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16. Abstract <p>This report presents guidelines as to how highway agencies can better prepare to handle major transportation emergencies. It is prepared as a planning document, designed to illustrate how an agency can develop and integrate a system of preparations into its normal state of operations that will facilitate that agency's ability to maintain and even enhance mobility before, during, and after an emergency. In addition, the report is expected to help agencies establish mechanisms to improve their response to emergency situations. Suggestions are presented relative to:</p> <ul style="list-style-type: none"> <li>• Transportation System Evaluation,</li> <li>• Intraagency and Interagency Coordination,</li> <li>• Resource Assessment and Management, and</li> <li>• Public Communication and Notification.</li> </ul> <p>These recommendations will be useful to TxDOT District personnel in improving their preparations for emergency response and recovery.</p>					
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**PLANNING GUIDELINES**  
**FOR**  
**MAJOR TRANSPORTATION EMERGENCIES**

by

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Nada D. Trout

Research Report 1231-3F  
Research Study 2-18-90-1231

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# METRIC (SI\*) CONVERSION FACTORS

## APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
In	Inches	2.54	centimetres	cm
ft	feet	0.3048	metres	m
yd	yards	0.914	metres	m
mi	miles	1.61	kilometres	km

<b>AREA</b>				
In <sup>2</sup>	square inches	645.2	centimetres squared	cm <sup>2</sup>
ft <sup>2</sup>	square feet	0.0929	metres squared	m <sup>2</sup>
yd <sup>2</sup>	square yards	0.836	metres squared	m <sup>2</sup>
mi <sup>2</sup>	square miles	2.59	kilometres squared	km <sup>2</sup>
ac	acres	0.395	hectares	ha

<b>MASS (weight)</b>				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg

<b>VOLUME</b>				
fl oz	fluid ounces	29.57	millilitres	mL
gal	gallons	3.785	litres	L
ft <sup>3</sup>	cubic feet	0.0328	metres cubed	m <sup>3</sup>
yd <sup>3</sup>	cubic yards	0.0765	metres cubed	m <sup>3</sup>

NOTE: Volumes greater than 1000 L shall be shown in m<sup>3</sup>.

## TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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## APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
<b>LENGTH</b>				
mm	millimetres	0.039	inches	In
m	metres	3.28	feet	ft
m	metres	1.09	yards	yd
km	kilometres	0.621	miles	mi

<b>AREA</b>				
mm <sup>2</sup>	millimetres squared	0.0016	square inches	In <sup>2</sup>
m <sup>2</sup>	metres squared	10.764	square feet	ft <sup>2</sup>
km <sup>2</sup>	kilometres squared	0.39	square miles	mi <sup>2</sup>
ha	hectares (10 000 m <sup>2</sup> )	2.53	acres	ac

<b>MASS (weight)</b>				
g	grams	0.0353	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams (1 000 kg)	1.103	short tons	T

<b>VOLUME</b>				
mL	millilitres	0.034	fluid ounces	fl oz
L	litres	0.264	gallons	gal
m <sup>3</sup>	metres cubed	35.315	cubic feet	ft <sup>3</sup>
m <sup>3</sup>	metres cubed	1.308	cubic yards	yd <sup>3</sup>

## TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
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These factors conform to the requirement of FHWA Order 5190.1A.

\* SI is the symbol for the International System of Measurements



## SUMMARY

This report presents guidelines as to how highway agencies can better prepare to handle major transportation emergencies. It is prepared as a planning document, designed to illustrate how an agency can develop and integrate a system of preparations into its normal state of operations that will facilitate that agency's ability to maintain and even enhance mobility before, during, and after an emergency. In addition, the report is expected to help agencies establish mechanisms to improve their response to emergency situations.

The first step towards improved emergency preparedness is an assessment of the potential frequency and magnitude of emergency situations. This assessment takes into consideration the types of emergencies that may arise and the severity with which they may impact the agency and the general public. Generally, large urban areas require more formalized preparations than small rural areas. Likewise, more extensive efforts may be required by a large agency to achieve the same level of preparedness that may normally exist with a small agency.

Most major emergencies are large enough to affect more than one agency. When they occur, it is imperative that response efforts by all agencies be coordinated to avoid duplication and to increase effectiveness. Interagency cooperation agreements (also called mutual-aid agreements), intraagency and interagency communication networks, and personnel training are all methods of increasing coordination within and between agencies in times of emergency.

Another preparation for major emergencies is an assessment and management plan for the equipment, supply, and personnel resources of an agency. This can save precious time and allow response efforts to be more effective. It has been suggested that a regional perspective of resources available be developed to facilitate quicker and more efficient response efforts by state and local highway agencies.

Perhaps the most valuable resource an agency must monitor and manage throughout an emergency is its personnel. Emergency conditions often call for extraordinary efforts and sacrifices by agency employees. Consequently, the agency needs to monitor its employees and have a means of rotating them out for rest.

Highway agencies need to be prepared to effectively collect and disseminate travel information to the public during emergencies. The public wants and needs accurate, timely, and credible information. Information dissemination may include direct methods such as providing special signing and answering telephone requests for information, or it may include indirect methods such as the media. An agency must recognize that several news items typically compete for attention during an emergency, and the agency may not have total control over the accuracy or frequency with which its information is presented to the public.

## **IMPLEMENTATION STATEMENT**

This report contains recommendations regarding highway agency preparations for major transportation emergencies. These recommendations will be useful to TxDOT District personnel in improving their preparations for emergency response and recovery. The report represents a "shopping list," from which District personnel may select one or more suggestions that may fit their particular set of circumstances.

## **DISCLAIMER**

The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration or the Texas Department of Transportation. This report does not constitute a standard, specification, or regulation. This report is not intended for construction, bidding, or permit purposes.

## **ACKNOWLEDGMENTS**

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## **1. INTRODUCTION**

### **Need for Planning Guidelines for Major Transportation Emergencies**

Emergency situations that affect the transportation system of an area can result in major traffic delays and congestion as well as cause risk to life or property. When emergencies occur, it is important that all public agencies pull together to tackle the problem.

Emergencies can vary dramatically in type, duration, and the amount of the roadway network involved. As a result, the number of agencies involved in an emergency will vary drastically. Likewise, the level of involvement of a given highway agency will also vary. Thus, the concept of planning for major emergencies may, to some, seem foolhardy for all but the most likely and hazardous types of situations (i.e., hurricanes, evacuations near chemical and nuclear plants, ice storms, etc.).

It is impossible to predict all the types of emergencies that could occur, where and when they could occur, and how severe they could be. Every emergency requires real-time decisions and actions of key personnel from each agency directly involved. Nevertheless, experiences nationwide suggest that basic preparations can be made to allow an agency to better react when an emergency does occur. By being prepared, precious time organizing, coordinating, and responding to emergencies can be reduced. In addition, the amount of wasted effort and frequency of ineffective and improper decisions can also be lessened.

Traditionally, transportation planning for major emergencies has focused upon activities such as identification and analysis of evacuation routes for hurricanes and areas near chemical and nuclear plants, development of incident management programs (primarily in urban areas), and selection of bypass routes for hazardous material shipments. Overall emergency preparedness has generally been limited to broad statements of highway agency roles and responsibilities and declarations of the intent to coordinate and communicate within and between agencies and with the private sector. Unfortunately, the details as to how these roles and responsibilities will be carried out or how coordination and communication will be achieved are often not considered until after disaster strikes. Experiences with past emergencies indicate that these details are not resolved automatically and have often given highway agencies the biggest headaches before, during, and after an emergency situation.

