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16. Abstract

This report provides a catalog of some of the activities and techniques which have been used or considered for use to enhance response and recovery from major transportation emergencies. The intent of the report is to provide highway agency field personnel with some "helpful hints" that officials involved in past emergencies have contemplated, used, or wished they had considered using.

These activities and techniques have been divided into four categories: 1) Traffic Capacity Improvements, 2) Implementation of Unique or Unusual Traffic Control Devices; 3) Coordination/Management Issues; and 4) Recovery/Clean-up Phase. The first two categories focus on providing an efficient transportation system for the motorist. The last two categories are primarily concerned with the interaction of the various agencies involved in major transportation emergency response and recovery efforts.

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CATALOG OF TRANSPORTATION MANAGEMENT ACTIVITIES FOR MAJOR EMERGENCIES

by

Steven D. Wohlschlaeger

Gerald L. Ullman

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

Sponsored by

Texas Department of Transportation
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TEXAS TRANSPORTATION INSTITUTE
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November 1991
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METRIC (SI*) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
in	inches	2.54	centimetres	cm
ft	feet	0.3048	metres	m
yd	yards	0.914	metres	m
mi	miles	1.61	kilometres	km
AREA				
in^2	square inches	645.2	centimetres squared	cm^2
ft^2	square feet	0.0929	metres squared	m^2
yd^2	square yards	0.836	metres squared	m^2
mi^2	square miles	2.59	kilometres squared	km^2
ac	acres	0.395	hectares	ha
MASS (weight)				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams	Mg
VOLUME				
fl oz	fluid ounces	29.57	millilitres	mL
gal	gallons	3.785	litres	L
ft^3	cubic feet	0.0328	metres cubed	m^3
yd^3	cubic yards	0.0765	metres cubed	m^3

NOTE: Volumes greater than 1000 L shall be shown in m^3.

TEMPERATURE (exact)

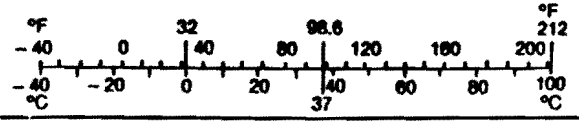
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
mm	millimetres	0.039	inches	in
m	metres	3.28	feet	ft
m	metres	1.09	yards	yd
km	kilometres	0.621	miles	mi
AREA				
mm^2	millimetres squared	0.0016	square inches	in^2
m^2	metres squared	10.764	square feet	ft^2
km^2	kilometres squared	0.39	square miles	mi^2
ha	hectores (10 000 m^2)	2.53	acres	ac
MASS (weight)				
g	grams	0.0353	ounces	oz
kg	kilograms	2.205	pounds	lb
Mg	megagrams (1 000 kg)	1.103	short tons	T
VOLUME				
mL	millilitres	0.034	fluid ounces	fl oz
L	litres	0.264	gallons	gal
m^3	metres cubed	35.315	cubic feet	ft^3
m^3	metres cubed	1.308	cubic yards	yd^3

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



These factors conform to the requirement of FHWA Order 5190.1A.

* SI is the symbol for the International System of Measurements

EXECUTIVE SUMMARY

This report provides a catalog of some of the activities and techniques which have been used or considered for use to enhance response and recovery from major transportation emergencies. The intent of the report is to provide highway agency field personnel with some "helpful hints" that officials involved in past emergencies have contemplated, used, or wished they had considered using.

These activities and techniques have been divided into four categories: 1) Traffic Capacity Improvements, 2) Implementation of Unique or Unusual Traffic Control Devices; 3) Coordination/Management Issues; and 4) Recovery/Clean-up Phase. The first two categories focus on providing an efficient transportation system for the motorist. The last two categories are primarily concerned with the interaction of the various agencies involved in major transportation emergency response and recovery efforts.

Traffic capacity improvements include:

- Conversion to one way flow,
- Suspension of tolls on roads and bridges,
- Adjustment of signal timings,
- Assignment of residential areas to evacuation roadways,
- Use of high occupancy vehicle (HOV) vehicle lanes to increase flow,
- Restriction of parking on major routes, and
- Assignment of tow trucks to bottleneck locations.

