

FREIGHT ISSUES AND TRENDS – AN UPPER MIDWEST REGIONAL PERSPECTIVE

Prepared by

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OVERVIEW

We are here at this workshop because of a common interest in freight. We bring a wide variety of perspectives – the typically longer-range perspective of the public providers of highways; the often short-range perspective of the private sector carriers, shippers and logistics managers; and the independent perspective of university researchers. Our immediate goal is to identify critical issues in facilitating regional freight transportation in the Upper Midwest. What are the gaps in current planning, organizational and financial methods? What key infrastructure improvements are needed to make the region competitive in the twenty first century?

A regional perspective is logical because most freight does not stay within the borders of an individual state. For the Upper Midwest region Figures 1 and 2 show that the proportion of all ton-miles of truck shipments that stay within a state ranges from a low of 17% in Indiana to a high of 46% in Michigan. The regional average is 26% which is essentially the same as the national average of 27% (1). Because rail shipments tend to be much longer than truck shipments, the proportion of rail shipments that stay within a state are likely to be even smaller. Thus, most freight shipments are affected by conditions outside of the state of origin or destination. By working together states, carriers, shippers and other stakeholders in the Upper Midwest can address common problems affecting regional freight flows.

To provide a starting point for our discussion, I will first identify some of the “drivers of change” that will likely affect future freight trends. Next, demand side issues will be explored. Can we really expect the demand for freight to double over the next 20 years? Supply side issues will be discussed in the context of “level of service”. How can we best measure freight level of service? Data needs for planning and measuring level of service are also addressed.

On the public sector side, the states have responsibility for a wide range of activities that affect freight infrastructure and operations. Of primary interest here are the state-level freight activities that are likely to have regional impacts. I have summarized these key activities across the states in terms of issues and modal initiatives that have the greatest potential for regional impacts. Finally, to implement regional solutions to freight problems, a framework for regional cooperation will be needed. Consequently, I have identified regional organizational options that could serve as a model for regional initiatives. These options can also be considered as part of federal transportation reauthorization legislation that would address regional freight infrastructure and operations needs.

DRIVERS OF CHANGE IN A DYNAMIC SYSTEM

Overview

The powerful social, economic and technological forces that are generating rapid change in our society as a whole are affecting freight as well. In order to address freight issues and trends more effectively, we need to identify how these forces, in particular, are affecting freight. I have identified four key “drivers of change” for freight that we will need to consider in developing regional solutions to freight problems.

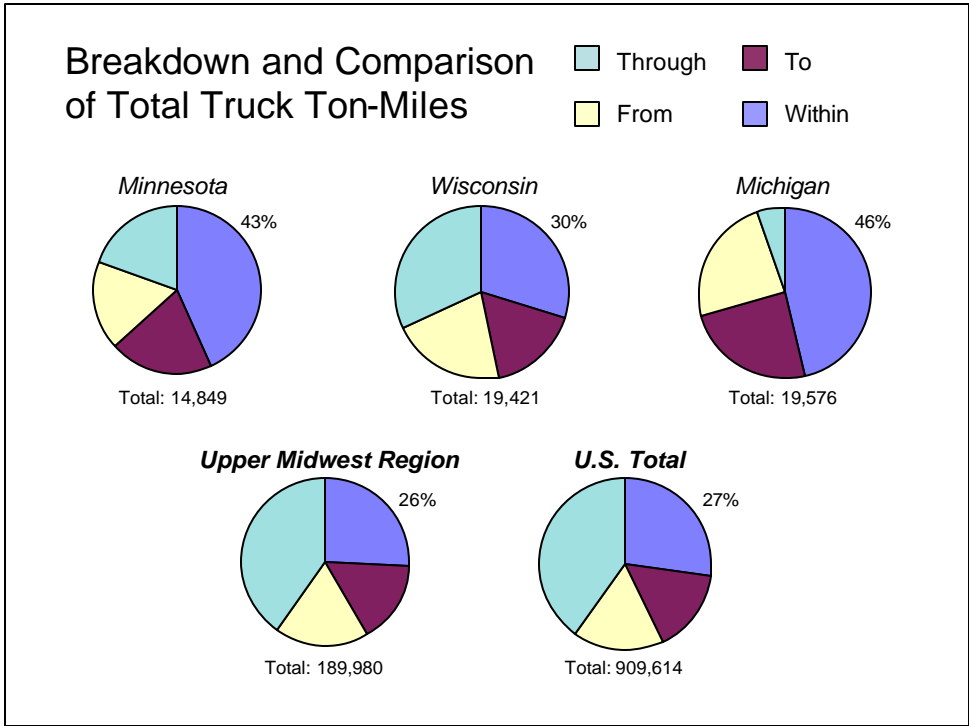


Figure 1: Total Truck Ton-Miles by State -IL, IN, OH

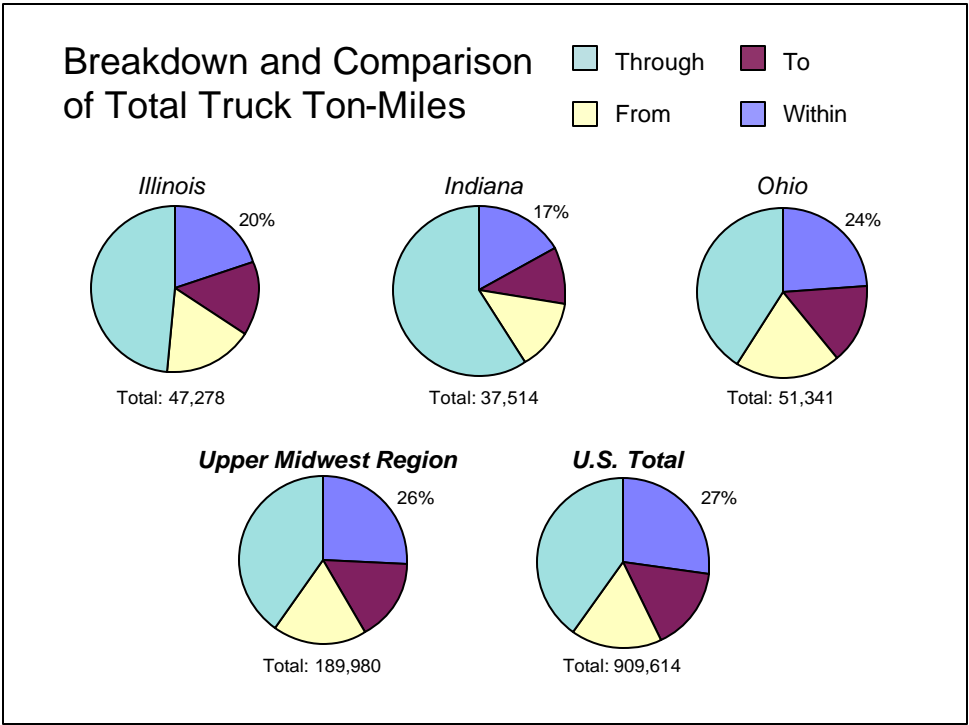


Figure 2: Total Truck Ton-Miles by State -MN, WI, MI

Demand Side

The demand for freight is projected to double over the next twenty years. The two most important “drivers” for the increase are continued growth in Gross Domestic Product (GDP) and global trade. Continuation of the trend towards a “service economy” will likely result in higher growth rates for premium freight services. Expansion of global trade will also favor longer-distance premium services.

Continuing Technological Revolution

The development of new and improved materials and engineering designs resulted in more powerful diesel engines with fewer emissions. Similar, but less dramatic improvements may be possible for diesel locomotives. Jet engines for aircraft are more powerful, fuel efficient and quieter. Improved truck suspension systems lead to reduced driver fatigue and safer vehicles. Automation of construction processes reduces highway and rail bed construction costs.

Communications and Logistics Revolution

Moore’s Law continues to apply to improvements in microprocessor speeds (doubling of CPU speed every 18 months) and the capacity of digital storage has increased at an even faster rate. As a result, inexpensive communications permits carriers to monitor their truck fleet locations in real-time. Logistics management permits dynamic fleet allocation and the reduction in deadhead miles. Internet bidding on shipments allows independent truckers to reduce their deadhead miles.

Manufacturing and Distribution Revolution

Companies have switched from a “push” to a “pull” approach to inventory management. With the pull method companies use “just-in-time” delivery methods to minimize inventory. The pull method requires more reliable transportation and information management systems. Logistics managers use “mode-neutral” optimization techniques to identify the best mix of transportation services and warehouse and/or manufacturing facility locations.

Congestion

There will be limited ability to add highway capacity in major urban areas. Increased congestion will force trucks to use longer alternative routes and travel at off-peak times. Congestion will cause landside access problems at key airports and intermodal terminals.

DEMAND SIDE ISSUES

Growth Rates by Mode

The National Freight Dialogue recently initiated by FHWA states that “by the year 2020, freight tonnage is expected to nearly double, with even higher growth rates anticipated in and around key ports of entry, major corridors, and intermodal connectors and hubs.”(2) Can we

really expect demand for freight to double over the next twenty years? A doubling in 20 years will require an annual growth rate of 3.5 percent. The Bureau of Transportation Statistics' (BTS) website provides data on freight trends over the past 40 years (3). As shown in Figure 3, the ton-miles of rail, intercity truck and air freight have all increased steadily from 1960 to 1998 (the last year for which data were available in the series).

In terms of projecting the trends shown in Figure 3 into the future, it is useful to consider the 10-year annual growth rates by mode shown in Figure 4. Domestic air freight increased at the highest rate for all of the modes during the four decades. The very high growth rate for air freight in the 1960s was the result of the much lower costs of jet aircraft and the low base from which the growth rate was measured. Air freight growth rates remained relatively high over the next three decades.

As shown in Figure 4, intercity truck annual growth rates declined during the first three decades but increased dramatically in the 1990s to over four percent. Note that the steady growth in intercity truck demand shown in Figure 3 for the first three decades, essentially a linear trend, translates into declining growth rates because the base level of demand used for computing the growth rate increases over time. Class I rail freight followed the same pattern.

Now looking at 20-year annual growth rates in ton-miles by mode, Figure 5 shows much more stability in the growth rates. Air freight growth rate declines to a more sustainable level of six percent in the second time period. Intercity truck growth rates are nearly the same for both periods with a growth that doubles every 20 years (3.5 percent annual increase). Class I rail freight also grew at about the same rate for both time periods, but more slowly than intercity truck, doubling every 30 years (2.3 percent annual increase).