## **Purpose and Scope of Report**

This report has been written to assist highway agency management personnel in their efforts to become better prepared for handling major transportation emergencies. Chapter two of the report discusses how to assess the necessary scope of preparations. The risks of an emergency, the size and organizational structure of the agency, and the number of other agencies to be involved all affect the level of effort necessary by an agency to become better prepared. Chapter three describes various areas of highway agency preparedness for major emergencies and presents recommendations for improving the ability of the agency to react and operate during times of emergency. These recommendations are tied directly to the needed scope of preparations of each agency. In some cases, only a few informal arrangements may be useful; in other cases, an elaborate formalized set of activities and preparations may be needed. Chapter four is the summary of the major points of the report.

Three appendices are also included in this report. Appendices A and B are summaries of case studies of emergency preparedness and response of two Texas Department of Transportation's (TxDOT) Districts. These case studies highlight how each District has prepared and responded to emergency conditions and serve to highlight some of the more important recommendations presented in this report. Appendix C provides suggested major topics of highway agency emergency preparedness that could be used in the development of training materials (such as videotape training sessions).

## **2. ASSESSING AGENCY NEEDS FOR MAJOR TRANSPORTATION EMERGENCY PLANNING**

### **Assessing the Scope of Planning Needs**

Before a highway agency (or department within the agency) can take effective steps towards improved emergency preparedness, it is important for that agency to assess its needs for such preparations. Each agency is different, with unique abilities, responsibilities, and working relationships with other agencies in the region. In addition, the types and characteristics of emergencies which it may have to deal with also vary dramatically. Those actions and preparations that may be particularly useful to one agency may have no relevance to another. Consequently, each agency must first determine how extensively it should prepare for potential major transportation emergencies.

One factor to be considered by an agency is the risks that exist for major transportation emergencies to occur. As stated in a previous interim report (1), major transportation emergencies can be defined as those events which affect the transportation system in a way for which the response measures required by an agency or the resulting traffic impacts caused by the event are not part of the normal day-to-day operations of the system. The responses required may be unusual in terms of the number and types of agencies involved, in the amount of manpower or equipment resources required, or in the types of actions required away from the emergency scene. The traffic impacts may be unusually severe, of extremely long duration, or involve unusual reactions by motorists.

To assess the risks associated with transportation emergencies, an agency begins by considering what types of natural and man-made hazards are present in a given region. Among the many potential natural disasters that have affected highway agencies in the past are the following:

- Hurricanes,
- Tornados,
- Floods,
- Ice and snow storms,
- Dust storms,
- Forest fires,

- Volcanic eruptions, and
- Earthquakes.

Man-made emergencies can include the following:

- Bridge and pavement failures,
- Chemical and nuclear plant disasters,
- Hazardous material spills,
- Power outages,
- Gas leaks and explosions, and
- Major accidents.

Obviously, this list is not inclusive. An agency cannot predict all of the possible emergency scenarios that could develop. However, by proceeding through this assessment, an agency becomes better aware of what emergencies have the potential to occur.

Next, the potential impacts of emergencies within an agency's jurisdiction are assessed by examining the type and location of industries in the area, population densities, and the traffic volumes and operating conditions of the different parts of the roadway system. In large urban areas, any emergency that occurs is likely to wreak havoc among a large number of motorists and the general public, whereas an emergency in a primarily rural area may affect only a small number of people.

The impacts may overlap jurisdictional boundaries and involve a number of different public agencies, depending on the characteristics of the region. In general, larger metropolitan areas will require more intense coordination and cooperation between agencies than will less populated jurisdictions.

### **Description of an Emergency Planning Framework**

It is not the intent of this report to describe a step-by-step methodology for preparing for major transportation emergencies. Indeed, the previous discussion of the planning scope illustrates just how different the needs of each agency are. Rather, the purpose of this section is to highlight the different facets of emergency preparedness that an agency may need to consider.

Emergency preparedness planning can be divided into three different phases, each representing a different period in the timeline of an emergency. These are:

- Planning for the time prior to an emergency,
- Planning for the time during an emergency, and
- Planning for the time after an emergency,

The actual period of time that makes up each of these phases varies tremendously from emergency to emergency. Using this breakdown of a typical emergency as a guide, it is possible to identify the types of planning efforts that may ultimately enhance an agency's level of emergency preparedness.

A framework of highway agency emergency planning needs is presented in Table 2-1. Examining this table, it is evident that as an emergency proceeds from phase to phase, the responsibilities of the highway agency change. As one might expect, the types of actions that are necessary and appropriate within each phase then depend on these sets of responsibilities. Finally, the desired actions of an agency within each phase specify what planning efforts are necessary to achieve the best possible level of emergency preparedness. A detailed description of each of the phases of an emergency is provided below.

### Planning for the Time Prior to an Emergency

Many emergencies occur with little or no warning, and their location cannot be predicted in advance. Hazardous material spills, major accidents, etc. can occur anywhere at anytime and must be dealt with by the agency immediately after they happen. Other types of emergencies, however, provide some advance warning time during which an agency can go into the "alert" status in its emergency preparation and response mode. For example, a certain amount of advance warning is generally available for hurricanes, ice storms, etc. when a highway agency can mobilize and be ready to act.

Obviously, it is preferable to have some warning of an upcoming transportation emergency. With such knowledge, an agency can customize the operations of the transportation system in order to preserve public safety before, during, and after the emergency while at the same time maintaining mobility at as high a level as possible. For example, special traffic signal timing plans could be enacted on evacuation routes to facilitate traffic flows, parking bans on major routes could be enacted, and left-turning

**TABLE 2-1. PLANNING FRAMEWORK FOR MAJOR TRANSPORTATION EMERGENCIES**

Phase of Emergency	Agency Focus of Emergency Responsibilities	Description of Agency Emergency Actions	Preparations to Enhance Agency Actions
Prior to the Emergency	<ul style="list-style-type: none"> <li>• Move to "alert" emergency response status</li> <li>• Prepare the transportation system to facilitate mobility and endure emergency conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Implement an emergency transportation plan</li> <li>• Monitor status of impending emergency conditions</li> <li>• Initiate response efforts when appropriate</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate transportation system and develop action plan</li> <li>• Establish person or agency to designate initiation of emergency response efforts</li> </ul>
During the Emergency	<ul style="list-style-type: none"> <li>• Maintain mobility of the transportation system to the extent possible</li> <li>• Support other agency roles in efforts to minimize loss of property and life</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and respond to problems in the transportation system as they arise</li> <li>• Notify public of transportation problems</li> <li>• Provide personnel, equipment, and supply assistance to other agencies</li> <li>• Manage outlay of equipment and personnel resources</li> </ul>	<ul style="list-style-type: none"> <li>• Establish interagency coordination and mutual-aid agreements</li> <li>• Establish intraagency and interagency communication networks</li> <li>• Develop and maintain personnel and equipment resource lists</li> <li>• Develop methods of notifying the public of conditions of the transportation system</li> </ul>
After the Emergency	<ul style="list-style-type: none"> <li>• Restore transportation system to pre-emergency conditions</li> <li>• Support regionwide clean-up and repair efforts</li> </ul>	<ul style="list-style-type: none"> <li>• Assess damage to transportation system and prioritize repair efforts</li> <li>• Assist other agencies in damage assessments</li> </ul>	<ul style="list-style-type: none"> <li>• Identify protocols and documentation procedures for receiving assistance</li> <li>• Develop mechanism for prioritizing recovery needs in the transportation system</li> </ul>



movements could be restricted (2). An agency may also need to prepare various components of the transportation system to better weather the upcoming emergency. Depending on the type of emergency, traffic control devices may need to be covered or removed, and parts of the transportation system may need to be closed or restricted.

