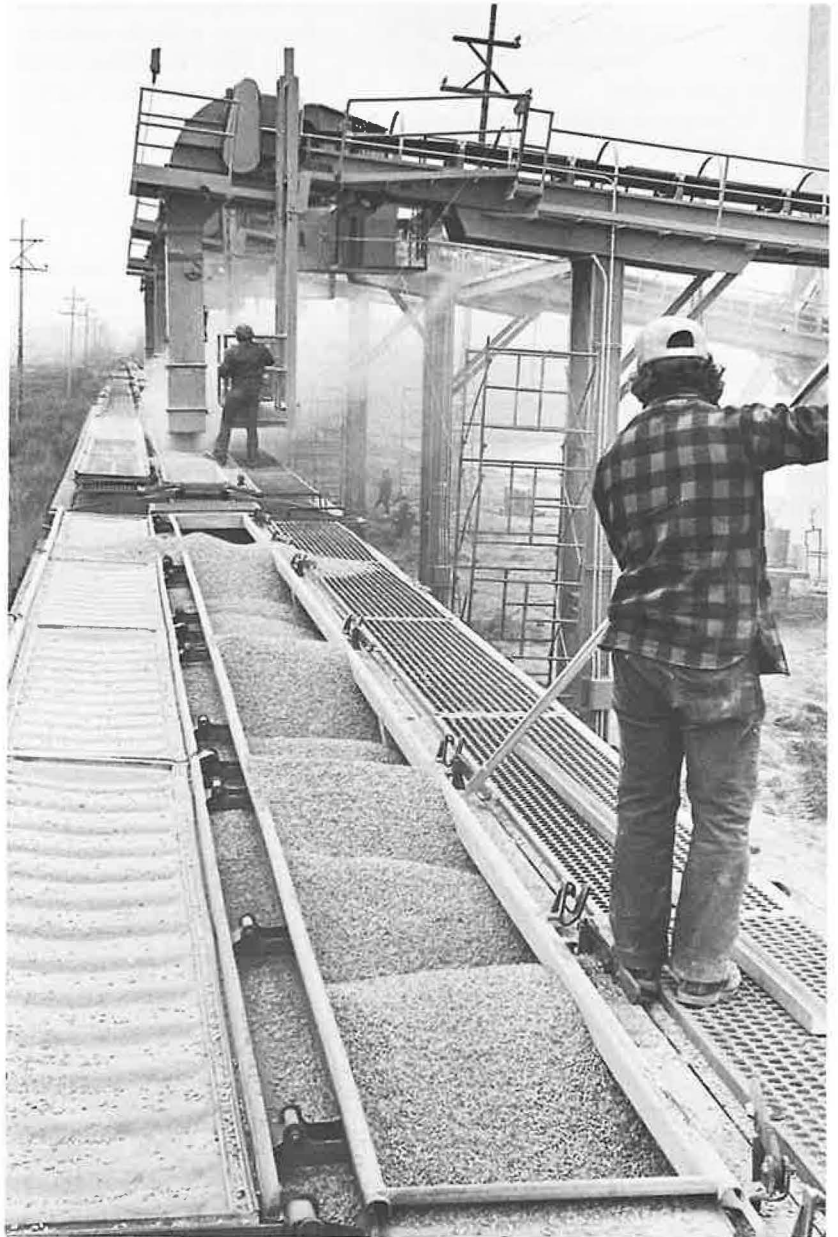


TRENDS IN STATEWIDE FREIGHT PLANNING

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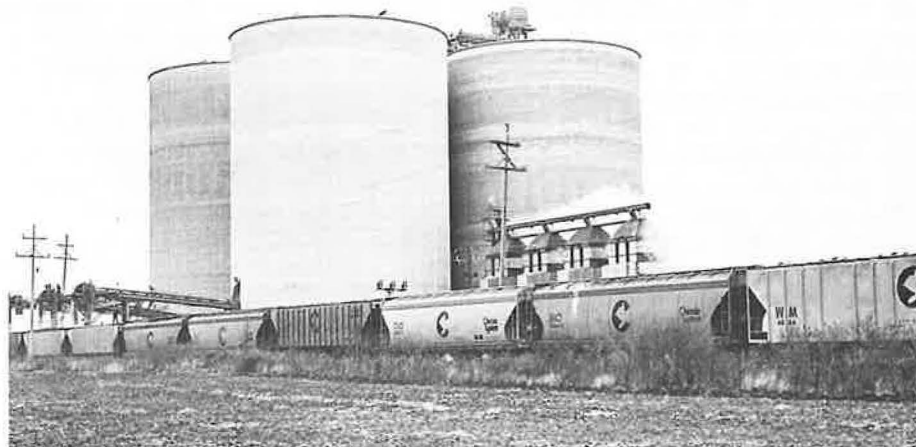
Applying coal-loading technology to grain shipping, the Chessie System Railroads inaugurated the first load-in-motion facility for corn at the Westmac elevator in Grand Ledge, Michigan. A solid train of 65 covered hoppers can be loaded in just 3 hours, eliminating costly and time-consuming switching and car spotting.

THE MOVING TARGET

Relatively rapid changes have continued to dominate the scene in freight transportation in the United States. The 1979-1982 recession, combined with rail and motor carrier deregulation, has led to (a) greatly intensified competition among carriers, stemming in part from increased pricing and market entry freedom; (b) a proliferation of new, customized services, including carrier ability to tailor services and rates to meet the needs of individual shippers; (c) deterioration in the economic health of many long-established common carriers; and (d) less information being available to the public sector (i.e., through the regulatory process) with which to plan or monitor changes in freight transportation.

Over the years there has been a gradual shift to motor carrier transport. Until recently, states were not overly concerned with increased truck traffic, as this provided additional justification for an improved or expanded highway system and additional road user tax revenues. Many of the new highways were built to Interstate standards, and thus were presumably capable of handling frequent, heavy axle loadings. Given the imperfect relationship between pavement loadings and deteriorations, the effects of this shift in freight traffic were not noticed or appreciated.

This situation has changed. Rail line abandonment in recent years has made states sensitive to the spillover of bulk freight traffic onto the highway system, particularly because of a perceived long-term incapability of accommodating this traffic on older road systems without pavement strengthening or reconstruction. States are concerned that their dollars are already stretched thinly enough without being further burdened by private sector service and infrastructure decisions made without any consideration of the capabilities of the total transport system.