Relationship to Industrial Production, GDP and Population

Three possible factors that can help to explain the historical growth rates for freight (air, intercity truck and class I rail) are the Industrial Production Index, U.S. Gross Domestic Product (GDP) and U.S. Population. As shown in Figure 6, the overall growth rate for freight declined gradually for the first three decades and then increased dramatically in the 1990s, with the rate of growth doubling from the 1980s to the 1990s. The Industrial Production Index follows a similar pattern with an even greater decline in growth rates in the first three decades, followed by a substantial increase in the rate for the 1990s. The rates of increase in GDP remained high for each time period, but with a declining trend over the last three decades. U.S. population growth was remarkably stable at the one percent level.

Again looking at the 20-year annual growth rates, Figure 7 shows ton-miles of freight growing at a constant 2.8 percent level (doubling every 25 years) while both the Industrial Production Index and GDP growth rates decline over the two time periods. U.S. population growth rates also show a very small decline.

What can we conclude from the various trends in freight growth rates by mode and possible relationships with the economic indicators and population? Separate forecasts by mode are probably safer and more meaningful than a blanket aggregate forecast for all freight. Thus,

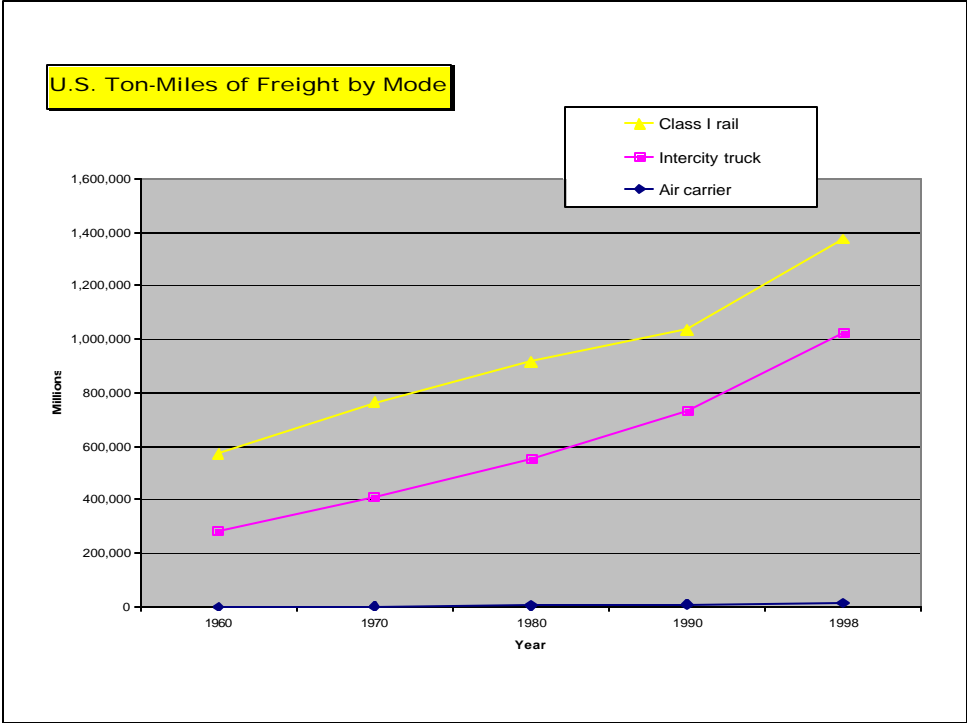


Figure 3: U.S. Ton-Miles of Freight by Mode

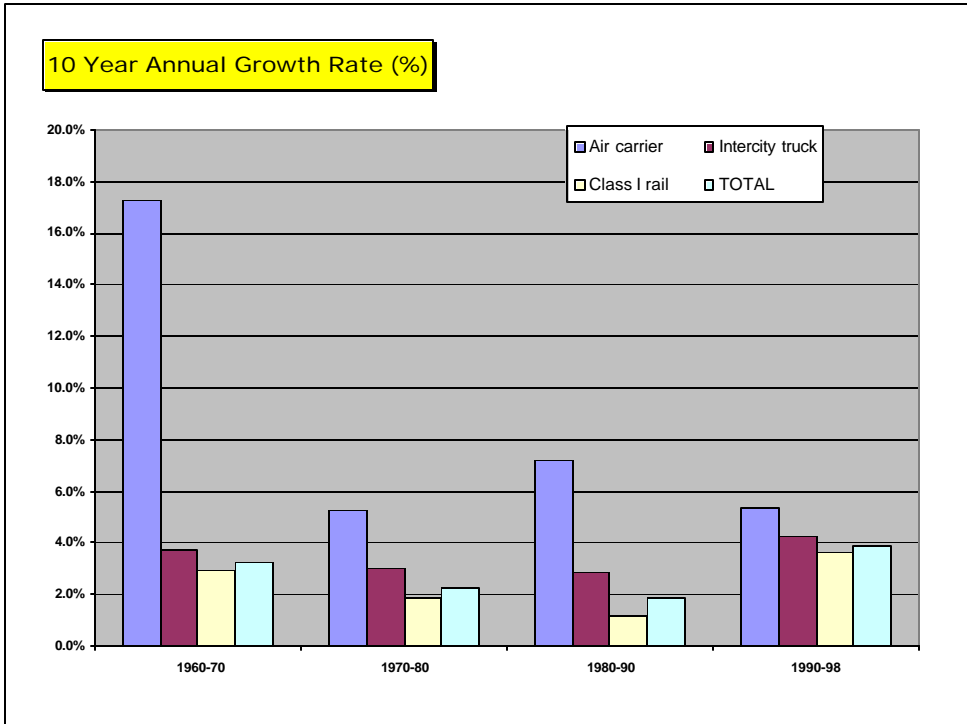


Figure 4: 10 Year Annual Growth Rate (%)

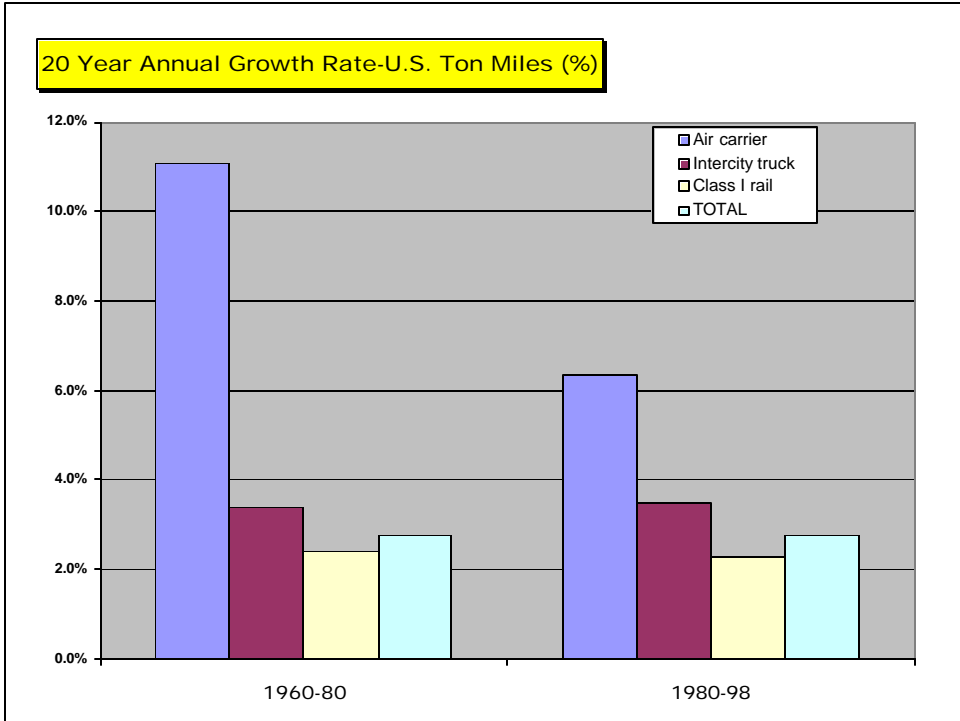


Figure 5: 20 Year Annual Growth Rate-U.S. Ton Miles (%)

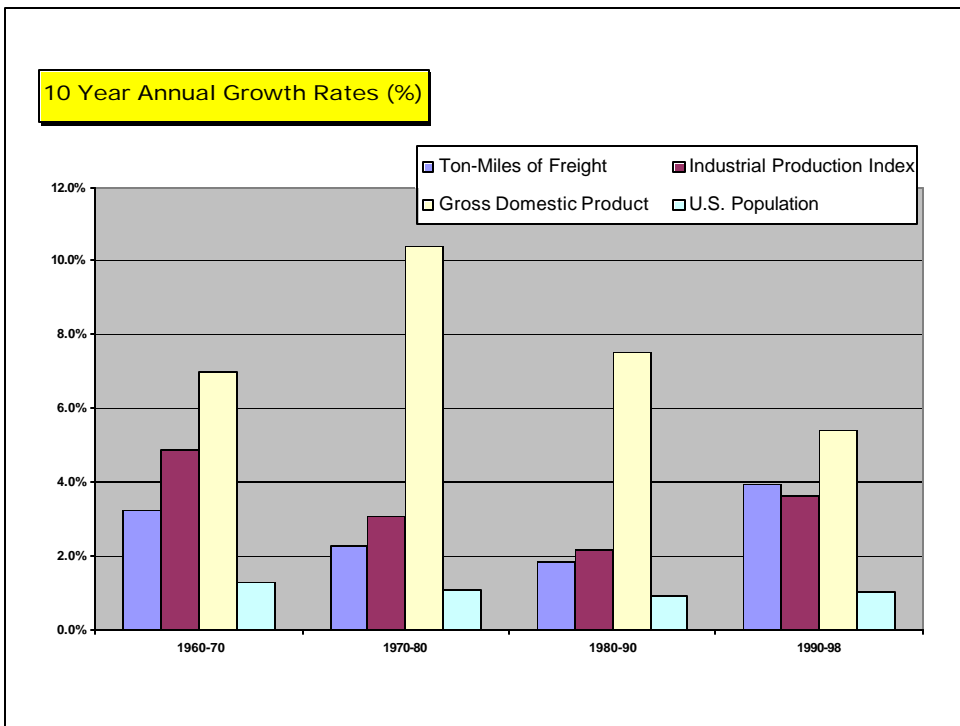


Figure 6: 10 Year Annual Growth Rates (%)