Given the general responsibilities of the agency and potential actions in its pre-emergency mode, the types of planning efforts that could be utilized by the agency are listed in the last column of Table 2-1. In order to prepare the transportation system for an impending emergency, the agency must have already evaluated the system and have a plan ready to implement. When an agency has those types of emergencies which are fairly common and for which there exists advance warning, the level of planning detail can be very high. As examples, several urban Districts in Texas have developed formal plans for closing high-speed freeway segments that are prone to icing during winter storms.

In addition to preparing the transportation system for an impending emergency, a highway agency can begin to prepare its own resources to respond to conditions that may result when the emergency actually begins. In effect, the agency goes into an "alert" status, notifying personnel to be ready to respond should the need occur, establishing initial contacts with other agencies in the region, monitoring travel conditions, etc.

The benefits of planning efforts for this phase of an emergency extend far beyond the agency's ability to better prepare for impending emergencies. The knowledge gained through the development of plans and procedures for handling a certain type of emergency for which advance warning is available can often help that agency better respond to other emergencies when there is no advance warning. The understanding of the capabilities and limitations of the transportation system under certain emergency conditions can provide a solid base from which agency officials can make better real-time decisions under other emergency scenarios.

### Planning for the Time During an Emergency

Emergencies differ not only in terms of advance warning time but also in terms of the actual duration and severity of the emergency itself. Agency actions during this phase of the emergency will primarily involve active management and reactions to transportation situations as they arise. The highway agency will also serve a supporting role to other agencies, providing equipment and personnel as requested. Therefore, agency planning

efforts for this phase should focus on ways of improving real-time decision-making and response efforts.

Planning for this phase of an emergency tends to become more generic in nature. Emphasis focuses upon establishing good cooperating arrangements between departments within an agency, between agencies, and between agencies and the private sector. Also, communication mechanisms are established or modified, and lines of authority are verified. The goal is to reduce potential confusion and streamline the decision-making process within and between agencies under emergency situations so that safety and mobility is maintained to the extent possible.

#### Planning for the Time After an Emergency

Even after the critical period of a very large emergency has passed, the transportation system may require considerable effort and resources to return to its normal state of operations. As with the time during an emergency, the time after an emergency has passed will likely involve ongoing transportation management and reactions to developing situations. In addition, the highway agency will continue to provide equipment and engineering expertise in a supporting role to other agencies.

Planning for this last phase of an emergency also focuses on the appropriate lines of communication and coordination within and between agencies. However, the emphasis becomes the clean-up and restoration of the transportation system, rather than the real-time "fix-it" actions performed during an emergency to maintain mobility. When planning for this phase of an emergency, the emphasis is on the identification of protocols and documentation procedures needed to obtain federal aid (when necessary) and to minimize possible tort litigation. Also, a highway agency should emphasize the development of a mechanism for establishing priority lists for recovery activities that are needed.

### **3. INCREASING AGENCY PREPAREDNESS FOR MAJOR TRANSPORTATION EMERGENCIES**

This chapter discusses several mechanisms and activities to improve agency preparedness for major transportation emergencies. The chapter is divided into four major topics. The activities described within each topic have been found through past experiences to have a major effect upon how well an agency is able to cope with the various types of major emergencies that may arise. These topics are:

- Transportation system evaluation,
- Intraagency and interagency coordination,
- Resource assessment and management, and
- Public communication and notification.

Each of these topics should be considered in any attempt to improve emergency preparations, regardless of agency size, emergency types, or regional characteristics. However, the degree of formality to which each is addressed depends greatly on the needs assessment of a particular agency as described in chapter two. In some cases, simple handshakes and verbal discussions between key personnel within different agencies will do the job. In other cases, detailed formal written agreements with appropriate official signatures will be required. As stated previously, the degree of formality of the planning process will generally be related to the sizes of the agencies involved, which is likely to depend upon the size of the population the agencies serve.

#### **Transportation System Evaluation**

One of the most basic preparations a highway agency can make is to take stock of the existing transportation system with respect to its ability to function under emergency situations. As with other preparations, the level of effort and detail given to this task will depend on the characteristics of the highway agency, types of emergencies that are realistically possible in the region, size of the population and roadway network, and other factors. Generally speaking, a detailed evaluation of the system is performed in preparation for those emergencies which afford an agency with some advance warning (i.e., ice storms, hurricanes) or which the location of the emergency can be pinpointed (such as near chemical plants, oil refineries, etc.). The evaluation may include such things as:

- Traffic operations analysis at specific signalized and unsignalized intersections,
- Capacity analysis of key diversion and evacuation routes,
- Identification of "sensitive" locations within the corridor from a transportation perspective (schools, hospitals, etc.), and
- Assessment of manpower and traffic control device needs to accomplish real-time traffic management at key points.

However, even if the highway agency does not feel the need for this detailed an evaluation, an overall understanding of the transportation system's capabilities and limitations is important to an agency's ability to respond to unexpected and unusual emergencies.

The term "evaluation" is somewhat of a misnomer in that it implies a one-time effort by the highway agency. In reality, it is an ongoing process in which the agency develops and maintains an awareness of the ability of the system to accommodate travel before, during, and after a major emergency. In this regard, knowledge of temporary conditions within the system (such as roadway construction and non-functioning traffic control devices) are as important in the process as the physical characteristics of the roadway (which do not change).

In preparing for major emergencies which afford the agency some advance warning, certain characteristics of the transportation system can be modified to enhance traffic flow. In general, almost any type of transportation systems management (TSM) technique can be considered for use during major emergencies. Examples of some of these techniques include:

- Adjustment of intersection signal timings,
- On-street parking bans,
- Suspension of tolls on toll roads and bridges,
- Left-turn prohibitions at critical intersections,
- Posting law enforcement officers at critical locations to control traffic,
- Use of shoulders and high-occupancy vehicle lanes to temporarily increase roadway capacity, and
- Temporary conversion of roadways to one-way flow.

Generally speaking, interagency coordination and cooperation are an essential component of the utilization of any of these techniques. For example, integrated control

of ramp metering and traffic signalization should be emphasized in freeway corridors, particularly during emergency conditions. The latter two techniques also require special attention from highway agencies with respect to potential geometric and operational problems that may result. Conversion of roadways to one-way flow involves the reversal of all entrance and exit ramps, and violates driver expectancies. Likewise, converting shoulders to travel lanes puts motorists in an unexpected driving situation. The temporary use of shoulders as travel lanes does have precedent in long-term reconstruction and short-term freeway maintenance operations (3, 4), and several coastal cities have considered the conversion of roadways to one-way flow. However, highway agencies must consider the safety and operational impacts of such techniques prior to their implementation in order to avoid liability problems. Proper treatment of these techniques at entrance and exit ramps are particularly critical, and may require extensive enforcement manpower to make them operate safely.

