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Urban Freight Movement
What Form Will It Take?

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The American way of life relies on the U.S. transportation system to move goods and services effectively and efficiently. Much of this movement occurs in urban areas, so it is natural that we wonder about what form our "urban freight systems" will take in the next millennium. Freight movement is not an end unto itself, but a physical reflection of global, national, and local economic processes. To plan for an effective freight movement system, we must consider the economic drivers of freight—the individual practices of shippers, carriers, and the public—in shaping the need for freight movement. An effective urban freight system must take into account the demands of freight movement (e.g., pickup and delivery, intermodal connections, and regional consolidation) in the context of urban passenger transportation issues such as congestion and accessibility. As we move into the next millennium, the role of emerging and yet-to-be discovered technology will further dictate how, when, and where goods will move.

Although the kinds of concerns about urban freight have not changed, the significance of an efficient and effective transportation system for urban freight has increased in response to the demands of the global marketplace and business practices. Urban freight movement is important not only to the national economy but also to state and urban economies.

More than ever before, decisions about where to locate businesses are based on how the transportation system functions. Congestion, an increasing transportation problem in urban areas, has implications for the urban economic base and national freight movement practices. The efficient movement of urban freight is a challenge that cannot be tackled by freight carriers or government in isolation; rather, this task must be viewed as one of the important demands placed on a community's transportation system. Concomitant issues also must be addressed. Some issues, such as loading zones and hazardous materials movement, are unique to freight movement. Issues in which freight is one of many contributing factors, such as incident management or air pollution, must be addressed in their larger context, considering all the elements that create the problems.

This article is divided into five sections. First, it provides a historical snapshot of urban transportation planning and national transportation policy in relation to the movement of urban freight. Second, it presents the influences on freight demand. Third, it examines the potential effects of research and technology on urban freight movement, particularly how the Intermodal Surface Transportation Efficiency Act (ISTEA) is changing urban freight transportation planning and policy development. Fourth, it addresses the topic of educating

future decision makers, planners, and engineers. Finally, it considers the direction that urban freight movement might take in the next millennium.

BACKGROUND

Traditionally, urban freight did not play a significant role in transportation planning or in the development of transportation projects. Beginning in the late 1950s, some preliminary transportation planning efforts were undertaken that identified truck trips as minor elements. Two of these efforts were the Detroit Transportation and Land Use Study and the Chicago Area Transportation Study (*1*). One of the first documented efforts to address the role of urban freight specifically was the book *Freight and the Metropolis* (*2*), written by Benjamin Chinitz in 1960, which focused on the New York City metropolitan area. The recognition of urban freight transportation as a national issue can be traced to the 1962 Federal Aid to Highway Act, which required cities to plan by using the now famous "3C" process: comprehensive, coordinated, and continuing.

INFLUENCES ON URBAN FREIGHT

Several developments during the past 25 years have changed the way we think about urban freight. Some are global, some are national, and others are local. At the global level, as all nations increase their reliance on each other for labor, products, and markets, the transportation system becomes a significant element of individual business (*3*). Maximizing the efficiency of the transportation system has resulted in many changes in the way urban goods move.

On the global scale, private companies and individuals have responded to the changes with new delivery systems. Perhaps the best-known example is the shift to integrated multimodal shipping and containerization of freight. Containerization requires a uniform parcel in which to move goods. It is easily stacked on ships and allows smooth transfers at intermodal terminals (e.g., marine ports and railroad facilities). Trucks then can transport containers to their final destinations. Linking containerization to the process of multimodal just-in-time delivery decreases the need for warehousing space and results in a manufacturing system that depends on an urban freight system that can deliver products reliably. Thinking about goods delivery on a global scale makes trips more efficient and alters the geography of urban freight origins and destinations.

At the national level, several federal policy changes have dramatically recast the freight industry. First came the deregulation of transportation modes; the airline industry was deregulated in 1978, then the rail industry, and finally the trucking industry. Deregulation has increased competition, created higher levels of efficiency, made companies more dynamic, and increased traffic on the surface transportation system and in the air. For urban freight movement, this change has meant cheaper prices, better service, and wider geographic coverage.

Another national level policy change that affected urban freight was the North American Free Trade Agreement (NAFTA). Enacted by the U.S. Congress in 1992, NAFTA is an international agreement among the United States, Canada, and Mexico. Its purpose is to lower trade barriers among the three trading partners so that export/import activity increases. In many places, the result was exacerbated congestion, especially at border crossings, which inhibited the movement of freight across the border—the exact opposite result of what NAFTA was supposed to accomplish. NAFTA also placed an even greater

demand on the urban transportation systems that were not expanding to meet the increased volume. Although it is questionable whether the net effect of this policy has been good or bad for the United States, one clear result of NAFTA has been the increased transportation of goods in urban areas (*4*).

Local factors that influence urban freight movement include such diverse trends as consumer shopping, urban development policies, and traffic congestion. First, the combination of increased shopping from home (via catalogs, cable television shows, and the Internet) and highly efficient package delivery companies—such as Federal Express and United Parcel Service—has increased trips to local businesses and homes.