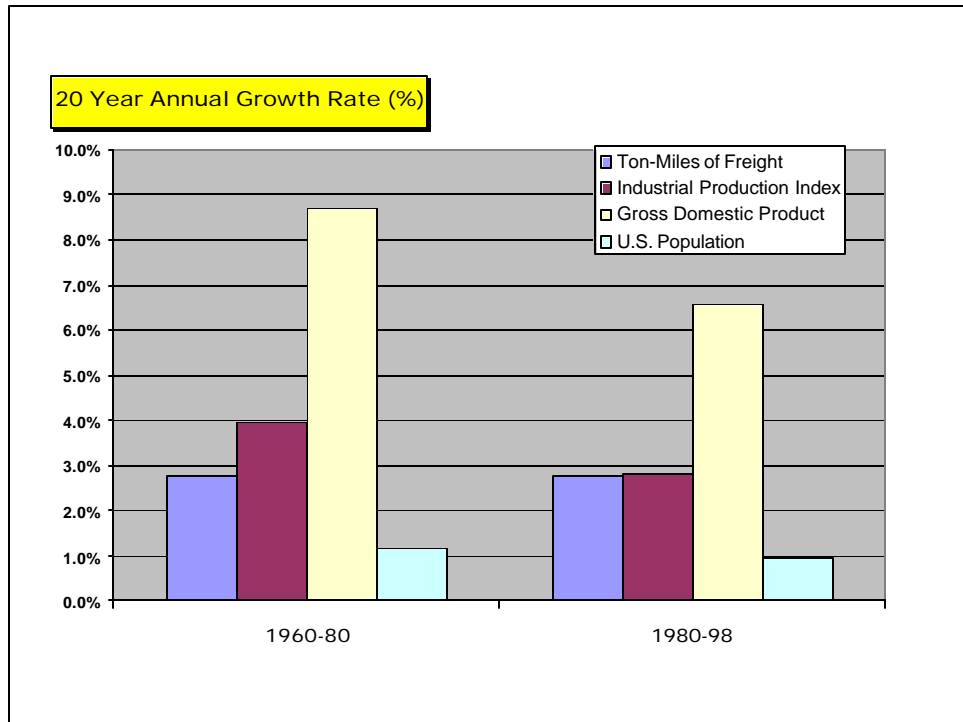


Figure 7: 20 Year Annual Growth Rate (%)

intercity truck freight may well double over the next 20 years (3.5 percent annual growth rate) if the economy continues to grow at its historically high rates. Class I rail will also likely grow substantially, but at a slower rate.

Disaggregate Growth Rates

A more disaggregate perspective on freight growth rates is also useful. As shown in Figure 8, rail freight car-loadings in ton-miles grew rapidly during the 1990s. The 3.8 percent annual rate would result in more than a doubling in volume over 20 years. As shown in Figure 9, international waterborne container traffic volume increased at a high rate of 5.8 percent over the past seven years. This trend shows the impact of the rapid growth in global trade in the past decade. Figure 10 shows an even higher rate of growth for domestic air freight ton-miles over the past decade. The 6.4 percent annual growth rate would result in a doubling of volume in only 11 years. Figure 11 shows the surprising result that rail intermodal volumes (units of trailers and containers) only increased at an annual rate of 1.8 percent over the past six years. Finally, Figure 12 shows the trends for domestic waterborne freight. The ton-miles for internal and lakewise waterborne freight have been constant over the past decade and have declined substantially for coastwise freight.

Clearly, planning and investment decisions regarding freight must consider disaggregate data for each of the relevant modes and commodities. In addition, trends in other relevant factors must be identified. For truck freight the overall trend in highway vehicle miles of travel (VMT) is relevant to competition in the future for scarce highway capacity especially in urban areas. As shown in Figure 13, the long-term trend in growth of highway VMT shows little sign of slowing.

Over the past eight years highway VMT has grown at an annual rate of 2.7 percent (doubling over 26 years).

