The act made highway funds eligible for all forms of transit. In implementing the act, the Secretary of Transportation delegated responsibility for the urban planning process and the urban capital program sections that were multimodal in nature jointly to FHWA and UMTA. The urban system funds were drastically increased, and some new aspects were added to the delivery of the funds. These actions led to the issuance in September 1975 of the joint FHWA-UMTA urban planning regulations that required the development of a transportation system management element as part of the transportation plan in order to emphasize more efficient use of existing transportation resources.

Attached to the published planning regulations was an appendix of advisory (not regulatory) information listing TSM strategies that are recommended for consideration in developing the TSM element of the plan. It should be emphasized that UMTA and FHWA do not intend to prescribe efficiency standards or even the particular measures that must be implemented; that decision is a joint local-state responsibility, not a federal one. Furthermore, FHWA does not intend to precisely prescribe what form the TSM plan documentation should take. We have never done that for the urban transportation planning process. We do insist that there be a systematic method for describing the products of the planning process. Most urbanized areas will probably find it convenient to package the descriptive material for the TSM element in a separate, easily retrievable document.

The TSM element in the planning process reflects the evolution of national and local goals. Changing needs have brought about changing goals. The following seem paramount at this point:

1. Efficiency, both functional and economic;
2. Mobility, including equity for those without access to an automobile;
3. Environmental protection, including land use, air quality, and noise considerations; and

Although these goals are reflected at the national, state, and local levels, the reflection is not necessarily a mirror image. Local transportation goals and objectives must be defined and harmonized with national goals, e.g., air quality standards. Local decision makers must cooperatively articulate local priorities. State and local decision makers implement programs and projects based on defined goals and objectives and agreed-on priorities.

Within the context of local decision making, a variety of TSM actions is available for use by localities to improve the transportation system. These include

1. Actions to improve the efficiency of the existing highway network,
2. Actions to reduce vehicle use in congested areas,
3. Actions to improve transit service, and
4. Actions to improve internal transit management efficiency.

Metropolitan areas have great flexibility to tailor and package a wide range of strategies to meet their local needs and conditions. Federal funding has become increasingly flexible to help local areas implement a variety of TSM improvements. In addition to UMTA section 3 and 5 funds, all major federal-aid funding categories can be used to support TSM activities. I want to highlight a few of those provisions.

1. The Carpool Demonstration Program was indefinitely extended in the Federal-Aid Highway Act of 1976. The program provides funding (90 percent federal and 10 percent state or local) from either urban system or primary system for the following activities: car-pool matching programs; public information and promotion activities; designating existing lanes, whether on or off the federal-aid systems, as preferential car-pool or bus and car-pool lanes; initial enforcement costs; and acquisition of van-pool vehicles with a pay-back provision.
2. Highway public transportation projects and special use highway facilities can be implemented on any federal-aid system. Examples are exclusive or preferential bus or truck lanes, bus passenger-loading areas and facilities, and fringe and corridor parking facilities.
3. Bicycle and pedestrian projects can be implemented on any federal-aid system. Types of projects include independent or incidental projects; bikeway networks; downtown or residential pedestrian improvements; and landscaping, lighting, traffic signing, parking facilities, and shelters.

Looking ahead, I think we can clearly see three major thrusts: greater emphasis on operational planning in order to maintain a high level of performance of transportation systems, greater flexibility in sources of funding, and continued emphasis on developing cooperative decision making and actions at the local level.

STATE TRANSPORTATION DEPARTMENT

VIEWPOINT OF TSM

Adriana Gianturco
California Department of Transportation

This paper points out the problems with instituting federal highway programs at the state level and relates those to TSM programs. The Diamond Lanes, multiple-occupancy vehicle lanes on the Santa Monica Freeway, are discussed to illustrate the reactions that can come from innovative approaches to controlling automobile travel.

A distinction was made in the conference program between state transportation departments and state highway departments. It is true that we have in California a transportation department. Our major responsibility, however, remains the development and operation of the state highway system. Highways are the only kind of facility that we own and, out of our 14,000 employees, less than 200 are directly involved in activities having
to do with facilities or modes other than the highway or the automobile and truck. Most of our employees previously worked for the Division of Highways, which was absorbed into the transportation department when it was created 4 years ago. Out of our current yearly budget of about $1 billion, less than $50 million is devoted to purposes other than highways. I make these points because my prime experience in trying to make a more efficient use of existing facilities—a key TSM concept—is in the highway area, and my remarks will focus primarily on highways and TSM.