> Kurt Salmon Associates (KSA) estimated that in 1992, 85 percent of all retail sales were through stores and that 15 percent of retail sales were through nonstore retailing . . . . For the year 2010 only 45 percent of all retail sales are expected to be through stores, thus 55 percent of sales will be through nonstore retailing. KSA also indicates that an ever-increasing portion of all types of retailing will require next-day delivery. This trend will also drive freight supply and demand away from long-haul carriers and toward air carriers coupled with less-than-truck load or smaller-class truck freight shipments (*5*).

Second, the physical form of the city for the next century and its relationship to transportation must be considered. If “smart growth” policies are implemented, then urban sprawl could decline dramatically. This occurrence might affect decision making about the locations of urban freight facilities (which tend to be on the expanding urban/rural fringe), time of day deliveries, and intermodal connections.

Third, because congestion imposes costs on the movement of urban goods, any policy or program that reduces congestion across the system could have a positive effect on goods movement and a concomitant benefit to business productivity. However, incompatibility between the needs of the public and private sectors may make this goal difficult to achieve. “Truck movements, which are largely responsive to shipper demands, are often the target of congestion-based solutions, such as peak-hour bans, and not the object of efforts to ensure their more efficient use” (*6*).

The transportation of urban freight and how we plan for that movement has changed since the early 1960s, when the 3C process was introduced. Factors that influence change exist at the global, national, and local levels. The role of the federal government—enhancing urban freight transport—has been identified. One of the most significant factors affecting urban freight change was the enactment of the ISTEA in 1991.

NATIONAL TRANSPORTATION POLICY, ISTEA, AND TEA-21

With the enactment of ISTEA, the role of urban freight in the transportation planning process changed dramatically. For the first time, urban freight was specifically mentioned as one of the 15 planning factors that required attention in the planning process. Freight transport and freight facility location were factors to be considered by metropolitan planning organizations (MPOs) as they developed their long- and short-range transportation plans and programs. The ISTEA planning factors also placed a new emphasis on the role of intermodalism and intermodal facilities as elements that should be considered when

improving the overall transportation system (*7*). For the first time, urban freight was granted its own identity in federal law.

As a practical matter, MPOs developed various techniques for implementing the planning factors and giving urban freight a higher priority. They set priorities for urban freight projects, surveyed shippers, and included freight as an element in corridor studies. They also held workshops to raise the level of awareness about the role of urban freight in the planning process.

One of the most significant developments for MPOs was the creation of urban freight councils. These groups, made up of individuals from both public and private sectors, represented one of the first efforts to offer the private sector a role in developing regional transportation plans and policies. It also represented a major change in the way transportation projects were considered for implementation and funding. Some of the earliest freight councils were located in San Francisco, California; Seattle/Tacoma, Washington; Toledo, Ohio; and Chicago, Illinois.

Major projects to enhance urban goods movement were undertaken as a result of ISTEA. Some of these projects were the Alameda Corridor Project in Los Angeles, California; the Greater Columbus, Ohio, Inland Port Project; Northside Highway and Rail Corridor Project in Galveston, Texas; and the Chicago Area Consolidation Hub. The U.S. Congress reaffirmed its commitment to maintaining the importance of urban freight in the transportation planning process when it passed the Transportation Equity Act for the 21st Century (TEA-21).

Technology

Technological innovation is one of the most exciting aspects of urban freight movement. All the modes have had significant changes to their technologies. Intelligent transportation systems (ITSs) will play an increasingly important role in improving traffic flow and managing the logistics of urban goods movement. Improvements may be made by rerouting traffic during peak times and managing random incidents on the highway system. The use of global positioning systems for tracking and communication will expand in the future. Trucking firms and package delivery companies already use global positioning systems (GPS) to track vehicles and parcel flow. GPS use will flourish, providing information during accidents and helping reroute vehicles more efficiently. In addition, automated vehicle location, automated bills of lading, and electronic vehicle tagging will enhance freight transport in and through cities (*8*).

The traditional core of urban freight movement—access to the businesses in the central business district—remains important. As was noted in Transportation Research Board (TRB) Special Report 240, “of the last 70 buildings built in Boston and New York City, only a few have been built with a single facility for off-street goods delivery” (*6*). One of the best examples of central city access technology improvements comes from the European Logistics and Multimodal Transport Management Project, known as LEAN (*9*). LEAN takes a fresh look at organizing the logistics of urban freight movement in the city. It also suggests the use of computer reservations for loading zones, thereby eliminating the need for trucks to search for parking locations**.**

Research

To improve freight flow and handling, research must be a major element in the urban freight agenda of the next millennium. As a result of conferences sponsored by TRB and the U.S. Federal Highway Administration (FHWA), meetings and sessions of the TRB urban freight committees, and concerns of state departments of transportation (DOTs) and MPOs, numerous research topics have been identified and recommended for investigation so we can make more informed decisions about freight movement. Three general research areas have been identified: modeling, data, and organizational issues.