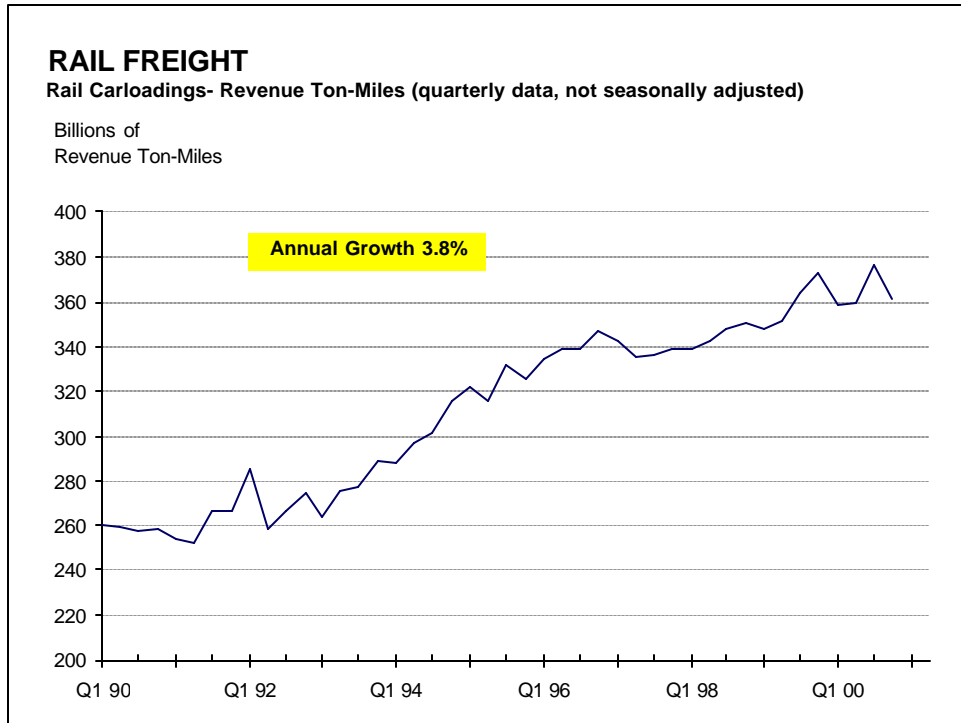


Figure 8: Rail Freight Carloadings- Revenue Ton-Miles

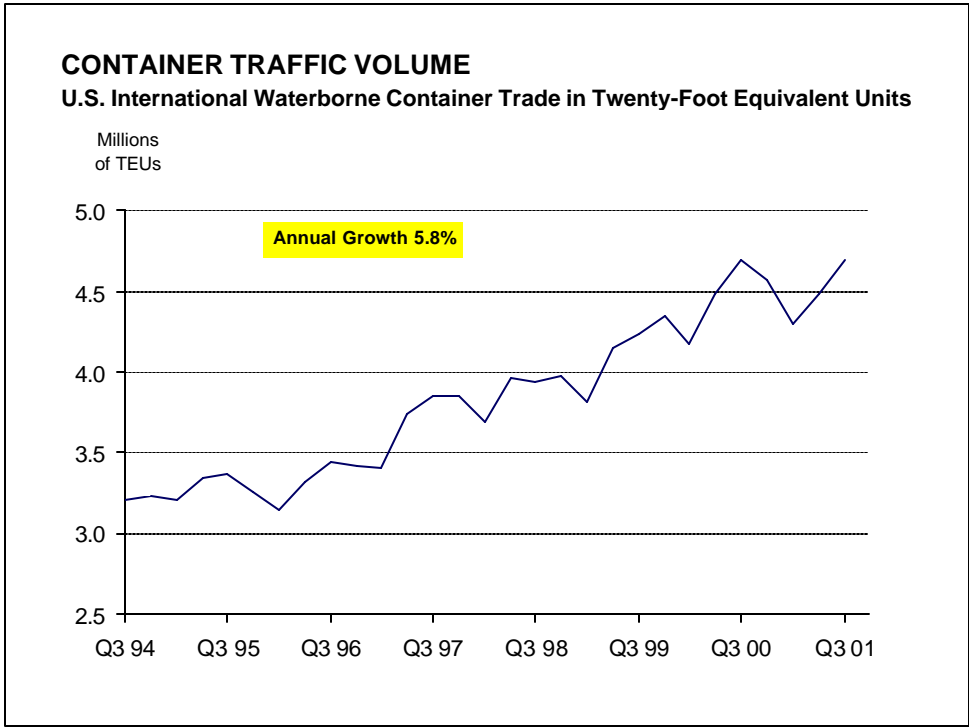


Figure 9: U.S. International Waterborne Container Trade in TEUs

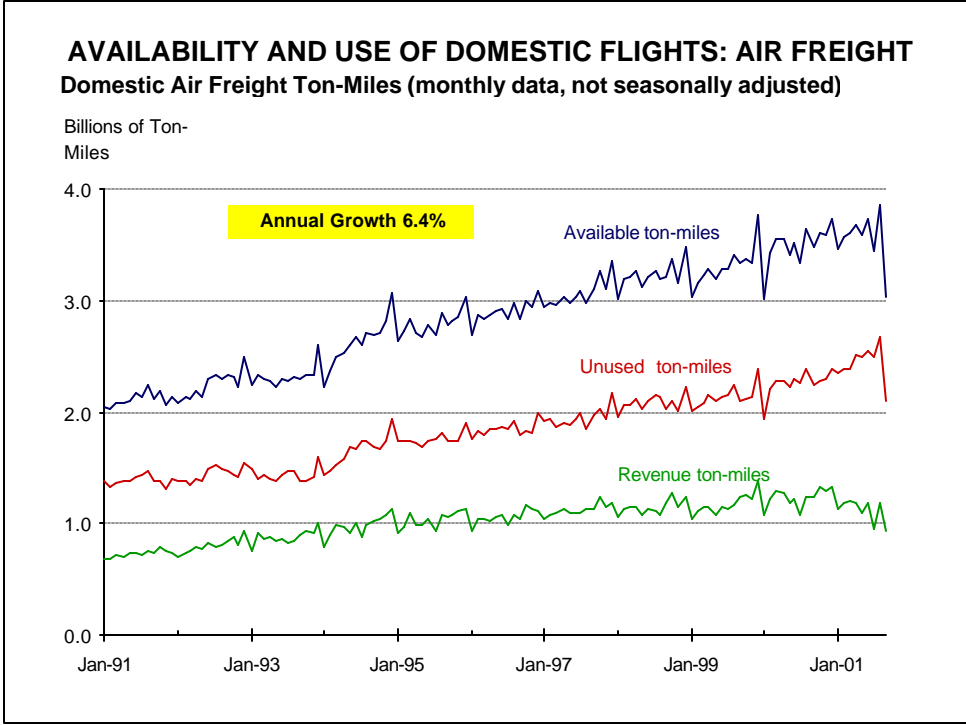


Figure 10: Domestic Air Freight Ton-Miles

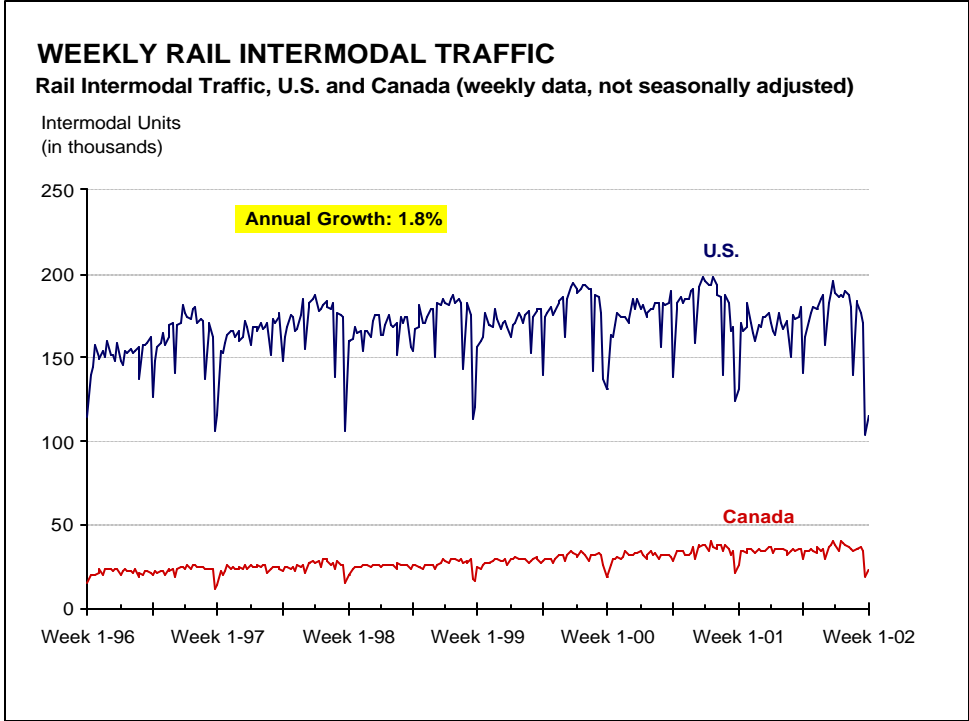


Figure 11: Rail Intermodal Traffic, U.S. and Canada

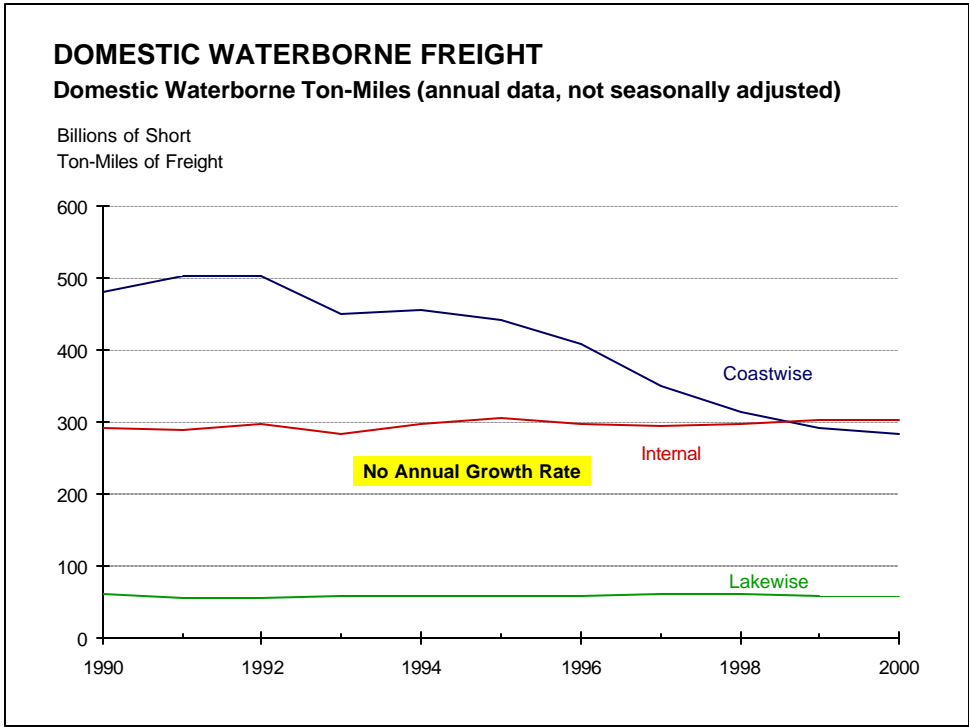


Figure 12: Domestic Waterborne Ton-Miles

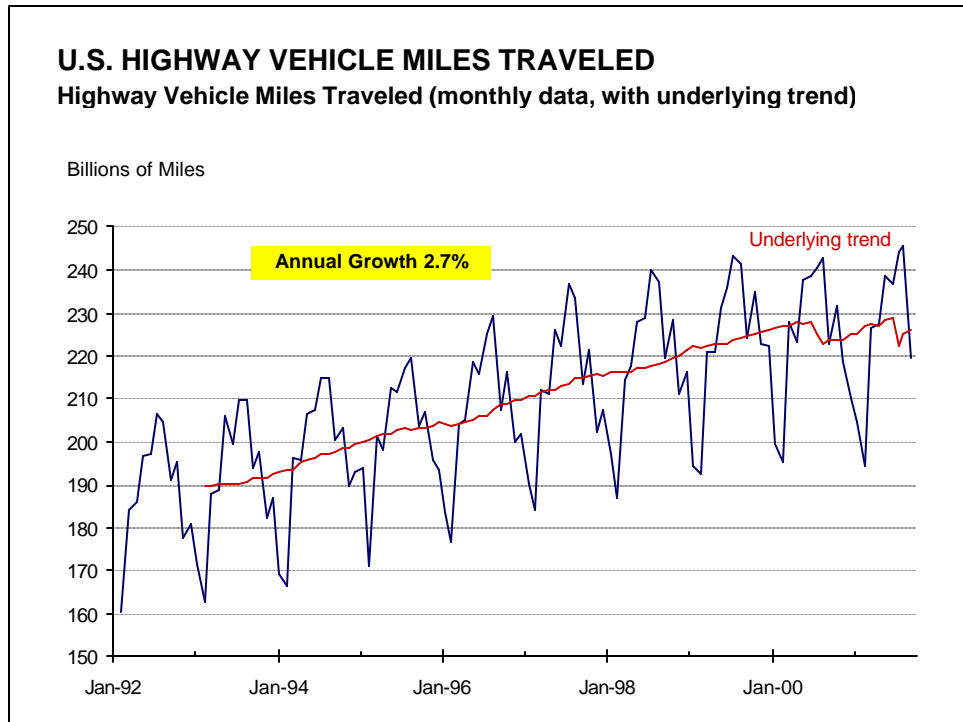


Figure 13: U.S. Highway Vehicle Miles Traveled

LEVEL OF SERVICE (LOS) ISSUES

Overview

Given the projected substantial growth in freight demand and the expected limited growth in infrastructure capacity, what is the likely impact on future freight levels of service? Will there be significant capacity limitations that will slow the growth in freight demand? To begin to answer these questions, we need to look at our current capability to measure freight level of service.

LOS Measurement Problems

On the highway side LOS is typically measured in terms of peak-hour delay compared to typical free-flow conditions in the off-peak. For intercity truck freight peak-hour delay will be less important to the extent that trips can be scheduled to avoid the peak hours or less congested, alternative routes are available. Nevertheless, overall indicators of urban congestion are still useful.

Trends in urban congestion indexes over a 15 year time period for the six major urban areas in the Upper Midwest region are shown in Figure 14. Data for the Los Angeles and New York areas are shown for comparison. As could be expected, Chicago is the most heavily congested of the cities in the region by a substantial margin. Detroit is next, followed by Minneapolis-St. Paul. The remaining three cities (Cleveland, Indianapolis and Milwaukee) are congested (index greater than 1.0), but not to the extent of the three much larger cities. Los

Angeles is clearly in a league by itself and surprisingly New York has fallen below Minneapolis-St. Paul in recent years. Congestion levels in Manhattan, however, are likely to be a special case.

At the national level Fekpe and Alam have developed a national highway network in order to conduct highway freight demand analysis and generate capacity-related performance measures (4). The baseline truck traffic flows for 1998 are shown in Figure 15. The flow map clearly shows a high concentration of truck traffic east-west across northern Illinois, Indiana, Ohio and southern Michigan. Very heavy north-south flows extend across Indiana and Ohio. Chicago and Detroit serve as hubs for these flows.

Fekpe and Alam’s freight demand analysis will use Reebie’s 1998 Transearch commodity flow database at the county-to-county level (5). The commodity flow data will be converted to a truck trip Origin-Destination (O-D) matrix for the base year and estimated for the forecast years 2010 and 2020. Analysis of truck trips by time-of-day will be used to generate link-level performance measures including travel-time, delay and average speed. Thematic maps will be used to identify highway links with capacity problems.

Since the most severe congestion problems occur in the major urban areas, integration of the national level truck freight demand analysis with regional planning models would be a logical next step. The Metropolitan Planning Organizations (MPOs) in each urban area produce detailed forecasts of future traffic volumes and expected levels of service. These urban travel demand models could be used to estimate the impacts of congestion on key truck freight corridors.

