Integrated Traffic Management Systems

*Herman E. Haenel and Leslie N. Jacobson**

INTRODUCTION

A transportation system of the future was unveiled at the 1939 New York World's Fair. To many people who were used to gravel roads and country lanes it seemed like a dream world. They were amazed to see how traffic would travel along freeways and streets without unnecessary stops. Today, this dream world of a little over 50 years ago is a possibility, thanks to technology.

Today's technology is improving safety and mobility along urban transportation networks. Better mobility reduces vehicle delay, emissions, and fuel consumption, and improves the quality of life by lowering costs for services and goods to everyone within the urban area.

Traffic management systems within the United States are, for the most part, operated and maintained by individual agencies. Freeway control systems are operated by state DOTs, and traffic signal systems in urban areas are operated by cities and counties. Benefits have been obtained from these systems. Additional benefits beyond those obtainable from individual systems can be achieved by integrating them as traffic management systems.

According to Webster's Dictionary (*1*), *integrate* means "to put or bring together into a whole; to unify." Webster also defines *management* as "the act, art or manner of managing, or handling, controlling, directing, etc." Considered together, these two words describe the need to unify systems for the purpose of achieving improved traffic operations within the integrated system.

This is a new area to work in, one that can be uncomfortable at times. But as trained traffic engineering personnel, we can meet the challenge by communicating, cooperating and coordinating with others. Working with other agencies on an organized effort is required to assure improved traffic management.

The following review is intended to show the need for integrated traffic management systems, outline the elements that must be included, and provide guidance in developing such a system. These systems may not provide the dream world of transportation predicted at the 1939 New York World's Fair, but they will bring us closer to eliminating unnecessary stops and achieving optimum mobility.

THE NEED FOR INTEGRATION

From Phoenix to San Francisco to Washington, D.C., citizens are identifying transportation as their number one concern (*2*), outweighing issues such as pollution, overpopulation, unemployment, and crime. Traffic congestion is certainly the primary reason for this concern over transportation issues.

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Several factors have led to the increase in traffic congestion. From 1950 to 1986, population in the United States grew by about 160 percent. This population growth increased the demand for transportation. As evidence of this increased demand, the number of motor vehicles increased even faster than population, by almost 360 percent, from 1950 to 1986 (*3*). In addition, people place more reliance on their automobile as the primary transportation mode. From 1960 to 1980, transit's share of work trips in urban areas dropped from about 13 percent to about 6 percent. In the same time period, work trips in automobiles jumped from 61 to 82 percent (*4*).

The increased reliance on the automobile and the growth in population, jobs, and households, have combined to create severe and alarming levels of congestion in our urban areas. Delay on urban freeways in the United States increased by 57 percent from 1983 to 1985 and is projected to increase at a yearly rate of 8.8 percent through the year 2005. This rate of increase will produce a 435 percent increase in delay from 1985 to 2005. The increased congestion will also affect urban signalized arterials. From 1985 to 2005, projections indicate a 240 percent increase in delay on urban signalized arterials (6.3 percent increase per year) (*5*).

One of the responses to urban traffic congestion has been traffic management efforts. Transportation system management was introduced in the 1970s to improve the efficiency of the existing transportation network. Often, implementation of these efforts was not coordinated within an urban area or even within a single jurisdiction. Through the 1970s and early 1980s, these efforts proved to cost effectively improve system efficiency, even when they were implemented in a piecemeal fashion. However, as noted above, transportation demand and congestion levels continue to grow. It is now necessary to view the transportation network as one system and to integrate as many aspects of transportation management as possible.

System integration is important because it makes maximum use of resources. It can be implemented in a range of ways from personal communication between operating agencies to a sophisticated central computer that supervises individual traffic control systems on arterials and on freeways throughout a given area. Integration allows operating agencies to manage the transportation system better and to more efficiently employ personnel. System integration allows agencies to allocate vehicles and people to the transportation system as efficiently as possible by accounting for the conditions or attributes of all elements within the system.