As another example of transportation system evaluation for major emergencies, many urban highway agencies have developed or are developing alternative route plans for freeway incident management. These plans specify the degree and location of traffic control devices and real-time traffic management techniques to be enacted both on the freeway and on alternative routes if travel lanes have to be closed anywhere along the freeway system. An example of an alternative route plan from the California Department of Transportation (CALTRANS) is shown in Figure 3-1. With such plans, the highway and law enforcement agencies can minimize the impact of a freeway incident upon freeway traffic as well as upon traffic on adjacent arterial streets.

### **Intraagency and Interagency Coordination**

Inherent in all discussions of emergency preparations is the fact that coordination within and between agencies is essential before, during, and after an emergency occurs. No one agency can handle a major emergency on its own; it takes cooperation and teamwork among all affected parties. Unfortunately, while the need for cooperation and coordination is well accepted, little specific guidance is available about how to do this under emergency conditions.

Although each situation is different, experiences suggest that coordination can be enhanced in many cases by establishing:

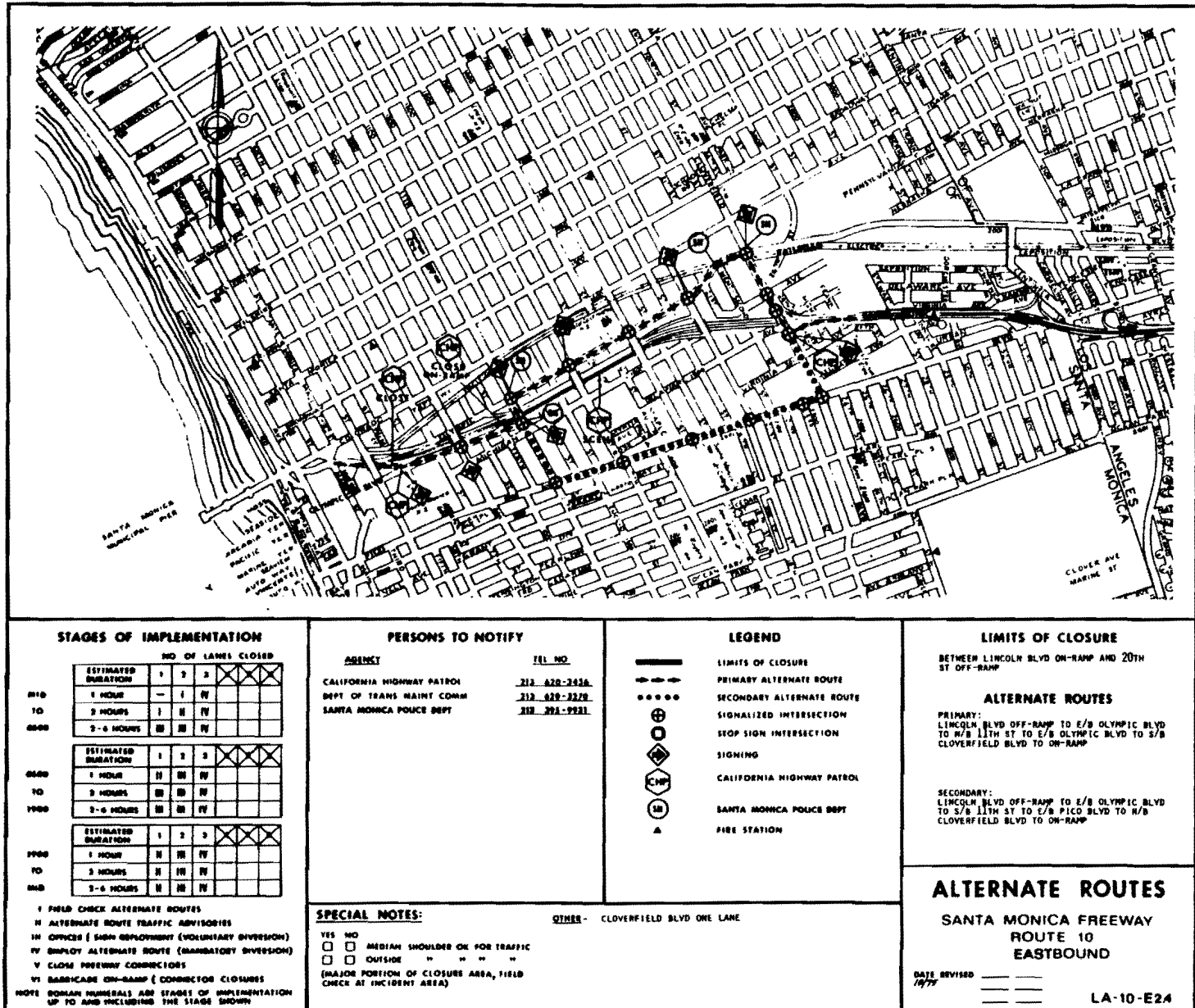


Figure 1. Alternative Route Plan

- Interagency cooperation agreements,
- Intraagency and Interagency communication networks, and
- Personnel training programs.

### Interagency Cooperation Agreements

Cooperation agreements indicate the commitment of two or more agencies to coordinate with each other in times of emergency. Such agreements can be informal (without explicit written authorization of upper agency management) or formal (with upper agency management authorization). Often, informal agreements are verbal, between key officials of different agencies who work closely with each other on a day-to-day basis. Formal agreements, on the other hand, are always written.

Table 3-1 contrasts how the characteristics of the region and the emergencies that have to be faced affect the need for either formal or informal interagency agreements. Certainly, informal agreements require less work to establish and usually provide more flexibility as to how agencies interact in emergencies. However, this requires a high level of trust and cooperation between agencies. In effect, an informal agreement may merely extend the cooperation and coordination that agencies already have when dealing with the day-to-day operation of the transportation system. In Texas, traffic management teams (TMTs) that have been established in most moderate to large size cities can serve as an excellent starting point for developing and maintaining good interagency cooperation for major emergencies.

Conversations with various personnel within TxDOT and other highway officials nationwide suggest that departments of the same highway agency generally cooperate in times of emergency. Also, normal day-to-day interactions between personnel from different departments provides a good mechanism for knowing who should be involved in times of an emergency and what resources each department may have at its disposal. Consequently, the need for formal agreements between departments is usually not necessary.

**TABLE 3-1. CHARACTERISTICS OF COOPERATION AGREEMENTS**

Characteristic	Formal Agreements	Informal Agreements
Existing coordination between agencies	Low	High
Complexity of the transportation system	High (i.e., urban)	Low (i.e., rural)
Size of agencies directly involved in emergency response	Large	Small

Regardless of the type of agreement, items that are important to have worked out prior to an emergency occurring are:

- The chain of command within the agency and between agencies,
- List of key personnel from each agency (with addresses and telephone numbers),
- Method and sequence of alerting each agency in the event of an emergency, and
- Each agency's manpower and equipment capabilities (in general terms).

All agencies should supply this information to all other agencies participating in the agreement. Of course, the agreement may include additional information, depending upon the needs of the region and the agencies involved.

