MEETING TRANSPORTATION SYSTEM MANAGEMENT REQUIREMENTS AT THE LOCAL LEVEL

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INTRODUCTION

During the last four years events have occurred, both nationally and internationally, which have tended to cloud and obscure urban transportation planning and the future of urban transportation, itself. In no other field of endeavor is the future as difficult to predict as in urban transportation. The primary factors to be considered in urban transportation decisions are continually changing; emphasis is alternatively placed on mobility, cost, energy consumption, air pollution, and many others. While mobility has been the primary consideration in urban transportation planning in the past, with cost a close second, we are told that in the immediate future, *energy consumption* may be the primary factor—above both mobility and cost. Environmentalists demand that air quality now be considered more important than both mobility and energy consumption. All of these primary factors, however, now require that emphasis be placed on low-cost improvements to the transportation system. This change in emphasis has dictated that the transportation engineer re-examine his own role and specifically re-examine his approach to urban transportation.

The transportation engineer has, in the past, been charged with the responsibility of determining the *need* for urban transportation and with meeting that need by *planning, designing,* and *constructing* transportation facilities. Since the early 1970's, however, the engineer's definition of *need* for additional urban transportation has been questioned. As the need was questioned, so was the construction of additional transportation facilities. As a result, new transportation facilities were increasingly more difficult to justify, and inflation and increased maintenance costs reduced the budget available for construction. In 1975 federal rules and regulations directed that the transportation

engineer become concerned with the *operation* of the urban transportation system and required that low-cost, transportation system management (TSM) alternatives be considered to *reduce the need* for additional transportation facilities, smooth out the peaks and valleys of travel demand, and improve urban transportation through better operations, rather than by constructing new facilities. Transportation system management planning was required to be an integral part of the annual transportation program.

Responsibility for coordinating TSM planning was assigned to a new creature called the Metropolitan Planning Organization (MPO). This new creature, which came on the scene in 1973, initially coordinated long-range transportation planning that crossed jurisdictional boundaries and involved various modes of transportation. Under the new guidelines, the MPO was required to become involved in operational strategies which previously had been the unique province of traffic engineers, transit operators, etc.

So in TSM, we have a new acronym, new "buzzwords," a new organization dealing in strategies at a new level of planning in an attempt to solve old problems with little or no money. This paper will attempt to present some observations and thoughts as to what lies ahead in urban transportation, a definitive look at TSM and why it is different from previous operational programs, and some characteristics of an effective TSM program.

OBSERVATIONS ON URBAN TRANSPORTATION

What lies ahead in urban transportation? Recognizing the many unknowns with which we have to deal from energy availability, or nonavailability, to questions on the future of urban concentration, certain observations should be considered before looking at TSM in detail. I submit these as personal observations and predictions for the future of urban transportation.

Fragmentation of Jurisdiction and Responsibility Will Continue to be One of the Major, If Not the Major, Problem in Urban Transportation

Fragmentation exists within the myriad number of governments and autonomous agencies within an urban area, and, to a great extent, also exists within the organizational framework of the individual municipality. Within a municipality, responsibility for transportation is often shared by the director of public works, the traffic engineer, the transit operator, the planner, the taxicab operator, the airport man-

ager, and many others. This fragmentation is most apparent when one considers the *operation* of the total transportation system. We must expect that this fragmentation of responsibility will continue to be with us, and ways must be conceived to provide a uniform level of operational emphasis among all parties. Fragmentation within municipalities and within urban areas will continue to be the most difficult problem in urban transportation.

The Days of Developing Grandiose Transportation Plans are Over

Transportation planning in the past has generally resulted in major transportation facilities being included in the plan with no recognized constraint on available resources. "Make no small plans" was the unwritten motto of the transportation planner, and it was argued that no resources would be made available for transportation facilities unless the need was projected and the facilities included in some long-range plan. Also, the argument ran, if these facilities are not needed by the forecast year, they will be needed at some time in the future so they should be included in the plan. The days of such long-range plans, unconstrained by financial resources, are over. In the years ahead, transportation plans must be both practical and financially feasible in order for their implementation to be accepted by both elected officials and the urban public.

A New Role Will Evolve for the Transportation Engineer—A Role in Improving the Operation of the Complete System and in the Monitoring of Its Operation

The transportation engineer in the future must not be confined to planning, designing, and constructing new transportation facilities, but must assume a larger role—that of identifying ways that transportation needs can be reduced and mobility increased by low-cost TSM improvements. The engineer in the future must enlarge his perspective from design and construction to the combined operation of all elements of the transportation system, and must be a very active participant in its daily operation. We have only begun to scratch the surface in TSM and many of us are still unclear as to what is actually meant by transportation system management. We are even more unclear as to how TSM strategies can be evaluated, particularly in light of the fragmentation in urban areas, and how priorities can be effectively established for TSM improvements. If our observations are any where near correct, we must learn more, much more, about a TSM approach to urban transportation.

