fuel Taxes (IFTA)	54	44.3%
Vehicle Titles	51	41.8%
Trip Permits	22	18.0%
Surrender Old Plates	30	24.6%
Other	6	4.9%

The fact that only six carriers indicated "other" suggests that the menu of choices was reasonably comprehensive. Not surprisingly, the IRP and IFTA programs were identified as the most complex transactions. It is important to realize, however, that these are cooperative programs, and the ability to "simplify" them may be quite limited within the framework of the needs of other states. In terms of actually being able to simplify transactions, the state may make better progress if it can focus on the transactions which it controls, e.g., as it has done regarding the surrender of old plates when a vehicle is no longer in service.

[23]% Responses should be interpreted as the percent of those responding to this particular question rather than all respondents to the survey.

Education Programs

One of the major activities of the Office of Motor Carrier Services is to provide educational seminars for motor carriers. Approximately 48% of survey respondents indicated that they had attended an educational program sponsored by a state agency and 44% indicated they would like to have additional programs offered.

Programs offered by the OMCS were placed in three categories, becoming a new carrier, economic regulation, and safety including safety reviews. Respondents were asked to indicate their level of awareness using a 5-point scale with 5 = very aware and 1 = not aware. The awareness scores are as follows:

Program	Mean	Std. Deviation
Becoming a New Carrier	2.28	1.34
Economic Regulation	2.36	1.18
Safety-Related	3.06	1.34

Somewhat surprising is the awareness of the new carrier program, i.e., Initial Motor Carrier Contact. This seminar is required of carriers who are first awarded an operating authority. The explanation for the relatively low ranking is in part explained by the fact that the course was made a requirement in 1992. The level of awareness for economic regulation programs is essentially bi-modal. That is, there are two large categories of awareness. Approximately 35% of respondents are "somewhat aware" of this program while 34% are "not aware" at all. The balance of the responses are on either side of somewhat aware, i.e., a rating of 3.

Safety-related programs rank the highest but basically only occupy a central position on a

5-point scale. Approximately 21% of respondents are not aware of such programs. In general, the rankings suggest that more could be done to promote the availability of these programs and find ways to increase carrier participation.

Passenger Carrier Survey

Surveys were sent to 85 charter motor coach companies registered in the state which represented approximately 50% of the population. There were 23 useable responses for a response rate of 27%. While the number of data points is less than in the case of the freight survey, the data provide opportunity for identifying similarities and differences between the two groups. A detailed tabulation of the passenger survey is in Appendix C. Comments are in Appendix D.

General Characteristics

The demographic makeup of motor coach respondents is similar to the freight carriers. Over 50% of the carriers hold both intra- and interstate authorities and only one carrier indicated a fleet larger than 100 units. The dominant size of the carriers is between one and five power units. The telecommunications and computer profiles of these carriers are also similar to the larger survey.

Attitudes Toward EDI

Relative to freight carriers, passenger carriers appear to be slightly more involved with EDI programs, but it is hard to draw any fast conclusions. The data clearly show that as a group these carriers are as inexperienced with EDI as freight carriers. However, the fact that this is a smaller group may make it easier to identify individual carriers who may be willing to participate in various pilot projects.

These carriers file tariffs less frequently, i.e., on an annual pattern, but they still perceive tariff filing as a fruitful application of EDI. For passenger carriers, the potential for EDI and tariff filing is not driven by frequency of filing but is a general characteristic of the respondents in the sample. EDI is not viewed as a surrogate for visiting state agencies since most of these carriers have adopted operations which minimize visits.

Enforcement

Weigh stations are not an issue with Minnesota-based motor coach carriers since they are not required to pass over scales. The loss of opportunity to inspect motor coaches at weigh stations significantly lowers the incidence of inspections of these carriers. Passenger carriers rank the convenience of the annual safety inspection program as 3.71 versus 3.34 for freight carriers. Many indicate it is convenient since they have been able to certify their own mechanic.

As in the case of the freight survey, approximately 33% of the passenger carrier respondents

have experienced some form of terminal inspection. For the most part, these carriers found the process to be helpful and informative. The one difference is that only two carriers had any portion of the necessary records computerized. This may explain the higher number of staff hours required by the inspection, i.e., 16.9 hours versus 10.3 for freight carriers.

Passenger carriers appear twice as likely to have had complaints lodged against them as freight carriers. However, they find such complaints much less disruptive than their freight counterparts. Specifically, on a 5-point scale where 5 = very disruptive and 1 = not disruptive, passenger carriers average 1.75 while freight carriers average 2.71.

Registration and Fuel Licensing

Passenger carriers rank the convenience of the registration processes slightly higher than freight carriers, 3.52 versus 3.21 respectively. IFTA appears to be the most troublesome transaction for this group of carriers. A number of carriers also indicated trip permits could be simplified. Otherwise the data are similar to the freight survey.

Education Programs

In general there is a much lower level of awareness among these carriers relative to the educational programs offered by Mn/DOT. This is despite the fact that approximately 50% of both sets of carriers report having attended at least one such program.

CONCLUSIONS and RECOMMENDATIONS

This study has identified five specific barriers to the adoption of electronic technologies in state - CVO transactions. In addition to the specific barriers listed below, it is recognized that the state has either a constant or shrinking source of resources which may represent the most impenetrable barrier of all. Many of the recommendations that follow do carry resource implications.

Barrier: Differing Objectives

The most significant barrier against the rapid adoption of electronic technology in state-CVO transactions is the need for a win-win outcome. For example, since both parties to the transaction must make some form of investment, either monetarily or procedural changes, there needs to be some return or motivation to each party. This study has provided insights toward what CVOs consider positive outcomes. For example, survey data suggest that carriers are electronically literate and a significant proportion would be well prepared to adopt EDI technology for tariff filing and other applications. In addition, approximately one-third of the respondents indicated a willingness to make an investment, albeit modest, in IVHS technology in order to eliminate redundant weigh station stops. Within the context of state-CVO transactions, the trade-off from the carriers' perspective appears relatively straight forward, i.e., the technology needs to measurably reduce costs or be translated into cash.

The trade-off from the perspective of states may be more difficult to define. Cutting state administrative costs may not be sufficient if change does not advance or compromises other

objectives such as preserving a competitive environment or public safety. Further, it is not sufficient for state agencies to profess a "customer service" objective if they have not also answered the question "at what cost?". The conclusion is that the basic task of implementing electronic technology in state-CVO transactions is inherently difficult if for no other reason than the differing objectives of the participants. The significance of this observation is that it will be difficult for the state to be more proactive toward the adoption of this technology without a clear concept of what a win-win situation is.

Barrier: Different Organizational Homes

The separation between DPS and Mn/DOT is apparently transparent to the commercial vehicle operator but is not for representatives of the various state agencies. This creates a fragmented approach to the state's role in its transactions with CVOs and may mask opportunities for the state to be more proactive. Simple examples of the consequences of this organizational division are that the Administrative Truck Center is no longer a site of one-stop shopping for the carrier and the educational mission of the OMCS is not viewed as a strong opportunity to educate the carrier relative to IFTA and IRP or on the future applications of EDI. The latter example may also be exacerbated by a lack of resources. Recommendations which follow do not suggest a reorganization of the state but rather how DPS and Mn/DOT units could engage in joint efforts when interacting with CVOs.

Barrier: Multiple Jurisdictions and Lack of Control

For the most part, specific barriers are a reflection of the complexity of the transaction rather than specific policies followed by the participants. For example, most of the carriers who are in a position to be "early adopters" of electronic technology are interstate carriers. This increases the number of players (jurisdictions) involved in the adoption process and makes the win-win criteria more difficult to satisfy. The reason this is important is that CVOs will not embrace multiple systems. If the states want to capitalize on electronic technology there must be uniformity among the states. However, agendas of multiple jurisdictions are often directed by legislative mandates which do not include coordination between states as a priority. For example, one of the few joint projects between Minnesota and Wisconsin is the planned safety inspection area, which will include brake testing, on Highway 8 in Wisconsin near Taylors Falls, Mn. The reason this is one of the few is that state agendas are passive to such joint projects.

The basic complexity of the state-CVO transaction suggests that no one participant is in control of the entire process. In certain cases this has been caused by the expansion of the number of parties to the transaction. For example, in the IRP and IFTA programs, data processing has been "outsourced" to commercial vendors who face the challenge of creating software to the satisfaction of the participating states. The result is that an individual state has diminishing influence in adapting the software to its particular need or to alter the basic process.

Barrier: Communicating With and Training CVOs

While CVOs may be at or above the threshold of EDI or IVHS literacy they nevertheless need to be trained. The reason for this is that state-CVO transactions are different than CVO-shipper transactions. Except for the largest of carriers, transactions with the state are periodic and not continuous such as interactions with shippers, i.e., customers. Further, CVOs do not perceive transactions with the state as a positive influence on profit. Thus, it is probably viewed as a necessary evil which should be accomplished as quickly as possible. For smaller carriers these transactions will not be routinized or systematized without some encouragement.

The fact of the matter is that CVOs are a diverse group, and providing adequate motivation for them to participate in such efforts will require focused communication programs outlining the costs and benefits of proposed changes. The logistical problems of conducting training with as diverse a group as CVOs, not to mention the expense, represent a significant barrier for the adoption of electronic technology.

