leads most citizens to believe that, if the engineer were only smart enough, they would always receive a green light. That mystique also leads uninformed administrators to believe a traffic signal system requires a super computer. The task of the transportation system manager is to find the most cost-effective solution.

Traffic signal systems fall into two basic categories: (a) fixed-time traffic systems and (b) traffic-responsive systems. The traffic-responsive system detects and responds to actual traffic movements. One must first ensure that existing signals are warranted and second that potential new installations are warranted. One must then determine traffic flow characteristics. Is there a repetitive daily traffic flow that can be anticipated within reasonable bounds and programmed into a fixed-time traffic system, or does the traffic flow fluctuate sufficiently to require a traffic-responsive control logic?

Advances in computer technology are beginning to allow us to monitor what the traffic signal is doing at each location. In the past, we relied on visual observations by technicians or police personnel. Accurate assessments need to be made of current traffic control systems. The traffic-responsive system detects and responds to actual traffic movements. One must first ensure that potential new installations are warranted. One must then determine traffic flow characteristics. Is there a repetitive daily traffic flow that can be anticipated within reasonable bounds and programmed into a fixed-time traffic system, or does the traffic flow fluctuate sufficiently to require a traffic-responsive control logic?

SUMMARY

The transportation system management requirement of the federal planning and funding programs is brought about largely by significant concerns relating to energy, clean air, and the most economic way to manage transportation. Traffic engineering techniques have always been geared to the cost-effective use of existing facilities, and political and funding efforts are now emphasizing those techniques. No time in history has ever been more opportune for implementing traffic engineering programs, which are highly visible and greatly needed.

FREIGHT MOVEMENT: A CRUCIAL COMPONENT OF TRANSPORTATION SYSTEM MANAGEMENT

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This paper points out how important freight movement is to the functioning of the urban economy, how urban development can be encouraged by including freight movement in the urban transportation planning process, and how the inclusion of freight movement is both logically and legally supported. It is appropriate to apply planning funds to freight movement if these activities are included in the unified planning work program. Thus, the types of freight planning activities considered appropriate can be as varied as the cities that apply for those funds as a portion of their unified planning work programs. The important role of freight planning in the transportation system management (TSM) element is explored. Examples are given of TSM actions that can significantly improve the flow of both freight and people by reducing the conflicts between these essential activities.

The crucial role of freight movement in urban areas is aptly pointed out in the advertisement of the American Trucking Associations: "If you've got it, a truck brought it." Although this statement may be an exaggeration, it makes the point that movement of freight in urban areas by trucks is essential to economic functioning—even survival—of urban communities. The movement of freight, therefore, should receive attention in the urban transportation planning process in a degree commensurate with its importance. Yet, some claim that it receives little or no direct attention in the planning process and that the attention it does receive is not adequately directed to the issue of efficiently moving freight.

The most available means for influencing the efficiency of freight movement is to include considerations of freight movement in the transportation planning process. This would bring us closer to the basic purpose of planning: to improve the quality of life. In fact, there are efforts that are expanding the planning process to specifically address the quality of life (2, 3). Unfortunately, many planners shy away from this broad purpose of planning by confining their perspectives to already familiar ones such as planning for passenger movement.

This paper shows that the inclusion of freight movement in the transportation planning process is both a logical and a necessary action. It presents arguments and examples that illustrate how a community's well-being is dependent on the efficient movement of freight. It also points out that this can be done through adjustments to the existing programs with minor redirection of planning funds. Often a significant improvement in transportation system efficiency can be achieved by giving a little extra effort to the impacts of planning recommendations on freight movement.

IMPORTANCE OF EFFICIENT FREIGHT MOVEMENT

The dependence on efficient freight movement is dramatized by occasional short-term breakdowns in the supply of freight transportation services to and from businesses and homes. A severe storm prevents supplying supermarkets with food or homes with heating oil. Truck strikes prevent supplying freight to businesses, causing them to close down and lay off workers. Sanitation workers strike, and the accumulation of refuse causes significant health hazards. These and other dramatic cases of disruptions to the efficient flow of freight attract considerable attention and reinforce its importance.

