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**Integrating Business Continuity and TDM Measures to Ensure Regional
Emergency Preparedness and Mobility**

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ABSTRACT

The business community must be prepared for a variety of emergencies ranging from natural disasters to terrorist attacks. Additionally, businesses have to be prepared to continue operations with the expectation that it may not be business as usual. For businesses, protection of critical resources is paramount in emergency planning. However, the consideration of employee mobility during and after an emergency is less often considered, although it is an equally significant aspect of businesses continuity.

The objective of this paper is to explore how Metropolitan Planning Organizations (MPOs), as coordinators of regional transportation decision-making, can promote regional business continuity after an emergency. The focus of the study is on the role of Transportation Demand Management strategies (TDMs) in supporting employee mobility and business continuity.

This paper summarizes the results of a 2008 study commissioned by the Sacramento Area Council of Governments, the MPO for three of California's urbanized areas. It represents the MPO's first step towards the development of an emergency management and business continuity plan for its six-county region. Based on 20 interviews with government agencies and private companies across the United States, as well as a review of government and industry publications, the paper highlights best practices—including public-private partnerships, resource sharing protocols, and technology applications—for maintaining employee mobility and business continuity following an emergency situation. The study also presents five case studies based on public and private sector experiences that highlight lessons learned and planning and coordination efforts aimed at supporting employee mobility after an emergency.

INTRODUCTION

Metropolitan Planning Organizations (MPOs), as regional coordinators of Transportation Demand Management (TDM) services, can play a vital role in ensuring business continuity immediately following an emergency situation. Business continuity can be defined as returning to operations that are critical to maintaining business after a natural or human-induced disaster. This paper specifically focuses on the role of TDM in ensuring that the region's workforce can continue business after an emergency.

The Sacramento Area Council of Governments (SACOG), the federally-designated MPO, is comprised of six jurisdictions encompassing a central region of California. SACOG contracted a research team to identify national and regional TDM best practices and lessons learned that could support business continuity after an emergency situation. As the region has become more urbanized over the last 20 years, roads have become increasingly congested. SACOG's leadership in TDM has therefore grown, and the region has consequently been developing infrastructure to further support the use of carpools, vanpools, bicycling, walking and public transit.

As one of the region's primary TDM strategies, SACOG operates a regional rideshare program with the assistance of the Sacramento Region Travel Info 511 service. The service is a robust, one-stop source providing ridesharing, transit, traffic, and biking information. It is one of the very few 511 systems in the country that offers ridesharing information. As part of the 511 program, the SACOG Rideshare program is uniquely positioned—in coordination with its eight transportation management associations (TMAs) and other local assisting agencies—to work with the business community to prepare for future emergencies and disasters in order to maintain regional business operations.

The paper is divided into three primary sections:

1. The first section presents the research findings, organized by two main themes: a) *planning and partnerships* and b) *institutional communications and technology*.
2. The second section presents the research team's recommendations to SACOG and other MPOs, also organized by the same two themes used to present the findings: a) *planning and partnerships* and b) *institutional communications and technology*.
3. The third section provides five case studies that the research team developed from interviews conducted with public and private sectors, highlighting planning and coordination efforts, pilot projects, and simulation efforts aimed at supporting employee mobility after an emergency.

Although the findings from this study were initially intended for use by the Sacramento region's businesses and public agencies, the best practices and lessons learned could be relevant to any public or private entity interested in maintaining business continuity through the implementation of TDM strategies.

RESEARCH APPROACH

The research team conducted a literature review and interviews to identify best practices and lessons learned as they relate to the maintenance of employee mobility and business operations during and after an emergency. Interviews were conducted with transportation planners, emergency management coordinators, and transit providers across the U.S., as well as with members from the private sector. Table 1 lists the organizations and companies that participated in the interviews. Interviews aimed to gather information that would assist the team in

developing case studies that would highlight TDM best practices and procedures for emergency preparedness focused on employee mobility to support business continuity. Interview findings were supplemented with a review of government resources, academic literature, industry publications, on-line webinars and TDM clearinghouses.