Barrier: Absence of State-CVO Oriented Software

The above noted barrier of training CVOs is exacerbated by the absence of software which is oriented to the state-CVO transaction. The literature contains references to states adopting EDI standards for purchasing requirements but there appears little reference to the development of EDI transaction sets for non-commercial transactions such as the filing of tariffs. Since carriers are more oriented toward customer EDI, and since there is little

overlap between carrier-shipper transactions and state-CVO transactions, leadership for the development of such software will need to come from government(s).

Organizational, EDI-related, and IVHS, Transparent Borders, and I-94 recommendations have been developed based on the identification of the above barriers and the survey data. Note that recommendations have been linked to the above barriers.

Organizational

* State agencies should attempt to articulate as specifically as possible what they expect to accomplish from the application of electronic technology to transactions with CVOs. To the extent possible this should be formulated in operational terms which can be measured over time. Examples of such measures could include administrative cost per transaction, average processing time by type of transaction within specific capacity restraints, or improved enforcement capability, i.e., number of terminal inspections per unit of input. (Barrier: Differing Objectives)

* Locate DPS activities, including Prorate and Reciprocity, at the Administrative Truck Center. The ATC has wide recognition on the part of CVOs and purports to be a one-stop shopping center. This is not currently the case and is discussed more specifically below. (Barrier: Organizational Division Between State Agencies)

* The OMCS, P&R, and Office of Road and Vehicle Information and Services should each develop an advisory group of representative carrier constituents which would meet approximately quarterly to exchange ideas regarding the simplification of transactions.

EDI-Related

* A significant proportion of freight carriers has the capacity to participate in some form of electronically-assisted exchange of information, i.e., EDI. This should encourage state agencies to develop alternative means of accomplishing transactions. Such alternatives should include electronic templates for various state forms and the ability to submit forms by modem or disk. Such applications need to remain as straightforward as possible to minimize the costs of adoption by the CVO. (Barrier: Absence of State-CVO Transaction Oriented Software)

* The subset of freight carriers which may be most responsive to EDI opportunities includes

  - contract carriers with
  - both intra- and interstate authorities and
  - fleet size greater than 5 power units and 15 trailers, and
  - characterized as a general commodities carrier.

  (Barrier: Communicating With and Training CVOs)

* The subset of freight carriers identified above is uncertain as to what specific opportunities exist for the productive implementation of EDI in state transactions. Consequently the state must become more proactive in order to demonstrate the range of benefits from EDI. (Barrier: Communicating With and Training CVOs)

* The state should continue the practice of establishing pilot projects with various subsets of willing carriers to demonstrate the benefits of EDI. Large passenger as well as freight carriers should be selected for pilot programs. (Barrier: Communicating With and Training CVOs)

* Areas which appear to have the greatest payoff for carriers, regarding EDI or computerized information exchanges with the state, are as follows:

  Apply electronic technology to the filing of rates and tariffs for both freight and passenger carriers. Such a training program may have the highest impact for the carrier. (Barrier: Differing Objectives)

  Focus on those transactions which cause freight carriers to visit state offices and either simplify the transaction or provide training to carriers. In either case the objective should be to reduce the number of visits. For example, state offices should continue and increase the practice of upgrading the skill of carrier representatives when they do find it necessary to visit state offices. (Barrier: Communicating With and Training CVOs)

Identify which operating information, currently collected by the carrier, could be used by the state and demonstrate how the electronic exchange of such information could simplify transactions with the state. For example, if driver log information was automatically collected by on-board computers, how could it be integrated into the registration or fuel tax programs? (Barriers: Absence of State-CVO Transaction Oriented Software and Communicating With and Training CVOs)

Identify the types of information required by the state in various terminal inspection programs and demonstrate to the carriers how the retrieval of this information could be automated. In this regard terminal inspections should be viewed as an alternative form of training and should be expanded if possible. (Barrier: Absence of State-CVO Transaction Oriented Software)

* Currently the array of educational programs offered by the Office of Motor Carrier Services does not include areas of interest for the Department of Public Safety. This organizational barrier should be eliminated by expanding the number of courses to represent both Mn/DOT and DPS and to include all of the training areas noted immediately above. Because many of the educational programs can take place at the ATC, this is another reason why portions of DPS should be positioned there. Alternatively, training could also take the form of self-paced videos which carriers could purchase or at least be exposed to while waiting for other services at the ATC. (Barriers: Organizational Division Between State Agencies and Differing Objectives)

IVHS, Transparent Borders, and I-94

* Educational programs, as discussed above, should also identify the potential opportunities for IVHS technologies to save the carrier money and/or simplify transactions with the state. (Barriers: Differing Objectives and Communicating With and Training CVOs)

* There appears to be substantial interest on the part of freight carriers to develop the capability of eliminating redundant weigh station delays. Interested carriers are interstate, general commodities carriers with larger fleets. The state should begin developing pilot projects which would eliminate such redundancy for selected carriers. Examples are listed below.

  A significant number of carriers appear to be willing to invest up to $100 per unit for equipment which would allow the vehicle to bypass weigh stations. A pilot project with a major carrier, such as UPS, could give the state valuable experience in this process. (Barrier: Differing Objectives)

  Programs should be developed which represent a surrogate for weigh stations when data can be sampled in a cost-effective manner and there is little incentive for carrier violations. For example, it can be argued that highly visible carriers with well-established safety and control programs, e.g., LTL and express carriers, have little incentive to

compromise existing safety standards. Further, typical load densities of these carriers suggest that it is highly unlikely they would be overweight. Thus, pilot programs should be developed where such carriers are exempted from the weigh station process in exchange for periodic terminal audits. A similar program is already being conducted by the State Patrol. Periodically, the Patrol will visit a port area and audit bills of lading which represent shipments purchased by grain companies. If the bill of lading indicates an overweight shipment then the carrier is assessed the appropriate penalty. Thus, oversight is provided without the need to weigh each truck. (Barrier: Communicating With and Training CVOs)

In the Wisconsin-Minnesota I-94 corridor, weigh station redundancy between states should be eliminated. For example, only 47 miles separate Wisconsin's Rusk (Menomone) station and Minnesota's St. Croix station on westbound I-94. However, there appears to be little coordination between the states relative to the operation of either facility. When both operate they are clearly redundant to the carrier. Eliminating redundancy for the commercial vehicle operators would involve developing an information link between jurisdictions and coordinating the different facilities. Such coordination would also provide savings to the participating states while effective weigh station enforcement on I-94 would expand in terms of total hours. (Barrier: Multiple Jurisdictions and Lack of Control)

* A standing group of Mn/DOT and DPS representatives should be designated to meet periodically with their counterparts from neighboring states, as a group, to discuss current issues. The purpose is to broaden the perspective within Mn/DOT and DPS relative to interactions with cooperating neighboring states. (Barrier: Multiple Jurisdictions and Lack of Control).

Summary

This research indicates that most of the salient institutional issues revolve around the need for communications between the various participants. At least three communication networks need to be maintained. These are between Minnesota state agencies, between the state agencies on the one hand and commercial vehicle operators on the other, and finally, between Minnesota and neighboring states such as Wisconsin. The foundation for such communication networks may already exist in many areas. However, they need to be formalized and institutionalized so they become less ad-hoc and dependent on incumbents in specific positions. In the near term, the development of better communications between the many participants in EDI or IVHS related CVO-state transactions may be the best surrogate for a lack of resources.

Appendix A

Freight Survey Respondents = 214.
Response Rate = 31.5%

General Information

1. Check which of the following apply:

   1.1 Are you **INTRASTATE**__61_, **INTERSTATE**__22_ ? Both 126

   1.2 Are you a **FOR-HIRE** __185, **PRIVATE** __16_ carrier? (If you only checked PRIVATE go to question 2.) Both 10

   1.3 Are you a **CONTRACT CARRIER**? (Y/N) Y 125: N 61

   1.4 Are you an **IRREGULAR ROUTE CARRIER**__174, a **REGULAR ROUTE CARRIER**__14_? Both 5

   1.5 Are you currently classified as either **Class 2L**__12_, **Class 2T**__53_, **Class 1**__24_. (2L and 2T, 4; All 5)

   1.6 Please check which type of commodities represent your most important source of business: (**check only one**) Household Goods __10_; Temperature Controlled Commodities __21_; General Commodities __80_; Agricultural Commodities __68_; Petroleum Carrier __12_; Other __37_;

   1.8 Indicate the approximate number of **Trailers** licensed in Minnesota; (check only one)

_127_ 1 - 15 __40_ 16 - 60 ___4_ 61 - 125

___3_ 126 - 200 ___4_ Over 200

2. Indicate the approximate number of **Power Units**, including tractors or buses, licensed in Minnesota;

_110_ 1 - 5 __76_ 6 - 25 __10_ 26 - 50

___2_ 51 - 99 ___7_ Over 100

3. Please indicate the Minnesota county in which your home office is located. _____

4. Would your company be able to significantly reduce its cost of administration if it were able to use Electronic Data Interchange (EDI) for more of the transactions it conducts with the state? (EDI programs allow computer to computer communication.)

Yes __15_ No _117_ Don't Know __77_

5. Indicate the extent to which your firm currently participates in Electronic Data Interchange (EDI) programs. (Check all that apply)

_189_ None at all. (Go to Question 6.)

__12_ Currently investigating the benefits of EDI but have not implemented anything.

__10_ Currently participate in EDI programs with customers, e.g., consignors or consignees.

___3_ Currently participate in EDI programs with other commercial vehicle operators, e.g., other carriers or industry groups.