Implementation of unique or unusual traffic control devices involves:

- Use of portable generators at traffic signals,
- Use of paper reflectorized signs, and
- Use of special signing and real-time traffic messages.

The coordination/management issues presented include: management of volunteers; relief schedules for agency personnel; log of events, decisions, and activities; emergency preparedness kits; and back-up communication systems. Coordination of heavy equipment use with other agencies, and procuring equipment from contractors in the area, are both addressed under the recovery/clean-up phase.

The catalog is not intended to be a completely comprehensive list of all possible actions and strategies. Indeed, there is really no limit to the ingenuity and resourcefulness of field personnel. In the event of a major transportation emergency, it is obvious that no one is more effective in managing the transportation system and maintaining mobility that the engineers who work with and observe the system on a day-to-day basis. It is intended that these strategies and actions may prompt new ideas for dealing with emergencies, and assist highway personnel in their real-time emergency response and recovery efforts.

IMPLEMENTATION STATEMENT

This report contains a catalog of transportation management activities for major emergencies. The identified activities will provide TxDOT District and field personnel with "helpful hints " which will aid them in evaluating their emergency response and recovery preparedness. The report is a compilation of strategies which have been contemplated, used, or recommended for use in various major transportation emergency situations.

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.

ACKNOWLEDGEMENTS

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INTRODUCTION

Major transportation emergencies can be defined as "those events which affect the transportation system in such fashion for which the response measures required of the resulting traffic impacts are not part of the normal day-to-day operations of the transportation system." (1) For example, the vehicle breakdowns and accidents which occur frequently in a large urban area would not be considered "emergencies", while a hazardous chemical spill in the same area would. Likewise, although a "normal" accident would not be considered an emergency, an accident which blocked all lanes of a major roadway having no suitable alternative routes would most surely be considered an emergency.

Before, during, and after an emergency it is important to provide some level of emergency transportation management. The objectives of this emergency transportation management effort should be to 1) maintain mobility; 2) support response and recovery efforts; and 3) provide the engineering expertise necessary for dealing with the emergency.

Mobility is essential for the orderly evacuation of residents from an area, the timely response of emergency personnel, the recovery efforts of the various agencies, and the return of evacuated residents to an area. Maintaining that mobility requires some degree of advanced planning and it is essential that this planning take place (2).

How mobility is maintained is dependent upon the support provided during the response and recovery phases of an emergency. Support can be fostered by advance planning and preparation efforts including:

- Coordination agreements between and within agencies,
- Assessments of personnel and equipment resources,
- Evaluation of the transportation network and traffic control systems,
- Development of communication systems, and
- Training of personnel (1).

None of these advance planning and preparation efforts would be of any use if not backed by sound engineering judgement and expertise.

In the event of a transportation emergency, it is obvious that no one is more effective in managing the transportation system and maintaining mobility than the engineers who work with and observe the system on a day-to-day basis. In addition to the advance planning and preparation efforts, engineers can provide expertise for real-time traffic management activities during the emergency response and recovery periods. These activities can be divided into several categories:

- Provision of traffic control devices and signing,
- Traffic control and management activities,

- Emergency efforts to increase roadway capacity,
- Public notification activities, and
- Right-of-way clean-up concerns (1).

The last one is obviously limited solely to the emergency recovery phase.

This report provides a catalog of some of the techniques and actions which have been used or considered for use to enhance response and recovery from major transportation emergencies. The intent of the report is to provide highway agency field personnel with some "helpful hints" that officials involved in past emergencies have contemplated, used, or wished they had considered using. The catalog is not intended to be a completely comprehensive list of all possible actions and strategies. Indeed, there is really no limit to the ingenuity and resourcefulness of field personnel. Rather, the document is designed to help bring to light some of the issues surrounding transportation management for major emergencies, and illustrate how others have dealt with these issues. These strategies and actions may prompt new ideas for dealing with emergencies, and assist highway personnel in their real-time emergency response and recovery efforts.

Catalogued activities are organized as follows: 1) each technique/action is identified; 2) a short description of its purpose is provided; 3) conditions necessary for its application are identified; and 4) any additional factors that need to be considered are discussed. In some instances, references will be provided which document actual applications of the techniques/actions.