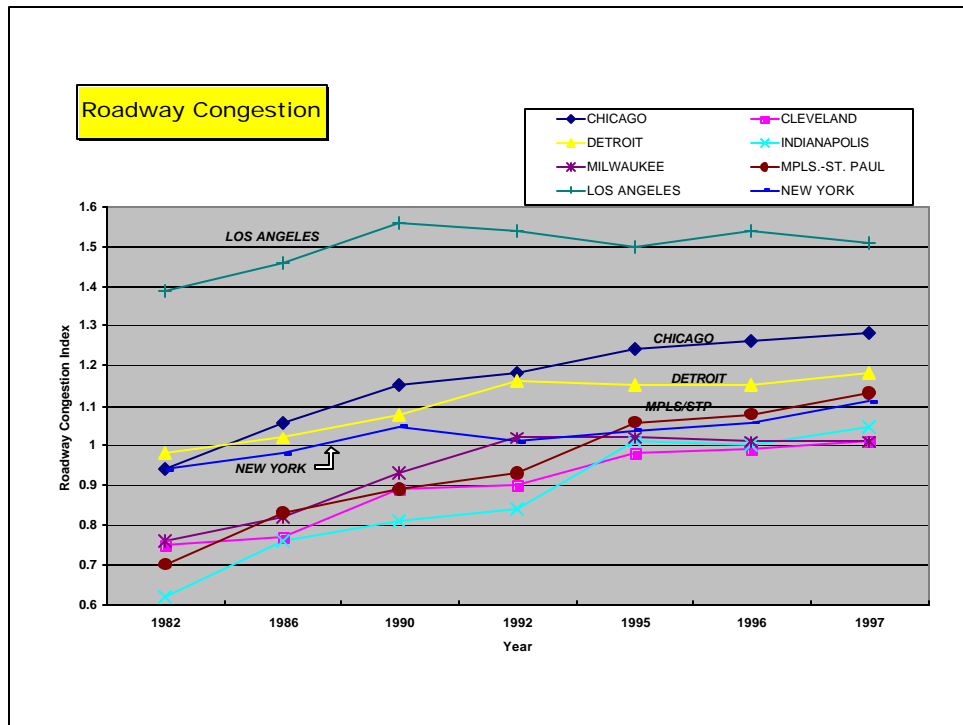


Figure 14: Roadway Congestion by Urban Area

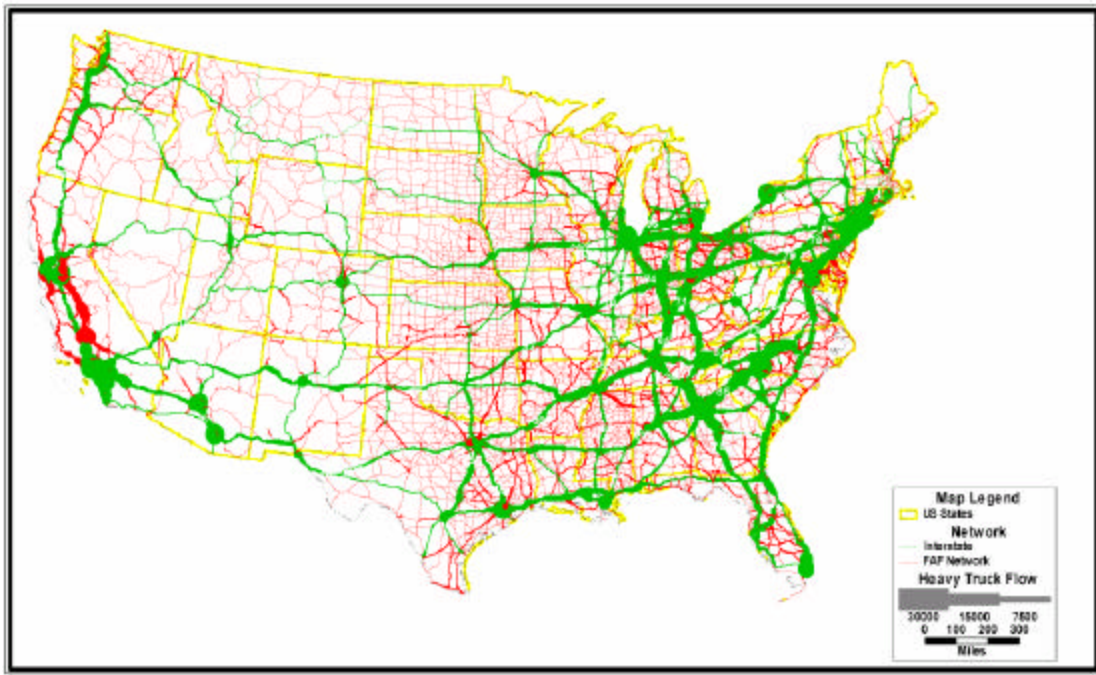


Figure 15: Truck Traffic Flows for 1998

DATA ISSUES

Demand Data

Regional level analysis of freight issues will require detailed data on commodity flows by mode for county-level origins and destinations nationwide. The 1993 and 1997 U. S. Census Commodity Flow Survey databases provide a nationwide county-level database, but confidentiality restrictions make it less useful for very disaggregate analyses. A commercial database, Transearch, that enhances the CFS databases and avoids some of the confidentiality problems is available from Reebie Associates.

The states of Minnesota, Ohio and Wisconsin have all purchased customized versions of Transearch. As shown in Figures 16, 17 and 18, the zonal systems used for the state-level freight analyses by these three states are centered on each particular state. Zones outside of the state are generally quite large. Thus, detailed analysis of freight mode choice based on Origin-Destination pair flows by commodity type is not possible. Purchase of Transearch for use as a regional analysis tool would give each state a much more powerful tool to analyze how regional freight issues affect their state.

The Bureau of Transportation Statistics (BTS) is currently planning for the next generation of freight demand data through the American Travel Survey. BTS needs input on how the specialized data needs of regions could best be served by the American Travel Survey.