___1_ Currently participate in EDI programs with government agencies, e.g., pre-clearing customs shipments.

6. Please indicate whether your company uses any of the following tools. (Check all that apply)

Telecommunications:

_127_	Fax machines	__86_	Two-Way Radios
_130_	800 Numbers	_104_	Cellular Phones
__15_	On-Board Computers	__28_	Networked PCs
___9_	Satellite Communications		
___3_	Vehicle Location/Tracking Transponders.		

Computerized Applications

__81_	*	Word processing
__70_	*	Spread sheets such as Lotus 123, Excel
__53_	*	Data base software, e.g., DBase or others.
__50_	*	Specialized Applications Designed for Specific Business Problems.
__86_	*	Preparing bills of lading, freight bills, invoices and other documents.
__42_	*	Transmitting files and messages, e.g., via modem, to other computers either within the home office or to other firms.
__64_	*	Maintaining various records such as vehicle maintenance, hours of service, or driver qualification and drug testing records.
__90_	*	General payroll and record keeping
__22_	*	Costing model(s)
__13_	*	Other (please indicate)_____

The questions which follow relate to the interactions you've had with units of Mn/Dot or The Department of Public Safety over the past year.

7. Is your company aware of the location of the Administrative Truck Center in South St. Paul? (Y/N) Y 199: N 11

8. Approximately how frequently does a representative of your firm find it necessary to physically visit the Truck Center? (Check only one)

___5_ Weekly
___8_ Monthly
__17_ At Least Once a Quarter
__28_ Two - Four Times a Year
__41_ Once per Year
_112_ No Visits Necessary

9. In your judgement, what proportion of these visits could have been accomplished more effectively through some other form of communication, e.g., FAX, Telephone, EDI, or mail?

__83_ Less than 10% of visits
___4_ 10-25%
___6_ 25-50%
___5_ 50-75%
__23_ 75-100%

10. Based on your response to question 9, which particular transactions do you believe could be simplified: (check all that apply)

__52_ Rate Filing
__17_ Transportation Regulation Board Meetings
__62_ Vehicle Registrations
__19_ Oversize/Overweight Permits
__28_ Insurance Filings
__12_ Other

Commercial Vehicle Division

11. If a method were found which would allow your trucks to avoid all but one (1) weigh station per trip would your company realize any significant savings, i.e., would you be able to turn this savings into cash? (Y/N) Y 102: N 84

11.1 How much would you be willing to spend per truck in order to reduce weigh station stops to one per trip?

$0_123_ $1-$100__47_ $100-$500__8_ Over $500__0_

12. How frequently does the State Patrol perform a roadside safety inspection on one of your vehicles? (Select the most appropriate response.)

__19_ At least one vehicle per week
__27_ At least one vehicle every two weeks
__40_ At least one vehicle per month
__49_ At least one vehicle per quarter
__61_ Fewer than 4 vehicles per year
___7_ Never

13. Regarding the annual vehicle safety inspection, please indicate your perception of the ease with which your vehicles are inspected so that you can obtain an annual vehicle inspection sticker. (Circle a number on the scale of 1-5)

$\bar{X}$=3.34 σ = 1.22	Very Convenient		Somewhat Convenient		Not Convenient
Obtaining Vehicle Inspection Sticker	5	4	3	2	1

Registration and Fuel Licensing of Power Units and Trailers

14. Approximately how frequently does a representative of your company communicate, e.g., by telephone or FAX, with Prorate and Reciprocity? (Check one)

___1_ at Least Daily
___1_ 3-5 Times per Week
___6_ Weekly
__12_ Monthly
__34_ Quarterly
_139_ Infrequently with No Regular Pattern

15. How frequently does a representative of your firm physically visit the office of Prorate and Reciprocity in St. Paul or a deputy registrar elsewhere in the state? (Check only one)

___4_ Weekly
___8_ Monthly
__18_ At Least Once a Quarter
__48_ Two - Four Times a Year
__49_ Once per Year
__75_ No Visits Necessary

16. In your judgement, what proportion of these visits could have been accomplished more effectively through some other form of communication, e.g., FAX, Telephone, EDI, or mail?

__92_ Less than 10% of visits
___9_ 10-25%
__10_ 25-50%
__11_ 50-75%
__25_ 75-100%

17. Based on your response to question 16, which particular transactions do you believe could be simplified: (Check all that apply.)

__83_	Registration (IRP)	__22_	Trip Permits
__54_	Fuel Tax Issues (IFTA)	__30_	Surrender Old Plates
__51_	Vehicle Titles	___6_	Other

18. Please indicate your perception relative to the convenience of registering vehicles with the state or the payment of fuel taxes; (Circle a number on the scale of 1-5.)

$\bar{X}$=3.21 σ = 1.15	Very Convenient		Somewhat Convenient		Not Convenient
Registration/IFTA	5	4	3	2	1

Oversize/Overweight Permits and Road Information

19. Does your company rely on the information provided by Mn/Dot relative to weight restrictions on certain rural highways? Y 143: N 65 (If NO, go to question 20.)

19.1 Are you able to secure this information easily and conveniently? (Y/N) Y 125: N 24

19.2 Is it in a form you can readily understand? Y 119: N 20

20. Does your company require Oversize or Overweight permits for any shipments in Minnesota? Y 69: N 136 (If NO, go to question 21)

20.1 Are you aware that such permits may now be obtained by FAX transmission? Y 41: N 49

20.2 Please indicate the percent of time when an oversize or overweight permit is required and you have been able to obtain it without making a personal visit to the appropriate Mn/Dot office? __62.0 Percent

Authorities and Tariff Publication

21. Please indicate how frequently your company is in communication with state agencies regarding the **filing (and changing) of rates and tariffs.** (Check the most appropriate response.)

___4_ Weekly ___1_ Bi-Weekly __10_ Monthly
__24_ Quarterly _153_ Annually.

22. Characterize how rate filing transactions are currently being accomplished with MnDot by indicating the PREDOMINATE method of communication used. (Choose only one)

__76_ Mail
__26_ In Person
__12_ Telephone
___1_ FAX
___0_ Courier
___0_ Express Service
__75_ Rate Bureaus File all Changes with the State
___8_ Other

23. If these transactions could be transmitted electronically, e.g., your computer sends an electronic file to a Mn/DOT computer, would your company see this as a significant savings and/or improvement in efficiency? Y 55: N 124

Educational Programs

24. To what extent are you aware of the <u>educational programs</u> and seminars offered by state agencies regarding: (Circle a number on the scale of 1-5)

$\bar{X}$		Very Aware		Somewhat Aware		Not Aware
2.28	Becoming a New Carrier	5	4	3	2	1
2.36	Economic Regulation	5	4	3	2	1
3.06	Safety, including Safety Reviews and Hazmat	5	4	3	2	1

25. Have you attended any educational programs or seminars offered by state agencies? Y 98: N 108

26. Would you like additional educational programs? Y75: N 94
If **Yes**, What Subject? _____

Safety Issues

27. Has your company had either a Safety Review, Compliance Review, or a Terminal Inspection, conducted by a state agency within the last 12 months? Y 77: N 128 (If NO go to question 28.)

27.1 Indicate whether you agree (Y) or disagree (N) with the following statements:

Y 54: N 18 Your company was given sufficient notice to prepare.

Y 63: N 8 The review was conducted with a minimum amount of disruption to normal business.

Y 65: N 4 The results of the review were clearly explained to members of your company.

Y 30: N 33 The records and or documents needed for the review were computerized.

Y 60: N 9 The review was informative and helpful.

27.2 Please estimate the effort in man-hours such a review took on the part of your administrative staff. Average = 10.3 man-hours

28. Has Mn/Dot ever contacted your firm about a complaint which had been lodged against it by a competitor or a member of the public? Y 36: N 170 (If NO go to question 29.)

28.1 Indicate the extent to which your company found the inquiry disruptive? (Circle a number on the scale of 1-5)

$\bar{X}$=2.71 σ = 1.56	Very Disruptive		Somewhat Disruptive		Not Disruptive
Responding to Complaints	5	4	3	2	1

29. Have you ever filed a complaint with Mn/Dot? Y 29: N 180
If **YES**, was it satisfactorily resolved? Y 12: N 14

Appendix B

MN/Dot Freight Survey
Comments

I have been associated with the trucking industry since birth. I have faith in the laws which are set for the trucking industry and believe that the reasons behind the laws passed are for a good reason.

Conforming to laws set is part of my job and any improvements made make my job easier.

If there are any other areas I can help with, please contact me. Chris Charlsen 612-439-2115

Our drivers are drug tested before working for us and random tested (another big expense borne by the trucking industry). For MN to also be a pilot program stopping our drivers on the road to test again – killing an hour on the road – is a waste of time, money and patience. If you test truck drivers on the road you'd best stop all vehicles and test all drivers.

Have more restrictions on people hauling for hire without authorities.

Abolish rate filings and such related matters. The rates are not followed anyway. This is evident by undercharge claims when companies go out of business.

Also too many exemptions from safety regulations, physical exams for drivers, etc. This adds to the costs of carriers who are in the business and creates a competitive disadvantage.

Abolish NARUC stamps (bingo cards). The insurance filing requirements which are one of the supposed reasons for the program are taken care of by checking when registration is renewed. And in all the years since its inception have never heard of any carrier being checked for authority or abiding by authority registered with NARUC. The whole thing is nothing more than a tax.

Also question whether these surveys such as this one are really needed. And who is paying for it.

I'm paying $5,000.00 a year in road use and license fees. I think it is a disgrace to have to drive on roads that would give shin splints to a mountain goat.