These are extreme cases in which the supply is cut off or, stated from the demand point of view, in which...
the effective price becomes infinite. But other examples occur daily and are so numerous and seemingly ordinary that they do not appear in the news: A truck is forced to wait before it can make a delivery, delaying or temporarily cutting off subsequent deliveries; businesses waiting for deliveries run out of stock, lose customers, and pay employees for unproductive time; a home delivery is temporarily prevented, keeping someone waiting for it, with possible loss of salary or vacation time, thus increasing the effective price of the delivered item; trucking firms have more vehicles and drivers than would be necessary if delivery trucks were not forced to wait for limited loading dock space or to wait in congested side streets or narrow alleys.

All the temporary but daily interruptions in freight flows increase the cost of transportation and thus reduce our standard of living and quality of life by requiring more resources and income than should be necessary to move this freight efficiently.

1. Businesses that repeatedly run out of stock while waiting for deliveries lose sales and their employees incur unproductive time. To avoid this possibility, many choose to keep larger inventories than would be necessary if freight deliveries were more efficient and reliable. Either of these options raises the costs of doing business. Almost any type of business can be affected, from retail stores to restaurants, wholesalers to home remodelers. Since these businesses are affected by the same increased costs of operation, they all must raise their prices to stay solvent. This invalidates the argument that competition will keep the prices down, and we all wind up needlessly paying extra.

2. Persons who must take time off from work to wait for a delivery can count their lost salary or vacation time directly as an increased price resulting from the delayed delivery.

3. Trucking companies must charge a higher price for each delivery in order to cover the cost of unproductive idle time spent waiting to make deliveries. Since all trucking companies incur these same costs, they have little fear about passing them on; i.e., competition does not prevent these costs from being passed on to the consumers.

The consumer bears the burden of the increasing delays and costs for urban freight distribution. Carriers simply pass the additional costs of servicing the central business district via surcharges and higher rates to the retailers. The retailer, in turn, passes these costs on to the consumer. According to Drake (4), "The problems of goods movement in a metropolitan area are the same for all. . . . These problems are built into the freight rate and therefore are ultimately borne by the general public." More important, consumers are not organized to hold members of the business or planning community accountable (1, p. 12).

The geometric requirements, e.g., for turning and parking, of trucks are strikingly different from those of automobiles. Thus, the omission of truck movement requirements from consideration in the allocation of public curbside parking space can cause major problems. A Teamster official in Saginaw, Michigan, pointed out that parking meter spaces are frequently placed so close to alleys that automobiles parked in those spaces seriously interfere with turning movements of trucks attempting to enter and leave those alleys for pickup and delivery of goods (1, pp. 3-5). Figure 1 illustrates a particularly troublesome situation in Bay City, Michigan, where trucks are not able to turn into or out of the alley for several blocks. Trucks are forced to enter the alley several blocks away and then travel several blocks farther before they can exit. Any other truck parked in the alley making a delivery blocks all other trucks trying to get in or out. Truck drivers say it is not unusual to spend 2 or 3 hours to enter, service, and exit this alley. Considering the large number of trucks using this alley, with each driver and equipment costing between $18 and $36/h, there would obviously be significant community savings by simply removing a few parking meters at each alley-street intersection.

The recommendations made by public planners often influence the distribution costs a community must bear. Stockton, California, has been actively clearing and rebuilding its central business district (1, p. 5). One phase of this program provides off-street parking by converting the land cleared of old buildings into parking lots. Unfortunately, the adjacent alleys were absorbed into the parking lots to maximize the number of off-street parking places. Thus, much of the once extensive alley system, which effectively separated passenger and freight movement, has been eliminated. Carriers are now forced to make on-street deliveries, which are considerably less efficient than alley deliveries for both passenger and freight movement. The parked trucks, many double-parked, now contribute to the congestion on those streets and increase the conflicts among transit, automobile, and pedestrian modes. This conflict between modes for scarce street space is aggravated by two factors:

1. Several new multistory office buildings were built without proper consideration of their freight-movement needs and consequently have insufficient off-street loading facilities, and

2. The curbside space allocated to the loading and unloading zone was kept small to provide the maximum number of on-street parking spaces for automobiles.

Consequently, the demand for freight movements in this area of town is increasing while the total supply of needed
facilities is drastically reduced and no compensating increases are being made in curbside loading zone space.