TABLE 1: List of Organizations and Companies Participating in Interviews

Organization and Companies
Capital Area MPO (CAMPO), Austin, Texas
Capital District Transportation Committee (CDTC), Albany, New York
Capitol Metro, Austin, Texas
Community Transit, Seattle, Washington
CommuterLink, New York City, New York
Delaware Valley Regional Planning Commission, Philadelphia, Pennsylvania
Denver Regional Council of Governments, Denver, Colorado
Genentech, San Francisco, California
Georgia Department of Transportation, Atlanta, Georgia
Homeland Security and Emergency Management Agency, Washington, D.C.
Houston Galveston Regional Council, Houston, Texas
Texas Department of Transportation, Houston, Texas
King County Transit, Seattle, Washington
Louisiana Small Business Development Center, New Orleans, Louisiana
North Jersey Transportation Planning Agency (NJTPA), Newark, New Jersey
New York Metropolitan Transportation Council (NYMTC), New York City, New York
New York State Department of Transportation (NYSDOT), New York City, New York
Puget Sound Regional Council (PSRC), Seattle, Washington
Southern California Association of Governments (SCAG), Los Angeles, California
The Walt Disney Company, Los Angeles, California
Washington State Department of Transportation (WSDOT), Seattle, Washington

SUMMARY OF RESEARCH FINDINGS

This section summarizes key findings captured from primary and secondary research. Findings are organized by the following two categories: *planning and partnerships*, and *institutional communications and technology*. The following sections elaborate on these two key categories and highlight the best practices and lessons learned collected from the research.

Planning and Partnerships

MPOs are in a strategic position to facilitate and promote partnerships that will improve and solidify planning efforts for responding to any emergency that disrupts travel options for a region's workforce. The section below presents information gathered from the team's research

about the various roles of an MPO in emergency preparedness as it relates to forging public-private partnerships and sharing resources.

Roles of MPOs as Facilitators of Emergency Preparedness

Transportation planning for emergency preparedness requires coordination amongst a range of state and local stakeholders. MPOs can serve as a forum for cooperative decision making and have the potential to shape the region's transportation strategies. Because MPOs can influence the allocation of resources to improve transportation systems, they have a role to play in emergency preparedness (1). While MPOs have a strong history of influencing regional transportation operations, MPOs continue to face challenges in bridging regional coordination between emergency response stakeholders and transportation stakeholders (2, 3). Several interviewees reported that it has been challenging to obtain a clear policy role beyond transportation planning and improvement. Based on the team's interviews and literature review, the project team determined that an MPO's level of involvement in emergency preparedness usually depends on the interests of the members, and perhaps more critically, the existing emergency preparedness structure in the region.

Through conversations with MPOs, the research team found that some MPOs are interested in being more involved in emergency preparedness planning, but do not necessarily have the authority from their member organizations to serve as coordinators of emergency preparedness. For instance, New York City's five boroughs determine their own standard operating procedures for an emergency. Since a robust emergency preparedness structure already exists in New York City, the MPO has not been sought out to contribute to or certify the existing structure for its member jurisdictions. Similarly, the state of California has a strong emergency preparedness structure; however, the state has not historically involved MPOs in the decision-making and planning processes as it relates to emergency preparedness. In response, many MPOs interested in contributing to emergency preparedness are working more closely with county leaders on issues specific to transportation planning and preparedness.

Perhaps the most significant lesson learned from the team's research is that an MPO often plays a critical role as facilitator, bringing stakeholders to the decision-making table to discuss emergency preparedness related to transportation options. For instance, North Jersey Transportation Planning Authority (NJTPA) has held hundreds of meetings to deploy an Intelligent Transportation System (ITS) architecture, which includes a security module for evacuation and reentry management for traffic management incidences.

Development of Public-Private Practices

Both public and private organizations have potential resources to share during an emergency when it comes to transit options for employees, including rolling stock, staging areas, and technology. Formalizing these resource agreements can better solidify public-private relationships and increase the likelihood of cooperation during an emergency. These public-private relationships can further benefit from formal evacuation exercises and drills that encourage regular communication between organizations. The sections below summarize public and private sector lessons learned and best practices from formalizing resource sharing, evacuation exercises, and partnership development.