SECTION 1: TRAFFIC CAPACITY IMPROVEMENTS

CONVERSION TO ONE-WAY FLOW

Purpose

- The conversion of shoulders and roadways to one-way flow increases the directional capacity of a facility allowing for larger volumes of traffic to be served and travel times of these vehicles to be reduced.

Conditions for Application

- This strategy should be considered when the evacuation of an area is required to take place in a shorter time frame than the current system can accommodate, or

- When diversion due to a major emergency on another roadway requires conversion to one-way flow (eg. when an eight lane facility is closed in the peak direction during rush hour and the only feasible alternative is a parallel, low volume, two-lane two-way facility).

Factors for Consideration

- Careful planning should take place before this strategy is implemented to make sure that all geometric problems are addressed in order to limit agency liability.

- In some areas, the feasibility of this activity is limited due to capacity restrictions. Bottlenecks may occur at either end of the facility where flow is transitioned from one-way to two-way flow or vice versa.

- Provisions have to be made for the establishment of a special usage lane in the opposite direction for emergency vehicles.

- Providing personnel for the control of access points along the facility being converted to one-way flow can become very costly.

References

- Mlcak, D., District Maintenance Engineer, and J. Gbur, Public Affairs Officer, District 12, Texas Department of Transportation. Personal Interview, August 7, 1990.

SUSPENSION OF TOLLS ON ROADS AND BRIDGES

Purpose

- The major factor affecting the time that it takes vehicles to travel through a toll facility is the rate at which vehicles can be processed at the toll plazas. Suspension of tolls during a major transportation emergency allows more vehicles to travel through the facility at a higher, more constant rate of speed. This increases vehicular flow rates and lowers the travel times of vehicles passing through the toll facility. Also, this encourages more people to use roadway.

Conditions for Application

- This activity would be appropriate when the evacuation of an area is required to take place in a shorter time frame than is possible if the toll facility was collecting tolls.

- In the event that there are no suitable alternatives for evacuation or diversion, forcing citizens to pay the necessary tolls may be a concern.

- A hazardous chemical spill or radiation in an area may require officials to take steps to reduce exposure time of the public.

Factors for Consideration

- Eliminating tolls during a major transportation emergency sets a precedent for similar type actions in the future.

- At the onset of the emergency, clear and direct information concerning the suspension of tolls should be made widely available to the public. Knowing that a toll authority is "considering" suspension of tolls may cause motorists to respond more slowly to requests to leave an area or take an alternative route; therefore, the intentions of the toll authority should be made very clear.

References

- Mlcak, D., District Maintenance Engineer, and J. Gbur, Public Affairs Officer, District 12, Texas Department of Transportation. Personal Interview, August 7, 1990.

- Lewis D.C. "Transportation Planning for Hurricane Evacuations." ITE Journal, Vol. 55 No. 8, August 1985, pp. 31-35.

ADJUSTMENT OF SIGNAL TIMINGS

Purpose

- Signal timings can be adjusted to favor traffic flow in a particular direction; increasing vehicle flow rates and travel speeds and decreasing travel times in that direction.

Conditions for Application

- The adjustment of signal timings should be considered any time it is deemed necessary to favor traffic flow in one particular direction. For example, to speed evacuation of an area, or if a major emergency occurs during rush hour.

Factors for Consideration

- Implementation time could become a constraining factor. Most large cities have computer controlled signal systems making the adjustment of signal timings rather easy. In rural areas, field personnel may have to be sent out to adjust signal timings.

- Cooperation between different agencies is essential in urban freeway corridors where emergency routes cross jurisdictional boundaries, to coordinate arterial street signal systems and integrate freeway ramp metering and arterial street control strategies.

- Favoring traffic flow in one direction comes at the cost of traffic flow in the other directions. For pre-timed signals, serious thought should be put into how much time to allow for conflicting movements so that those motorists can be served without severely penalizing traffic moving in the favored direction.

- Extended emergencies may require several different signal timings to accommodate daily variations in traffic volumes and peak direction of flow.

- Close monitoring is necessary to ensure that the system is working as anticipated.

References

- Lewis D.C. "Transportation Planning for Hurricane Evacuations." ITE Journal, Vol. 55 No. 8, August 1985, pp. 31-35.