This leads to the emerging challenges of the 1980s. One recurring issue is *pricing* the use of the highway system in a way that discourages unnecessary and inappropriate diversion of freight traffic (particularly bulk commodities) from the waterway and rail systems to highways. Previous mechanisms for controlling impacts, such as state restrictions on vehicle length, width, and maximum axle loading, are less effective as a result of the standardization brought about by the Surface Transportation Assistance Act of 1982. This accentuates the need for better allocation of highway costs among the different classes of users.

An even larger issue is that of minimizing total system cost or, conversely, improving overall transportation system efficiency. The unique institutional arrangements surrounding transportation systems in this country, in addition to the deregulation taking place in recent years, encourage suboptimization, particularly by private operators. Reliance on competition does not necessarily mean or guarantee overall efficiency. Hence the use of economic tools to encourage shippers to use modes and services that provide overall system efficiencies is important.

In general state departments of transportation are increasingly accepting the idea that their responsibilities are not solely confined to the state highway system, but also include the larger arena of freight transport services being provided by the different modes. States are recognizing the need for better man-

agement and coordination of transport resources—and thus the need for better freight planning—regardless of whether the infrastructure and services are provided by the public or private sector.

CURRENT ISSUES

The current issues facing the states stem largely from the need to make adjustments to the changes discussed above as well as to earlier market and technological changes. Among these issues are

- Continued abandonments of light density lines;
- Highway maintenance needs accentuated by longer, heavier trucks;
- Increased truck traffic;
- Provisions of new rail-highway and highway-port connections to improve access between modes;
- Changes in waterway use; and
- Need to ensure that no economic sector, group, or substate area will be seriously disadvantaged through changes in the type and the cost of services being offered.