System integration requires that information be exchanged so that resources can be efficiently allocated. The information sharing can occur among computer systems, operators, or designers, and between the operating agencies and the public. Resources can then be allocated to assure a cost effective program for traffic management.

METHODS OF INTEGRATION

System integration comprises design and operations. Cooperation and communication between agencies are needed for the design and operation of an urban system. Integrated traffic management requires four elements:

1. An integrated approach to transportation management;
2. Resource integration;
3. Manual information exchange; and
4. Integration of control/surveillance systems.

Integrated Approach to Transportation Management

The way in which transportation professionals view the transportation network and management of the network is probably the most critical aspect in the concept of integrated systems. Planners, designers, operators, and managers must believe that the entire network operates as a single system. The management approach must reflect this belief. Agencies and jurisdictions must cooperate. The actions one group takes must be supported by the other groups. Policy issues, incentives, and human factors must be explored to help reduce the demand on the system, in addition to technological ways to increase system efficiency and capacity.

The integrated view of the transportation network includes a framework that meshes all efforts together to create a balanced approach. These elements include physical systems, as well as incentive, policy, and human factors programs. For example, when conditions are severe because of daily peak period congestion, special events, construction, or incidents, the demand cannot be accommodated simply with modified control strategies. Incentives must be offered to encourage people to choose different routes, different modes (i.e., public transportation, car pools), and different times for travel. Furthermore, if traffic management systems do a great job of detecting incidents but the correct information does not reach motorists or assistance is not provided to them, then the detection technique is diminished in value. Information can be provided to motorists through use of changeable message signs, lane control signals, and highway advisory radio. Also an incident management team and motorist aid patrol should be available to assist motorists once an incident has occurred. Similarly, if the public is accurately informed, but they cannot choose flexible working hours, cannot modify their routes because control systems are not adjusted, or cannot change their modes of travel, then the detection system and the information system diminish in value.

Research and design activities also need to be coordinated as part of the integrated approach. Research feeds the design process, which, inevitably, uncovers questions or ideas that need further research in the same area or related areas. The integrated approach should recognize the connection between research and design (or implementation) and structure programs to facilitate the exchange of information, results, and ideas. A fully integrated approach to system management looks at the totality of the system and explores the range of solutions available.

Resource Integration

Resource integration involves sharing facilities, personnel, and financing to use them most efficiently. Examples of resource integration include shared central operations centers, regional control centers, communications facilities, conduit, and design, maintenance, and operation of the shared facilities. Costs and personnel can be shared. Resource integration reduces the costs to all systems, even if control strategies are not integrated.

An example of resource integration is the Surveillance, Control, and Communication (SC&C) system planned for Houston. This program involves three agencies and systems on three types of facilities. The city of Houston, the Texas Department of Transportation, and Houston METRO operate arterials, freeways, and transitways, respectively. In the SC&C system, the three agencies share communication cables and regional control centers for the arterial, freeway, and transitway control systems. Personnel from the three agencies are working together in the design and operation of the SC&C system.

Information Exchange

Information exchange is one of the key elements of system integration. Information exchange may involve sharing data with operators or managers of other systems so they can use the information for planning or to develop control strategies. The data usually come from historical databases. Managers of one system can identify trends in other systems that may affect the operation of their system operation.

Information exchange also takes the form of periodic meetings to share information on ongoing projects. Traffic Management Teams (TMTs) are a type of formal information exchange that helps integrate transportation management. These teams provide the best opportunity for developing an integrated traffic management system. Members of the team discuss problems from various points of view at regularly scheduled team meetings. They reach solutions through mutual agreement.

Integration of Control/Surveillance Systems

The most familiar element or portion of traffic management system integration involves control and surveillance. The integration of multi-agency control and surveillance systems allows agencies to make system control decisions on the basis of conditions in other systems.

Engineers and operators make changes in system operation on the basis of historical data obtained from their own system(s) and data received from other systems. System operators utilize real-time data to make changes to reduce congestion at a particular moment. In both instances, changes made in one or more systems should be agreed upon by personnel from other agencies whose system(s) will be affected by the change.