I would also like to know how the DOT can ban trucks from an interstate such as 35E.

This 9-ton law is the biggest joke since Dewey didn't get elected. It's just one more perk for the big carriers to try to squash the little ones. This is the only purpose it serves.

My trade organization, the OOIDA, will be checking into these items and lawsuits will be forthcoming as they are now in Tennessee against the PSC.

People won't obey ridiculous laws they will only rebel and strike back against society which is happening now. Wake up and smell the B.S.

Item 29, enforcement should be handled quickly, when carriers are found operating with no authority intrastate.

It would help if you had a phone number to call and get someone to answer your questions without calling four or five people in different places. Most of the time nobody can answer your question.

These forms we get to fill out are usually written so difficult it's hard to understand. The one for changing truck classification is written in circles. Most of us truck drivers don't have a college education so write things so we can understand them.

My main concern is with ever-growing bureaucracy that one must face with the state of Minnesota. We have operations in the state of North Dakota and have found that they are much more user-friendly than what we have in Minnesota. If my company were physically able we would move all of our operations to North Dakota to take advantage of lower fees, less government intervention, quicker responses to questions and problems, and generally less confusion than we now face in Minnesota. I can see why we are losing so many jobs to other states. It seems as if we are trying to create jobs in government and not the private sector.

On questions 14 to 18: I have had prorate done at the Moorhead registrar. The last time we added two trucks and things got quite screwed up. The people just throw a bunch of papers at you and say fill them out. If I'm supposed to know all about filling them out why have those people on the payroll the last episode probably cost me over $1,500 because they didn't know anymore about filling those papers out than I did.

We believe that great efforts should be made to regulate farmer hauling under farm license but actually hauling commercially.

We also found that the regulations that required a certificate of deposit or a bond was totally unnecessary. I'm returning to the IRP partial pay program. I was rather frustrated by this. If you think of it, they already have enough collateral to secure payment. If we don't pay they could pull the plates from the truck. We're a very small company doing everything possible to comply with all rules and regulations. But this forced us to take a bank loan out to pre-pay the IRP so-called partial payment program. Almost everybody is running on a short cash flow these days and we can understand the need to be assured of payment. But when they already have the authority to pull your truck off the road tomorrow if you don't pay I would think they could enforce this rather than putting companies as small as us through the process of getting a loan at 10% interest. Please take this matter into consideration. Thank you.

I feel that operating authority is very difficult to understand – regulated too much. Different types of authority, I feel, are a waste...why not haul whatever you want, to whomever you want.

Prorate should be allowed at Bemidji for renewal, not just new applications.

DOT should take a closer look at RRCC carriers doing operation within their so-called authority limitations.

Some carriers do not operate accordingly to the laws an rules of DOT and are never stopped or fined. This creates a "mocking" feeling to the carriers that do abide by laws and rules.

I know of a carrier in our community that runs under another carrier's authority (100) but does not have carrier's name on vehicle on job bills.

(1) More concern in education for private car drivers interacting with trucks. (2) Easier filing of tariffs and rates. (3) More concern with vehicle equipment and safety in cars (lights on cars and trailers they pull and trailer size as compared to towing vehicle small cars and pickups pulling large trailers which can't control loads. (4) With CDL for truck drivers and health cards, why not for everybody.

Nothing was done about it. They say they are short of manpower.

Inspection Stickers Instead of assigning stickers to a certain mechanic, just sell them to the company and have a mechanic put his certification number on the sticker. Why should my company buy 50 stickers for a mechanic that might quit? It's just a joke. And don't change them from year to year, just use the same stickers and have the dates written in on them.

Please find all truckers who don't even have any permits at all – Also why do some truckers get by with hauling for hire and only have a "T" license?

We do not understand and do not agree with our having to send the state a detailed report of our trucking business – financial statement – miles percentages etc., etc. – We should not have to do this for our permits – It does not make sense.'

How about an annual checklist of 1) what reports must be filed, 2) licenses or permits we may or may not be required to obtain, 3) seminars or informational literature that is available, 4) guidelines for successful operations, etc.

I guess we were all misled on the safety sticker on the trucks and trailers. When it was passed into law it would make us stop at check points but we were supposed to be moved on if we had it. That is not the case here in Minnesota so I think the safety people had misled us all.

If you go to either Kent or Tennessee(?) the sign says all truckers stop except the one's with that state sticker. Why can't we have that here? It could save us a lot of time which is money. I have a friend that was in the metropolitan area and was stopped three times in 2 hours. That's ridiculous and when you report accidents you should not say truck related accident. You should report which ones are truckers at fault. The percentage would be a lot less. I remember on 94 by Alex five people died in a truck related accident. It was not the trucker's fault. The van carrying the people came across the median and hit the trucker head on. If you need more on this I's be glad to speak to you or the Board. Martin Transportation, Inc. by Carl Martin Press 612-934-9067.

Drug testing is a farce – I don't want to "belong" to any one clinic. Can't find a clinic to do a simple drug test!

The safety checks are out of line – the fees assessed on items like too high beam ($117) are excessive! Cities and states have it in for truckers.

Profit margin is only 1.5%. Cut the red tape.

2290's should have rates available for how much you use your vehicles each year. Not just newly owned vehicles.

Licensing should be able to be done at any driver vehicle office.

The state personnel can't tell you what the driver's qualifications are. Different answer every time.

There needs to be regular periodic informative meetings in every county in the state so that people can be educated and learn just what they need and need to do to become legal and safe without being scared to ask because they may be "ticketed" or fined for something they do not even know about and then have to suffer a penalty.

We did not know just what a compliance review was going to consist of so were in fear of being penalized for our ignorance; yet did not know who or what to ask for. It's not that we don't want to comply with all regulations, it's just that we do not know what they are, what to ask for, what phone numbers to call to find out if and when we do have a question from someone we heard it from ("it" meaning anything we may have heard we should have or do and don't know if it applies to us.) Regular periodic meetings held in each county or however would alleviate a lot of problems, give company representatives a place to get educated and make the trucking industry safer and all of us more in compliance because of the education part of it.

The average person retains about 33 1/3% of what is discussed at such meeting – lets get these meetings going on a periodic basis so we all get educated without fear. So many good things could happen with this type of education such as even what to do when you want out of the business and who could benefit from it all. **Don't keep people frightened of being penalized.**

I would very much like to see that the license plates to be turned in when a new vehicle is licensed (registered) that the old plates do not need to be turned into pro rate until we actually no longer have the truck in our possession. In other words – get credit for the plate without having it in hand at time of new registration.

Costs for contract and IIT and IIL permits per truck are already too high and are going up again this year!

I think it would be helpful and I would appreciate when you send out the forms or applications for license renewal that you would include a listing of all the law or regulation changes. Sometimes we don't know they have changed until it's too late.

1) More DOT enforcement to get the junk trucks and drivers who are not qualified off the highway. 2) Just 2 types of license plates, the Y plate and Prorate plate. Eliminate the T plate. 3) More enforcement of the farmers who use T plates to haul for hire and have no authority. 4) For interstate transportation have universal license plate and fuel permit valid for all states and a universal weight law for all states to be the same.

MN DOT was put forth to help the trucking industry and be sure that all equipment was safe and properly maintained. It has now become a revenue-making agency whereas they wish to issue citations and create revenue!

I feel that at times it seems that state employees feel burdened to answer simple questions. As an owner I have questions that I need answered and I have called the Adm. Truck Cntr. and gotten the run-around. I have only owned one truck for one year, and I didn't know which papers I needed to fill and they acted like I should know what I needed. I think the state should have a program for first-time buyers and explain what they need. When I filed my tariffs, I felt that the state wanted me to use a tariff filing service instead of me doing it myself. I think that the people that work at the truck center should remember that as a citizen of the state of MN, and as a truck owner, that I pay quite a few taxes every year, and that these taxes help pay their wages. If there were no trucks, they would have no job. I think that is something to remember.

Make all permits, licenses, etc. due on the same day each year; examples being Prorate plates, IFTA stamps, MN Cab cards. And on a federal level: Hwy road use tax, hazmat reg., bingo stamps.

I don't have any ideas on how to impose the technical aspect of regulations, but I would like to compliment the MN DOT for always being as helpful as possible.

Deregulation on all intrastate.

I think that the filling of tariffs is a waste of time.

If a customer of mine is not happy with my rates he can look to other companies for better rates. I do not think other companies should be able to know what my rates are and approach my customers and cut rates just to get work.

Open South St. Paul office up for Prorate like it was at one time.

McCord seems OK if you need advice. There was one that retired, Ray Harvey would drive hundreds of miles to help you. The rest are a joke. They need a shovel to fill chuck holes on the roads. Too much behind the door shit that's why the world is going to hell in a hand basket. Politics, sex, and greed. That's what is killing society. Overdrive says they're harassing trucks this week. MN has the worst reputation in the 48 states according to Tr. Legal Aid of Oklahoma. Why, let's clean it up now, not just talk about it, OK? P.S. I trucked 50+ years as a designated trucker and enjoyed it but lately it stinks. It's a shame because there are good, honest truckers out there, OK?

I have been a carrier for about 3 months and feel this is not a good example for your study.

I was required to attend a class when I was granted my operating authority. I feel the class covered too much material in too short of a time. Most of the material was only mentioned briefly. People in attendance at the class that have been in business for a period of time know a number of the laws and were not concerned about those of us that needed to learn. These people had specific problem for their own business and too much time was wasted on their particular problems that should have been taken care of on an individual basis.