I believe that the application of TSM concepts to state highways should be a major direction of TSM implementation. At least in California, to focus system efficiency efforts on local streets, roads, transit, and bicycles is to ignore the backbone of the transportation system. In California, more than 95 percent of all passenger travel is by automobile, and more than half of all passenger travel occurs on state highways. This predominance of the state highway system is true for urban as well as for rural areas. Not only in Los Angeles (which we consider our freeway capitol) but also in San Diego and Sacramento a major part of travel within the metropolitan areas is on state highways and freeways.

The predominant role of state facilities in providing for local travel is an important reason for our interest at the state level in TSM, and it also creates some problems, which I shall return to later. The point I want to make now is that the notion of applying the techniques of cost-effectiveness analysis, of emphasizing better use of existing facilities, and of attempting to influence transportation demand as well as transportation supply is not an idea that should be limited to localized transportation networks. It applies equally to state transportation networks.

At the state level in California, we have been trying for a number of years to reorient our thinking along lines that parallel those now subsumed under the heading of TSM. This reorientation started well before the Brown administration. It was an outgrowth of three sets of factors: (a) a decreasing amount of revenues—in real terms—available to highway construction; (b) the environmental movement, which focused attention on costs that had not before been explicitly considered in our highway decision making; and (c) the creation of the Department of Transportation and the formal recognition that there are potentially multiple solutions to any given transportation problem. As we have tried to move toward better management of existing facilities, toward less expensive solutions to highway problems, toward projects that are more environmentally responsible, we have faced a number of problems and they generally overlap with the types of problems that I see with TSM.

1. The first problem is the federal government. The conference program stated, "Federal funds cannot be channeled into costly new capital projects without first maximizing the use of existing transportation facilities." Of course, this is not true. Moreover, while the federal government tells us that we should try to conserve scarce taxpayer resources, we note at several levels that the federal grant programs, in the highway area at least, operate in exactly the opposite fashion. With regard to total highway spending, the federal government urges and cautions us to spend every dime of apportionment. We receive letters reprimanding us for not having obligated all the funds for which we are eligible, and we are criticized, not commended, if we have any outstanding balances in Washington. We seem then to be the object of a certain kind of schizophrenia. On the one hand, we are warned that resources are limited, that capital investment should be weighed against pricing and regulatory techniques, and that cheaper is better. On the other hand, we are pressured to spend that apportionment no matter what.

2. On a project-by-project basis, we are actively constrained from looking at inexpensive ways of making highway improvements through the application of design standards. These standards encourage expensive improvements. In California, for example, in rural areas we have many two-lane roads that we consider are providing adequate transportation services with their present designs. If, however, we want to use federal money to resurface these roads with 2.54 cm (1 in) of asphalt, we are told that we also must provide 2.5 to 3-m (8 to 10-ft) shoulders in order to be eligible for federal funding. In many instances the shoulders cost more than the resurfacing, provide insignificant safety benefits, and get us in trouble with environmental laws since this may increase road runoff or otherwise generate undesirable environmental costs.

3. The federal grant structure creates what I will call the "free money problem," and it is probably the most serious of the federal obstacles to an optimal allocation of total resources. The problem is an ironic one, and it exists precisely because we at lower levels of government do try to save our own money. One would think that, if a given transportation problem has two solutions with identical transportation benefits except that one costs $5 million and the other $10 million, we would pick the $5 million solution. If, however, we are eligible for 80 percent federal aid on the $10 million solution, it only costs us $2 million. The $10 million therefore becomes the cheaper solution and the one we will do.

There is a second kind of factor that I think has and will weaken TSM efforts and that is reliance on metropolitan planning organizations. I know that MPOs and regional planning agencies are dear to the federal government. I know that many problems are regional in nature, and I think regional planning is a good idea. However, I also think that just about anyone who has dealt with regional planning agencies would agree that they are a weak reed to spearhead any new or controversial approach to transportation. One reason is that the vast majority of MPOs have no implementing authority. They may be given power to veto and thereby effectively halt the activities of others and they may be able to devise good plans, but they have no power to carry out those plans or to force others to carry them out. Another reason is that in California MPOs are, with one exception, voluntary associations of governments. I believe this is the general pattern across the country. Members of the boards of directors of MPOs do not represent a regional constituency; they respect their own local constituents.