Having the desire and/or a verbal or written agreement to coordinate and cooperate within and between agencies is only one aspect for improving emergency preparedness. Emergency conditions continuously change, and require decisions and reactions to be made in real-time to deal with those changes. Thus, a good communication mechanism within and between agencies is vital for ongoing coordination in times of emergency.



## Communication Networks

The second part of improving and maintaining intraagency and interagency coordination and cooperation involves a solid communication network. In most highway agencies, communication systems already exist and are useable during emergency conditions. TxDOT, for example, maintains its own highway maintenance radios that allow for communication within the Department. In addition, some of the Districts are using cellular telephones to supplement communication capabilities.

Difficulties arise, however, in establishing and maintaining communication between different agencies during times of emergencies. The most common form of communication, the telephone, is often inoperable during many large-scale emergencies. One of the most beneficial preparations agencies can make is to establish a back-up communication system that allows contact between agencies to be maintained regardless of the condition of the telephone system. The Amateur Emergency Service and the Radio Amateur Civil Emergency Services (RACES) are systems that have been very useful in maintaining emergency communications between public agencies in past emergencies.

In Texas, the Department of Public Safety's (DPS) communication system is designated as the official state system during times of regional disaster. TxDOT and other state agencies then respond to the DPS as requested. This insures emergency communication between state agencies. However, in most jurisdictions, emergency communication between state and local agencies has received much less emphasis. Given the need for interaction between the state and local agencies in most emergency situations, this is one area that should be given more emphasis.

The type and amount of preparations necessary to develop interagency communications depends on the needs of the agencies involved. Certain areas and certain emergencies may require only that key personnel between two or three agencies communicate periodically during an emergency to keep abreast of each other's activities. In other areas, communication needs between agencies may be much greater. In general, the more thought and effort that can be given to interagency communications under emergency conditions, the more effective all agencies are likely to be in coordinating response efforts.

## Personnel Training Programs

The final topic to be discussed regarding interagency and intraagency coordination is the training (and periodic retraining) of agency personnel. Typically, this activity is considered beneficial for enhancing the efficiency of personnel response to emergency situations. However, it serves an additional purpose as well, demonstrating to personnel how and why communication and coordination within an agency and between agencies is necessary.

Traditional training activities for emergencies include workshops and conferences, instructional videos, and mock disaster exercises. Mock disaster exercises typically focus on one type of emergency, such as a hurricane or hazardous material spill. Other forms of training, however, can be as specific or as general as desired. Training exercises held within an agency can foster improved intraagency coordination and cooperation, illustrating weaknesses in existing emergency preparations. However, in order to enhance interagency coordination, training activities must include all agencies involved. Mock disaster exercises are particularly useful in this regard.

It appears that training efforts for emergencies will become more important in the future, particularly from the standpoint of agency liability. It has been noted that the liability an agency bears for failing to properly train its personnel to react to normal day-to-day situations is slowly being extended in the courts to cases involving more dynamic emergency situations. In the future, if it can be proved that adequate training to handle emergency situations could have prevented injuries or damages, it is likely that the agency will be forced to assume at least some liability for failing to provide that training.

## **Resource Assessment and Management**

Another important facet of emergency response preparation is an assessment of an agency's available resources, which is often considered (1) "the nuts and bolts of emergency planning." Knowledge of what resources are available and where they are located can save precious time and allow response efforts to be more effective.

## Equipment and Supply Assessment and Management

Each agency, as well as each department within an agency, needs to be aware of the quantity and location of its own resources. This does not appear to be a significant problem for most transportation agencies. The amount of equipment, barricades, supplies, etc. under its control generally necessitates some method of record keeping for normal daily activities. Conversations and case studies of selected Districts within TxDOT (see appendices A and B) indicate that each District generally maintains a well-kept record of equipment, personnel, and supplies that can be readily accessed in times of emergency.

Equally important to an assessment of resources is a means of effectively managing them when emergency situations occur. Resource needs change constantly when responding to emergencies, and some mechanism is required for tracking and allocating resources in real-time to react to these changing needs. Commonly, resource management is considered from the standpoint of equipment and supply coordination. Computer technology can now provide valuable assistance with emergency resource management. The most difficult aspect of this type of real-time management is to actually implement and utilize such a computer program when the agency is "under fire" during an emergency. The importance of keeping up with resources must therefore be stressed prior to an emergency, and agency personnel need to be designated to perform the updating and management function during an actual emergency.

## Personnel Assessment and Management

In addition to the real-time management of equipment and supplies, personnel management during emergency situations can also be a very difficult task. For short duration emergencies involving only a limited number of people, personnel management may be fairly simple. However, as the size and duration of the emergency increases, so does the complexity of the personnel management function. Limited communication capabilities between personnel, their continued movement from point to point responding to the various problems that arise, and long periods of work without adequate rest characterize the efforts of personnel responding to extended emergency situations. As a result, it can be extremely difficult to monitor and manage agency personnel who are responding to an emergency.

It must be remembered that events (i.e., personal crises, other volunteer commitments, etc.) during an emergency may keep some employees from contributing to agency emergency response and traffic management efforts. This would suggest that agency response and traffic management activities during emergencies not be planned or designed dependent upon specific individuals participating in those activities. If activities must depend on a particular individual's knowledge, efforts should be taken to ensure that person is accessible by other agency personnel (through radio communications, telephone, etc.) in an emergency.

### Resource Coordination Between Agencies

Whereas the management of an agency's own resources can be quite demanding during emergencies, the integration and coordination of several agencies in real-time to the ever-changing conditions of an emergency is even more difficult. In large urban areas where numerous agencies are involved, some method is needed for coordinating resource needs and expenditures between them. In general, basic lines of distinction will most likely exist, with each agency taking primary responsibility for the facilities under its direct jurisdiction. However, each agency may encounter situations that it cannot adequately handle on its own which will require assistance from other agencies in the region.

Highway agencies in areas with high potentials for large-scale transportation emergencies (i.e., coastal areas, areas surrounding large chemical industries, large population centers, etc.) may be well-advised to develop a region-wide resource list as part of their overall emergency response plan. In this way, the overall capabilities of the region to respond to such an emergency can be ascertained, and the potential need for additional assistance from outside agencies and the private sector more clearly defined.

A region-wide resource list can also be useful in coordinating and distributing donated resources that are typically received in response to large-scale natural or man-made disasters. In general, highway agencies do not lead overall emergency response and management efforts for such disasters. Unless those in authority of the overall emergency response and management efforts are aware of the types of resources utilized by the highway agencies, it is unlikely that the agencies will receive those donations that would be of most use in mitigating the impacts of the disaster upon the transportation system.

## **Public Communication and Notification**

The final topic of highway agency emergency preparedness to be discussed involves the dissemination of transportation-related information to the media and directly to the public. Depending on the type of emergency and its severity, the public information effort may be one of the largest tasks of the highway agency. For example, during severe flooding in north central Texas in 1990, TxDOT in Dallas received approximately 2700 calls per day about road conditions. Another 150 calls per day were answered by the Travel Information Division in Austin, Texas (1).

It has been stated that regional emergency management plans should have an entire chapter devoted to how agencies should deal with the media and the public. People have to know how to behave in times of an emergency, or an emergency plan will not work. This sentiment also holds true for highway agencies in their efforts to mitigate transportation emergencies as well.