Going back to #21 about rate filings. What good does it do to file rates. Nobody goes by them anyway. I am in the grain hauling business. The big elevators tell you what to charge.

The big grain companies in St. Paul and Mpls buy grain in the country and they pay the freight. You should see what some of their rates are. Some of it isn't worth hauling if it is a one-way haul. And you don't always have a load back. By the time you pay fuel, driver license and insurance, there is nothing left. Too bad the state can't do something about these grain rates. The big grain companies should be in the grain business, not in the trucking business. Thank you. LeRoy Larson, Svea, MN 56216. P.S. We used to get 39/cwt out of Raymond, MN a few years back. When they deregulated everything, now we get 27/cwt. How would you like something like that? All your other expenses keep on going up, which I think you know.

Very happy with Oversize and Overweight Division, very helpful and accommodating. Prorate division is also good at helping in St. Paul.

The only problem I have is when the state man comes out to inspect our logs(?) and equipment. They get too picky and want to fine the hell out of us if a T isn't crossed or an I dotted. Have them work with us.

The process of developing and getting approval for rates and tariffs can be and is very complicated. When you haul a host of different commodities it becomes very difficult to set up tables of rates and tariffs that are fair to both customer and carrier. Also, rates do not allow one to be customer specific yet each customer's facilities, requirements and efficiencies produce a wide variety of costs associated with each shipment. Negotiated rates with each customer seem to be more in tune with today's service requirements. I find it more and more difficult to believe that there is very much public good coming out of the rate filing process.

Something should be done about licensing new equipment and prorating — It is a waste of time when a person has to spend a day to travel to a place that prorates trucks. Out of our area we have to travel 120 miles to St. Paul or 100 miles to Grand Rapids or 100 miles to Cook or to Two Harbors – there are registration places in Cloquet and Moose Lake, but do not take prorate.

There is too much regulation and paper work in the trucking industry. People are here to make a living and the regulations are driving employees crazy. The trucking industry is way over regulated.

I get along with state laws very good. What I don't like is the truckers that do not go by the laws. Such as cutting rater hauling products with no authority. Farmers hauling for hire with T license plates and not permits. Farmers buying trucks not paying workman's comp. or unemployment. Or state and federal fuel tax that they get off their own farm. In general, I just can't compete with this any more. John T. Ganske, Ganske Truck.

Communication.

I have questions on filed rates that I'm required to charge for hire that is my tariff if filed at a set rate which I have been charging because I only haul for one particular elevator. But yet I know of Grain companies that tell you what you're going to get paid for hauling a

load from point A to point B. I'd like to know how they can do this. Or is there something I can do to change the way this is being done. The loads are called FOB (freight on board), whatever that means. I get 35 center per hundred lbs for a load to harvest states, Savage, MN. Harvest states buys grain from the elevator I haul from and they only pay 30 center per hundred lbs. If you can give me info I would appreciate it.

The state could eliminate many problems with the trucking industry simply by informing each company when changes are made. It seems that my company never finds out about changes in regulations until a roadside inspection is done or when going thru a weigh station. A quarterly newsletter sent by MN DOT and the State Patrol would be very helpful and eliminate many questions about changes in regulations. Also, one simple thing you could do would be to create an "800" number for the prorate section of MN DOT.

We filed a complaint in January of '93 and after about 75 to 100 phone calls to 10 to 15 different people and agencies it is still unresolved!

More policing of carriers to control the carriers that consistently operate in violation of their scope of authority and employ penalties that discourage this practice.

If they were more concerned about the rates so people could make money they would be able to keep their equipment up and roadside inspections would not be as necessary.

Being a Wisconsin-based carrier, I see no place for improvement on the transportation related transactions that I conduct with the state of Minnesota.

May I add that the blanks left on the forms were because I am a Wisconsin-based carrier and did not feel I had appropriate answers or opinions.

I am an owner-operator. I don't think I need to answer all the questions. They don't have anything to do with a one-man operation.

Put prorate center back in truck center in South St. Paul. As is convenient for truckers who don't have a car at their convenience to go to state. Trucks have no parking within great distance.

Deregulate and cut the red tape!

Can anything be done about lumper fees?

Please put the MN DOT people back into regulation and inspection.

The new fees for cab cards were meant for that department. They had a long record of cooperation with the truckers.

Sending a trooper with no experience and a spit and polish uniform out to go under trucks is a damn fool move. The MN DOT people know their trucks and only needed funding. Wake up and give them and our troopers a break!!! Donald W. Meek, Pres. Meek Truck Line, Inc. 218-894-3699

Authority cards in trucks should be able to be transferred with a FAX, phone call, or EDI in the case of breakdown. This would allow the permit from the down vehicle to cover

the rental vehicle. I have had no success over many years with this problem and it does come up from time to time, especially during the canning season of July, August, and September when instant replacement of equipment is required. I think I'll go to jail before I ever pay another fine as I have tried to work with the State and now MN DOT. I carry a minimum of 2 authority cards in each vehicle so I'm working with DOT, I don't think they are working with us; yet I believe it could be so simple. Authority desk is unwilling to prearrange permits with a phone call. Thanks. Dick McDonough

Appendix C

Passenger Survey Respondents = 28
Response Rate = 27%

General Information

1. Indicate which of the following apply with an X:

   1.1 Are you **INTRASTATE**__6__, **INTERSTATE**__1__ ? Both 12

   1.2 Are you a **CHARTER**__17_, or **REGULAR ROUTE**__1__ Carrier? Both 3

2. Indicate the approximate number of **Power Units** licensed in Minnesota;

   _16__ 1 - 5 __6__ 6 - 25 ___0_ 26 - 50

   ___0_ 51 - 99 ___1_ Over 100

3. Please indicate the Minnesota county in which your home office is located. _____

4. Would your company be able to significantly reduce its cost of administration if it were able to use Electronic Data Interchange (EDI) for more of the transactions it conducts with the state? (EDI programs allow computer to computer communication.)

   Yes ___5_ No ___8_ Don't Know __10_

5. Indicate the extent to which your firm currently participates in Electronic Data Interchange (EDI) programs. (Check all that apply)

   __18_ None at all. (Go to Question 6.)

   ___3_ Currently investigating the benefits of EDI but have not implemented anything.

   ___0_ Currently participate in EDI programs with customers, e.g., consignors or consignees.

   ___0_ Currently participate in EDI programs with other commercial vehicle operators, e.g., other carriers or industry groups.

   ___1_ Currently participate in EDI programs with government agencies, e.g., pre-clearing customs shipments.

6. Please indicate whether your company uses any of the following tools. (Check all that apply)

Telecommunications:

__14_	Fax machines	__17_	Two-Way Radios
___9_	800 Numbers	__10_	Cellular Phones
___2_	On-Board Computers	___3_	Networked PCs
___0_	Satellite Communications		
___1_	Vehicle Location/Tracking Transponders.		

Computerized Applications

__15_	*	Word processing
__11_	*	Spread sheets such as Lotus 123, Excel
___9_	*	Data base software, e.g., DBase or others.
___4_	*	Specialized Applications Designed for Specific Business Problems.
__10_	*	Preparing invoices and related documents.
___3_	*	Transmitting files and messages, e.g., via modem, to other computers either within the home office or to other firms.
__10_	*	Maintaining various records such as vehicle maintenance, hours of service, or driver qualification and drug testing records.
___9_	*	General payroll and record keeping
___2_	*	Costing model(s)
___3_	*	Other (please indicate)_____

The questions which follow relate to the interactions you've had with units of Mn/Dot or The Department of Public Safety over the past year.

7. Is your company aware of the location of the Administrative Truck Center in South St. Paul? Y 20: N 1

8. Approximately how frequently does a representative of your firm find it necessary to physically visit the Truck Center? (Check only one)

___0_ Weekly
___1_ Monthly
___3_ At Least Once a Quarter
___2_ Two - Four Times a Year
___4_ Once per Year
__12_ No Visits Necessary

9. In your judgement, what proportion of these visits could have been accomplished more effectively through some other form of communication, e.g., FAX, Telephone, EDI, or mail?

___6_ Less than 10% of visits
___0_ 10-25%
___0_ 25-50%
___3_ 50-75%
___4_ 75-100%

10. Which particular transactions do you believe could be simplified: (check all that apply)

___8_ Rate Filing
___4_ Transportation Regulation Board Meetings
___7_ Applications for Operating Authority
___7_ Vehicle Registrations and Cab Cards
___6_ Insurance Filings
___1_ Other

Commercial Vehicle Division

11. How frequently does the State Patrol perform a roadside safety inspection on one of your vehicles? (Select the most appropriate response.)

___0_ At least one vehicle per week
___0_ At least one vehicle every two weeks
___0_ At least one vehicle per month
___3_ At least one vehicle per quarter
__16_ Fewer than 4 vehicles per year
___4_ Never

12. Regarding the annual vehicle safety inspection, please indicate your perception of the ease with which your vehicles are inspected so that you can obtain an annual vehicle inspection sticker. (Circle a number on the scale of 1-5)

$\bar{X}$=3.5 σ = .707	Very Convenient		Somewhat Convenient		Not Convenient
Obtaining Vehicle Inspection Sticker	5	4	3	2	1

Registration and Fuel Licensing of Buses

13. Approximately how frequently does a representative of your company communicate with the Prorate and Reciprocity Office in St. Paul or a deputy registrar elsewhere in the state? (Check one)

___0_ at Least Daily
___0_ 3-5 Times per Week
___0_ Weekly
___0_ Monthly
___0_ Quarterly
__23_ Infrequently with No Regular Pattern

14. How frequently does a representative of your firm physically visit the Office of Prorate and Reciprocity in St. Paul or a deputy registrar elsewhere in the state? (Check only one)

___0_ Weekly
___0_ Monthly
___1_ At Least Once a Quarter
___2_ Two - Four Times a Year
___8_ Once per Year
__12_ No Visits Necessary

15. In your judgement, what proportion of these visits could have been accomplished more effectively through some other form of communication, e.g., FAX, Telephone, EDI, or mail?