Resource Sharing Both the public and private sectors are taking steps to identify overlapping resources available in an emergency, and ensuring that agreements are in place to effectively access those assets in an emergency. For instance, The Walt Disney Company (Disney) has

agreements with local taxi companies to establish priority access to some of the service fleet in the event of an emergency. Such an agreement would ensure that many of the company's employees can get to and from work. Additionally, Disney has established agreements with private charter bus companies to allow access to a defined amount of buses on pre-identified occasions. Pre-established agreements can also be utilized in an emergency, and can help to solidify the transaction of resource sharing.

The Denver Regional Council of Governments facilitated the development of a Memorandum of Understanding (MOU) with local hotels and transit providers to help with business continuity for the hospitals. The MOU allows for critical hospital staff to stay in hotels close to the hospital after an emergency in the event that transit into and out of the city is not available. If travel disruptions (e.g. from frequent snow storms) were to limit hospital employee access to the facility, there is also an MOU to allow for plow trucks to pick up critical staff or executives and transport them to the hospital. These types of agreements help to stabilize business operations despite limited travel options or travel disruptions related to an emergency.

Similarly, Washington D.C.'s Emergency Management Agency has mutual aid agreements in place with the local school districts and the local transit agency, Metro, to have access to buses in the event of an emergency. Earlier this year, the City utilized its mutual aid agreement with Metro after a major apartment fire in Mount Pleasant that displaced 200 residents; buses were used to keep residents warm until further shelter could be provided.

Since many necessary resources (e.g. fuel, IT infrastructure, rolling stock) reside in the private industry, it is important for public organizations to seek access to private resources. To facilitate this exchange, some cities are beginning to develop resource inventories to track public and private assets that may be available in an emergency. For example, New York City created a Private Asset and Logistics Management System (PALMS), which is a database of private assets and resources collected by the New York City Office of Emergency Management (OEM). The purpose of the database is to identify potential resource-sharing opportunities for the community during an emergency. Businesses can enroll to become members of PALMS and list goods and services available for use by the City in an emergency. The advantage of this resource is that it further formalizes resource sharing between public and private entities so that the networks are in place in the event of an emergency.

The city of Denver has a rudimentary system, yet similar in concept to the PALMS system described above, but the focus is less on resources and more on skill sets. The Denver Regional Council of Governments and the City of Denver Public Works Department developed an inventory of people with specific skill sets that can be reached or accessed during an emergency. Similar inventory systems can be developed by logging existing vanpools or rideshare arrangements that can be accessed during an emergency.

Exercises, Drills and Forums Public and private organizations engaged in resource sharing are also looking for ways to evaluate their state of preparedness for an emergency. The City of Seattle has formally extended its evacuation procedures and meetings to include private companies, many of which have now become a part of the conversation regarding resource sharing. King County, the fifth largest county in the nation, realizes that the key to emergency response is mobility for the region's workforce – and this is the message they are pitching to private companies.

Bringing private and public partners together can be critical to fostering a stronger linkage between emergency preparedness and business continuity. Safeway, a national grocery

chain, is one example of a private partner that is identifying strategies for maintaining business continuity as it pertains to transit. The retail store's approach is to remain actively involved in the decisions made at the county-level about how to access local transit resources for emergencies. Bringing private companies into the conversation through forums and seminars can be critical to determining a region's state of preparedness and support business continuity.

Washington D.C. has likewise formalized public-private relationships to exercise emergency preparedness in the region. For example, the hotel industry meets annually with D.C. Emergency Management Agency (EMA) to run through potential emergency scenarios and discuss ways to improve the evacuation process and continuity of operations. The D.C. Emergency Management Agency holds similar exercises for the public with its Community Emergency Management exercises. The D.C. EMA invites chambers and businesses to run through an exercise once a year to identify how the community would respond in the event of a major emergency, whether man-made or natural. The D.C. EMA reaches out to businesses by leveraging associations, such as the Board of Trade and the D.C. Chamber of Commerce.

One of the larger instances of emergency evacuation drills is Seattle's Soundshake 2008, a regional earthquake preparedness exercise planned by city, county, and state officials. Soundshake 2008 includes seminars, drills and table-top exercises that either have already or will take place throughout the year. Counties, cities, businesses, hospitals, tribes, and schools are invited to take part in the activities to test the state of preparedness in the community. The exercise offers practical training, templates and improvement plans for participants on a variety of topics, including resource sharing and contingency planning. These types of exercises are vital to preparing the community and businesses for how to respond in an emergency.