This lack of loading and unloading facilities affects everyone. Because of their size, trucks appear to dominate the vehicle flow in the Stockton CBD and, to the sidewalk shopper, the visual impact is overwhelming. The intended purpose of the increased off-street parking was to make the downtown area more attractive. However, because the downtown revitalization plans omitted the crucial component of freight movement, the combination of actions taken may be having just the opposite effect.

Freight movement delays are not the only type of problem. The size and operating characteristics of freight vehicles may create significant safety problems in traffic (1, p. 6). Short, upwardly inclined acceleration lanes create safety problems when trucks enter the traffic stream because they accelerate slowly. Sharp curves in the roadway can cause freight to shift and threaten the stability of the truck unless it slows to speeds well below those of passenger vehicles using the same street. Both of these cause potential conflicts between freight vehicles and passenger vehicles.

URBAN TRANSPORTATION PLANNING PRACTICES

Urban transportation planning traditionally was concerned with providing and maintaining transportation facilities for safe and efficient movement of vehicles within an urban area. These facilities serve different activities vital to the functioning of a metropolitan area, including the movement of its freight. But because the traditional orientation is on vehicle movement, the great bulk of which is passenger vehicles, any benefits that accrue to freight distribution are incidental to the objective of providing adequate capacity for total vehicle movements (1, p. 11).

This orientation is now changing to one of facilitating the movement of people instead of vehicles, by placing the emphasis on high-occupancy passenger vehicles. Currently, few urban transportation planners consciously pursue the complementary objective of facilitating the movement of freight (1, p. 16).

Transportation planners have assumed that the needs of freight-carrying vehicles are essentially the same as those of passenger-carrying vehicles. Therefore in the long-range planning process, freight-carrying vehicles are converted to automobile equivalents and added to automobile trips to get equivalent total vehicle flows. This approach was accepted as reasonably treating the truck flows, or what is now called the stem driving those of passenger vehicles. Therefore in the stream, it was a step in the right direction (p). A methodology is currently under development that will more adequately represent the differential impacts of truck types in the traffic stream and may eventually become available as a portion of the urban transportation planning system computer battery.

Although some needs of freight-carrying vehicles are addressed by the current planning process, many local needs are not. Taken individually, the inefficiencies and environmental consequences resulting from not treating each need are generally small; taken collectively their impact is substantial (1, p. 1).

Subsequent sections show that many freight distribution problems can be traced to a lack of consideration for the unique characteristics of different freight distribution practices and a variety of freight-carrying vehicles. Design considerations, operating policies, geometric features of streets, placement of street furniture, number and placement of loading zones, building codes, and land use planning can result in unnecessary delay and expense in a number of instances. In most of these cases the problems can be avoided with a little extra planning effort (1, p. 2). Most important, planners need to consider the implications for freight distribution when they evaluate various future actions.

FUTURE IMPACTS OF INEFFICIENT FREIGHT MOVEMENT

Changing Structures

The highest rate of population growth has shifted from large urban centers to small and medium-sized urban areas (6, 7, 8). Growth in many of these areas will be accompanied by problems, including that of efficiently moving freight. An additional problem that will exacerbate those inefficiencies is that industries currently requiring large amounts of truck travel are the ones forecast to have highest growth rates (21).

A casual observation can detect differences in freight movement efficiency among different metropolitan areas. Regional economists refer to these differences as regional locational advantages or disadvantages. The importance of these locational advantages is easily seen at the metropolitan level where many industries have relocated from the congested downtown to the less congested suburbs. The relative locational advantages of different regions are less commonly acknowledged, although the impact on employment opportunities is often greater. The population shifts now occurring from larger to smaller areas is one illustration of the relative locational advantage of these smaller areas; another is the relocation of many industries from the congested Northeast to the less congested South and Southwest.

Although there are many factors other than transportation costs that determine relative locational advantage, an urban area that improves its efficiency of freight transportation relative to other regions will have a better chance of attracting growth in industries particularly sensitive to these transportation costs.