- "Incident Management." D. H. Roper. California Department of Transportation.

- Kurtzweg, C.L. Problems and Solutions in Establishing Freeway Incident Management. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 21.

ASSIGNMENT OF RESIDENTIAL AREAS TO EVACUATION ROADWAYS

Purpose

- With the exceptions of accidents and incidents, left turns provide the most disruption to normal traffic flow operations. This technique decreases the time it takes to vacate an area by assigning residents to specific routes, eliminating the need to make left turns onto the evacuation roadways. Allowing only right turning vehicles to enter evacuation roadways optimizes the use of the transportation system by increasing the travel speeds and through put of vehicles traveling on the evacuation roadways.

Conditions for Application

- Assignment of residential areas to specific evacuation roadways is appropriate when favoring through movements is necessary to evacuate an area in a timely manner while ensuring equally timely access of emergency vehicles that area.

- This technique may also help assure the effective utilization of all alternative routes when several areas have equal access to the same alternative facilities.

Factors for Consideration

- This technique may be confusing to motorists who are unfamiliar with the area, actually increasing the time it takes them to evacuate. Hence, a strong public information program will be needed.

- Active control may need to be provided to make sure that instructions are actually followed.

- Provisions must be made for the access of emergency vehicles.

References

- Lewis D.C. "Transportation Planning for Hurricane Evacuations." ITE Journal, Vol. 55 No. 8, August 1985, pp. 31-35.

USE OF HIGH OCCUPANCY VEHICLE (HOV) LANES TO INCREASE FLOW

Purpose

- The use of HOV lanes will provide more lanes for travel in the favored direction. This will increase total vehicle flow while simultaneously increasing travel speed and decreasing travel times due to the increased capacity of the roadway in the favored direction.

Conditions for Application

- When evacuating an area, it may be prudent to open HOV lanes to increase the capacity in the favored direction.

- This activity may also be applicable when major emergencies limit the number of lanes available for flow in the peak direction or when extra capacity is needed to decrease travel time through an area (eg. in the event of a hazardous chemical spill or radiation hazard).

Factors for Consideration

- If all vehicles, including single occupant vehicles, will be able to use the HOV lanes, it should be communicated clearly to the public. This might be done using changeable message signs.

- Because barrier-separated HOV lanes typically have few access points, the removal of stalled vehicles and vehicles involved in accidents is of critical importance. Provisions should be made to make sure that traffic flow is restored to normal as soon as possible following an incident. The limited access of HOV lanes restricts the number of areas which may be effectively served by them.

- Not all motorists are familiar with the use of HOV facilities.

- All HOV lanes eventually come to an end. The point at which they reenter the regular facility could become a bottleneck due to the increased demand of traffic at that point, especially in cases where people are attempting to evacuate an area.

References

- Kurtzweg, C.L. Problems and Solutions in Establishing Freeway Incident Management. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 21.

RESTRICTION OF PARKING ON MAJOR ROUTES

Purpose

- On-street parking can be restricted during and after emergencies in order to keep as many lanes as possible open to traffic. Maximizing the number of lanes available for traffic flow increases the capacity of a roadway and allows for corresponding decreases in travel time and increases in travel speed and total traffic flow.

Conditions for Application

- This activity should be considered when it is necessary to use a route, either for evacuation or diversion, which normally allows for on-street parking;

- When it is important to limit or eliminate the motorists exposure to hazardous chemicals or radiation; or

- With respect to freeway facilities, as a strategy to keep motorists from stopping on the shoulders, eliminating the temptation for rubber-necking and the associated decreases in facility performance.

Factors for Consideration

- Adequate and ample warning must be provided to motorists who are currently parking their vehicles on the roadway.

- It will be necessary to provide enforcement. Tow-trucks may have to be brought in to remove vehicles which are parked on the roadway or for vehicles which break down on the roadway.

References

- "Incident Management." D. H. Roper. California Department of Transportation.

ASSIGNMENT OF TOW TRUCKS TO BOTTLENECK LOCATIONS

Purpose

- The goal of this technique is to maintain maximum traffic flow through a bottleneck location by removing vehicles which have been involved in an accident as soon as possible.