___9_ Less than 10% of visits
___0_ 10-25%
___0_ 25-50%
___0_ 50-75%
___3_ 75-100%

16. Which particular transactions do you believe could be simplified: (Check all that apply.)

___9_	Registration (IRP)	___5_	Trip Permits
___8_	Fuel Tax Issues (IFTA)	___2_	Surrender Old Plates
___2_	Vehicle Titles	___0_	Other

17. Please indicate your perception relative to the convenience of registering vehicles with the state or the payment of fuel taxes; (Circle a number on the scale of 1-5.)

$\bar{X}$=3.52 σ = 1.08	Very Convenient		Somewhat Convenient		Not Convenient
Registration/IFTA	5	4	3	2	1

Authorities and Tariff Publication

18. Please indicate how frequently your company is in communication with state agencies regarding the **filing (and changing) of rates and tariffs.** (Check the most appropriate response.)

___0_ Weekly ___0_ Bi-Weekly ___0_ Monthly
___0_ Quarterly __22_ Annually.

19. Characterize how rate filing transactions are currently being accomplished with MnDot by indicating the PREDOMINATE method of communication used. (Choose only one)

___6_ Mail
___3_ In Person
___1_ Telephone
___0_ FAX
___0_ Courier
___0_ Express Service
___12 Rate Bureaus File all Changes with the State
____0 Other

20. If these transactions could be transmitted electronically, e.g., your computer sends an electronic file to a Mn/DOT computer, would your company see this as a significant savings and/or improvement in efficiency? Y 8: N 14_

Educational Programs

21. To what extent are you aware of the <u>educational programs</u> and seminars offered by state agencies regarding: (Circle a number on the scale of 1-5)

$\bar{X}$		Very Aware			Somewhat Aware	Not Aware
2.0	Initial Motor Carrier Contact Program	5	4	3	2	1
2.2	Economic Regulation	5	4	3	2	1
2.7	Safety, including Safety Reviews	5	4	3	2	1

22. Have you attended any educational programs or seminars offered by state agencies? Y 11: N 12

23. Would you like additional educational programs? Y 10: N 8
If **Yes**, What Subject? _____

Safety Issues

24. Has your company had either a Safety Review, Compliance Review, or a Terminal Inspection, conducted by a state agency within the last 12 months? (Y/N) _Y 8_ (If NO go to question 25.)

24.1 Indicate whether you agree (Y) or disagree (N) with the following statements:

Y 6: N 2 Your company was given sufficient notice to prepare.

Y 5: N 3 The review was conducted with a minimum amount of disruption to normal business.

Y 8: N 0 The results of the review were clearly explained to members of your company.

Y 2: N 6 The records and or documents needed for the review were computerized.

Y 6: N 2 The review was informative and helpful.

24.2 Please estimate the effort in staff-hours such a review took on the part of your administrative staff. average = 16.9 staff-hours. σ = 16.8.

25. Has Mn/Dot ever contacted your firm about a complaint which had been lodged against it by a competitor or a member of the public? Y 8: N 15 (If NO go to question 26.)

25.1 Indicate the extent to which your company found the inquiry disruptive? (Circle a number on the scale of 1-5)

$\bar{X}$=1.75	Very Disruptive		Somewhat Disruptive		Not Disruptive
Responding to Complaints	5	4	3	2	1

26. Have you ever filed a complaint with Mn/Dot? Y 7: N 16

If **YES**, was it satisfactorily resolved? Y 3: N 4

Appendix D

Passenger Survey Comments

The MNDOT does not regulate or check on the charter companies or on companies fly by night that operate. Currently, as long as they don't control or don't attempt to control, they should close up and simple deregulate charter bus movements.

I am mainly a school bus operator. The charter license I have is used only as an added service to my local school district area. I run a limited number of charter trips and gross only about $200.00 to $500.00 per year from it. It is more a service than a money making undertaking.

State should accept inspection's conducted by the Federal Government or by Consolidated Safety services utilized by the military.

I would like to see government out of the business of being in our business!!

At the present time the T.R.B. is granting authority to just about anyone with a bus. To my knowledge the governor is appointing political buddies to the board that have no idea what it is like in the real world of transportation. I know that most bus companies that are out state are having some problems. The reasons for this are:

1. Too many busses and companies
    a. What there are for buses are old
    b. The rates are low compared to other local midwestern states
    c. Safety and tariff violators are not punished

If the state continues the same programs and ways of operation, outstate Minnesota may not have the good, reliable, and safe transportation it deserves.

It's going well. If it's not broke, don't fix it.

We're Happy.

Appendix E

Literature Review

What follows is an annotated bibliography of a sampling of the literature concerning the application of technology to transportation related transactions. This bibliography is intended to supplement the following document;

> Erickson, Cathy L. "Current Trends in the Use of Information and Communications Technology in the Transportation Industry," Truck and Economic Studies Section, Minnesota Department of Transportation, December 1992.

Transactions in the private sector and complex areas of government, such as customs, have been the most active arenas of technologies such as Electronic Data Interchange (EDI). The literature reflects more discussion of EDI technologies than IVHS. There are probably a number of reasons for this including shipper pressure and less investment. It is clear that technology has been implemented only when cost or time savings have been readily apparent.

Customs

Perhaps the fastest growth area for EDI is in the area of customs. However, there remain many different systems. The automated manifest system (AMS) has shorted international custom clearance times yet is not being widely used. CF Motor Freight and Canadian customs are using the Inland Pre-Arrival Review System (INPARS) in a pilot program aimed at reducing delays and stimulating trade. Automated Commercial Systems (ACS) is the system used by US customs and has an electronic funds transfer module. Despite the potential for reducing the massive number of forms required for international trade, EDI has been slow to be implemented because of the complexity of the whole process.

Crockett, Barton, "EDI Usage Proliferates at U.S. Customs Service," Network World, Vol. 6, Issue 29, Jul 24, 1989, pp: 21-23.

Abstract: For the last 6 years, the US Customs Service has been working to convert to electronic data interchange (EDI). The agency is undergoing what may be the largest migration to EDI ever attempted by an organization. According to the Custom Service's plan, EDI will be used to replace the approximately 9 million documents filed with the agency by importers each year. Even though the Customs Service has been supporting EDI for years, the degree to which the technology is used by shippers and importers is limited. According to a 1988 study by the Department of the Treasury and the Office of Management and Budget, EDI has enabled the Customs Service to increase productivity by over 10% per year since 1984. The Customs Service has saved $194 million per year, mainly because EDI has allowed it to avoid adding 6,456 positions that otherwise would have been needed. Networks are being used by the agency to help speed the movement of goods through inspection sites at the Mexican and Canadian borders. Diagrams.

"CF Motor Freight, Canada Customs Join in Pilot Project on Border" (to speed clearance of US exports), Traffic World, Vol. 226, May 20, 1991, p. 20.

Abstract: CF Motor Freight and Canada Customs are taking part in a joint pilot program designed to accelerate clearance of more than $62 billion of U.S. exports trucked into Canada each year. Once the Inland Pre-Arrival Review System (INPARS) is completely implemented, it is expected to reduce most customs clearance delays and stimulate North American trade, which is currently estimated at $175 billion annually between the United States and Canada.

Cooke, James Aaron, "Why Sears Turned Logistics Inside Out," Traffic Management Vol. 31 Issue 5, May 1992 pp: 30-33

Abstract: Sears Roebuck & Co. had its own in-house distribution department until 1990, when the logistics department was spun off into a separate subsidiary - Sears Logistics Services (SLS). SLS provides a full menu of logistics services. With SLS, distribution costs for Sears have decreased dramatically, and the subsidiary has earned a profit for the parent company. In 1991, SLS moved 5.2 billion pounds of freight and earned some $1.4 billion in revenue. While SLS has only one customer, Sears Merchandise Group, the subsidiary is actively seeking business from other companies. If SLS is successful in acquiring business from other companies, it could become the largest provider of 3rd-party logistics services in North America. Sears established the subsidiary to improve service and cut costs. After the separate logistics organization was developed, first Sears and later SLS was able to reduce staffing requirements for the warehouse network. The only logistics function not controlled by SLS is customs clearance. Charts.

Hellberg, Roland; Sannes, Ragnvald, "Customs Clearance and Electronic Data Interchange - A Study of Norwegian Freight Forwarders Using EDI," International Journal of Production Economics, Vol. 24 Issue 1, Nov 1991 pp: 91-101.

Abstract: An information system for customs clearance, called TVINN, was developed by customs services in Norway. The system is one of the first running systems in the world with an electronic data interchange (EDI) standard for customs clearance. Three freight forwarders that use the system to declare import orders are examined, and the influence on time, costs, flexibility, service level, and industry competition are discussed. The direct effects for the freight forwarders are improved cash flow, reduced lead time, and increased flexibility in the handling of import orders. These effects have indirectly caused change in conditions for the material flow and have an impact on logistical performance. This will lead to a new competitive situation for the freight forwarding business. Diagrams. Charts. References.