Planners' Perceptions of Impacts

Guidelines are commonly developed for the functional responsibilities of an organization and each of its components. Often these functional statements serve as a constraint on the perceptions and imagination of the people working in these organizations. Transportation planners are no exception, and consequently few acknowledge the many ways they already do or can influence the development or decline of a region. The director of one metropolitan planning organization (MPO) indicated that development and promotion of commercial and industrial districts are and should be the responsibility of the private sector and that the MPO's major role in these planned developments is to ensure reasonable adherence to land use planning guidelines. Such a precise definition of responsibilities does facilitate the management and operation of planning agencies. However, it seriously fails to recognize the major opportunities and public responsibility of the MPO to facilitate development of the community by revitalizing the CBD or by encouraging and controlling the development of well-planned industrial districts (1, p. 9).
Opportunities for Planners to Influence Impacts

1. Many new commercial or industrial parks are developed outside the current urbanized area. The narrow definition of responsibility often practiced excludes those areas from transportation planning consideration until the boundaries of the urbanized area are extended or perhaps until the total vehicle volume (truck and automobile) begins to cause significant impacts on other areas that are already being considered in the transportation plan. As a result of this oversight by public transportation planners and the desire of private developers to keep their costs to a minimum, commercial and industrial tracts are frequently developed without adequate external or internal accessibility. The total community value of these commercial and industrial parks would be increased and the economic base of the community enhanced if the transportation planners considered these developments as a portion of the future urbanized area and planned the required future transportation networks as a portion of the development (1, p. 9).

2. Quite often a city or region desires to attract new economic activity both for the jobs and for the additional tax base associated with it. The most common action taken is to have an advertising campaign. However, some areas grant special tax incentives and provide local government bonds to finance facilities. Sometimes these actions are successful, sometimes they are catastrophic, but generally they are neither. A major reason is that the underlying economic structure and locational advantages of the area are not adequately addressed.

Knowledge of what freight commodities are being shipped into and out of a metropolitan area can be a valuable input to the development of a community (9). An economic base study performed in Modesto, California, found that the primary goods imported into the community were fertilizer, seed, farm machinery, and other farm-supporting products (1, pp. 8-9). The area’s exports were largely raw fruits and vegetables, which were processed elsewhere. To expand the economic base, community leaders concluded that a logical course of action would be either to encourage the processing of the commodities consumed in farming or to encourage the processing of the fruits and vegetables in Modesto before they were exported from the region.

Having identified the actions that would most significantly reduce Modesto’s imports or increase the value of its exports, they were faced with the same problem that others must deal with: What are the chances of success associated with each option? They preferred to attract food processors, but food processing produces large amounts of by-products and would require a substantial capital investment to expand the sewage treatment capacity. The same economic base study that identified the major freight flows also found that no other city within 160 km (100 miles) had the sewage capacity to handle food processing on a large scale and that Modesto had a central location in the food growing region of the San Joaquin Valley, proximity to a major market (San Francisco), and ready access to both highways and major rail lines. Thus, the conclusion was that, if the city were to make a substantial capital investment in a sewage treatment plant, the combination of all its other locational advantages would give it considerable competitive advantage over other communities in the area to attract the food processing industry.

The community built a sewage treatment plant of a capacity that would never have been justified by the previous forecasts of population growth. Because of this careful planning, Modesto today is the home of Berberian Haig, the world’s largest almond processing plant, Ernest and Julio Gallo Winery, Campbell Soup Company, Del Monte Corporation, and C.V.C. General Foods. A secondary impact resulting from the food processing industry locating in Modesto is that major manufacturers of cans, glass containers, cardboard boxes, and other packaging materials have located in the Modesto area to support the food processing industry.

Transportation planning was included as a significant part in planning the direction, rate, and type of growth desired in various parts of the area. Thus, the community effectively encouraged new development to concentrate in planned commercial and industrial parks. This transportation and zoning planning made it possible to provide efficient locations for the industries, which brought new jobs to the region. At the same time it also provided the means for minimizing the conflicts between the freight movement requirements of the community and the desires of residential and office areas for relative freedom from noisy truck traffic (10). Modesto clearly used an understanding of commodity flow to direct the economic development of the community.

3. Many older cities already have major infrastructures that have developed through the years. Often these areas were developed long ago by the use of design standards for transportation facilities quite different from those used today. Baltimore City has major port and rail facilities located within the city. These are a significant potential resource. However, the surrounding streets are inefficient for a number of reasons. Consequently, there is a continuing exodus of industry from the city to the suburbs or to newer, more efficient cities in other regions. This is an excellent example of the need for transportation system management. Baltimore has valuable capital resources, but needs a major effort to improve the efficiency of these facilities (11). New York City is attempting exactly this type of approach with its garment district. The city is faced with an industry that is relocating both to the suburbs and other regions. New York City has begun a program of transportation system management designed to improve the efficiency of the freight delivery system in the garment district. It is hoped this will slow the exodus of the garment industry from New York City and thus keep employment opportunities there (12).