Currently these issues emerge as urgent site-specific, line-specific, corridor-specific, or commodity-specific problems. The problems subsequently become projects that must be undertaken by the state transportation agency. At present, the most common types of projects are:

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- Proposed branch line abandonments, particularly those resulting in significant amounts of truck traffic being added to local and state highways, or where the increased cost of replacement transport creates economic hardships to the user.

- Corridor studies where major changes in the type or cost of transport services is contemplated. Again, the concerns are the potential adverse impacts on highway systems and the local area economy.

- Commodity studies typically involving the transport of agricultural products (primarily wheat, corn, and soybeans) and coal, in which the underlying concerns are cost and access to markets.

In the immediate future, it is expected that "project" issues will predominate. However, other issues may arise, including (a) downgrading of service on, or abandonment of, entire main lines resulting from rail mergers; and (b) increased traffic to TOFC/COFC (trailer-on-flat-car/container-on-flat-car) terminals if railroad companies increasingly get into trucking.

FREIGHT PLANNING

The National Cooperative Highway Research Program (NCHRP) has been supporting research work to improve the quality of state freight planning. For example, *NCHRP Reports 177* and *178* focus on the freight data required for statewide transportation systems planning. *NCHRP Report 177* provides a detailed assessment of existing freight issues and identifies the data required to apply related analysis techniques. The companion document, *NCHRP Report 178*, contains a user's manual that presents a detailed catalog of existing data sources, methods for obtaining missing data, and guidelines for data collection and management activities by state DOTs.

The first phase of NCHRP Project 20-17 identified freight transportation issues that needed to be addressed by demand forecasting techniques, and proposed a comprehensive research approach to develop a spectrum of such

techniques. However, because of limited funding, it was not possible to undertake the extensive research required to develop this capability.

The followup project (NCHRP 20-17A), published as *NCHRP Report 260* in September 1983, focused on documenting the current state-of-the-art in freight demand forecasting. In particular, a technique was documented to (a) quantify freight flows by highway, rail, and water for the current year; (b) forecast the likely annual freight volumes and shifts among the modes over the short term (5 years or less); and (c) provide origins and destinations by commodity within a corridor or region at the substate, state, or multistate level.

The end product is a usable freight demand forecasting technique supplemented by several case studies that demonstrate the application of the technique. Because flexibility and adaptability were paramount considerations, a process was developed that requires the user at the outset to (a) define the problem, (b) structure the technique to address that problem, and (c) concurrently simplify and adapt both the problem and the technique to produce the desired product within applicable fiscal, time, and data resource constraints. Once this is accomplished, the user carries out his customized freight demand forecasting technique.

The user's manual in *NCHRP Report 260* contains over two dozen subtechniques. The majority are not unique to freight planning and stem from other areas of transportation planning as well as from other disciplines. The three modal costing subtechniques, the shipper costing model and the rate estimating models, pertain only to freight planning. These subtechniques are probably the portions of the user's manual that will be used most often by the state DOTs. It is expected that further development of these subtechniques will occur over time both as a result of refinements brought about by use and by the need for keeping these subtechniques current.

Appreciable field testing has been done through the three case examples described in *NCHRP Report 260* as well as through applications of portions of the technique by the researchers in

other freight planning studies. The experience gained to date indicates that the technique is flexible and adaptable to a wide range of applications.

COSTING MODELS

One of the most interesting developments in state freight planning is the increasing use of costing or accounting models. These models are particularly well adapted to project-specific or statewide commodity studies after present and future commodity flows have been developed. They are integral to mode-split determination.

The costing or accounting model can be illustrated by a study in which alternative mode-and-route combinations were evaluated for transporting commodities (see Figure 1). The cost to transport different types of commodities over each segment of the freight route is estimated, including not only line-haul costs, but also transfer/storage costs at ports. The implications of such a model are as follows.

- Detailed cost data are required for each mode and transfer, as a function of commodity type, vessel size, speed (which affects interest costs significantly, especially for high-value commodities), and other factors.

- There is an assumption that under competition, price of transportation will approach cost in the short run, and price, when it includes travel time, is the prime determinant of mode split.