With regard to TSM, I believe MPOs with their local base have a special problem. Local governments, in California anyway, tend to see investment in new state facilities as an alternative to better management of the local street system. Congestion on local streets is viewed by local governments as a serious problem, and putting that traffic on new state facilities is often seen as the way to solve the problem. Conversely, any actions to manage existing state facilities that have the effect, even temporarily, of increasing local street congestion are viewed negatively by local governments, which make up the membership of the MPOs. Most damaging to the ability of MPOs to be responsible for new TSM solutions to transportation problems is their lack of stature and credibility among the public. The fact is that a good number of people have never even heard of their metropolitan planning organization. In
places where MPOs are known, they are not taken seriously.

This brings me to the last problem I would like to note with regard to TSM concepts, and that is public attitudes and perceptions. The public, for good reason, is naturally suspicious of government. It is particularly suspicious when government tries to influence private behavior. And insofar as we are operating on the demand and not the supply side of the equation with certain TSM techniques, we are likely to get a lot of opposition. When we build a new facility, we provide taxpaying travelers, at least in the short run, with more than they had before, or at least they perceive it like that. When we manage an existing facility, regulate it, or price it, we are likely to be seen as narrowing their options and impinging on their freedom.

I would like to relate the Santa Monica Diamond Lanes to some of the problems with TSM that I have just mentioned. The Diamond Lanes on the Santa Monica Freeway were a traffic management technique designed to encourage multiple occupancy on a state facility. The project was developed by the California Department of Transportation in cooperation with local governments as a response to the Clean Air Act and in an attempt to provide an alternative to an EPA-mandated transportation control plan (TCP) for the Los Angeles area. The project was designed as one of four alternative techniques for encouraging car pooling and bus ridership, each of which was to be tested and evaluated in a first stage of the program. In the second stage, those techniques that had proved most effective were to be extended to other freeways in the metropolitan areas. In the Santa Monica project, we took existing freeway lanes out of mixed use and dedicated them to buses and car pools. In a second project, which we have not yet implemented, we intend to add new lanes to an existing facility and dedicate them to preferential use. A third project is a separated facility for multiple-occupant vehicles (this is our El Monte Busway, which we recently opened up also to car pools). And finally, we are trying ramp-metering with by-pass lanes for buses and car pools on several freeways.

The Santa Monica project was in operation for 21 weeks and, on the merits, worked extremely well. At the beginning of the project, 6 percent of all travelers on the freeway in rush hours were in buses and car pools. At the end of the project, 18 percent of travelers were in buses and car pools. In terms of total use of the freeway, the facility was carrying 3 percent more people at the end of the project than at the beginning in 7 percent fewer vehicles. When the project started, use of surface streets went up by 10 percent, but by the end of the project no traffic was being diverted and travel times on the freeway itself were the same (for 1 and 2-person vehicles) as before the project. They were, of course, substantially less for riders in car pools and buses. We estimated that on an annual basis we were saving about 11 million liters (3 million gal) of gasoline. Air pollution sampling, although not definitive because of the limited scope of the project, nonetheless indicated a small but statistically significant decline in several major pollutants.

There was also a tremendous outcry against this project. We were sued by a business-backed organization, the Pacific Legal Foundation, on the ground that we had failed to comply with environmental laws in instituting the project, and it was stopped by court order 21 weeks after it started.

Let me briefly discuss the problems. First of all, the federal government was not a problem. It was very supportive. But there were a couple of interesting aspects to this. The federal government seemed reluctant to come out with strong, independent statements on the necessity for this kind of project for fear, I guess, of showing the heavy hand of Washington. We at the state level kept saying this is a project in response to a federal mandate—the Clean Air Act—and that the federal government believes strongly in transportation management as an alternative to expensive system expansion. We, at the state level, became the expositors and proponents of a point of view being pushed by Washington, while little came out publicly from Washington itself. Of course, new facility solutions to ever-increasing travel demand continued through the project to be built and to be discussed. We have not stopped freeway construction in Los Angeles (or elsewhere in California), and, at the time of the Diamond Lanes on the Santa Monica Freeway, we were putting together an application to UMTA and were being encouraged to seek a grant for a multimillion dollar rail rapid transit system.