Institutional Communications and Technology

Even a city with sufficient resources will need to have a means for communicating with businesses and the public about transportation options available to them in the event of an emergency. Networks and systems of communications must be in place to allow for businesses to learn about transit options available to their employees immediately following an emergency. According to research, "Effective coordination and communication among the many different operating agencies in a region and across the nation is absolutely essential. In the aftermath of emergencies, the focus has been on funding better communication technologies that can be used for coordinated response to future incidents" (2). This section explores best practices identified in the team's research as they relate to Intelligent Transportation System (ITS) infrastructure and communications networks, including company hotlines and 511 numbers, and telework infrastructure.

Internal Communications at Businesses

The Walt Disney Company provides an internal staff hotline to all employees. Staff may call the hotline to access information about emergency events and the types of travel options available to them. As TMAs and MPOs develop partnerships with private entities, they may want to encourage businesses to develop a similar type of internal staff hotline for emergencies. For companies without internal hotlines, they may consider contracting with a communications vendor to provide mass communications to employees in the event of an emergency. Such a service could be used to distribute emails with available transportation options.

On a smaller level, the Louisiana Small Business Development Center (LSBDC) is encouraging small businesses to identify a peer company when considering their continuity plan.

This would encourage like-minded businesses, whether in close geographic proximity or not, to communicate with one another in the development of business continuity plans, to think through hypothetical responses to disasters in order to maintain daily operations, and to determine if there are resources that can be shared.

Private companies are also promoting rideshare programs internally. For instance, The Walt Disney Company promotes an internal ride match program that encourages employees to sign up for the “emergency only” option. Employees who normally do not use a ride share program could still take advantage of the option in an emergency. Ride match would provide them with a type of “safety-first” buddy who would be available, for example, to walk home with in the event of an emergency. All staff is entered into the “emergency only” section of the ride match program regardless of their involvement in the larger ride match program, but employees may opt out at any time.

Regional Communications and Coordination

At the Federal level, the National Incident Management System (NIMS) establishes standard protocols and procedures to assist incident managers and transportation agencies to work together to prepare for and respond to incidents of all kinds, including natural and human-made disasters (4). NIMS includes a communications and information management component to enable states, counties, and local jurisdictions to respond to catastrophic events through better communication and coordination (5). The national-level implementation of this component of NIMS has been focused on encouraging the development of interoperable communications among responder agencies through the Interoperable Communications Technical Assistance Program. In January 2007, the Department of Homeland Security released a report that documented the progress of 75 urban and metropolitan areas nationwide in the area of interoperable communications including that of Sacramento (6).

The Federal Highway Administration’s (FHWA) Office of Operations recently examined how Advanced Traveler Information Systems (ATIS) could support communications with the public during disasters, and explored how ATIS and other communication tools could be integrated into broader public disaster information strategies (7). The Office of Operations aims to improve the nation's ability to manage emergencies that take place within the transportation network, with a broad interest in transportation response and recovery management.

In California, an incident command system (ICS) is the mandated incident management framework, strongly supporting the collaboration amongst transit agencies, MPOs, and emergency responders (8). The ICS allows transit police and operations personnel to work with other emergency responders to establish a common set of objectives and a single plan for managing an incident. Once transit agency personnel learn how to operate the system, they effectively can work with other public entities to manage response efforts, enabling transportation, and their emergency management personnel counterparts, to work together to respond to and maintain business continuity after a regional incident (8).

The issue remains, however, that local and regional communication networks may be completely inoperable or only partially functional to support business continuity during an emergency. Two recent and notable instances in the U.S. when regional communications networks experienced wide-scale failure were after 9/11 and, along the Louisiana and Texas coastline as a result of hurricanes Katrina and Rita. Immediately after 9/11, several transportation agencies responded to the challenges of inoperable landline telephones by equipping buses with satellite and computer technology (9).