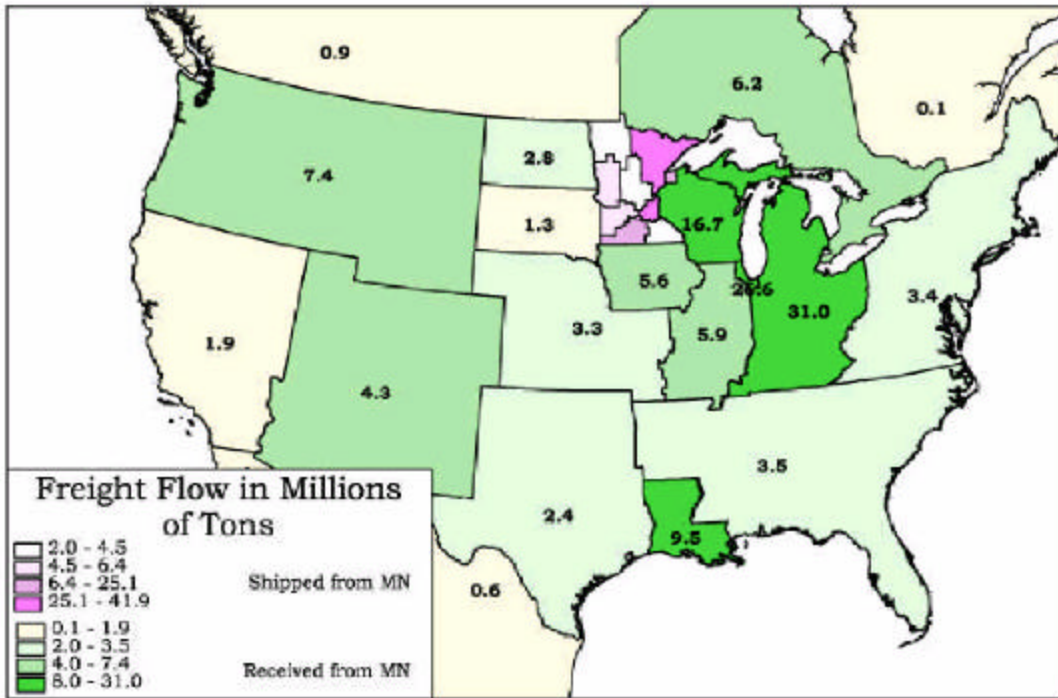


Figure 16: Minnesota Freight Study Zonal System

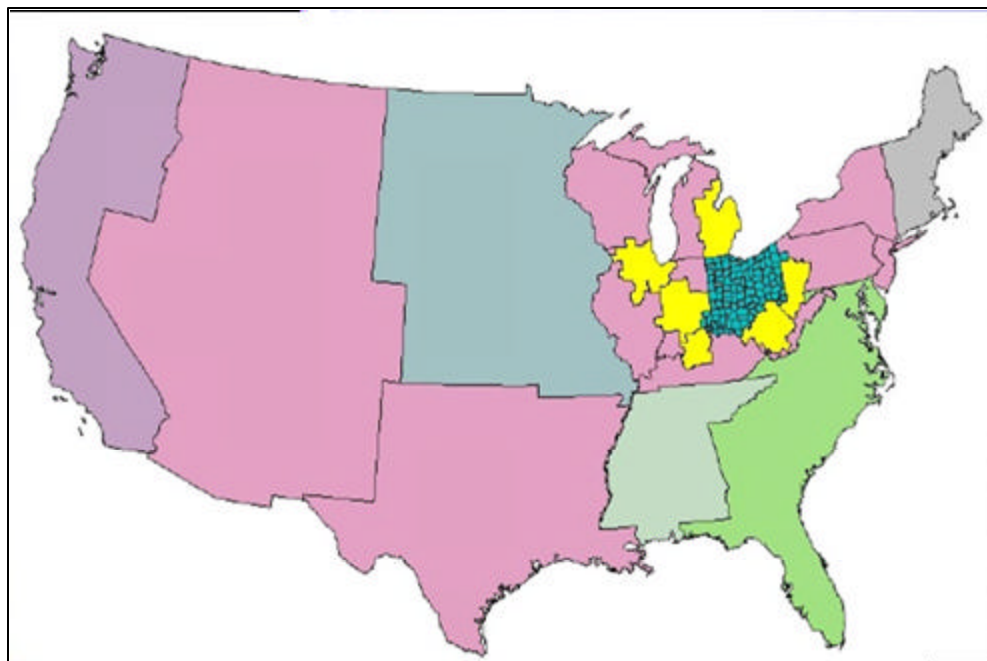


Figure 17: Ohio Freight Study Zonal System

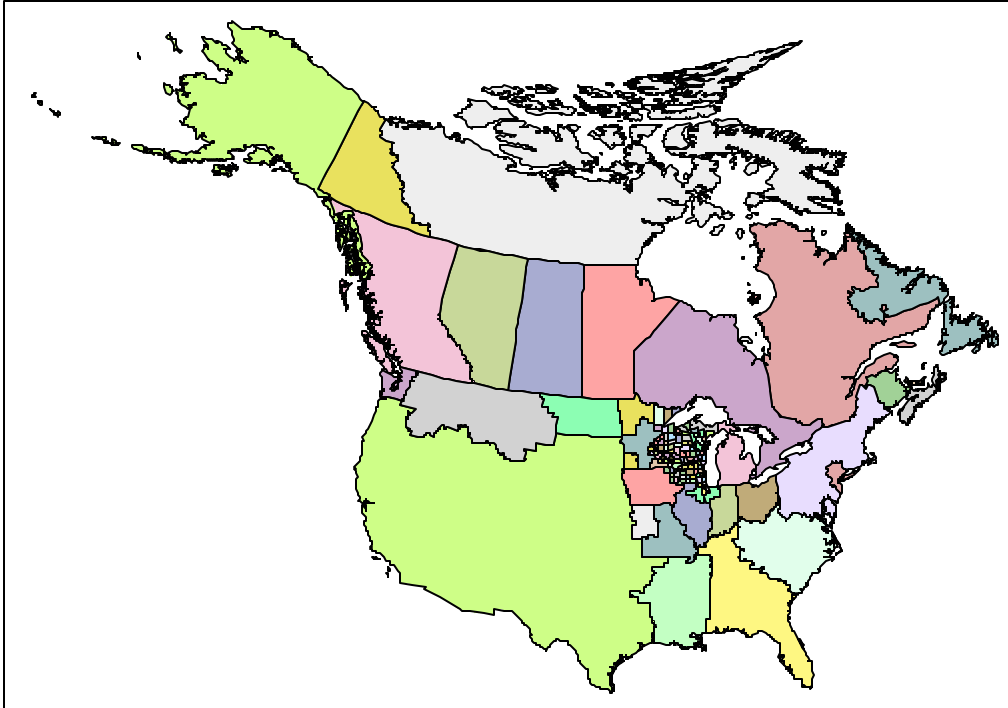


Figure 18: Wisconsin Analysis Zones

Transportation Network Data

A national-level highway network that is designed for modeling truck flows is available. A separate, national-level rail network is also available. As part of the development of its state rail plan, Wisconsin has hired a consultant to assign rail commodity flows to a highway network that was modified to represent the rail network in the state. More sophisticated multimodal freight networks may be available from logistics firms.

REGIONAL FREIGHT ACTIVITIES

Overview

All of the states in the Upper Midwest region have some interest in freight issues. An initial review of current freight activities for each of the states in the region is presented in the appendix. Common themes from the initial review are summarized below.

Freight Visibility

Of the states in the region, freight has the highest level of visibility in Minnesota. Mn/DOT has an Office of Freight, Railroads and Waterways that serves as an effective advocate for freight throughout the organization. Mn/DOT has reached out to the business and freight community by creating the Minnesota Freight Advisory Committee (MFAC). The MFAC has provided input to the process of developing multimodal freight performance measures.

Mn/DOT's funding of their statewide freight flows study also illustrates the commitment to addressing freight issues.

Freight also enjoys a high level of visibility in Ohio and Wisconsin. In Ohio the Secretary of the Ohio DOT has a strong interest in freight as demonstrated by his presentation of a progress report on the Ohio Freight Study at the Transportation Research Annual Meeting in Washington, D. C. last January. The funding of the \$353,000 freight study is another indication of the commitment to addressing freight issues. Wisconsin is currently addressing freight issues modally through the development of their State Rail Plan for 2020. Wisconsin strongly supports the GCM Corridor (Gary, Chicago Milwaukee) program. The program provides benefits to freight through reduced congestion and a focus on commercial vehicle operations.

The Michigan DOT (MDOT) includes freight issues in its Long Range Plan for 2025 by developing rail, air and marine freight transportation strategies in addition to truck strategies. Freight facilities are a key part of MDOT's Intermodal Management System.

In Indiana freight issues were addressed in the 1995 Policy Plan as part of the focus on development of "an efficient and well-integrated multimodal transportation system." Rail freight is addressed through the development of the 2002 Indiana Rail Plan. Freight will be a component of a planned Market Research Study. In addition, Indiana has been a key supporter of the GCM Corridor program.

The Illinois DOT's primary focus for freight has been on highways. IDOT has committed to providing highway access to the new rail-highway intermodal terminal at the Joliet Arsenal redevelopment site. IDOT has played a lead role in the GCM Corridor program.

Highway Projects

In recognizing the growing importance of trade with Canada to the economy, the Michigan DOT has developed and is implementing a five-year strategy to systematically repair and rebuild the border infrastructure and the connecting interstate freeway system. All of the states in the region have plans to upgrade their highway networks to provide mobility for people and freight and to support economic development.

Rail-Highway Intermodal Facilities

Plans are being developed for upgrading a regional intermodal facility in Detroit. The primary focus of the Michigan DOT is on the proposed access roadway improvements. Options for improved rail access and consolidation are also being explored.

In the Chicago area part of the Joliet Arsenal is being redeveloped as the 2,200 acre CenterPoint Intermodal Center including a privately-funded 621 acre BNSF rail intermodal facility. The Illinois DOT has committed \$51 million to improve highway access to the center including access to I-55.

In Minnesota the Mn/DOT Statewide Freight Flows Study identified intermodal terminal development as a key issue. The rail-highway intermodal terminal in Minneapolis-St. Paul is at capacity with no apparent interest by the railroad in expanding it. An intermodal terminal study is in progress for Duluth-Superior port.

In the process of developing its State Rail Plan, Wisconsin will assess the potential for expansion of rail-highway intermodal facilities. Because of its proximity to intermodal terminals in Chicago, Wisconsin currently has a relatively small level of intermodal terminal activity.

Support for Rail Freight Infrastructure

All of the states in the region have active loan and/or grant programs to upgrade existing local rail infrastructure including access to shippers. Ohio's program includes funds for mainline rail projects, such as intermodal terminals, elimination of bottlenecks and clearance improvements. Michigan is attempting to sell its state-owned rail lines (about 700 miles) to the private sector.

Planning, Management and Databases

Freight issues have been incorporated into the statewide planning process in Michigan, Ohio, Wisconsin and Minnesota. Ohio, Wisconsin and Minnesota have purchased Reebie's Transearch freight commodity flow database. As a result, these three states now have some ability to address freight flows that extend beyond their borders. In all three states there is only limited ability to analyze specific Origin-Destination commodity flows because of the large zone sizes beyond the state borders. Indiana developed a multimodal freight model (truck and rail modes) based on the Commodity Flow Survey database. The Michigan DOT (MDOT) has been proactive in including multi-modal freight issues in its planning and programming process. Indiana established a freight advisory committee as part of their intermodal management system development activities in the 1997 to 1998 time period. The Committee identified problem locations on intermodal connectors and strategies for improvements of freight operations.

Michigan and Minnesota have developed freight facility databases. Future links to statewide and corridor models are planned.

Larger Vehicles

Both Wisconsin and Minnesota have identified the potential impacts of heavy rail cars as an issue. Wisconsin is evaluating the impacts as part of its State Rail Plan development. Michigan and Minnesota are interested in exploring truck size and weight issues.

Air Freight

Illinois identified development of a third airport in the Chicago area as a major objective in their recent strategic planning initiative. The likely impacts on air freight are not clear. Minnesota has addressed air freight issues because the Minneapolis-St. Paul airport has not been competitive with Chicago. A recent air cargo study for the airport concluded that strong industry

forces were the primary cause of the “declining air cargo relevance of the airport” (6). The airport in Detroit just opened a new \$1.2 billion passenger terminal. The improved ability to handle international flights should enhance the competitiveness of Detroit’s air freight operations.

REGIONAL ORGANIZATIONAL OPTIONS

Regional Models

A recent study by Wilbur Smith Associates identified seven examples of multi-state organizations that have been created to address regional transportation issues (7). Six of the seven have some relevance for the Upper Midwest region:

- 1) I-95 Corridor Coalition. Twelve states in the northeastern U. S. from Virginia to Maine initially explored the use of Intelligent Transportation Systems (ITS) technology to solve traffic problems on Interstate 95. The organization received Priority Corridor funding under ISTEA. The Coalition has expanded to cover intermodal freight and economic development issues.
- 2) Latin America Trade and Transportation Study (LATTs). Twelve southeastern states plus Texas and Puerto Rico formed a coalition to study the opportunities for trade with Latin American and the associated transportation infrastructure needs. FHWA funded the study as a pooled-fund study.
- 3) I-69 Steering Committee. Eight states along the existing and potential I-69 corridor from Michigan to Tennessee to Texas formed a steering committee to explore completion of I-69 and upgrades to existing sections.
- 4) Joint Working Committee/Bi-national Transportation Planning Study. Four U. S. states and six Mexican states along the Mexican border joined with the two national transportation agencies to coordinate planning and programming activities related to bi-national border area transportation issues.
- 5) International Mobility and Trade Corridor (IMTC) Project. A coalition of over 80 U.S. and Canadian business and governmental units provides a forum for cross-border transportation issues between British Columbia and the state of Washington. The public/private partnership is funded under the TEA-21 Coordinated Border Infrastructure (CBI) program, and
- 6) Midwest Regional Rail Initiative. The Initiative is sponsored by Amtrak, the Federal Railway Administration, the six DOTs in the Upper Midwest plus the DOTs of Iowa, Missouri and Nebraska. The focus of the Initiative is to develop high speed passenger rail service for the entire region. AASHTO’s Mississippi Valley Conference Board of Directors has been supportive of the Initiative. Funding for developing the initial system plan was provided by Amtrak, the FRA and state contributions ranging from \$10,000 to \$50,000. The Wisconsin DOT is the administrative agency for the pooled funds.

Other organizational options and models for regional initiatives that could be explored include:

- 1) Expansion of the GCM Corridor Coalition (Gary, Chicago, Milwaukee). The Coalition was funded under the ITS Priority Corridors Program in ISTEA. The CEOs of the Illinois, Indiana and Wisconsin DOTs serve as the Executive Committee for the Coalition. The Coalition funds projects in eleven ITS program areas including

Commercial Vehicle Operations. Congestion and safety on freeways and arterials are major issues. The initial two year budget in 1995 amounted to \$32.6 million.

- 2) Build on the Northern Great Plains: Trade and Transportation Initiative. Freight issues are being addressed as part of a planning study of transportation infrastructure in five states (Iowa, Minnesota, Nebraska, North Dakota, South Dakota) and two Canadian provinces (Manitoba and Saskatchewan). Funding was provided under the Transportation Equity Act for the 21st Century (TEA21) and administered by Mn/DOT. A preliminary Interstate 29 Corridor Plan was produced as part of the TEA21 Border Crossings and Trade Corridor Initiative.
- 3) Global Gateways Initiative. Eight states have organized to sponsor the I-10 freight corridor feasibility study. The Texas DOT is the lead agency for the study.

Urban Area Models

Freight issues have also been addressed effectively at the urban area level. Shin and Kawamura have documented successful public-private partnerships to address intermodal freight issues in Seattle, Los Angeles and Chicago (8).