Certainly, the amount and type of information to be disseminated to the public by the highway agency cannot be established prior to an emergency. Rather, it has to be tailored to events and conditions that prevail before, during, and after the emergency occurs. However, agencies can take steps to insure that transportation information requests will be addressed when the need arises. One of the most important steps is to ensure that a public information coordinator has been appointed to handle the collection and dissemination of transportation information to the media and to the public directly. It must be remembered that transportation information will compete for time and space with other news items during an emergency, so the highway agency will likely have little control over how often or how complete the information they provide will be disseminated by media. In addition, highway agency personnel need to be instructed to direct questions to that individual or the public information office, thereby reducing the potential for inaccurate or conflicting information being distributed.

From a highway agency's perspective, transportation-related information dissemination before and during an emergency is generally limited to the media outlets (radio and television news bulletins) and telephone calls directly from the public. In order to get the proper information out to the public, a mechanism must be in place prior to an emergency for collecting the information to be disseminated. The Dallas District of TxDOT has recently established a severe weather communications plan, whereby maintenance officials from the Department provide information about road conditions to the Public

Affairs Office continuously during emergency situations. This information is then disseminated by the office to the media and directly to the public.

Extensive human factors research in the 1970s resulted in guidelines for the design and operation of real-time motorist information displays. Although this research did not specifically address motorist information needs for major transportation emergencies, many of the findings and recommendations are relevant to the design and presentation of information concerning major emergencies. For example, when determining the objectives of a real-time motorist information system, the following items need to be considered:

- What the problem is,
- Who it is to be communicated with,
- What type of driver response is desired,
- Where the response to the information should take place, and
- How the message is to be displayed.

These same items are relevant to a highway agency's effort to keep the public informed about major transportation emergencies.

## **4. SUMMARY**

This report has presented suggestions as to how highway agencies can better prepare to handle major transportation emergencies. It is prepared as a planning document, designed to illustrate how an agency can develop and integrate a system of preparations into its normal state of operations that will facilitate that agency's ability to maintain and even enhance mobility before, during, and after an emergency. In addition, the report is expected to help agencies establish mechanisms to improve agency response to emergency situations.

Every emergency is different, requiring customized responses by all affected parties. Furthermore, conditions can change dramatically before, during, and after the actual emergency, necessitating quick decisions by highway agency personnel and flexibility in responding to the changing conditions. The fact that responses to many emergencies must be "real-time" often leads to the feeling that very little planning can be done for major emergencies. Although it is true that detailed plans of specific agency actions can be developed for only a few types of emergencies, experiences do show that basic preparations can be made to enhance an agency's ability to react to emergency conditions that arise.

The first step towards improved emergency preparedness is an assessment of the potential frequency and magnitude of emergency situations. This assessment takes into consideration the types of emergencies that may arise and the severity with which they may impact the agency and the general public. Generally, large urban areas require more formalized preparations than small rural areas. Likewise, more extensive efforts may be required by a large agency to achieve the same level of preparedness that may normally exist with a small agency.

Preparations that have served highway agencies best in past emergencies fall into four basic categories:

- Transportation system evaluation,
- Intraagency and interagency coordination,
- Resource assessment and management, and
- Public communication and notification.

An awareness of the characteristics of the transportation system is essential during major emergencies. In addition to the normal physical characteristics of the system (i.e., roadway configuration, general traffic demands, etc.), knowledge of the temporary conditions such as roadway construction or inoperable traffic control devices which may adversely affect system conditions is also important. This information allows the highway agency to make more detailed plans to prepare the transportation system for those emergencies which afford some lead time before they strike (i.e., such as hurricanes or ice storms). In addition, this information is necessary for agency personnel to make real-time decisions during the actual emergency itself.

Most major emergencies are large enough to affect more than one agency. When they occur, it is imperative that response efforts by all agencies be coordinated to avoid duplication and to increase effectiveness. Interagency cooperation agreements (also called mutual-aid agreements), intraagency and interagency communication networks, and personnel training are all methods of increasing coordination within and between agencies in times of emergency.

Another preparation for major emergencies is an assessment and management plan for the equipment, supply, and personnel resources of an agency. This can save precious time and allow response efforts to be more effective. Although most agencies do keep records of their own resources as part of day-to-day operations, very few have given thought as to how to keep track of these resources once in the middle of an actual emergency. Likewise, very few agencies share these lists with others in order to develop an overall regional list. It has been suggested that a more global perspective of resources available within a region would also facilitate quicker and more efficient response efforts.

Perhaps the most valuable resource an agency must monitor and manage throughout an emergency is its personnel. Emergency conditions often call for extraordinary efforts and sacrifices by agency employees. For short duration emergencies, individuals may be able to provide these extra efforts without impairing their performance or personal health. For longer emergencies, however, the effects of long hours and lack of rest will lead to increased chances for mistakes and mishaps. Consequently, the agency needs to monitor its employees and have a means of rotating them out for rest.



Highway agencies need to be prepared to effectively collect and disseminate travel information to the public during emergencies. The public wants and needs accurate, timely, and credible information. Information dissemination may include direct methods such as special signing and answering telephone requests for information, or indirect methods such as through the media. An agency must recognize that several news items typically compete for attention during an emergency, and the agency may not have total control over the accuracy or frequency with which its information is presented to the public.



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## **APPENDIX A: CASE STUDY - DISTRICT 12, HOUSTON/GALVESTON**

### **Introduction**

District 12 of the TxDOT, located in southeast Texas, includes Houston and Galveston as well as several other smaller coastal cities. The District faces serious threats to the public and the transportation system from several sources. Hurricanes blow in periodically from the Gulf of Mexico, hazardous material shipments spill along some of the most congested roadway segments in Texas, and the oil refinery industry of the District presents a constant possibility of explosions and toxic material releases. There are also less catastrophic problems within the District. Ice and snow storms occur infrequently, but when they do, they cause major problems with the transportation system, particularly on the high-volume elevated freeways in and around Houston. Rainfall in the area is abundant, and situations occur when flooding is of such magnitude as to bring all traffic in parts of the city to a standstill.

Given the potential for so many types of emergencies and the possibly severe impact of any one of them upon the travelling public, it is obvious that the level of emergency preparedness of TxDOT must be fairly high. To evaluate the planning guidelines presented earlier in this report, a case study of District 12's preparations for and response to past emergencies was conducted. As this discussion will illustrate, the agency has indeed placed emphasis on emergency preparedness. The case study involved two District officials, Mr. Dennis Micak of the Maintenance Section and Ms. Janelle Gbur of the Public Affairs Office. Mr. Micak serves as the Emergency Coordinator and Ms. Gbur handles the public information efforts for the District.

### **Transportation System Evaluation**

According to Mr. Micak, the District maintains an accurate and up-to-date assessment of traffic and state-maintained roadway conditions within the District. It keeps a list of ongoing roadway construction and maintenance activities on hand. The District also has record of low-lying roadways which typically flood during heavy rains. Traffic control devices and signing in place throughout the District is recorded in the Department's computerized database system.

The District has considered the potential for, and in some cases made arrangements to implement if needed, several techniques to increase capacity on selected roadways in the event of an emergency. These techniques include:

- Suspension of tolls,
- Temporary use of shoulders and HOV lanes for travel, and
- Use of tow trucks to remove accidents and stalls at bottleneck locations.