One of the most hotly debated topics involving urban freight is how to generate a higher priority for freight projects than for other "traditional" road projects. Given the existing criteria used by many MPOs and state DOTs to evaluate project priorities, it is difficult for urban freight projects to gain a high priority rating. One way to counter this problem would be to research the effect of goods movement on a regional economy. These dollar effects could become one of the criteria for evaluating projects. This research should be done, because issues such as job creation and regional competitiveness often are more relevant to decision makers than solely improving the efficiency of the transport system.

A related research need is a model of urban freight travel demand that would be equivalent to the four-step passenger model. Another development would be to tie this urban freight "four-step" model to a regional input/output model that could measure the financial and employment effects of freight-related projects. Some preliminary steps for the urban freight travel demand model are specifications on a standard set of design elements that indicate how to develop a model of an urban freight network. Trip generation tables and regression lines for trips by urban freight vehicles also must be generated. The trip generation data could be refined later by seasonal and temporal variations.

One serious research need is for freight origin/destination (O/D) data by mode and commodity group. These data could be used in many kinds of studies, for example, to create trip generation statistics and to validate and calibrate models of urban freight travel demand. In addition, more research is needed to create default parameters for urban freight–related land use, density, and number of employees per traffic analysis zone. Without such information, every urban freight study is unique; consequently, the costs and the time required to obtain reasonable results are increased. Another research need is to determine the transferability of multipliers, regression coefficients, and parameters from one urban area to another. Identifying these relationships also would generate savings in time and money.

The third area where research is needed is the perspective of transportation organizations. Relevant topics include broadening the perspective of our investigations beyond traditional infrastructure and including operations and maintenance. We also need to research how to collect data from the private sector. Although the general perception is that companies do not want to share information, some evidence indicates that, when approached in a way that benefits both parties, the private sector is willing to provide data.

We also must address the issue of differing time frames to implement policy between the public and private sectors. Public sector organizations operate with a 20-year time frame for long-range plans and seek results in the future. They also use 5-year time frames for capital improvements programs and 1-year work programs to accomplish well-defined and publicly reviewed projects. In addition, their bureaucratic structures often require significant amounts of time to reach a decision. Transportation firms are quick to act and expect immediate results. The two perspectives appear to conflict, but evidence from cities such as

Chicago and San Francisco indicates that the public and private sectors can work together to arrive at mutually beneficial solutions to common problems (*10*).

The final research focus should be on increasing the private sector's understanding of the demands that business practices place on the transportation system. Linking business productivity to transportation investment may increase our collective understanding of the impact of improved transportation on increasing profit and enhancing the community.

EDUCATION

The education of transportation planners and engineers during most of the 20th century focused on how to move private automobiles effectively. With the passage of ISTEA, the emphasis shifted. To some degree, it forced professionals to investigate land-use alternatives as possible solutions to mobility problems. As a result, many professionals had to shift from a more focused approach to one that was more open-ended and multimodal (*11*). In the future, planners and engineers will come to their jobs with new skills and, most important, new attitudes about how to create and maintain "the best transportation system possible." This approach includes generally recognized curriculum elements, such as urban planning and traffic engineering, as well as elements specific to urban freight movement, such as logistics. Multidisciplinary courses also should be developed for this purpose.

Professionals must be able to communicate with diverse groups that are made up of other professionals, practitioners, elected officials, and the public. Successful communicators need training not only in writing and public presentation skills but also in being effective members of a group or team. Transportation problems are more complex than in the past and require more than one kind of expertise to solve them. Today's issues require that solutions be generated from a group of people who offer a range of skills.

The role of urban freight movement should be a major curriculum element in the new approach to transportation education. It must address the issue of change. Our deregulated transportation system is dynamic. Private companies must be able to adapt quickly to market and technological changes. Given this unique perspective, they have to make a contribution to the urban freight education of transportation planners and engineers. Government must protect health and safety without crippling the capability of the transport industry to meet the demands of society. Meeting this goal will require multimodal and intermodal approaches to problem solving.

CONCLUSION

The relationship between urban freight transportation and regional economies is not yet well-understood. We do know that improved freight movement in urban areas can have a positive economic benefit. In the next millennium, urban freight planning should play a more important role in the overall process of transportation planning and policy development. The elements of ISTEA that moved urban freight toward a more central role in transportation planning and policy implementation have improved freight movement in some cities; they have the potential to improve many other urban systems. However, the lack of understanding implies that policies and funding to help freight movement may be misdirected.

The adjustments and innovations developed in the private sector also have enhanced freight movement in cities. Nonetheless, individual freight transport decisions made to minimize costs or maximize profits may have unknown consequences on local

transportation systems. Perhaps urban freight councils can provide a mechanism by which government and companies can significantly increase the effect of their individual efforts by joining forces. ITS technologies and rethinking how freight moves in cities hold tremendous potential for improving freight flow. Without research focused on urban freight issues, the potential of government and the private sector to reach their goals may never be realized. Finally, if we desire significant progress in the next 50 years, we will require an educated, diverse work force that is qualified to address the old problems as well as still-undiscovered urban freight issues.

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