The Santa Monica project was part of the MPO's regional plan. It had been discussed during a 3-year period. It was officially made a part of the plan and adopted by the MPO's governing body. It went through the citizen participation mechanism and all the rest. And yet we found that as soon as the Diamond Lanes opened (and as soon as they became controversial, which was right at the beginning) none of this meant anything. Most people in Los Angeles do not appear to have heard of the Southern California Association of Governments (SCAG), and when they do hear of it the common reaction is, "Who is SCAG to be telling us what to do? It does not represent us." We found ourselves giving a lot of publicity to SCAG, its mandates and its goals and objectives, just as we were doing for the federal government. We, and the public, heard very little out of SCAG itself. There was no visible movement by SCAG to explain or mobilize support for its plan now that it was under attack, and SCAG is not without resources. It spends several million dollars annually on planning, a major aspect of which is supposed to be community development.

Our most serious problem was, of course, public reaction—or more specifically public reaction as generated and focused by the press and the media. That in itself would provide, I think, a good subject for a thoughtful discussion, and I would not be trying to analyze it in any detail here. But the reaction was strong, and it took some directions that I do not think had been anticipated. First of all, the project was seen as an ominous example of government coercion, restricting the freedom of the individual and restricting the rights of the property owners (the automobile owners) to do what they want to with their property. We talked about encouraging car pooling and transit ridership. The press talked about forcing people out of their automobiles or into other people's automobiles, which is an invasion of privacy. We talked about making a more efficient use of existing facilities. The press and the public talked about the rights of persons—in a car pool or not—to use freeway lanes that had been built with their tax money.

There was another general line of reaction to the project, and this developed in response to the experimental nature of the project. When we explained that we did not necessarily view the Diamond Lanes as being the solution to congestion, air, and energy problems in Los Angeles and that we were trying it as one of four alternatives and would drop it if it did not work, we were accused of social engineering and using people as guinea pigs.

Finally, the incrementalism inherent in this kind of approach to transportation, as opposed to the "lumpiness" and permanence of capital investment actions, translated itself, in the eyes of the media and the public, into an insidious, creeping, conspiratorial movement to
destroy a life-style in small steps. The theme was, Stop it now before it spreads.

I do not want to end this on a negative note, yet I have no magical words of wisdom to put it on the upbeat. I will say that I think two things are essential. First, we in government have got to get our act together. We do not accomplish much if what we do with one hand is at cross purposes with what we do with the other. Second, public understanding and acceptance of TSM are crucial. We need to talk less to each other and more to the people. Transportation is less a technical matter than ever before and more a political one, in the good sense of that word.

STATE HIGHWAY DEPARTMENT VIEW OF TSM

Robert N. Hunter
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Transportation system management is not a new concept but has been practiced as long as there have been transportation facilities. The need now is to have a balanced transportation system in which each mode does the job that it is best suited to do and for which there is an expressed need or desire. In addition, one mode is not artificially enhanced by impeding the efficiency of another mode. Achieving a balanced transportation system requires the cooperative efforts of all agencies involved.

The term, transportation system management, is of relatively recent origin, but surely the activity is very old—as old as transportation itself. Transportation began in this country along the waterways and was centered on the port cities that grew up in proximity to them. In the nineteenth century, railroads emerged as the nation’s dominant transportation mode; in the twentieth century, air travel became a significant mode for moving both people and freight.

In urban areas, commercial and social development helped dictate the location of transportation corridors and was enhanced by the fact that those corridors came into existence and worked well. That sort of symbiotic relation between transportation corridors and the neighborhoods through which they passed has continued to the present time.

The evolutionary development of the various transportation systems has been steady in pace and remarkable in scope as managers and owners proceeded to improve service to users. On rivers, woodburning stern and sidewheelers of sharply limited capacity and speed gave way to diesel tugs, whose tows of essential freight and resources are equally allocated to each of the several modes.

What is a balanced transportation system? A truly balanced transportation system is one that most efficiently allows each transportation mode to do the job for which it is best suited and for which there is an expressed need or desire. We are coming increasingly to realize, I think, that the critical elements of a balanced transportation system are the nexus points at which different modes come together. But surely any thoughtful transportation practitioner must reject that greatly simplistic concept of balanced transportation in which time, effort, and resources are equally allocated to each of the several modes.

The evolution of the several transportation modes has itself brought about many basic changes in the structure of American life. But it has been accompanied by another evolutionary process that has perhaps brought about even more: the process of exchanging rural free delivery (RFD) numbers for addresses in urban and suburban apartment complexes. Steadily through most of this century and at a greatly accelerated pace since World War II, Americans have become and are continuing to become a nation of city dwellers. As a result, transportation needs have increased and will continue to increase in cities.