One topic that has received considerable attention is the temporary conversion of Interstate 45 between Houston and Galveston to one-way inbound to increase capacity. However, evaluations performed by the Department illustrate that the manpower requirements to facilitate the conversion, coupled with the bottleneck that would be created closer to Houston wherever the interstate would be converted back to normal operations, made this option unfeasible for that roadway.

### **Intraagency and Interagency Coordination**

As a state agency, the District is an integrated component of the State of Texas Emergency Management Plan (5). The District has primary responsibility for state-maintained roadways during emergencies. However, Mr. Micak indicated that no separate arrangements had been made between the state and local transportation agencies. He believes that cooperation between agencies would not be a severe problem, as the Department has good working relationships with all other agencies in the region. The Department of Public Safety (DPS) serves as the primary agency responsible for state response and agency coordination in times of emergency. The Department serves in a supporting role, responding to DPS requests for assistance.

Several years ago, the District began a traffic management team (TMT) consisting of officials from state and local transportation and law enforcement agencies. Early on, a number of procedural and responsibility issues were reportedly addressed at TMT meetings. Turnover within the TMT is fairly low, so Mr. Micak felt that nearly everyone on the team was still familiar with emergency issues discussed and agreements reached.

Coordination between District employees is accomplished through the Department's state band radio system or through cellular telephones. In the past, the various resident offices have coordinated their efforts through the District office which, according to Mr. Micak, worked fairly well.

With respect to emergency training, the Emergency Management Center in downtown Houston conducts a mock disaster exercise periodically, but TxDOT has never been invited to participate. Mr. Micak felt this was probably due to the fact that the Department serves on a support level during most major emergencies and would receive instructions from the DPS office if assistance was needed.

### **Resource Assessment and Management**

The Department maintains a current list of equipment and supply quantities and locations through its computerized equipment management system. Consequently, this information is available to all District offices and residencies through the Department's computer system. Mr. Micak stated that this list is updated continuously. The District also maintains a current list of personnel, including employees on call at any given time, their call numbers, the telephone numbers of contractors in the District, etc.

The Department does not possess information concerning resources available from other agencies. Mr. Micak indicated that this was probably not necessary to have since the Department does serve a support role to the DPS. The DPS Emergency Management Center does have resource lists from other agencies, so Mr. Micak felt that this information could be accessed fairly easily if needed.

This District does not have formal agreements established with private businesses in case additional supplies are needed during emergencies, but Mr. Micak again believed that it would not be a problem to obtain additional supplies if the need arose. Last winter, the District ran low of sand during an ice storm and was able to obtain more without much trouble. The District did have some trouble in the past with getting more fuel, but it is currently working to rectify that situation.

### **Public Information and Communication**

Ms. Gbur indicated that one of the problems the District has had in the past regarding major emergencies was with getting information out to the public. The District provides information to all electronic media (i.e., television, radio) to be broadcast before and during emergencies, but it appears that the public does not place a lot of confidence in the media reports and still attempts to call the District office to ask about roadway conditions and other travel-related information. Recently, the media has even been

broadcasting the District's telephone number to call for information. This has resulted in an overloaded telephone system within the District. The District is currently converting over to a new synthesized voice telephone answering system that will increase its capacity to handle incoming calls.

Generally speaking, each agency in the region handles its own public information dissemination efforts. The information is not always coordinated through the Emergency Management Center operated by the DPS, although such coordination would be possible if it was deemed necessary.

Employee training is an important part of emergency preparations for personnel in the District's Public Affairs Office. The Office puts on a seminar on a regular basis to train its personnel on what to do during an emergency. Special attention is given to helping individuals who answer telephone calls and take public questions, comments, and complaints during emergencies. According to Ms. Gbur, the District is working to develop a systematic procedure for responding to emergency public information needs.

## **Summary**

In summary, District 12 has taken an active role in preparing for major emergencies. Efforts have been made in each of the major areas of emergency planning as presented earlier in this report (transportation system evaluation, interagency coordination, resource assessment and management, public information and communication). Officials from the District feel that they are fairly well prepared to deal with most emergencies that may arise. However, the officials believe that public information dissemination can be improved. In particular, the District has had problems accommodating the large number of requests for information from past emergencies. One possible reason for this appears to be a lack of public confidence in the information disseminated over traditional electronic media sources. To combat these deficiencies, the Department is taking steps to expand its capacity to take incoming telephone requests for information through a synthesized voice telephone information system. Mr. Micak and Ms. Gbur also agreed that improved credibility of media information was needed, but that was something out of the Department's control.



## **APPENDIX B: CASE STUDY - DISTRICT 23, BROWNWOOD**

### **Introduction**

On April 25 and 26, 1990, approximately 12 inches of rain fell upon the city of Brownwood and surrounding areas in central Texas. The rains left a path of destruction through this city of 20,000, with nearly the entire region under floodwaters at some point during the emergency. One week after the flooding began, the President of the United States declared Brownwood and nearby counties federal disaster areas.

This particular emergency was selected as a second case study of TxDOT emergency preparations. The roadway network in and around Brownwood was particularly hard hit by the flooding. Mr. Will Parks, TxDOT Resident Engineer was interviewed to evaluate both the preparations and responses of the Department to the emergency.

### **Transportation System Evaluation**

The smaller transportation network around Brownwood makes it much easier for Department personnel to stay abreast of roadway conditions. Mr. Parks indicated that District personnel are familiar with areas that tend to flood easily as well as with roadway construction ongoing in the area. However, the floods were so extensive that everything was under water at some point in time. The Department went into a public protection mode of operation, trying to keep people from driving into flood waters, pulling people from the waters who did try to cross flooded roadways, etc.

During the emergency, the District placed flagmen at critical intersections to help control traffic from entering flooded areas. Mr. Parks indicated that this was one of the most effective traffic management techniques, because conditions changed continuously throughout the several days of flooding. The remainder of the traffic control efforts by District personnel were generally limited to barricading roads which were under water.

## **Intraagency and Interagency Coordination**

The District, as part of TxDOT, is automatically included in the Texas Emergency Management Plan (3). Generally speaking, the Department has the primary responsibility for maintaining the transportation system during an emergency and to support the DPS in other engineering and heavy equipment requests.

The District participates in a Traffic Management Team that includes officials from several state and local agencies. However, the floods in Brownwood indicated a need for better coordination and cooperation between federal, state, and local authorities during a major emergency. The city established its own Emergency Operations Center when the floods came and did not include or even notify District officials. Mr. Parks stated that District personnel tried hard to get some local law enforcement personnel out to help control traffic and keep people from using flooded roads, but the enforcement agency itself was overwhelmed by the disaster and was too busy trying to maintain law and order that it could not provide this type of assistance to the Department. This lack of coordination occurred even though the District and City officials know and work with each other on an almost daily basis. These events do indicate a need to discuss and establish agreement regarding interagency coordination and cooperation during emergencies, even when the agencies are of smaller size.

Communication between District personnel was not disrupted during the flood, as they continued to maintain contact through the Department's state-band radios. In addition, the telephone system was not largely affected by this emergency.

Mr. Parks felt that, given the size of the District office that was directly involved in the emergency, formal training exercises were not essential to the Department's level of emergency preparedness and would have been of little use during this particular emergency. He stated that they do talk amongst their people from time to time stressing the need for safety when assisting people or working under adverse weather conditions.