Kindel, Sharen, "The Esperanto of Documents," Financial World, Vol. 161, Issue 14., July 7, 1992, pp. 64-65.

Abstract: Because of the massive increase in imported goods, the US Customs Service has built one of the most extensive and sophisticated computer systems in the federal government. The Customs Service computer system has to be able to track the 9.5 million individual shipments that enter the US each year by plane, ship, train, or truck, passing through any one of hundreds of ports of entry. When US Customs decided to automate

about 10 years ago, it began with revenue generation because the Service collects around $20 billion a year. The computer operation, known as Automated Commercial Systems (ACS), can process 600,000 on-line transactions and 17,000 batch jobs daily. It stores 262.8 billion bytes of data in 281 data bases and 672 files. Keeping the system going are 2 new IBM ES 9000 computers. ACS is not a local area network; it was built on the principles of electronic data interchange (EDI) - a computer-to-computer exchange of business documents between organizations in a standard electronic format. One of ACS' most popular features with customs brokers is its electronic funds transfer module.

King, Elliot, "EDI Slowly Steps into the Limelight", Global Trade, Vol. 111, Issue 11, Nov 1991, pp. 19-21.

Abstract: In April 1992, customs house broker and freight forwarder W. N. Proctor Inc. successfully completed its first totally paperless transaction using electronic data interchange (EDI). Proctor worked in conjunction with Digital Equipment Corp. to set up a highly integrated system. As more large companies start to demand EDI services, its use should grow dramatically. Nevertheless, no one is predicting adoption will be easy. There are 2 major problems standing in the way of widespread adoption of EDI. One is the mystery and confusion created by having to cope with several different EDI standards. The primary obstacle to implementation, however, is the difficulty companies face in integrating EDI into their business applications. EDIFACT, the United Nations-led effort to develop EDI standards, has begun to win support around the world.

Page, Paul, "Airlines, Customs Closing Gap on Paperless Clearance for Cargo," Traffic World, Vol. 227, September 9, 1991, pp. 19-20.

Abstract: Part of a special report on U.S. exporters. The automated manifest system (AMS) promises to eliminate the often lengthy and complicated bottleneck at the customs desk that burdens international air shipping. According to Beatrice Lutz, TWA supervisor for cargo services, policy, and procedures, the airline has been able to clear an entire plane before it lands. Edward Kerwin, British Airways cargo customer service manager for the Americas, says that although AMS means a bit more work, it definitely saves a lot of time. AMS also saves space at increasingly crowded facilities, as cargo can be moved out virtually immediately.

Solomon, Mark B., "Custom's Cargo Clearance System Slow in Getting Off the Ground" (Automated Manifest System), Traffic World, Vol. 224, Dec 24, 1990, pp.22-3.

Abstract: The Customs Service's Automated Manifest System (AMS) has taken a while to catch on. Since it became operational about a year ago, only Federal Express, Japan Airlines, and Nippon Cargo Airlines have hooked this option into their systems. Under the airline version of AMS, an airline transmits key shipment data to Customs while the freight is in transit, which can allow Customs to release the freight before it has even arrived.

Tausz, Andrew, "Backups at the Border Slow U.S./Canada Trade," Distribution, Vol. 89, Issue 5, May 1990 pp: 60-64.

Abstract: The US-Canada Free Trade Agreement (FTA), signed between the world's busiest trading partners, is generating enormous amounts of paperwork and increased traffic at border crossings. Transportation specialists are promoting electronic data interchange (EDI) use by the brokerage community and major importers. The US went online with the Automated Broker Interface in 1982 to release goods with duties and taxes settled after the fact. In 1988, Canada implemented its Customs Automated Data Exchange Systems for release on minimum documentation. The impact of the FTA treaty is more pronounced in Canada because over 70% of its exports go to the US, while the US sends only 22% of its exports to Canada. By 2000, exporters can expect fully automated customs clearance. The US and Canada have yet to meet the need for more and better highways and bridges at border crossings.

Zottola, Lory, "The United Systems of Benetton," Computerworld, Vol. 24 Issue 14, Apr 2, 1990, pp: 70.

Abstract: While many in the retail industry are struggling, Benetton Group SPA has translated its colorful clothing into sales of $1.2 billion in 1989 with the help of networking and electronic data interchange (EDI). Benetton's international EDI network, supplied by General Electric Information Services, replaced a leased-line setup in 1987 and since has become the information systems (IS) nexus of Benetton's commercial business. The network is at the core of the ordering cycle, which is initiated by independent business clients in 73 worldwide locations who act as intermediaries between the Benetton Group and retailers. Interactions between human and technology networks keep the highly decentralized structure together. To extend its IS influence into other operational areas, Benetton has devised a freight-forwarding and customs-clearance application using the EDI network. The company has diversified into cosmetics, home linens, and eyewear and is planning to take its retail business to the USSR and Eastern Europe.

EDI and Government

There has been increasing interest in using EDI technology to streamline transactions with federal government agencies. This includes the development and maintenance of uniform standards to facilitate purchasing transactions. Defense Contractors are now using EDI in the procurement process. However, little attention has been given to using EDI for the regulatory set of transactions which define relationships between governments and commercial vehicle operators. It appears that, despite the interest in EDI between shippers and carriers, there is still little carry-over to regulatory transactions.

A related technology is bar coding. The transportation industries have been expanding the use of bar coding in applications such as tracking vehicles and the elimination of paper documents such as bills of lading. The Uniform Code Council and the Automatic Identification Manufacturers have been actively developing standards for US and Canada in order to create an "open system" between manufacturers and customers.

Harding, Elizabeth, "IS Captain Sets Course for Standards, Service," Software Magazine, Vol. 18, No. 10, August 1990, pp. 80-81.

Abstract: Stan Johnson, management information systems (IS) director for the Port

Authority of Los Angeles, has strived to run his operation like a business, helping the Authority meet the demands of its international clientele for electronic data interchange (EDI) services. The numerous types of documents processed by the Authority, such as construction contracts and litigation papers, usually use different formats and standards. These inconsistencies are a barrier to EDI standards implementation. Convincing trading partners to agree to EDI is difficult. Many variables must be considered, such as different meanings for the same symbol in different parts of the world. Since Johnson joined the Authority 2 years ago, innovative solutions have been developed. In his ongoing effort to locate technology to provide information faster, Johnson is looking into computer-aided software engineering technology and evaluating remote linkup from mainframe to laptop computers.

Kalashian, Michael A., "EDI: A Critical Link in Customer Responsiveness," Manufacturing Systems, Vol. 8, No. 12, Dec. 1990, pp. 20-26.

Abstract: Electronic data interchange (EDI) involves standards-based electronic transmission of common business information between trading partners. EDI is growing in popularity for reasons in addition to its obvious advantage in transmission speed. Most significant, major manufacturers and government agencies are insisting that suppliers use EDI. In manufacturing environments, EDI can link internal databases and material requirements planning systems to customers and vendors in a seamless information flow. Grant Industries, a top-ranked General Motors supplier, relies on an EDI system that is programmed to query customers daily to facilitate a just-in-time approach to meeting requirements. Federal-Mogul uses EDI with original equipment manufacturers and aftermarket customers now and soon will integrate the system with computer-integrated manufacturing. Other EDI success stories are found at Owens-Corning Fiberglas and Sonoco Graham. As part of a total corporate strategy, EDI electronically can close the circle between customers and vendors. Diagrams.

Messmer, Ellen, "EDI Suppliers to Test Fed Purchasing Net," Network World, Vol. 9, No. 25, June 22, 1990, pp. 43-44.

Abstract: The Defense Department's Electronic Commerce Procurement Pilot, created as a prototype military purchasing system, promises to widen supplier access to procurement information and help the government eliminate paper in the procurement process. The pilot project will give suppliers a standard way to bid electronically on government purchases under $25,000. The electronic data interchange (EDI) suppliers that have joined the procurement pilot will be connected through a value-added network hub located at the Lawrence Livermore National Laboratory in Livermore,California. The incoming EDI messages will be translated and batched into a common format for Defense Department procurement offices. Of the $151 billion in Defense Department purchases made each year, it is estimated that about 98% falls into the under-$25,000 category. The EDI suppliers will make transport services and software available to users, allowing them to review and download request for quote information and prepare a standard bid response.

Molloy, Maureen, "Department of Commerce Issues EDI Mandate, Network World, Vol. 8, Issue 19, May 13, 1991, pp. 27-28.

Abstract: The US Department of Commerce recently approved the Federal Information Processing Standard (FIPS), which requires all government agencies involved in electronic data interchange (EDI) programs to embrace American National Standards Institute (ANSI) X12 and EDI for Administration, Commerce and Transport (EDIFACT) standards. The standards mandate, which takes effect in fall 1991, will make it easier for federal agencies and nongovernment organizations to exchange data. Roy Saltman, EDI project leader at the National Institute of Standards and Technology (NIST), said that the new requirement will ensure that there are no more proprietary EDI formats adopted by federal agencies. He pointed out that the mandate allows a 5-year lead time to give federal agencies and nongovernment organizations currently on proprietary systems sufficient time to migrate to the X12 standard. Still, some agencies and nongovernment trading partners currently on proprietary systems may not be happy with the mandate. Charts.