Emergency Notification Systems and Intelligent Transportation Systems (ITS)

Much like institutional communication networks described above, Intelligent Transportation Systems (ITS) systems have the potential to provide employers critical information about what transit options are available. Cities and counties are developing communication networks that allow for information dissemination and coordination of messages. For example, King County, Seattle, Washington, developed a Regional Public Information Network (RPIN) after 9/11 to facilitate communication across government and non-government lines. There are 75 entities (public and private) represented on the RPIN. The network is set up to provide information quickly to the public, such as transit information on which roads are closed. The RPIN allows for uniform information to be passed along to private companies that want to know how their employees can get home and back to work.

Sacramento's 511 system is one of the few systems in the nation that offers a one-stop source for ridesharing, transit, traffic and biking information. Cities that do not have 511 programs have developed emergency notification systems to disseminate information to the public rather than waiting for the public to contact them. For example, Washington D.C., which does not have a 511 number, has a Citizen Emergency Notification System known as *Alert D.C.* Residents and business travelers are encouraged by the city to subscribe to these real-time updates on emergencies. Subscribers can receive the alerts by email or text message. The city also encourages associations, for example a consortium of ten local universities, to sign up for the alerts, so that their communities can be informed when there is an emergency. When an emergency occurs, alerts are distributed with instructions about evacuation procedures, as well as information about availability of transit options.

At the time of the writing of this document, New York City did not yet have a 511 system in place, but it does provide alerts similar to those described above in Washington D.C. Businesses can sign up through New York City Office of Emergency Management (NYC OEM) Corp Net program to be specifically contacted when there are emergencies in the area that may require businesses to respond. NYC OEM recognizes that many small businesses do not have the emergency planning resources that larger companies have (e.g., an on-site disaster recovery staff member), and has prepared an Emergency Resource Guide for small businesses highlighting details of how to prepare a continuity of operations plan, as well as additional guidance on responding to an emergency (10).

Corporate Emergency Access

New York City OEM's Corporate Emergency Access System (CEAS) aids in business continuity by providing certification to essential employees that are part of CEAS's member organizations. This system allows employees access to their businesses in areas that may be restricted due to an emergency.

Some private companies in California, such as Genentech, have developed a special arrangement with local government to allow pre-identified employees to access restricted areas in order to maintain critical business functions. For example, designated personnel have been assigned a pass that would allow them to travel beyond restricted areas and curfew limits to access the business site immediately following an event.

Use of Geographic Information Systems in Planning and Preparedness

The private sector is using Geographic Information Systems (GIS) mapping (e.g., developing population density maps; identifying fixed transit routes) to better determine immediate disaster impacts on employee travel options. These data will help companies make more informed decisions about how to effectively and quickly meet the mobility needs of employees. The public sector is also employing GIS to develop models to assist with recovery across its region. For example, the Southern California Association of Governments (SCAG) is working with local agencies to collect regional geographic data in a common format, and offer a regional repository to synthesized geographic data for emergency planning, training, and response (5).

Promotion of Telework System

Gaining growing acceptance since the 1990s, businesses and governments are increasingly integrating telework systems and networks into their operations. A telework system offers employees the ability to work remotely via, for example, computer (Internet), phone, and fax, thereby improving employee flexibility. Federal and state government agencies are progressively promoting telework programs, and not just for the flexible benefits it provides employees. For example, the Office of Personnel Management (OPM) recognizes the natural link between telework and emergency preparedness. It is committed to assisting agencies meet their goals by providing technical support and assistance for supporting broader insertion of telework into mainstream culture of Federal organizations (11). The Department of Labor has implemented a continuity of operations plan that establishes telework as a key function of business continuity. The Department tests networks, staff, and management processes regularly to improve the agency's preparedness for an emergency (12).

The State of Colorado has set guidelines for businesses to utilize telework in the event of an emergency, as part of its Pandemic Emergency Guidelines. The State, with support from the Denver Regional Council of Governments and the Downtown Denver Partnership, encourages businesses to proceed with telework guidance for regular operations so that the systems are in place for non-emergencies and to ensure that the systems run smoothly should an emergency occur.