Information is also shared between the computers of two or more agencies so that traffic patterns can be changed rapidly to prevent and alleviate congestion. The computers are subject to manual override by the operator(s).

An example of manual operation involves construction projects that require control systems to be coordinated for the term of the project. The coordination activities may involve simple retiming of traffic signal systems based on projected diversions, or real-time manual selection of timing plans based on observations of field conditions. During the unusual circumstances of traffic disruption and diversion caused by construction activities, manually coordinated control systems can be very beneficial.

The integration of two or more systems permits smoother flow of traffic throughout the urban area. It also assures that adjacent systems are able to change in time to accommodate traffic arriving from other systems. As an example, a freeway control system should be ready to handle large volumes of traffic released by an adjacent traffic signal system during daily peak periods, incidents, special events, and nearby street construction. An interchange of information permits this and, in so doing, provides the benefit of optimum system operation.

Control and surveillance system integration can take place between control systems with different functions (e.g., a freeway control system and an arterial control system) or between geographically separated control systems. In either case, the systems may be controlled by the same jurisdiction or by different jurisdictions. Some of the types of control systems that can be integrated are outlined below.

- *Freeway management systems* — Ramp metering systems, incident detection systems, closed circuit television systems, and electronic surveillance systems are included in this classification. HOV lanes and transitways are also included.

- *Arterial management systems* — Any kind of coordinated signal control system (time-based or centrally controlled) is included in system integration. (Time-based coordination systems can be integrated with other systems manually.) Conditions on freeways and arterials often have an impact on each other. When severe congestion occurs on one facility, traffic diverts to use the other. The control systems can best handle the added traffic if the systems have been integrated.

- *Traveler information systems* — Traveler information is an effective tool in transportation network management. With current and accurate information, drivers can make intelligent decisions on routes traveled, time of travel, and mode of travel. To be most effective, the system must be based on current data. Those data come from other systems, such as freeway or arterial management systems; hence, the importance of system integration.

- *Incident management systems* — One of the primary elements of incident management is incident detection. Incident detection can be accomplished through the electronic surveillance and closed circuit television components of freeway management systems, through field observation, and through reports from motorists with cellular telephones. Information on alternative routes may come from either arterial or freeway systems. Freeway or arterial systems can use information on incidents to modify control strategies. Traveler information systems inform the public about the incident and may direct traffic to alternative routes. Therefore, there are benefits in integrating incident management systems with freeway management, arterial management, and motorist information systems. An incident management team is part of the incident management system. The team clears the incident and reroutes traffic when necessary. The team, working with the operators at a traffic management center, can reduce delay and secondary accidents through rapid response and proper action at the scene. Although motorists can reroute on their own when an incident occurs, they can do much better when they receive assistance from the incident management team.

- *Construction traffic management systems* — Construction traffic management systems usually integrate combinations of the above systems. Because of the magnitude of most freeway reconstruction projects, construction traffic management systems modify freeway management strategies, improve coordination or update control plans on arterials, heighten incident management efforts, and improve driver information techniques. Construction traffic management systems, by their very nature, are highly integrated with other management systems.

- *High technology systems* — Most of the high technology systems being researched today will be implemented as part of overall integrated systems. Automatic vehicle identification and automatic vehicle location systems will provide information to freeway and arterial management systems. In-vehicle route guidance is a form of traveler information system and uses information from freeway management, arterial management, and incident management systems. Integrated traffic management systems designed at present should be capable of adding high technology systems in the future.

The above is not an all-encompassing list. Any traffic management system or action may be part of an integrated system. Any of those mentioned above may be joined with systems of the same type in different geographical areas or under different jurisdictions.

IMPLEMENTATION, OPERATION, AND MAINTENANCE

An integrated system includes communication, cooperation, and coordination between agencies during implementation, operation, and maintenance. The agencies work closely during the planning, design, construction, operation, and maintenance stages. A review of items to consider included in these areas is discussed in the Appendix.

Integrated system development includes solving institutional and funding issues early on in the planning stage. It also includes development of a Traffic Management Team (TMT) to develop goodwill and an appreciation and use of the views of representatives from all of the agencies involved. The TMT approach goes a long way to solving problems as they arise. Information on the TMT concept, which is working in Texas, Washington, Florida, and other locations, is discussed in a publication included in the Appendix of this paper.