- 1) In Seattle, the Puget Sound Regional Council established the Regional Freight Mobility Council in 1993. The Council includes private-sector representatives from carriers and shippers and others. The Council identified freight initiatives in an “Action Package” covering institutional reorganization, operations, infrastructure improvements and funding. One major result of the recommendations was the creation of the Fast Corridor program. The program identified 15 rail grade crossing separation projects to reduce congestion and improve access to the ports along the I-5 corridor. Funding of \$470 million was obtained from federal, state, and municipal governments as well as ports and private railroads.
- 2) In Los Angeles, the Southern California Association of Governments (SCAG) formed the Goods Movement Advisory Committee (GMAC) to address freight issues. The GMAC recommended construction of truck lanes along several freeways as well as major rail grade-crossing separation projects. One of the projects, the \$912 million Alameda Corridor East project proposes improvements for 55 rail grade-crossings including grade separation at 21 of the highest volume crossings. CALTRANS has programmed the project and obtained funding for about 40 percent of the total cost (9).
- 3) In Chicago, the Chicago Area Transportation Study (CATS) established its Intermodal Advisory Task Force (IATF) in 1994 to address intermodal freight issues. The membership includes representatives from freight-related businesses as well as the public sector. The IATF identified a list of 47 projects to improve intermodal freight operations in the region. Some of these projects have been completed.

One of the largest projects to address freight infrastructure problems is the Alameda Corridor project in Los Angeles (10). The project will create a 20 mile grade-separated railroad connecting the ports of Los Angeles and Long Beach with the transcontinental rail yards east of downtown Los Angeles. About one half of the estimated \$2.4 billion cost of the project is from bond proceeds with bonds backed by railroad use fees. The idea for the project began in 1981 when the Southern California Association of Governments (SCAG) created the Ports Advisory Committee (PAC) to address traffic concerns in the port area. A study of highway and rail

access to the ports led to a plan to consolidate rail access in the Alameda corridor. The appointment by SCAG of the Alameda Corridor Task Force in 1985 resulted in a recommendation to create a Joint Powers Authority to design and construct the project. The Alameda Corridor Transportation Authority was created in 1989. Construction began in 1997.

The impetus for the Alameda Corridor project comes from the \$157 billion value of cargo handled by the ports each year and the projected doubling of the volume of cargo by 2020. Thus, the railroads can easily pass on the cost of the improved port access along to their customers as well as realize substantial operating cost savings.

CONCLUSIONS

Historical trends in freight growth over the past 40 years strongly suggest that a doubling of truck freight ton-miles is a very likely scenario. Rail freight will grow at a somewhat slower rate while air freight will grow even faster. These forecasts are implicitly based on the assumption of no significant capacity constraints and a continuation of strong economic growth.

The potential impacts of highway capacity constraints on freight flows in the Upper Midwest need to be explored in depth. While shippers and carriers can find short-term solutions, the longer-term impacts of congestion may be that shippers move their operations to less congested parts of the country. Key bottlenecks need to be identified and the potential for both operational and capacity expansions evaluated.

There is substantial interest in upgrading and expanding rail-highway intermodal facilities in the region. Highway congestion can also have an impact on the utilization of these facilities. Opportunities for improvements in rail service will need to be explored as well particularly in the Chicago area where east-west rail connections are a problem.

Many freight issues can be addressed most effectively at the regional level. The vast majority of freight flows cross state borders. Thus, constraints on freight flows in one state will impact the freight stakeholders in all of the surrounding states. At the regional level the interests of all of the stakeholders can be included in the decision-making process. Excellent models for a freight task force that could address regional freight issues exist such as the urban area-level Intermodal Task Force in Chicago and the state-level Freight Advisory Committee in Minnesota.

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APPENDIX – STATE-LEVEL FREIGHT ACTIVITIES

Michigan Freight Activities

Administrative Structure for Freight

Freight issues related to rail are the responsibility of the Freight Services and Safety Division within the Bureau of Urban and Public Transportation. The Division manages programs related to capital development, operations and rail safety.

Business Plan Focus on Freight

The Michigan DOT’s 1977 Business Plan identifies “businesses in the state of Michigan as well as ...businesses and shippers from out-of-state...” as part of their customer base. Customers’ needs that are most important for freight include: safety, reduced traffic congestion, inter-modal connections and decreased delays at border crossings. One of MDOT’s strategies

for meeting customers' needs is to "provide multi-modal transportation infrastructure and services that strengthen the economy and the competitive position of Michigan and its regions for the 21st century."

State Long Range Plan for 2025

Under "Highway Strategies" the Border Crossing and Trade Corridor Strategy has a direct impact on freight. "A five year strategy to systematically repair and rebuild the Michigan-Canada border infrastructure and connecting interstate freeway system has been developed and is being implemented."

Specific "Truck Strategies" include:

- 1) truck-related highway improvements, such as capacity improvements to reduce congestion, eliminate choke points and modernize the highway system; and new design standards that address truck volume, sizes and weights issues,
- 2) new technologies, such as weigh-in-motion and video monitoring of freeways for incidents, and
- 3) state trucking laws. Michigan endorses the state truck weight laws currently in place, but would not oppose a shift in federal truck size and weight laws that would bring the rest of the country closer to Michigan weight laws.

Rail, Air and Marine Freight Transportation Strategies include:

- 4) highway/railroad grade crossing eliminations,
- 5) development and enhancement of inter-modal freight terminals,
- 6) divestiture of state-owned rail lines (currently about 700 miles) to the private sector,
- 7) support for air freight facilities at appropriate airports, and
- 8) support for maintenance and improvement of public marine navigation channels with funding from appropriate sources.

Inter-modal Management System

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required state DOTs to develop Transportation Management Systems (TMS) including an Intermodal Management System (IMS). MDOT put a high priority on developing an integrated database to support TMS. In terms of freight, MDOT includes airports, border crossings, pipeline terminals, ports, container/trailer terminals, rail freight stations and weigh stations in its IMS. One of the key concerns in the continued development of MDOT's IMS is the ability to address freight issues.

Statewide Travel Demand Model

MDOT's statewide travel demand model provides an analytical framework for assessing transportation system performance and deficiency analysis, long range plan development, systems-level project analysis as well as a spatial framework for many of the management systems. In addition to the standard person-trip based demand model, a truck-trip model was developed which estimates truck volumes by commodity group. The truck model was based

primarily on the 1993 national Commodity Flow Survey data. The truck trips are stratified into international, interstate domestic and intrastate domestic trips.

Detroit Intermodal Freight Terminal Project

The goal of the project is to develop a regional intermodal facility in Southwest Detroit with sufficient capacity to provide for future intermodal demand. Three alternatives for rail terminal development and the associated highway access requirements are currently being evaluated. Daily truck traffic forecasts for 2025 for the three alternatives range from 7,300 to 15,800. Under the maximum development scenario, the proposed access roadway improvements alone are estimated to cost \$176 million. Two existing intermodal terminals in the project area are currently operated by three railroads. Additional railroads may be provided with access to the Terminal District area.

Funding for Freight

The Transportation Economic Development Fund (TEDF) provides funding for highway, road and street projects that support economic growth in Michigan. One of primary targets is projects that encourage industry development and redevelopment. During Fiscal Year 1998-99, nearly \$19 million was available for these projects. Annual funding of \$3 million for rail-highway grade-crossing improvements may also have an impact on freight.

Detroit Metropolitan Planning Organization (MPO)

The Southeast Michigan Council of Governments (SEMCOG) is the MPO for the Detroit area. SEMCOG's Transportation Advisory Council is responsible for addressing regional transportation issues relating to roads, transit, airports, rail and traffic safety. Freight issues are addressed by the Council's Intermodal Freight task force.

Ohio Freight Activities

Ohio DOT Administrative Structure

Freight issues are addressed most directly in the Division of Planning. The Division's mission focuses broadly on "safer and more efficient multi-modal transportation systems in Ohio." The Corridor Section of the Office of Urban and Corridor Planning within the Division has specific responsibility for "research into freight issues... to better manage freight flows."

Freight currently has a high level of visibility in ODOT as the result of the \$353,000 one-year Ohio Freight Study administered by the Office of Urban and Corridor Planning. The Secretary of ODOT, Gordon Proctor, has a strong interest in the study. Secretary Proctor presented preliminary results from the study in a session at the Transportation Research Board (TRB) Annual Meeting in Washington, D. C. last January.

Ohio Freight Study

The one-year, \$353,000 study is being conducted by the consulting firms, Cambridge Systematics, Inc. and Reebie Associates, Inc. The study will identify major freight issues in Ohio, analyze freight commodity flow data using a variety of analysis techniques, conduct several case studies, address additional issues including input to federal reauthorization proposals and conclude with a high-level, one-day freight summit.

The key issues to be addressed in the study include:

- 1) corridor and intermodal connector capacity impacts, and implications for widening or new construction,
- 2) local traffic and development impacts, and implications for MPO modeling, access studies, and TIP development,
- 3) mode share impacts, with implications for diversion of freight from truck-to-rail or rail-to-truck, and
- 4) statewide and local economic development impacts and implications for Ohio's economic growth and market competitiveness.

The national data on truck freight by state shows that only 13% of the truck ton-miles involve within-state trips (both origin and destination within Ohio). Thus, full consideration of the study's key issues will require at least a regional perspective.

Ohio Rail Development Commission

The Commission is an independent state agency that was created by the Ohio General Assembly in 1995. The mission of the Commission is "to plan, promote and implement the improved movement of goods and people faster and safer on a rail transportation network connecting Ohio to the nation and the world." The Commission uses grants and loans to help local governments, port authorities and the private sector rehabilitate existing rail lines, develop new rail lines or purchase other rail lines. The Commission also funds improvements in rail grade crossing safety. Under the Strategic Corridor program, funds may be available for projects on main lines such as intermodal terminals, elimination of bottlenecks or clearance improvements. In the 1998-99 bi-ennium the Commission received \$14 million from the corporate franchise tax paid by railroads and \$30 million in federal funds for grade crossing improvements.

Indiana Freight Activities

Overview

The INDOT 1995 Policy Plan includes a policy statement on the need for a "...multimodal transportation system [that provides] efficient and effective transportation of people, goods and freight." The Plan identifies the need for "...intermodal solutions [to the] demand for mobility of people and goods." The Plan explicitly identifies rail freight, international ports and international airports as components of the multimodal transportation system. Rail freight issues are also addressed by the Railroad Section of INDOT's Multi-modal Transportation Division. The Railroad Section is responsible for the development of the 2002

Indiana Rail Plan. The plan will focus on the implications of rail company mergers and the planned implementation of high-speed rail passenger service.