- The capital costs of making improvements in any one mode, route-segment, or transloading facility can be evaluated in terms of transport cost reductions over time.

- The costs of maintaining or creating new production or storage facilities can be evaluated as components of total production plus transportation costs (examples include typical branchlines and their production facilities).

The movement toward cost accounting of transportation and production, facilitated by the use of microcomputers, is a significant step toward objective freight planning.

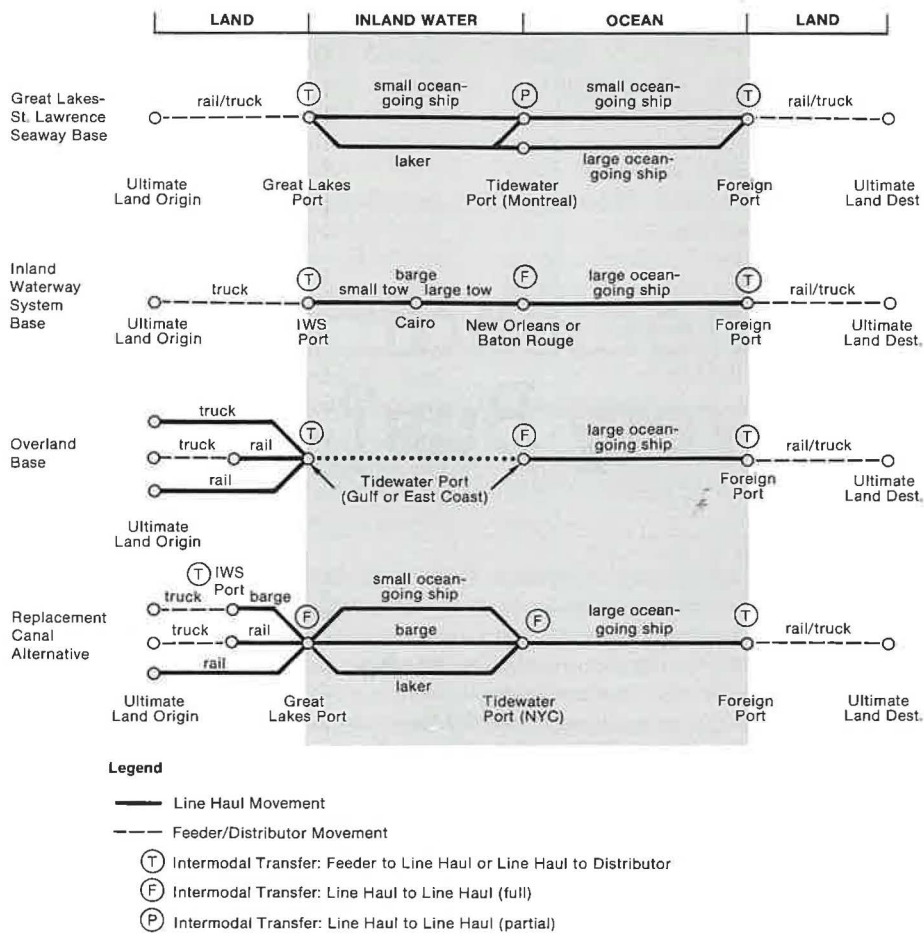


FIGURE 1 The major components of a costing model by which alternative mode-and-route combinations were evaluated for transporting commodities.

CONCLUSION

State freight planning continues to be an activity that is accepted by state transportation agencies. The issues that predominate, however, tend to be project-, corridor-, or commodity-specific rather than broad and generalized. Statewide, multimodal, comprehensive freight planning will continue to be undertaken, but mostly in terms of providing background strategies.

Freight planning, especially at the project, corridor, or commodity level, is difficult. Data quality and availability have not improved much, if at all, in the past decade, and there is not much prospect for improvement in the current atmosphere of deregulation.

Nevertheless, when critical problems and issues arise, adequate data can generally be assembled, including the critically important cost data. With this information, planners can evaluate transport costs, improvement costs, and the costs of maintaining or expanding economic enterprises, which are, in fact, the real determinants of state decisions.