Another federal agency, the Internal Revenue Service (IRS), also implemented a telework policy in response to severe flooding. After a storm in Washington D.C. in June 2006, the sub-basement of the IRS building was filled with 20 feet of water and the basement above was filled with four additional feet of water. Located in one of the lowest points of D.C., the IRS building was surrounded by 5 feet of water, resulting in the displacement of many of the 2,400 employees in the building. Although many of the computers were lost in the flood, the data centers were located outside of the city. The IRS used a telecommuting system to allow employees to continue working as the building was renovated. To facilitate the communication of plans and changes, all employees were given access to an emergency hotline to remain aware of updates (13).

Given an MPO's role as facilitator of collaboration and communication, a regional telework system seems a promising tool for supporting regional information exchange, particularly in preparation for and during an emergency. Telework systems potentially could be used to deploy a system that allows joint access to critical emergency planning documents. Many robust telework applications allow on-demand, secure, remote access to information, thus enabling multi-user/multi-regional access to critical emergency planning documents during and after an emergency.

RECOMMENDATIONS

Table 2 summarizes the team's recommendations based on information captured from the team's interviews and literature review. Recommendations are organized by two key research themes: *planning and partnerships* and *institutional communications and technology*. The following recommendations can be integrated into an agency's current practices, and are not meant to be implemented in isolation. Additionally, since integrative organizations such as local emergency planning committees, emergency management sharing centers, and regional council of governments rely upon on-going coordination efforts between public and private sectors, MPOs would greatly benefit from collaboration with these entities when implementing the following recommendations.

TABLE 2 Recommendations

PLANNING AND PARTNERSHIPS	
<i>Networks/ Role of MPOs as facilitators</i>	<ul style="list-style-type: none"> • With regional stakeholders, develop an information exchange framework that identifies the private and public networks and relationships that can facilitate commuting and enable business continuity in the event of an emergency. • Host semi-annual or annual meetings/conferences with companies interested in being part of an emergency preparedness network to find out about their own strategies and identify areas in which travel coordination is necessary and viable. • In partnership with transportation management associations/organizations, encourage smaller companies to identify peer companies to share lessons learned from developing business continuity plans.
<i>Resource Sharing</i>	<ul style="list-style-type: none"> • Develop a database system to register both public and private transit inventory and assets that may be utilized during an emergency. New York City's Private Asset and Logistics Management System (PALMS) provides an example of this system. • Develop templates for Memorandums of Understanding (MOUs) that can be used by public and private organizations interested in formalizing their transportation resource agreements.
<i>Emergency Drills and Exercises</i>	<ul style="list-style-type: none"> • Promote emergency drills that require city, county, transit, and private business participation. Integrated emergency drills would solidify the networks that need to be in place during a real emergency and evaluate the state of preparedness of the business community and to enhance cooperation with business community initiatives. • Host workshops bringing together private and public sectors to discuss the commuting and travel issues that could result from a natural or man-made emergency and the preparedness efforts each participating entity has made.
INSTITUTIONAL COMMUNICATIONS AND TECHNOLOGY	
<i>Internal Communications at Businesses</i>	<ul style="list-style-type: none"> • Recommend that companies identify and arrange for the most appropriate and expedient means to provide critical information to employees in the event of an emergency (e.g., organize workshops/panels comprised of private and public constituents to share case studies and lessons learned).

	<ul style="list-style-type: none"> • Encourage companies to promote an “emergency only” internal ride match.
<i>Emergency Notification Systems – Expand 511 Model</i>	<ul style="list-style-type: none"> • Expand the 511.org model by including an explicit link to up-to-date information about ride matching in the event of an emergency, as it relates to emergency transportation for “stranded” employees, etc. • Through the 511 program or transportation management associations/organizations, explore the means to provide point-to-point directions for commuters after an emergency via a website or 511. • Through transportation management associations/organizations, encourage private companies to link their emergency hotline number to rideshare 511 number and website so that displaced employees may find out what transit options are available to them. • Increase advertisement of 511, rideshare and vanpool capacities during and immediately following an emergency through media outlets (e.g., a news ticker; highway kiosk). • Provide links to a reverse 511 alert system on a rideshare website so that businesses can be notified of travel disruptions or emergency situations.
<i>Use of GIS in Planning and Preparedness</i>	<ul style="list-style-type: none"> • Utilize regional geographic data for map development to identify areas most in need of available rideshare resources relative to available commute options and home/employment locations. • Utilize GIS to help MPOs identify transit links most likely to be impacted in the event of an emergency, thus targeting areas that could most likely need back-up services.
<i>Promotion of Telework Program</i>	<ul style="list-style-type: none"> • Encourage telework as a viable business strategy providing multiple benefits while emphasizing the important role it can play in supporting short- and long-term business continuity after an emergency. • Provide telework vendor information on a rideshare website and include templates, guidelines, and lessons learned that can be used to streamline and accelerate organizations’ telework programs.