TRANSPORTATION SYSTEM MANAGEMENT (TSM)

What is transportation system management (TSM)? The joint guidelines of FHWA and UMTA of September 17, 1975, state: "The objective of urban transportation system management is to coordinate these individual elements (automobiles, public transit, pedestrians, and bicycles), through operating, regulatory, and service policies so as to achieve maximum efficiency and productivity for the system as a whole."[1] Four classes of actions are to be considered:

1. Actions to insure the efficient use of existing road space through traffic operations, preferential treatment for transit, provision for pedestrians and bicycles, management and control of parking, and changes in work schedules, fare structures, and tolls.
2. Actions to reduce vehicle use in congested areas through such things as carpools, restrictions on truck delivery, etc.
3. Actions to improve transit service.
4. Actions to increase internal transit management efficiencies in improved marketing, cost accounting, maintenance, etc.

Do the requirements for transportation system management identify new and unique solutions? The answer is, of course, they most certainly do not. The actions cited in the guidelines on TSM are strategies with which the traffic engineer and the transit operator have been familiar for years. Actions such as channelization of traffic, one-way streets, reversible lanes, and parking restrictions are actions which the traffic engineer has long had in his bag of tricks. Likewise, better transit collection and distribution systems, provision of express bus service, provision of shelters and other passenger amenities, and improved marketing are all actions which the transit operator has consistently promoted. Transportation system management strategies are not new; the guidelines are simply a recitation of strategies which have been used in the past.

Do the TSM guidelines propose a new structure by which TSM actions can be accomplished? Again, the answer is no. The traffic engineer in urban areas still is responsible for implementing TSM strategies within his jurisdiction. By these guidelines, he is given neither structure nor additional funds to implement strategies that he has been

[1] Department of Transportation, Federal Highway Administration and Urban Mass Transportation Administration, "Transportation Improvement Program" *Federal Register,* Vol. 40, No. 181 (Wednesday, September 17, 1975), p. 42979.

promoting for years. Likewise, the transit operator, while he has recently been given capital and operating monies which he may use for TSM improvements, is still constrained to implementing those TSM actions which are within his domain and realm of responsibility. Transportation system management guidelines have given him no new insight, no new tools with which to work, and no mechanism to accomplish those actions which he, too, has been promoting for years.

CURRENT LIMITATIONS OF THE TRAFFIC ENGINEER

To understand the significance of the TSM rules and regulations, we must look at limitations under which the traffic engineer, in an urban area, has been operating. While attention will be focused on the traffic engineer, the same basic limitations apply to the transit operator and, in general, to all of those disciplines on the urban transportation scene which deal with operational improvements.

Limited to Operational Improvements, Strategies and Actions in Jurisdiction

First, the traffic engineer has generally been limited to operational improvements, strategies, and actions within his jurisdiction or his area of responsibility. In most cases, there have been more than enough problems in traffic operations within his area of responsibility to demand his full attention, and he has been neither asked nor directed to look at low-cost alternatives which extend far beyond his jurisdiction. Such actions as staggered work hours, flexible work hours, peak hour computer tolls, and reserved lanes on freeways are areawide in scope and were not considered within the purview of the traffic engineer.

Limited by Politics

Second, the traffic engineer has been limited by politics. Operational improvements in transportation require political decisions which have to be made in the here and now. They are not decisions which can be made under one administration and implemented under another. In many instances, the decision to implement TSM strategies are tough political decisions, far tougher than committing millions of dollars to some long-range solution which can be conceived by only a few. Decisions to implement peak hour commuter tolls, to establish car-free zones, or to restrict downtown truck delivery are all tough political decisions, and in most instances, the traffic engineer has been restricted by politics from implementing these strategies.

Limited by Lack of Technical Justification to Sell Tough TSM Actions

Third, the traffic engineer has been limited by a lack of technical justification to sell these tougher TSM actions. The traffic engineer has been limited in areawide programs, simply because he has neither the resources nor the technology to develop the facts and figures for an effective and persuasive argument. As a result, these areawide strategies were neither considered nor promoted.

Limited by Lack of Funds

Lastly, the traffic engineer has been limited by a lack of funds. While the TOPICS Program provided funds for operational improvements, and urban systems monies likewise provided some relief, the traffic engineer, nevertheless, finds it difficult to find funding support on large-scale, yet seemingly low-cost, strategies. Funds are not available to expend on costly coordination of areawide TSM actions.

Under these limitations, the traffic engineer or transit operator has diligently pursued and implemented those operational strategies which he could. The requirements, however, for TSM planning and strategies brought a new significance to operational improvements.