Indiana Freight Model

The Indiana freight model estimates both truck and rail traffic volumes based on the 1993 Commodity Flow Survey database. The model distributes truck and rail freight shipments using a gravity model and county level zonal system. The truck and rail networks were developed from U.S. DOT sources. Indiana's model provides the capability of evaluating the impacts of changes in the highway and rail networks on freight flows (11).

Rail Freight

INDOT funds two railroad programs, the passive grade crossing program and the industrial rail service fund. The rail service fund provides loans and grants to Class III railroads and municipal port authorities to purchase or rehabilitate rail tracks and to upgrade rail grade crossings.

Illinois Freight Activities

Fiscal Year 2000 Annual Report

IDOT's new strategic planning initiative identified major objectives for fulfilling its mission. Objectives that relate to freight include: 1) provide cost-effective, quality highways and services; 2) improve Illinois' airport system and preserve the nation's top hub in northeastern Illinois by developing a third major airport; 3) support inter-city rail passenger service and develop a high-speed rail system; and 4) apply innovative technological solutions that improve the efficiency and safety of the transportation system, reduce congestion and enhance highway construction materials and designs. In addition to highways, IDOT's major responsibilities include airports and rail freight and passenger systems.

Rail Freight Programs

Rail programs in IDOT are administered by the Bureau of Railroads in the Office of Planning and Programming. The Rail Freight Program provides capital assistance to communities, railroads and shippers to preserve and improve rail freight service in Illinois. The focus is on projects that improve access to markets and enhance economic development. In fiscal year 2001 a total of \$7.2 million was available for the Rail Freight Program with 43 percent coming from the state general fund.

Wisconsin Freight Activities

Freight Rail Planning

In 1994 WisDOT adopted Translinks 21, its long-range, intermodal transportation plan for 2020. The freight rail element of Translinks 21 identified ways to improve the rail infrastructure and rail intermodal shipments. The infrastructure improvements could be made by upgrading primary and secondary tracks, improving operating signals, preserving low volume rail lines and upgrading rail lines preserved by public ownership. Intermodal shipments could be encouraged by improving all intermodal facilities (terminals, storage facilities, pulp loading sites), improving tracks to accommodate higher-speed movement and providing the necessary clearance for doublestack movements.

The process of developing a State Rail Plan for 2020 is in progress. The plan will include intercity passenger rail, freight rail and highway-rail crossings components. It will identify public investment needs, economic benefits and potential environmental impacts.

Two committees are assisting WisDOT with the development of the new State Rail Plan. The State Rail Plan Advisory Committee includes representatives from metropolitan and regional planning organizations, local governments, rail interests, private sector interests and state agencies. The Freight Railroad Advisory Committee includes representatives of freight railroad companies currently operating in Wisconsin as well as shippers and other private and public sector interests. Both committees have taken an active role in identifying key policy issues to be addressed in the plan.

Although the freight rail component of the State Rail Plan will have a policy focus, a firm analytical basis for the policies is being provided by consultant studies and a commercial commodity flow database. The major study elements include:

- 1) analyze rail corridor and system-wide capacity needs based on the 2020 forecast year,
- 2) assess the potential for shifting freight traffic from truck to rail,
- 3) assess the potential for expansion of truck-rail intermodal facilities, and
- 4) analyze the impact of heavy freight rail cars.

Wisconsin Freight Forecasts for 2020

Reebie Associates estimated the tons of freight by mode in 2020 using a base year of 1996 and economic forecasts prepared by WEFA. Freight volumes for 1996 were developed by integrating 1993 U.S. Census Commodity Flow Survey data with additional databases. The freight forecasts for 2020 were based on a “mode neutral” methodology. The mode share was assumed to be constant by commodity for each Origin-Destination pair. Overall shifts by mode resulted from relative commodity growth. The forecasts were not constrained by potential capacity limitations.

Overall, freight traffic for Wisconsin is projected to increase by 74% from 1996 to 2020 at an annual rate of 2.3%. Truck traffic is projected to grow at an annual rate of 2.7% and rail traffic at 1.7%. The truck traffic modal share is estimated to increase from 58% in 1996 to 63% in 2020 while the rail share declines from 33% to 29%.

The Reebie freight flow analysis was based on a set of analysis zones tailored to Wisconsin’s commodity flow pattern (see Figure 18). County level zones are used within

Wisconsin. The nearby states in the region form the next set of zones followed by division of the remainder of the U. S. into large regional zones. Somewhat more detail is provided for Minnesota and zones along the northern border with Canada to the west of Minnesota. Each Canadian province is a separate zone.

Minnesota Freight Activities

Mn/DOT Office of Freight, Railroads and Waterways

Freight activities in Mn/DOT are the primary responsibility of the Freight Section that is located within the the Modal Operations Division's Office of Freight, Railroads and Waterways. The Freight Section is a strong advocate for addressing freight issues within Mn/DOT and with the private sector through the Minnesota Freight Advisory Committee. In addition to the Advisory Committee, the Freight Section's projects include: 1) developing the freight facilities database, 2) supervising the Minnesota Statewide Freight Flows Study, and 3) administering the Northern Great Plains Trade and Transportation Initiative.

Minnesota Freight Advisory Committee (MFAC)

In 1998 Mn/DOT created the Minnesota Freight Advisory Committee in order to obtain input from the business community and freight carriers on freight issues. The purpose of the committee is to "...recommend policy and actions that promote safety, productivity and sustainable freight transportation systems in Minnesota." The committee was responsible for initiating the Statewide Freight Flows Study and the development of freight performance measures.

Freight Facilities Database

The freight facilities database is an inventory of facilities in which freight is originated, terminated, transferred, and/or stored. The database is designed to support freight planning and investment activities, commodity flow modeling and infrastructure needs studies. The database is an extension of the requirement in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) for an intermodal management system.

Minnesota Statewide Freight Flows Study

The goal of the study was to provide data, recommendations and direction regarding Minnesota freight flows to MN/DOT and the Minnesota Freight Advisory Committee. The objectives of the study that are relevant to the Upper Midwest Region include:

- 1) identify freight movements by type for major freight corridors,
- 2) identify origins and destinations of the freight flows by mode to and from major regional centers in Minnesota,
- 3) evaluate critical freight transportation planning, infrastructure and policy issues, and
- 4) develop freight transportation system performance measures.

The study did not provide estimates of future commodity flows. Forecasts of commodity flows would be useful to better evaluate alternative freight investment strategies.

The study evaluated the freight infrastructure for each mode (truck, rail, water and air) in detail and identifies key problems. The study also described the freight transportation needs of shippers and receivers in five major Minnesota industries: agriculture and food processing, bulk materials production, traditional manufacturing, high-tech manufacturing, and wholesale and retail trade. Key freight issues and impediments for each industry were identified.

The overall results of the study were summarized in a set of four, high-level freight policy objectives: 1) enable multimodal freight transportation choices for shippers, 2) focus investment in key freight corridors, 3) develop public/private partnerships and 4) maintain a Mn/DOT focal point for freight policy. In addition, freight planning activities in Mn/DOT should be strengthened by developing a Statewide Freight Plan.

Detailed recommendations for addressing freight issues and problems were developed for each mode. The recommendations that relate to regional (multi-state) issues and problems are summarized below.

Truck Issues and Recommendations

- Urban congestion causes delays and increases the operating costs of trucking.
- Develop major investment strategies and performance standards to facilitate freight movement. The interstate corridor between Minnesota and Wisconsin, Chicago, and points east is the most significant in terms of freight value and weight.
- Consider designation of the I-94 corridor as a Corridor of National Significance for funding under the U.S. DOT's Borders and Corridors Program.
- Assess the statewide 80,000 pound weight limit in conjunction with policies in neighboring states.
- Improve coordination between freight planning and motor carrier regulation to "ensure consistent truck regulatory policies and enforcement across Minnesota and the Upper Midwest." Opportunities for coordinated application of ITS technologies for regulatory and information purposes should be explored.

Rail Issues and Recommendations

- Maintain a healthy short-line industry in Minnesota. Negotiate with Class I railroads to maintain cost-effective interchange and market access.
- Rail industry consolidation and investment in higher capacity (286,000 pound) rail cars may have negative impacts on short-line companies.
- Identify a strategic rail network and conduct major investment studies on key freight corridors.
- Expand intermodal service by identifying base-load customers, and facilitating or partnering in terminal development.

Water Issues and Recommendations

- In comparison to the other freight modes, waterborne transportation is complacent and stagnant. The potential exists for diversion of large bulk shipments to heavy trucking.
- Support dam and lock improvements on the Mississippi River and Great Lakes/St. Lawrence Seaway systems.

Air Issues and Recommendations

- Anticipate air freight capacity needs and encourage a competitive environment

Air freight at the Minneapolis/St. Paul airport faces significant competition from Chicago. Chicago has the advantage of large economies of scale. Chicago has many more international flights than MSP and much higher freight volumes. Also, Northwest Airlines has a near monopoly on the freight gates at MSP. Consequently, other airlines tend to move their freight by truck to their own hub systems in Chicago. Planned air and landside improvements at MSP over the next three years will provide some relief.

Freight Transportation System Performance Measures

The final task of the study was to develop a methodology for evaluating multimodal freight corridors using freight performance measures. While the focus was on performance measures that would be applied within Minnesota, the methodology defined corridors broadly in terms of significant origin-destination patterns of major commodity flows. Corridors to external destinations, such as Chicago, were included explicitly in the methodology. The methodology identified bottlenecks, opportunities for system improvements and expected costs and benefits.

Northern Great Plains Trade and Transportation Initiative

Freight issues are being addressed as part of a planning study of transportation infrastructure in five states (Iowa, Minnesota, Nebraska, North Dakota, South Dakota) and two Canadian provinces (Manitoba and Saskatchewan). Funding was provided under the Transportation Equity Act for the 21st Century (TEA21) and administered by Mn/DOT. A preliminary Interstate 29 Corridor Plan was produced as part of the TEA21 Border Crossings and Trade Corridor Initiative.

Minnesota Rail Service Improvement Program

The program was established in 1978 to help prevent the loss of rail service on lines potentially subject to abandonment by railroads. The initial program authorized \$25.5 million in bonds to railroads and shippers for capital improvements and facilities. Most projects draw upon the revolving loan fund with additional funding from shippers and railroads. The program was expanded in 1994 to provide loan guarantees to rail users as well as rail carriers. Over the three year period from 2000 to 2002 total funding of \$22 million will be allocated to 71 projects. A total of \$103 million has been allocated and repaid through the program.