An integrated and dedicated team approach is needed in all stages of implementation, operation and maintenance, to assure that the system will achieve its goals.

CONCLUSION

Studies show that traffic volumes can be expected to increase vehicle delay between 1986 and 2005 by 435 percent on urban freeways and 240 percent on urban streets if no action is taken to improve existing conditions. Integrated traffic management will serve to significantly reduce this delay.

Integrated traffic management systems include:

- Handling traffic at incident locations;
- Integrating resources available to the agencies within an urban area;
- Sharing information and developing a research to implementation approach to further research;
- Developing a team approach to all aspects of the work for planning, designing, implementing, operating, and maintaining the integrated control and surveillance system;
- Obtaining needed funds to install, operate, and maintain and integrated control an surveillance system; and
- Implementing an integrated traffic control and surveillance system by interconnecting the operation of systems within different agencies.

Adequate funding and installation of an integrated control and surveillance system are the most important parts of the integrated traffic management system, but the other elements are also necessary to assure success.

The development and operation of an integrated traffic management system is a challenging process, but the benefits to the public make the effort worthwhile. The development of integrated traffic management systems is necessary for the continuing growth of our urban areas. Transportation is this nation's lifeline, and the integrated traffic management system is now and will continue to be a major element in this lifeline within urban areas.

REFERENCES

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4. K. Cushman. "Land Development and Transportation: A Photographic Commentary on the Results of One Dimensional Thinking." Presented July 1988.

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APPENDIX: Development, Implementation, and Operation/Maintenance of Integrated Systems

Introduction

The development of an integrated traffic management system follows the same steps as that of every traffic control and surveillance system. These steps are as follows:

- Planning
- Design
- Implementation
- Operation and Maintenance

The steps for developing an integrated system can be more complex and difficult to carry out than those for an individual system. The purpose of this section is to discuss some of the issues that may be more applicable to integrated systems and not those common to the development of individual systems.

Planning

Adequate and proper planning is required to assure that all issues are considered and accommodated and that potential (and existing) problems are resolved. These issues include the following:

- Initial and future use of the system;
- Types of control systems to be included initially and in the future;
- Type of control and communications (i.e., central control with or without distributed control, fiber optic and/or twisted wire pair communications);
- Addition of IVHS components in the future;
- Location of the traffic management center;
- Problems which may be encountered during design and implementation;
- Responsibilities of each agency and its personnel for design, operation and maintenance;
- Amount of funds and number of personnel to be contributed by each agency, and
- Institutional issues previously noted.

Planning needs to be done jointly by all agencies involved. A team (project team) effort makes each agency a part of the integrated system during the other steps of the process.

The project team should include planning, engineering, law enforcement, and maintenance personnel. The presence of law enforcement and maintenance personnel is important to ensure that their needs are met once the system has been built and to obtain their input on design questions. An architect should be included if a new traffic management center is included in the project or if an existing facility will be expanded. If a traffic engineering consultant will be employed for the design stage, he or she should be included on the team. Also, a public relations representative is desirable to provide well prepared information to the media and administrators. Additional personnel may be included as the planning and design process proceeds.

The planning process, as well as the design, implementation, and operations work, can be assisted to a high degree by the development of a Traffic Management Team (TMT). Actually, the TMT should, if possible, be developed before the beginning of the planning process.

The TMT, which comprise representatives of agencies involved in traffic operations within the urban area, can study local traffic operations, safety, and enforcement problems. By looking at problems from different points of view (i.e., city, county, state, enforcement, and engineering), the TMT can obtain solutions that might not have been developed by one agency alone. The members are not the top administrators for their agencies but are in a position from which they can speak for the administrators.

The TMT can develop trust and respect among team members and their agencies, provided that all members enter the TMT with openness and willingness to work together. The good working relations developed by the TMT can be applied in the initial design of an integrated system.