PLANNING PERSPECTIVES

Planners Must Take Initiative

The people most directly involved with freight movement (shippers, carriers, and receivers) commonly accept the inefficiencies of the transportation system and either feel they cannot influence the efficiency of the system or choose not to spend time influencing it for several reasons (1, pp. 12-13).

1. Many problems inadvertently created by planners and those who operate businesses cause freight distributors relatively minor delays, which, taken individually do not appear to be sufficient cause for complaint.

2. Problems may persist for years but occur only intermittently, and thus the business community simply accepts each one as an unavoidable inconvenience associated with doing business in the community.

3. The shipper or receiver likely faces only a few distribution-related problems in normal operations. When compared to other problems of running a business, a couple of hours or an occasional day’s delay in shipping or receiving freight is considered a minor problem.

4. Many people in business are simply not aware that any course of action is available for resolving some
of their distribution problems.

5. Members of the business community, especially for-hire carriers, are reluctant to complain too vigorously for fear of attracting attention. They recognize that their trucks are not always welcome by the community and do not want unfavorable publicity that could result in further restrictions on their operations.

6. Those in the private sector generally do not find it worthwhile to encourage any major improvements in system efficiency for freight because it would have no real effect on their profit margin. Since freight movement is quite competitive, any reductions in operating expenses would accrue directly to the consumer.

Correcting these inefficiencies would result in large savings that will accrue ultimately to the community, not to those selling transportation services. Conceptually the magnitude of these savings can be calculated by multiplying the time spent at each delay by the hourly costs of each vehicle and occupants encountering these delays. The same could also be done for those kept waiting for the pickups or deliveries. The average person in business only perceives the savings that his or her particular business would make in its operations and thus, unlike the planner, is not concerned with the total economic, environmental, and social costs of freight distribution. Therefore, if the community's freight distribution system is to be improved at the points where it interfaces with other public needs for transportation, the responsibility and initiative lie with the transportation planner (1, p. 13).

Crucial Role of Freight Component in TSM

The change in federal urban transportation planning perspectives resulting from the TSM requirement is particularly relevant to the efficient movement of freight. Even though there is not yet consensus on how freight movement should be included in long-range planning for urban areas, a number of opportunities exist for improving the efficiency of freight movement by considering it explicitly as part of the relatively small system changes that are made quite regularly. The payoff in increased efficiency from these changes is potentially high, even to the point of encouraging some relocation of employment opportunities to more efficient regional areas.

Examples of TSM Freight Considerations

An Urban Mass Transportation Administration (UMTA)-sponsored study of a proposed automobile-restricted zone (ARZ) in Boston found that the present volume of freight movement that must occur even after the proposed time for restricting vehicle movement in the zone (11 a.m.) is far too great to be ignored. The means for making these deliveries must be included in the plan, for any additional freight costs or inconvenience from undelivered freight would be passed directly to the consumer, who would likely respond by avoiding businesses subject to these effects. Such evaluations of the effects of planning alternatives on freight movement are a necessary part of genuinely comprehensive planning.

An earlier study done in the New York City garment district found that practical low-capital improvements had a high payoff in improved efficiency. These changes included installing curb cuts for material-hauling handcarts to separate them from heavy pedestrian flows, restricting parking near intersections to create turn lanes that allow through traffic to proceed, retiming traffic signals during nonpeak times to give more green time to facilitate freight movement vehicles, requiring shorter loading and unloading times, and enforcing traffic regulations. In addition, a type of ARZ was implemented on several cross streets (12, 13).

A study dealing with pedestrian flows in New York City found that the traffic signals were timed only according to automobile performance characteristics. Since sections of many cities have large concentrations of many modes on the same links, it is reasonable to assume that using a proper combination of performance characteristics from these modes would improve the overall efficiency of the system for the total community of users. One possible way to approach these system signal timings would be to use some of the computer programs being developed for a similar purpose (14). It is just as important to include trucks as one of the modes as it is to include buses, and this would require the computer program to consider multimodal interactions on the traffic system.