Conditions for Application

- Tow trucks should be assigned to bottleneck locations where it is essential that traffic flow not be interrupted or hindered by stalled vehicles and/or vehicles which have been involved in an accident (eg. on a causeway during evacuation of an island).

Factors for Consideration

- This involves considerable cost. It is possible that services will not be needed, but it may still be necessary to pay them for the time they spend out on the roadway.

- There may be limitations on the time for which this strategy is effective. For example, as a hurricane approaches, the tow truck operators positioned at the bottle neck locations face increasing risks.

References

- McDermott, J.M. Incident Detection and Response. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 7.

- Judycki, D.C. and J. Robinson. "Freeway Incident Management." Technical Papers from ITE's 1990, 1989, and 1988 Conferences. Institute of Transportation Engineers, pp. 359-368.

- Mlcak, D., District Maintenance Engineer, and J. Gbur, Public Affairs Officer, District 12, Texas Department of Transportation. Personal Interview, August 7, 1990.

SECTION 2: IMPLEMENTATION OF UNIQUE OR UNUSUAL TRAFFIC CONTROL DEVICES

USE OF PORTABLE GENERATORS AT TRAFFIC SIGNALS

Purpose

- Portable generators may be used to keep traffic signals operating when the regular power supply has been interrupted.

Conditions for Application

- It may be necessary to use a portable generator at a traffic signal if the regular power supply has been interrupted due to flooding,
- If a major accident has knocked down power lines, or
- If power has not yet been connected to a traffic signal, and its operation is essential for the effective use of a roadway during a major emergency.

Factors for Consideration

- If conditions at the signal location are bad enough that the power has been disrupted, it may not be wise to send someone out to the location to hook up a generator, or it may be unnecessary to keep the signal operating.
- Because portable generators have a finite power output, the number of signals that could be hooked up to a single generator is limited. This may favor the deployment of portable generators to isolated rural locations.
- Steps should be taken to secure the generator against theft.
- It will be necessary to refuel the generators periodically; therefore, emergency personnel should know the approximate running times of each generator.
- Length time that power is expected to be out dictates whether portable generators are needed.

References

USE OF PAPER REFLECTORIZED SIGNS

Purpose

- Paper reflectorized signs can be used during major emergencies to ensure that roadways are properly signed, that adequate control is provided, or to supplement existing sign inventories.

Conditions for Application

- During a major transportation emergency, existing stockpiles of metal sign blanks may be exhausted. Paper reflectorized signs provide a quick and inexpensive temporary replacement for metal reflectorized signs.

- Paper reflectorized signs could be useful during the clean-up stage of a major emergency when temporary signing is needed for relaying information to motorists, or when temporary control of a facility is necessary (eg. using paper reflectorized stop signs at an intersection where the traffic signal has been knocked out).

Factors for Consideration

- Because their use is not common and is intended to be only temporary, they may not be erected in the most effective manner. Training in the emergency implementation of all signs may prove beneficial.

- Paper signs are obviously not as durable as metal signs.

References

- Krueger, G.E. "Emergency Traffic Operations During the 1989 Earthquake." ITE 1990 Compendium of Technical Papers. Institute of Transportation Engineers, Washington, D.C., 1990, pp. 346-350.

USE OF SPECIAL SIGNING AND REAL-TIME TRAFFIC MESSAGES

Purpose

- Major transportation emergencies often create unusual conditions, sometimes necessitating the development and use of special signing and real-time traffic measures.

Conditions for Application

- Special signing and/or real-time messages are especially useful when it is necessary that motorists receive up-to-date information or during major emergencies that create unusual conditions.

Factors for Consideration

- Care should be taken to ensure that motorists are able to understand the messages and/or signing before put out on the roadway.

- Messages should supply timely and useful information.

- If messages are too long, motorists may not see the entire message, or they may be so occupied with reading the message that they forget to pay attention to the driving task.

References

- D. H. Roper. "Incident Management." California Department of Transportation.

- Dudek, C.L. Scope of the Traffic Problem Generated by Incidents and Special Events. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, pp. 4-5.

- Mlcak, D., District Maintenance Engineer, and J. Gbur, Public Affairs Officer, District 12, Texas Department of Transportation. Personal Interview, August 7, 1990.