Although TMT members may serve on the project team, the TMT studies problems on a broader urban scope than the project team. Members of the two teams may want to discuss problems encountered by the project team, and monthly project team progress reports could be given at TMT meetings.

The TMT concept is working in Texas, Washington, Florida, and other locations around the country. A copy of a publication developed by the Texas Department of Transportation (formerly known as the Texas State Department of Highway and Public Transportation) is included in this appendix.

Design

The results of the planning process, along with solutions to institutional and funding problems, are incorporated into the design of the system. The design incorporates existing systems and provides for future system expansion and the addition of new systems, including additions at the traffic management center, as well as in the field.

If the agencies do not have expertise in some or all parts of the system design, a traffic engineering consultant should be hired.

One or more agencies (together with the consultant and architect where needed), develops the plans and specifications. Where more than one agency is involved in the development of the plans and specifications, initial guidelines must be developed to assure that all parts of the design work (including nomenclature and symbols) are the same. This procedure eases integration of the plans and specifications, reduces confusion and misinterpretation (especially as the project is installed), and reduces the contractor bid prices (by eliminating the contractor's guess work).

A thorough review of the plans and specifications must be carried out by personnel who have not prepared them. Also, it is very important to obtain the necessary expertise in carrying out the design. Both the thorough review and expertise will pay for itself many times over during the installation and operation/maintenance stages.

Implementation

Assuring that the equipment, software, and materials meet specifications before installation and that all aspects of the plans and specifications are met during installation is a primary responsibility of the project engineer. He or she must employ qualified inspectors and persons familiar with the equipment and its intended operation.

Representatives from different agencies may inspect or observe the work, but these people must report any noted discrepancies to the project engineer by these representatives and not to the contractor, subcontractors, or the project engineering inspectors. The project engineer must in turn confer with the contractor on the discrepancies. Representatives from various agencies should also attend the factory demonstrations of hardware and software. In all cases, the project engineer is in charge and makes the final decision in case of different interpretations of the plans and specifications.

Operation and Maintenance

The old adage that taste is the proof of the pudding applies to operation and maintenance. The proper design and implementation of a system goes a long way in achieving good operation and maintenance.

Each agency must provide enough personnel to properly operate and maintain the system. The agencies can either have one group to maintain and operate the integrated system or carry out the operation and maintenance of its own portion of the system. Where a central computer supervises computers of several agencies, the central computer and its peripheral equipment (communications, work stations, displays) must be maintained by one agency or group.

The operation of the integrated system must be carried out as one unit within the confines of the design and interagency agreements. Operators of various agency systems should be able to work together best if they are located within the same traffic management center. They should also be able to formulate and implement appropriate responses for different traffic conditions more easily.

Operation and maintenance is a continuous process, and quite often funding must be obtained each year. It is important to maintain good relations with the administrators in each agency and assure that they realize that the system is providing a necessary function. When a new agency administrator is appointed or hired, every effort must be made to sell him or her on the concept of integrated traffic management.

Integrated systems operation is complex and requires constant vigilance and considerable patience, but it is worth the work involved.

TRAFFIC MANAGEMENT TEAMS IN TEXAS

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

MAINTENANCE AND OPERATIONS DIVISION

January 1990

The first Traffic Management Team in Texas was officially formed in 1975. By 1980, there were five teams and there are currently 24 operating in the state. These teams cover nine of the largest metropolitan areas, as well as other smaller areas. The rapid spread of the team concept and the wide acceptance among the larger cities in Texas lead us to believe that it is a very beneficial organization.

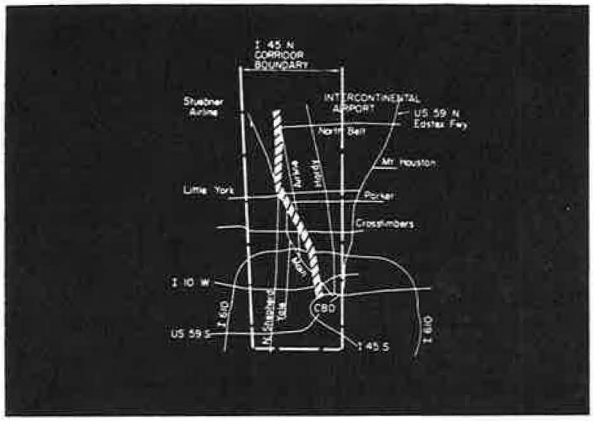
The team brings together professionals from the various transportation related agencies in the area and helps them to work together to solve the area's traffic problems. It aids in the development of mutual respect among members, but more importantly, it also aids in the understanding of others and breaks down perceived barriers. This is accomplished through enhanced communication, which leads to coordination and cooperation.