SIGNIFICANCE OF TSM REQUIREMENTS AND AN APPROACH TO TSM ACTIONS

The significance of the guidelines for TSM actions is that it directs the attention of the fragmented community toward a common objective. The significance of TSM planning under the guidelines is that the traffic engineer no longer speaks to just those traffic improvements over which he has control, but participates in a larger endeavor with transit operators, taxicab personnel, and all forms of private enterprise in accomplishing actions which are areawide in scope. Thus, the requirements for TSM planning on an areawide basis attempt to apply individual TSM actions on a metropolitan and multimodal scale.

But simply requiring TSM planning does not mean that it will be accomplished nor that it will achieve the desired end. An approach to the development of a TSM element of the transportation improvement program has not been fully defined. Should the TSM element be simply an aggregation of low-cost actions submitted by all participants? Should some means be developed to determine priorities, or should implementation be left to the individual entities for their own funding within their own time frame? How are areawide strategies approached and who initiates the first step?

Some UMTA officials have suggested what they call a "bottom-up approach" in contrast to a "top-down approach." This bottom-up approach suggests that TSM actions be identified by the traffic engineer or transit operator and that planning monies be distributed to all participants who would use these planning monies to develop their lists of TSM actions for aggregation into the total program. Obviously, the TSM program must speak to the needs of the individual participant.

However, what the urban traffic engineer or transit operator really needs is not planning monies. What he needs is analytical justification for TSM actions on an areawide basis and implementation monies to accomplish projects, both at the local and areawide levels. What he can do, he has already done or is doing. Planning monies to help him put his TSM ideas into a composite list of actions would not assist him. I would suggest that planning technology which will *justify* TSM actions, both within his jurisdiction and on an areawide basis, is the TSM approach which will benefit him. This approach is neither bottom-up nor top-down, but rather is a "teamwork" approach, involving all parties in a joint technological effort to evaluate TSM strategies.

Three Basic Characteristics of Teamwork TSM Program

It would seem that an effective teamwork TSM program would have three basic characteristics:

1. The TSM program must develop system performance criteria for the total and complete transportation system to identify system weaknesses, as well as deficiencies at specific locations. This will require some new thinking on overall system performance and will require a close monitoring of all elements of the transportation system.
2. An effective TSM program must bring long-range planning and short-range planning closer together for evaluation of areawide actions. The technology must also be able to window the evaluation technique to a subarea so that the traffic engineer or transit operator can evaluate local TSM actions in his own shop and at his own time.
3. The TSM program must provide a checklist for TSM actions at five different levels:
   a. Actions within the area of responsibility of the traffic engineer or transit operator which can be implemented immediately at little or no cost. These actions will include bus route changes, bus stop location, signal timing, etc.

b. Actions within the area of responsibility of the traffic engineer or transit operator but which require budget approval and justification. Examples of such actions would include channelization projects, shuttle transit service, and improved transit marketing.

c. Actions within the jurisdiction of a single municipality which must be coordinated among the traffic engineer, the transit operator, the taxicab owner, etc. Examples of actions would be flexible paratransit services and bus preemption to traffic signals.

d. Actions areawide in scope but which are low-cost and which involve many jurisdictions and disciplines. Such actions would include staggered work hours and peak hour commuter tolls.

e. Actions areawide in scope which require joint funding and programming, such as exclusive bus lanes and exclusive bus ramps to freeways.

It will be noted that each of the five different levels of TSM actions must be handled in a different manner and with a different approach. Of these five levels of TSM actions, only the first two can be handled independently by the individual traffic engineer or transit operator. It is these actions, which in all probability, the alert engineer or operator has already taken. The other three levels of TSM actions require evaluation technology which neither the traffic engineer nor the transit operator currently has available to him. It is actions at these three levels which give significant meaning to the TSM requirements and which must be developed through the "teamwork" approach.

An effective TSM program will include the development of a TSM handbook in sufficient detail to guide the traffic engineer and transit operator in evaluating actions at the first two levels. This TSM handbook, however, is not the most important part of TSM, and must be supplemented by performance criteria and technology for evaluating alternatives at all levels of TSM actions.

It is in the development of an effective TSM program with these characteristics that the metropolitan planning organization, or MPO, can make its contribution to TSM planning. To the MPO I would say: "You have work to do—hard work in the development of technology for use by others in projecting impacts of TSM actions at the local level. You have hard work to do in developing systems performance criteria which have meaning and which can set the framework for evaluating TSM strategies. You have hard work to do in making the long-range planning technology applicable on a subarea basis to short-

range strategies—taking it out of the 'black-box' category and making it a usable tool in the hands of the traffic engineer and transit operator." To the MPO, I would say that this work in TSM cannot be done simply by getting all the participants to talk to each other. What is needed is good sound technical leadership that will improve decision-making at the local level by all participants.

CONCLUSION

As we direct our attentions in the future to less costly, more energy-efficient transportation improvements, the TSM program will take on added significance. Engineers involved in all modes of transportation would do well to emphasize TSM in their professional development.