## **Resource Assessment and Management**

The District maintains an in-house resource assessment list that is updated approximately once a year, detailing the amount of equipment and supplies on hand, their locations etc. However, Mr. Parks indicated that he was continuously aware of what resources were available within his residency and knew that other nearby residencies had

similar resources. The District does not keep close track of the resources of local agencies, however.

The size of the flood did exhaust the barricades and other supplies of the residency. However, Mr. Parks stated that his District was able to get equipment and supplies sent from adjacent residencies and Districts within 24 hours. A few private businesses did assist with the clean-up efforts after the flood waters receded. Most of these efforts were not directly transportation-system related, and so the District did not maintain contact or monitor the activities of those businesses. One roadway contractor was rebuilding a traffic circle in the middle of the city at the time the floods occurred and was requested to assist the District to help get the roadway at that location back to where it could be used by traffic. The District did reimburse the contractor for his efforts in the clean-up phase of the emergency.

The small size of the residency required that nearly all District personnel put in extra hours to deal with the emergency. Mr. Parks, for example, indicated that he worked 30 to 36 hours straight through when the flooding was at its worst. He stated that had the flooding gone on longer than it did, it would have been necessary to bring in people to relieve District personnel. At the present time, no formal procedures exist to manage how long personnel work during an emergency, how they will be relieved, etc.

### **Public Information and Communication**

Public information dissemination at the residency is handled by a secretary. According to Mr. Parks, they provide her with information about roadway closings, traffic conditions, etc., and she writes up articles and sends them to local radio stations and/or to the local newspaper.

During the flooding, resident officials were forced to improvise to provide motorists with traffic information. The residency does not own a changeable message sign, but was able to borrow one that was assigned to the construction project of the traffic circle to put at the edge of town to warn motorists of roadway closings. The residency also constructed its own makeshift sign that indicated one of the roadways leading into town was washed out. Mr. Parks acknowledged that it was extremely difficult to communicate with motorists wanting to pass through town. Local motorists knew how to get around the problems (using local access roads and such), but those from out of town had no way to get through.

## **Summary**

To close the interview, Mr. Parks indicated that the District's biggest traffic management problem during the flood was an inability to offer motorists alternative routes to those that were closed because of high water. Law enforcement support for the District's traffic management efforts to keep people from venturing into flooded roads was another item that was needed. Mr. Parks felt that the traffic management problems that occurred could not have been mitigated because of the magnitude of flooding that did occur. However, he did feel that coordination and cooperation between the state and local agencies could have been much better than it was. The District was able to function as its own entity, and cooperations between residencies and other Districts helped him deal with the emergency. However, better communication, coordination, and cooperation between their office and local agencies (particularly enforcement) would have helped.

## **APPENDIX C: VIDEOTAPE TRAINING SESSION CONCEPTS FOR MAJOR TRANSPORTATION EMERGENCIES**

### **Types of Training Sessions**

Upon review of the planning guidelines and implementation procedures developed for this research study, it is suggested that TxDOT consider developing two training videotapes for planning and responding to major transportation emergencies. The first would be an overview of the material contained in this report, whereas the second tape would be devoted to public information and relations needs before and during emergencies from the perspective of the highway agency.

The first videotape would highlight each of the various planning topics discussed in chapter three, with emphasis given to the need for interagency coordination prior to an emergency in order to establish protocol and dialogue when an emergency occurs. Discussions with TxDOT personnel as well as with highway agency personnel in other states suggests that the common perception in most agencies is that they are fairly well prepared to deal with most emergencies. However, this preparation relates directly towards each agency's ability to maintain its operations and to attempt to react to whatever the emergency throws its way. In essence, each agency's operation was viewed somewhat independent of federal and local agency interaction. Each agency contacted that had endured a major emergency stressed that these simple in-house preparations had not been enough to effectively deal with the problems that arose.

Of the different types of problems that were identified through the research study, one of the most common was the inability of the highway agency to adequately obtain and disseminate information to the public. Problems were cited in obtaining accurate information from its field personnel to relay to the media, with public confidence about information provided by the media, and with the highway agency's inability to accommodate the high demand for information by the public from its own offices. This second videotape could provide important suggestions regarding this part of the emergency response and recovery efforts of an agency.

## **Items and Topics to be Included**

### Overall Planning for Major Transportation Emergencies

It is envisioned that the videotape would be a repeat of the information contained in this report, focusing on those issues that emphasize the need for the highway agency to be ready to interact with federal and local agencies. Three topic areas come to mind for this session:

- Coordination,
- Resource assessment, and
- Public relations.

The first topic, coordination, would emphasize the need to establish dialogue between state and local highway and enforcement agencies specifically about how emergency conditions would be handled. The important role that traffic management teams (TMTs) can play in this process would also be highlighted. The possible use of mutual-aid and interagency cooperation agreements would be discussed, and the need to consider how communication between agencies will take place would be emphasized.

With respect to the second topic, resource assessment, the emphasis would be upon the highway agency's responsibility to keep other agencies informed of its capabilities regarding personnel and equipment, as well as in maintaining a level of awareness of what resources other agencies (particularly local) will have at their disposal during an emergency. This knowledge is important not only from the standpoint of knowing what other agencies have that might be useful to the state agency during times of emergency, but would also illustrate what resources the local agencies do not have and which would likely need to come from the state agency.

The third topic would provide an overview of the needs, capabilities, and problems associated with highway agency public information and relations efforts during emergencies. As discussed earlier, this topic was of major concern to most highway agency personnel contacted as part of this research effort. It is envisioned that the videotape would emphasize the need for keeping the public informed during emergencies and would recommend that field personnel strive to report conditions and events back to the office during the emergency so that these could be disseminated to the public.

## Public Information and Relations for Major Transportation Emergencies

The second videotape would be devoted strictly to public information for major transportation emergencies. It would emphasize the public's need for accurate and timely information before, during and after the emergency occurs. For example, any plans an agency has developed to mitigate a given emergency includes certain assumptions about how motorists and/or the public in general will respond. Through the proper use of information, the public can be notified of these expectations apriori to facilitate operations during an emergency.

One portion of the session would focus on the need for, and the role and responsibilities of, a designated public affairs officer. It is suggested that existing officers in the urban Districts within TxDOT be contacted for additional information concerning activities and techniques that are necessary for handling the public information needs of an emergency.

It is also suggested that a section be devoted on mechanisms for collecting the necessary information about conditions and desired public responses before, during, and after the emergency. Coordination of appropriate information with local highway and enforcement agencies would also be recommended. The different mediums that are available for disseminating this information to motorists and the public would be reviewed.





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16. Abstract <p>This report presents guidelines as to how highway agencies can better prepare to handle major transportation emergencies. It is prepared as a planning document, designed to illustrate how an agency can develop and integrate a system of preparations into their normal state of operations that will facilitate that agency's ability to maintain and even enhance mobility before, during, and after an emergency as well as establish mechanisms to improve agency response to emergency situations. Suggestions are presented relative to:</p> <ul style="list-style-type: none"> <li>• Transportation System Evaluation</li> <li>• Intraagency and Interagency Coordination</li> <li>• Resource Assessment and Management</li> <li>• Public Communication and Notification</li> </ul> <p>These recommendations will be useful to TxDOT District personnel in improving their preparations for emergency response and recovery.</p>					
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