We hope this booklet will help introduce you to how the Traffic Management Teams operate in Texas. If you would like further information or have any questions, please write to:

State Department of Highways &
Public Transportation
Maintenance and Operations Division
11th and Brazos Streets
Austin, Texas 78701

What does a Traffic Management Team do?

A Traffic Management Team improves the overall traffic operation and safety along principal arterials and/or urban area corridors by coordinating the activities of the principal operational agencies in the area.



What is a corridor?

A corridor is a system of roadways which interact and serve as alternate routes to each other. Corridors can consist of two or more parallel streets or a freeway with parallel streets. All cities have several different corridors serving different origins and destinations which intertwine and change in size depending on the time of day and day of week. Any change made to the capacity of one element of the corridor affects the others by shifting the demand from one roadway to another; therefore, alterations must be coordinated between the various elements for the traffic to move in an efficient manner. The different elements of the corridor, though, are quite often controlled by different agencies and communication and coordination between them is sometimes weak.

What is a network?

A network is made up of the various corridors in an area. Just as roadways within a corridor interact with each other, the same is true for corridors within a network. There must be coordination between corridors in order to have an efficiently operating transportation network. In large metropolitan areas for example, a typical trip to and from the workplace may traverse two or three corridors. If a problem occurs in a corridor which encompasses a portion of an inner loop freeway, traffic on an outer radial freeway must be informed and given the opportunity to choose an alternate route.

The network is usually of major concern in the smaller city. Even though the corridor of a smaller city may contain only one or two roadways and the network consist of arterials instead of freeways, coordination is important. An efficient network will help maintain the level of service that citizens are accustomed to and expect.

How can traffic operations be improved?

There are basically three ways to improve the operation of a corridor and a single city street. The first is to improve safety. Much of the work done by the teams in Texas is directly related to safety and it is always a consideration in any other action. Some common safety improvements are adjusting the clearance intervals at signals, restriping faded lane lines, increasing enforcement of speed limits and improving confusing signing.

Operation can also be improved by increasing passenger capacity. This includes adding lanes, providing good signal progression, eliminating geometric bottlenecks, and providing mass transit facilities. Without good coordination, each agency will build those improvements specific to their needs, but may find that the new facility doesn't work as well as it could. For example, the state highway department and the local transit authority must work together closely in designing a separate priority entry ramp onto a freeway for high-occupancy vehicles. Other agencies can also, however, contribute to the design. The police department can suggest ways to make the ramp restrictions easier to enforce and less likely to be violated. The city traffic department can alter the geometry or signal operation of nearby intersections to make the ramp easier to access.

The third basic way to improve operation is to decrease the vehicular demand. This is more difficult to do since it requires convincing the driver to change his or her normal route or mode of travel (bus, carpool, etc.). Some suggestions are to encourage use of mass transit, less traveled alternate routes, and variable work hours. A temporary decrease can be obtained by the use of media releases explaining the need for diversion and how it can be accomplished. Installing freeway entrance ramp meter control may cause a more positive shift in motorist travel.

What different agencies should be represented?

Different cities have different situations, so representation is seldom the same on every team. However, some agencies are almost always included on the team. These include the city and state traffic engineering offices, city and state law enforcement agencies, and the local transit authority. In some cities, one agency may represent two disciplines on the team. In Kerrville, for example, the state resident engineer represents both traffic and design engineering disciplines. Other agencies and divisions should be included if they are significantly involved in the operation of the network. Possibilities include the maintenance, design and public works sections; the fire department; railroads and the port authority. It is important, however, to keep the team as small as possible to minimize red tape. Table 1 shows the disciplines represented on teams in ten various-sized cities in Texas.