- Parks, W., Resident Engineer, District 23, Texas Department of Transportation. Personal Interview, August 22, 1990.

SECTION 3: COORDINATION / MANAGEMENT ISSUES

MANAGEMENT OF VOLUNTEERS

Purpose

- Proper management of volunteers entails adequate training and training as well as the establishment of acceptable protocol for reporting in during major emergencies.

Conditions for Application

- Volunteers may be used for traffic control, in warehouses, etc. in instances where major transportation emergencies are of a magnitude which cannot be sufficiently handled solely by in-house personnel.

- Arrangements may be made to procure expert help on a volunteer consulting basis if the scope of a major emergency is beyond the expertise of the transportation agencies personnel.

Factors for Consideration

- Because of the litigious nature of our society, the possibility exists for law suits to be brought against the transportation agency for the actions of its volunteers during an emergency situation. Suits may also be initiated by volunteers injured as a result of their involvement in emergency response and recovery efforts. Such legal actions need to be considered and prepared for.

- Volunteers are less familiar with traffic control by nature and may be unable to make quality decisions should unusual circumstances arise. For this reason, it may be necessary to assign a full-time employee to monitor and instruct them while they are out in the field.

- Because their services are being provided free of charge, control and management of volunteers may require more intense effort.

References

- Tignor S.C. and M.S. Della Rocca. "Benefits of Advance Planning to Meet Transportation Emergencies." Transportation Research Circular 280. Transportation Research Board, Washington, D.C., June 1984, pp. 2-4.

- "Incident Management." D. H. Roper. California Department of Transportation.

- Hildreth, R. "Profile of a Disaster: United Flight 232." American City & County. December 1989, p. 41.

RELIEF SCHEDULES FOR AGENCY PERSONNEL

Purpose

- During the onslaught of a major transportation emergency, agency personnel may be required to work extended hours with little or no rest. Fabricating a relief schedule will guarantee that all employees are provided opportunity for rest. Because fatigue is a major factor in many avoidable accidents, this is an important part of emergency management.

Conditions for Application

- This activity should be conducted prior to any involvement in a major transportation emergency which spans an extended period of time. It should be kept a high priority item throughout the emergency.

Factors for Consideration

- Due to the nature of the major emergency and/or because of illness or death, all employees may not be available for work during an extended emergency; however the familiarity that comes with the initial preparation of the schedule should help personnel managers to make modifications more quickly.

- There may be certain positions for which there is no redundancy in personnel. Care should be taken to provide opportunity for these individuals to rest, but with the added understanding that they are to remain available for consultation should the need arise.

References

LOG OF EVENTS, DECISIONS, AND ACTIVITIES

Purpose

- A log of events, decisions, and activities before, during, and immediately after an emergency should be kept for future review so that the transportation agency may learn from its experiences. What was particularly effective in the given situation should be noted, as well as what could be improved for dealing competently with future major emergencies.

Conditions for Application

- This activity should be conducted during and agency's involvement in any major transportation emergency.

Factors for Consideration

- It is not enough to just keep a log of events, decisions, and activities during the response and recovery phases of a major transportation emergency. Soon after the end of the emergency situation, the log should be reviewed and appropriate comments should be documented.

- This information should also be reviewed on a periodic basis so that emergency personnel are better acquainted with what went on during the major emergency situation and become more aware of what actions were considered inappropriate.

References

- Roper D.H. Route Diversion Plans and Freeway Incident Management Teams. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, pp. 7-8.

EMERGENCY PREPAREDNESS KITS

Purpose

- Emergency preparedness kits facilitate the rapid deployment of transportation agency personnel during major transportation emergency situations by providing convenient access to supplies commonly needed in such emergencies (eg. flares, flashlights, safety vests, rain gear, etc.).

Conditions for Application

- Emergency preparedness kits are especially useful in frequently occurring emergency conditions such as ice or floods; however, by having commonly used supplies, they can also be valuable for use during the more unusual and severe emergencies.

Factors for Consideration

- Emergency preparedness kits need to be checked on a regular basis to make sure that they contain all of the proper equipment and that the equipment is in working order.

- They should be convenient to obtain and use (ie. well organized and easy to carry).