Teschler, Lee; Dreyer, Jerome L.; Van Wolvelaere, Cory; Lavery, Hank; Tannenwald, Peter; "Presidential Report on EDI; EDI Today; Focusing Steps for Success; Competitive Advantage for the Port Community", Industry Week, Vol. 240, Issue 21, Nov. 4, 1991, pp. EDI1-EDI18.

Abstract: Electronic data interchange (EDI) is the computer-to-computer exchange of business documents using standard formats. Reported benefits of EDI include: 1. helping to keep prices down in competitive markets, 2. tightening inventory controls, 3. eliminating delays, and 4. reducing administrative tasks. Nearly 12,000 US corporations now use EDI, and this number is expected to triple by the mid-1990s. Four factors drive EDI today: 1. There is a continued emphasis on customer-driven needs. 2. The US government is building EDI into its own procurement policies. 3. Industry now better understands the strategic advantages that EDI can provide in the marketplace. 4. Top management is starting to understand that EDI is a whole method of approaching business. The methodology for setting up EDI typically includes 4 basic steps: 1. plan, 2. design, 3. installation, and 4. support. To ensure success, both the organization and its participating trading partners must go through this process. Charts.

Van Brussel, Carolyn, "Government Makes Move into EDI," Computing Canada, Vol. 17, No. 25, December 5, 1991, pp. 47, 54.

Abstract: At a recent ceremony in Ottawa, Canadian Supply and Services Minister Paul Dick electronically transmitted a bid package from Ottawa to Maple Leaf Foods in Toronto using electronic data interchange (EDI). The transmission marked the first sending of a federal government bid package by computer. EDI is the computer-to-computer exchange of business documents that are sent over communications lines using recognized data standards. Plans for 1992 call for the expansion of EDI to rail, air, highway carriers, and freight forwarders. In Montreal, Hydro-Quebec and the National Bank of Canada recently announced that they are using EDI for financial transactions other than payments, allowing Hydro-Quebec to receive all bank account transactions electronically. Hydro-Quebec will use EDI to save money and time, to accelerate communication between suppliers, and reduce error. Graphs.

EDI Advantages

Clancy, David A., "Increase Efficiency with Data Communications," Transportation & Distribution, Vol. 30, Issue 4, April 1989, pp. 20-22

Abstract: Electronic data interchange (EDI) can help transportation and distribution companies create a paperless work environment that will allow them to increase efficiency and reduce errors, save time, and expedite payments. Translation software makes it possible for different computers to communicate with each other. Bank of Boston operates a paperless freight documentation service which, for shippers, serves as an electronic version of a freight bill audit and payment consultant. Westinghouse Trading Co. uses EDI in its function as a sourcing agent for purchasers internationally. Its system makes it possible to check international prices, note customs and transportation requirements, research economic conditions, and transmit data to its clients. When such systems as voice data recognition, bar codes, and radio frequency identification are used in conjunction with EDI, data collection and transmission are joined and the distribution process is enhanced even more. Graphs.

Craig, Anthony L. "Today's EDI: Cutting Costs and Backlogs of Transport," Transportation and Distribution, Vol. 29, Issue 10, Sept. 1988, pp 38-42.

Abstract: Electronic data interchange (EDI), the electronic exchange of business documents between companies, is a reliable technical solution to solve business problems. EDI can achieve lower transportation and distribution costs and can be used as a marketing tool to improve customer services. Using EDI to process documents can save from $.50 to $2.50 per document in costs for clerical data entry. Such processing also eliminates data entry errors. Because transportation is much more paper-intensive than other functions, transportation divisions and companies can improve their bottom line by using EDI for all their business documents. EDI messages can be used to create a database of equipment movement, with information from this database being used to support maintenance and repair decisions as well as those for routing and deployment. As a company's EDI volume grows, it will find that the services of a third-party network can reduce the resources required to exchange documents electronically with a large number of companies. Diagrams.

Crum, Michael R.; Allen, Benjamin J., "The Changing Nature of the Motor Carrier-Shipper Relationship: Implications for the Trucking Industry," Transportation Journal, Vol. 31 Issue 2 Winter 1991, pp. 41-54.

Abstract: The extent to which motor carrier-shipper relationships reflect the characteristics of partnershipping are measured, and potential impacts on the trucking industry are examined. The focus is on 3 constructs of the carrier-shipper relationship: the carriers' dependence on key shippers, contracting, and electronic data interchange (EDI) as a measure of the operational integration of carrier and shipper. The 266 usable responses to a survey of Class I and Class II motor carriers indicated that characteristics of partnershipping in motor carrier-shipper relationships are abundantly evident. On average, each carrier depends upon its primary shipper for a substantial portion of its total revenue and generates a large percentage of its revenue from contracted traffic. EDI is currently in use by almost 30% of all respondents, and its adoption is expected to increase significantly over the next 5 years. A few important behavioral and perceptual differences exist between the Class I and Class II carriers.

Crum, Michael R.; Allen, Benjamin J., "Shipper EDI, Carrier Reduction, and Contracting Strategies: Impacts on the Motor Carrier Industry," Transportation Journal, Vol. 29 Issue

4 Summer 1990, pp. 18-32.

Abstract: The results from a study of the potential impacts on the motor carrier industry of 3 logistics strategies that have produced fundamental changes in shipper acquisition and management of motor carrier service are reported. The 3 strategies are: 1. a reduction in the number of motor carriers utilized by individual shippers, 2. the use of electronic data interchange (EDI) between shipper and carrier, and 3. the use of long-term contracting for motor carrier service. The shipper logistics strategies investigated in the study have been widely adopted by the survey respondents, and respondents expect to increase their use of each strategy over the next 5 years. There is evidence that the strategies are positively correlated, with the EDI-carrier reduction and carrier reduction-contracting relationships appearing to be stronger than the EDI-contracting relationship. Charts. Graphs. References.

The following articles are descriptions of how industries have used bar-coding to simplify the documentation associated with distribution transactions.

Booney, Joseph, "Bills of Lading in Bar Code," American Shipper, Vol. 34, August 1992, pp. 51-53.

Canna, Elizabeth, "Bar-Coding Chryslers," American Shipper, Vol. 34, August 1992, pp. 43-4+.

"Global ID System, "American Shipper, Vol. 34, August 1992, p.52.

"Two-D Bar Codes Pack a lot into a Little Space," Traffic Management, Vol. 31, August 1992., p.38.

IVHS Interest

There is growing interest in the transportation industry for use of technology to improve operations. At least 250 organizations are experimenting with IVHS, and federal funding for IVHS projects through the Intermodal Surface Transportation Efficiency Act (ISTEA) is $659 million. Twenty-two states were involved in 54 projects in 1991, and the number of projects were expected to grow to 70 IVHS projects in 1992.

El-Badry, Samia and Nance, Peter K., "Driving into the 21st Century," American Demographics, Vol. 14, Sept. 1992, pp. 46-7.

Abstract: At least 250 organizations are experimenting with advanced technologies that can be applied to highway networks. These products include radar that can keep vehicles from colliding, transponders that track commercial vehicles, and satellite-linked electronic navigation systems. Together they are known as Intelligent Vehicle Highway Systems (IVHS). IVHS products are likely to be accepted by consumers in the same way as other new automobile features. During the early commercialization phases, the early adopters about 1% of the population are likely to be drivers aged 25 to 49 with household incomes of $60,000 or more. Demographic and social changes are making IVHS systems essential. Since 1980, the number of highway miles Americans travel each year has increased dramatically for all

age groups. One of the main reasons for this increase is that since 1960, women have joined the ranks of commuters. The increasing importance of environmental issues will also shape transportation choices. Charts. Graphs.

Haugen, Jim, "Congress Approves $659 M for IVHS R & D," Automotive Industries, Vol. 172, May 1992, pp. 54-55.

Abstract: The Intermodal Surface Transportation Efficiency Act authorizes $659 million in funding for research and development (R&D) related to Intelligent Vehicle Highway Systems (IVHS) during the 6-year funding period. In the past, both the federal government and industry have been reluctant to support IVHS R&D because of reservations about the other's commitment to the idea. The IVHS R&D support provided by the act should lead to a multitude of new prototype products for deployment in the nation's cities and on its highways.

Haugen, Jim, "The States get Aggressive, and IVHS Market Opportunities for the Industry Begin to Blossom," Automotive Industries, Vol. 171, March 1991, pp. 47-48.

Abstract: There are currently 22 states with some 54 different intelligent vehicle highway system (IVHS) projects under way. These projects involve 26 cities and 7 rural areas. In addition, a 37 percent growth rate to 70 projects is expected for next year within those 22 states, and many more states may begin projects. Some examples of IVHS systems and a map that indicates the location and numbers of projects by state are provided.

Mele, Jim, "Intelligent Vehicles: Smart Trucks Meet the Road," Fleet Owner (Big Fleet Edition), Vol. 85 Issue 8, Aug 1990, pp. 52-58.

Abstract: While visionary descriptions of smart trucks operating on smart highways may seem more like science fiction than realistic forecasts, the trucking industry in many ways has already begun using technology that will serve as the foundation for the intelligent vehicle highway system (IVHS). Smart trucks are already being used, and the technology to push the trucks into the genius category is being developed. A major hurdle that remains is separating those elements that can be justified on business terms from those that are technically feasible but commercially impractical. Roads will have to be equipped and managed with some new technologies before they can be considered smart, but the major portion of the brain power for IVHS will be provided by trucks and automobiles traveling on those roads. Competitive pressures are pushing the trucking industry into using advanced technology. The on-board elements that make a smart vehicle are divided into 2 categories: information systems and automated vehicle controls.