When discussing a topic which affects an agency not represented on the team, that agency should be invited to attend that meeting. For instance, several teams have met with local ambulance services to discuss ways of clearing accidents off of a freeway with as little disturbance to traffic as possible. Most teams invite a representative from a satellite city to attend a meeting at which a subject affecting that city will be discussed; however, some teams include representatives from satellite cities as permanent members of the team.

TABLE 1
COMPOSITION OF SELECTED TMT'S IN TEXAS
(SAMPLE BASED ON POPULATION SIZE)*

Agency	Brownwood (18,720)	Kerrville (19,890)	Tyler (75,440)	Laredo (117,060)
City				
Traffic	X	X	X	X
Police	X	X	X	X
Fire				X
Transit				X
State				
Traffic	X	X	X	X
Design	X	X		X
Maintenance	X	X		X
Highway Patrol	X	X	X	X
County				
Engineer		X	X	
Sheriff		X	X	X
Other				
Naval Air Station				
Traffic Safety Assoc.				
Railroad Assoc.				

*All populations are 1986 U.S. Census Bureau estimates.

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TABLE 1 (CONTINUED)
COMPOSITION OF SELECTED TMT'S IN TEXAS
(SAMPLE BASED ON POPULATION SIZE)*

Agency	Beaumont (119,900)	Midland and Odessa (199,270)	Corpus Christi (263,900)	Fort Worth and Arlington (679,320)
City				
Traffic	X	XX	X	XX
Police	X	XX	X	XX
Fire				
Transit				X
State				
Traffic	X	X	X	X
Design	X			X
Maintenance	X		X	X
Highway Patrol	X	X	X	X
County				
Engineer		XX	X	X
Sheriff				
Other				
Naval Air Station			X	
Traffic Safety Assoc.				
Railroad Assoc.				

*All populations are 1986 U.S. Census Bureau estimates.

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TABLE 1 (CONTINUED)
COMPOSITION OF SELECTED TMT'S IN TEXAS
(SAMPLE BASED ON POPULATION SIZE)*

Agency	San Antonio (914,350)	Houston (1,698,200)
City		
Traffic	X	X
Police	X	X
Fire		X
Transit	X	X
State		
Traffic	X	X
Design		X
Maintenance		
Highway Patrol		X
County		
Engineer	X	X
Sheriff	X	X
Other		
Naval Air Station		
Traffic Safety Assoc.		X
Railroad Assoc.		X

*All populations are 1986 U.S. Census Bureau estimates.

What actions need to be coordinated?

Virtually all work done in a freeway corridor can be coordinated between the agencies of the team to the benefit of traffic operations and safety. Listed below are a few common examples.

1. **Work Zone Traffic**

   Congestion in varying degrees often accompanies maintenance operations and new construction, causing traffic to divert to alternate routes. If maintenance is also being performed on that alternate route, the entire corridor can break down. Even along city streets and rural highways adjacent to a city, traffic can be affected by improperly designed work zones. Therefore, traffic control which affects the capacity of a route should be brought to the attention of the team to prevent any conflicts.

   In severe cases, such as where an entire freeway is closed, the entire team should be involved in planning and implementing the closure. The police department can direct traffic and enforce special signing while the city traffic office adjusts the coordination of the signals on the alternate route to provide an efficient operation. The highway department and city can provide signs warning of the closure and identifying the alternate route while the transit authority modifies its routes, if possible.

   The team as a whole can prepare media releases to warn drivers of the closure and recommend an alternate route. By coordinating the plan within the team, most problems can be worked out beforehand and the traffic control can be jointly carried out to provide a safe and efficient operation.

2. **Route Improvements**

   Permanent modifications to any roadway in a corridor or arterial network may affect the other elements. Therefore, team members often give updates on proposed projects so that all members can have advance notice. For maximum efficiency, all arterials which might be involved should be analyzed to prevent a bottleneck during construction and afterwards. Controlling entrance ramp volumes through ramp metering, for example, can improve freeway operation in terms of total volume, but it can also cause congestion on city streets. The team is well equipped to analyze the effects of new construction and to prepare for the changes in traffic flow.