- Space has to be provided for the storage of emergency preparedness kits.

References

- Parks, W., Resident Engineer, District 23, Texas Department of Transportation. Personal Interview, August 22, 1990.

BACK-UP COMMUNICATION SYSTEMS

Purpose

- Communication is extremely important during emergency situations. A back-up communication system safeguards communication capabilities should the primary system fail.

Conditions for Application

- Back-up communication systems are developed for use in the event that the power supply for the regular communication system is interrupted or other communication problems arise.

- Back-up communication systems can also be used to supplement the regular communication system during major emergencies allowing for more communication over a larger area than is normally possible.

Factors for Consideration

- A back-up communication system is worthless if it does not function properly. Equipment should be tested periodically to make sure that it is in good working order.

- If the equipment used for the back-up communication system differs greatly from that used regularly, training may have to be provided for emergency personnel.

- If back-up communication equipment is being considered for supplemental use also, it will be necessary to make sure that it is compatible with the current system.

References

- Tignor S.C. and M.S. Della Rocca. "Benefits of Advance Planning to Meet Transportation Emergencies." Transportation Research Circular 280. Transportation Research Board, Washington, D.C., June 1984, pp. 2-4.

- Yogis, V.W. "Better Emergency Planning." APWA Reporter, August 1989, p. 33.

- Mlcak, D., District Maintenance Engineer, and J. Gbur, Public Affairs Officer, District 12, Texas Department of Transportation. Personal Interview, August 7, 1990.

- Parks, W., Resident Engineer, District 23, Texas Department of Transportation. Personal Interview, August 22, 1990.

SECTION 4: RECOVERY / CLEAN-UP PHASE

COORDINATION OF HEAVY EQUIPMENT USE WITH OTHER AGENCIES

Purpose

- The coordination of heavy equipment use with other agencies will permit equipment to be used more effectively; reducing the time that it sits idle by allowing more agencies to use the equipment. This will reduce the time required for the recovery/clean-up phase.

Conditions for Application

- This activity will benefit the agencies involved primarily in instances where the major emergency affects a large geographical area (eg. a hurricane).

- This may also be necessary when only one or a few of the agencies involved has direct access to specialized equipment.

Factors for Consideration

- Coordinating heavy equipment use with other agencies may require the establishment of agreements before an emergency situation actually occurs.

- It will be necessary to establish a need hierarchy for the agencies involved in order to eliminate the possibility of faulty communication during equipment allocation.

References

- McDermott, J.M. Incident Detection and Response. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 7.

- Kurtzweg, C.L. Problems and Solutions in Establishing Freeway Incident Management. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 21.

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PROCURING EQUIPMENT FROM CONTRACTORS IN THE AREA

Purpose

- Obtaining equipment from contractors in the area can facilitate agency response during the recovery/clean-up phase of a major transportation emergency. This in turn will decrease the time that it takes the transportation system to get back up and running in a more normal fashion.

Conditions for Application

- This activity may be necessary if the transportation agency does not currently have direct access to the proper equipment or if their equipment has been damaged as a result of conditions brought about by the major transportation emergency.

- It may also be necessary to obtain equipment from contractors in the area if current demands for equipment exceed the supply which can currently be provided by the transportation agency.

- A contractor is sometimes in a better position to respond more quickly to emergency needs.

Factors for Consideration

- During high demand, equipment may only be able to be procured at an inflated price. Regulations guarding against price gouging need to be in place.

- Agreements may have to be drawn up before the recovery/clean-up phase begins to assure that equipment will not be allocated to another agency.

- Contractors may not be able to deliver on equipment that they had indicated would be available.

References

- McDermott, J.M. Incident Detection and Response. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 7.

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1. Ullman G.L. N.D. Trout, and T. Urbanik II. "Synthesis of Traffic Management for Major Emergencies." Research Report FHWA/TX-91/1231-1. Texas Transportation Institute, College Station, TX, 77843. January 1991.

2. Roper D.H. Route Diversion Plans and Freeway Incident Management Teams. "Traffic Management planning for Freeway Emergencies and Special Events." Transportation Research Circular 298. Transportation Research Board, Washington D.C., 1986, p. 7.