The behavior of pickup and delivery trucks is significantly different depending on whether they are performing stem or zone driving (15). An example is a bus service that picks up passengers at many regular stops in the suburbs, makes an express run into town, and discharges passengers at a number of regular stops. The amount of impact on traffic flow is greatly affected by whether the trucks are merely driving through the area (stem driving, which is analogous to the express portion of the bus trip) or whether they are making stops to pick up or deliver freight (zone driving), which can significantly interfere with traffic flow. Fortunately, many low-capital actions can have a significant effect.

1. Loading zones can be located to meet the needs of the freight movers and to maximize the flow of vehicles on the existing streets.

2. Loading zones can be restricted to the actual loading and unloading of freight (e.g., vehicles such as utility trucks can be restricted from parking all day).

3. Vehicles, such as messenger services, not loading or unloading freight can be prohibited from using the space.

POLICY CONSIDERATIONS

Policy Gives Direction

Transportation priorities have evolved through operating policies at both local and federal levels. Many urban transportation policies are set at the local level and consider guidelines set by the federal government. Federal regulations now require as a condition for receiving federal aid that the urban transportation planning process include a multiyear prospectus and an annual unified planning work program (16, section 450.114). An important function of these requirements is that the plan should set forth the underlying goals and policy objectives and the strategy selected to accomplish them (16, appendix). Thus, local policy is established by selecting items to be included in the prospectus and work program from those eligible for federal aid.

Local Determination

Only a few planning activities are given a high priority at any given time. But even these priorities are not absolute. A number of suggested actions are listed in the appendix to the planning regulations under the title Advisory Information (16, appendix). Some items in that list are specific because they are required by legislation, but the majority are deliberately stated in a general manner to allow local freedom in developing the prospectus and the unified planning work program. It is reasonable to expect that specific federal suggestions...
will change over time to include other important planning activities, but in general most final decisions on what specific activities should be included in the plan are left to the local metropolitan area.

Because local policies or priorities determine what items are included, it is not unusual for some items on the list of federal recommendations to be omitted and other planning activities not on the list to be added. This adjustment is reasonable since local problems can differ widely and local metropolitan agencies are expected to have a better knowledge of their own problems than a federal agency. The unified planning work program establishes planning priorities for what planning activities will receive federal funds. Thus, local policy is established by putting together a series of more pragmatic goals and objectives (16, appendix).

Changing Priorities

Local demands contributing to the determination of priorities are continually changing, causing each year’s work plan to change accordingly. In addition, the community may demand changes in the transportation system. Since the community is made up of many diverse groups, the demands of these groups will sometimes require short-range low-capital solutions and in other cases long-range capital-intensive solutions. These changes require the local unified planning work program to adjust in order to meet these needs.

The list of federal suggestions undergoes similar changes. A particularly significant aspect of a recent major shift in federal planning perspectives is its expansion to include short-range planning. Previously, planning was long-range and capital-intensive, whereas traffic engineering was short-range and relatively inexpensive. The urban transportation planning process determined what long-range capital improvements were needed to expand the capacity of the system. The traffic engineering process determined what short-range, relatively inexpensive improvements were needed to improve the efficiency of the existing system. Numerous efforts are now being made to give both short-range and long-range perspectives to urban transportation plans by joining the outputs of these two previously separate functional areas.

The federal planning regulations strongly encourage this unification by requiring a short-term portion called the transportation system management element of the transportation plan (16, section 450.116). TSM is providing an impetus for the traditional urban transportation planning process to look at shorter term, less capital-intensive improvements to the system. It encourages the traffic engineering process to include a look at the overall effects on the system caused or achieved by changes on specific existing links (17).

LEGAL SUPPORT FOR EFFICIENT FREIGHT MOVEMENT PLANNING

There is ample legal support for including efficient freight movement concerns as a portion of the transportation plan. The laws establish the inclusion of freight movement in the planning process. The regulations enable local areas to choose which planning components they will include. The following is the congressional declaration of purpose in establishing the Department of Transportation:

The Congress hereby declares that the general welfare, the economic growth and stability of the Nation and its security require the development of National transportation policies and programs conducive to the provisions of fast, safe, efficient, and convenient transportation at the lowest cost consistent therewith.