3. **Normal Operations**

   In their day-to-day work, police officers often notice locations where there is a violation or accident problem. The team provides a ready line of communications to the traffic engineering agencies who can act to correct the problem.

   A change in operation can also be important to the team because of the interaction between the elements of the corridor or overall network. For example, banning left turns at an intersection during peak hours will force traffic to use another cross street. This information is vital to the transit authority, which may need to alter its routes. The traffic could possibly start using a different on-ramp to the freeway, thus creating a weaving problem or a need to change ramp meter timings.

4. **Emergency Planning**

   In case of severe weather such as flooding or freezing, it is very helpful to have a plan delineating each agency's responsibilities to prevent delay and possible omission of those jobs which must be done to insure the safety of the driving public. This same type of planning can also be used for major incidents such as truck accidents, which can close an entire freeway. Once again, the advance planning fosters quick response and action.

5. **Special Event Traffic Handling**

   The team can often quickly and efficiently design, analyze and operate a traffic routing plan for a special event such as a parade or fair. The transit authority can provide express bus service to the event while the highway department and city can provide signs telling the driver how to get to the bus service and the event. The police department can direct the traffic around the event and provide temporary traffic control at intersections.

What is a Team Meeting like?

The team should be a group of transportation professionals with mutual respect and confidence. Below are a few guidelines which might help in setting up and running team meetings. Each team is different though, and this is reflected in the way the team operates.

1. Most teams in Texas hold monthly meetings, but some only hold them every other month or quarterly. It is important to schedule the meeting well beforehand so that all the members will have ample time to arrange their calendars.

   This can be easily done by setting a standard meeting date, such as the second Tuesday of each month at 2:30 in the afternoon.

2. The same people must attend the meeting each time rather than send an alternate. This helps to create a spirit of cooperation and respect among the team members and a more comfortable working situation.

3. The meetings should be informal. A chairperson helps in coordinating the discussion; however, with such a small body, formal rules that tend to stifle the interaction of the team are not needed. Most teams use a short prepared agenda of three or four items submitted by the team members and leave time for impromptu items. One type of problem should not be allowed to dominate the meeting; rather, an attempt should be made to have a mixture of subjects on the agenda that will keep everyone interested and involved.

4. After discussion, the team reaches a verbal consensus on the solution to a problem. Generally, actions are not taken in the name of the team; however, the responsible agency or agencies will take steps to implement the plan. The team members must be able to make decisions about committing their agency's resources to a team project and also be close enough to the operation to be able to effectively discuss the issues.

How are the team and its projects funded?

Generally, in Texas, the teams have not had dedicated funding sources. Rather, each agency funds its own improvements with its normal budget.

How much time does being involved in a team take?

Attending team meetings does take time away from a busy schedule, but most team members feel that this time is more than compensated for by the reduction in time wasted because of misunderstandings, redesigns, and letter writing. The team gets problems out in the open early and everyone benefits from the improved communication, coordination, and cooperation.

Teams are being formed in all areas of the state.

There are currently 24 Traffic Management Teams operating in Texas in areas ranging in population from 5,000 to 3,000,000, including nine of the largest metropolitan areas. Many of these teams are operating effectively in rural and smaller urban areas. Our experience has shown that teams are of considerable help in guiding agencies toward their common goal of improving traffic conditions.

The team is a local effort. It is geared toward looking at all aspects of traffic operations, not just one issue or project. However, for a large, on-going project, a separate task force may be needed to coordinate efforts.

Traffic Management Teams are needed now and in the future.

As our streets and highways become more and more congested and the cost of purchasing right-of-way escalates, the role of traffic operations will assume an even greater importance in the years to come. And as a forum for the transportation related agencies of a city or metropolitan area, the Traffic Management Team will play an important part in the enhancement of traffic operations. The team will provide a systematic and effective approach toward the improvement of traffic operations in a city and surrounding areas.