The Urban Mass Transportation Act of 1964 as amended states that

The welfare and viability of urban areas, the satisfactory movement of people and goods within such an area, and the effectiveness of housing, urban renewal, highways, and other Federally aided programs are being jeopardized by the deterioration or inadequate intensification of traffic congestion, and the lack of coordinated transportation and other development planning on a comprehensive and continuing basis.

The Federal-Aid Highway Act states,

It is declared to be in the national interest to encourage and promote the development of transportation systems, embracing various modes of transport in a manner that will serve the States and local communities efficiently and effectively. To accomplish this objective the Secretary shall cooperate with the States, as authorized in this title, in the development of long-range highway plans and programs which are properly coordinated with plans for improvements in other affected forms of transportation and which are formulated with due consideration to their probable effect on the future development of urban areas of more than fifty thousand population.

The Secretary may approve as a project on any Federal-Aid system the construction of exclusive or preferential truck lanes.

The Joint Planning Regulations of the Federal Highway and Urban Mass Transportation Administrations state,

The purpose of this subpart is to implement 23 U.S.C. 134 and sections... of the Urban Mass Transportation Act... (49 U.S.C. 1602...), which require that each urbanized area, as a condition to the receipt of Federal capital or operating assistance, have a continuing, cooperative, and comprehensive transportation planning process that results in plans and programs consistent with the comprehensively planned development of the urbanized area.

UMTA has interpreted its act as applying only to situations involving both people and goods (freight). Since most freight movements do interact with people movements in some definable way, this interpretation merely places a reasonable requirement on the transportation planner to consider such system interactions explicitly.

RECENT RESEARCH

A recent UMTA project on urban goods movement requirements identified a number of problems associated with 44 somewhat homogeneous segments of the economy. This breakdown into segments enables a community to more easily determine what problems they are likely to face depending on their individual economic structure (18).

An UMTA report on several ARZ demonstration areas includes a portion on the importance of considering freight movement in and out of these areas. The transportation costs associated with various alternatives are calculated (19).

A Federal Highway Administration report gives a detailed discussion of various urban planning viewpoints over time, how freight has been included, characteristics of freight movement that are different from passenger movements, and what role policy plays in determining how freight is treated in the urban planning process. This report addresses issues of both short- and long-term planning and methodologies applicable to each (20).

A forthcoming FHWA report (1) includes many TSM considerations that together can make enormous differences in the efficiency of freight movement. This report also includes guidelines on how to include short-range, low-capital freight movement considerations as a part
of the continuing, comprehensive, and cooperative planning process.

CONCLUSIONS

Efficient movement of freight and people is, and will be, a challenging problem for many metropolitan areas now and in the future. If these areas are to avoid or eliminate the tremendous inefficiencies in freight transportation now faced by numerous large older cities, they must begin explicitly to include freight considerations in their planning activities.

Minor considerations given to operating characteristics of distribution firms and freight-carrying vehicles can avoid many unnecessary delays and lower transportation expenses to the general community. In addition, by developing an understanding of commodity flows, planners can take the initiative to positively influence economic growth of the community. Moreover, by improving the overall efficiency of the community's goods distribution system, the planner can alleviate a number of environmental and social problems.

Many things have contributed to the historic lack of interest in this crucial component of urban transportation. The movement of goods is extremely fragmented among a large number of businesses—common carriers, flower shops, liquor stores, office supplies, delivery services, and painters. Many of these businesses are concerned with problems of getting a large amount of sales, and freight movement is considered too small a portion of the business to worry about. They perceive no profit incentive because greater efficiency in freight movement would force the delivered price to be lower because of competition. Therefore, the responsibility for improving the efficiency and reducing the environmental and social impacts of urban freight distribution lies clearly on the public urban transportation planner. There are significant opportunities for improvement by making freight movement a component of the transportation system management element.

A number of urban areas are currently looking at the question of efficient freight movement, trying to establish proper policy for it that will, in turn, be expressed in future unified planning work programs. If the knowledge furnished by these planning efforts were pooled and made available to everyone through channels such as the Transportation Research Board, the Federal Highway Administration, and the Urban Mass Transportation Administration, it could make a significant contribution to the efforts of all those concerned with better planning for the movement of freight in metropolitan areas.

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