CASE STUDIES

The following case studies demonstrate planning and coordination efforts, pilot or test projects, simulation efforts, and real-time experiences utilized by public and private organizations. These best practice approaches are aimed at ensuring business continuity through regional workforce mobility and access to employment infrastructure during and after an emergency. Table 3 summarizes the 15 TDM and business continuity strategies utilized by the public and private organizations interviewed. While no organization is using all strategies identified, each is using at least 6 of the 15 strategies identified. Organizations are electing to engage a variety of TDM strategies as a framework for restoring employee mobility under unusual or highly specialized circumstances. The case studies elaborate on these strategies with specific lessons learned.

TABLE 3: TDM and Business Continuity Strategies Illustrated by Case Studies

TDM - Business Continuity Strategies	Case Study				
	Walt Disney Company, Southern California	King County, Seattle, Washington	Genentech, South San Francisco, California	Atlanta Regional Commission, Olympic Planning	New York City
Internal Communications Networks at Businesses	X		X		
Emergency 511 Notification Systems		X			X
Intelligent Transportation Systems (ITS)				X	
Corporate Emergency Access			X		X
GIS	X	X	X		
Telework	X			X	
Ridesharing	X		X	X	X
MOU Development for Resource Sharing	X	X	X		
Emergency Ride Home for Employees	X			X	X
Vanpooling	X		X	X	X
Emergency Exercises		X		X	
Public/Private Communication Infrastructure		X			
Public/Private Partnerships	X	X	X		X
Shelter in Place			X		
Incident Management Standard Operating Procedures				X	
Count	8	6	8	7	6

Case Study A: The Walt Disney Company, Southern California

The research team spoke with the Director of Corporate Transportation Demand Management & Business Integration for The Walt Disney Company (Disney), based in southern California. The Director is responsible for over-seeing emergency preparedness as it relates to TDM and business continuity. This case study highlights lessons learned by the company in the context of its past responses to disasters to accommodate employees with transportation services. The study also summarizes a comprehensive approach to emergency planning that aims to ensure business continuity directly after an emergency.

Lessons Learned after a Commuter Train Derailment

Immediately following an early-morning commuter train derailment, The Walt Disney Company worked with its leasing contractor to make use of additional vanpool vans to help shuttle employees to and from work. Disney communicated with local TMAs to exchange communication about the event, as the company received direct updates from Caltrans, Metrolink (schedules), and the California Highway Patrol. Disney also provided signage for shuttles. In this event, The Walt Disney Company became a key information source for the general area. This event underscored the critical need to build relationships with external agencies early, to prepare for an event, whether the event is small or large.

Lessons Learned after Northridge Earthquake

After the Northridge earthquake in January, 1994, The Walt Disney Company worked with the City of Burbank to ensure that commute shuttles would be made available to employees to get home or to connect to other transit. While Disney maintained the shuttles for about a year after the event, the local transportation management organization (TMO) and the city of Burbank received grants to keep the Clean Natural Gas shuttles in service. The average daily ridership is 400 and peaks at 800. While an MOU was not in place that would allow access to shuttles, The Walt Disney Company does have an MOU in place for Emergency Ride Home services in case of an emergency.

Robust Communications Network Based on Staff Structure

Disney is highly reliant on their wealth of communications between work areas and staff. For example, it has a robust crisis management framework in place whereby 1-2 staff is tasked as crisis liaisons per office floor. Liaisons are trained for emergencies and equipped with a two-way radio. Liaisons are assigned to a command center which is in a trailer at some pre-determined location, where they can co-ordinate logistics with one another. They also have access to a TDM section of the company's information system, which provides travel options information for how to get home, as well as how to return to work. The TDM operations may receive information directly from Caltrans, California Highway Patrol, Metrolink, and possibly from TMAs.

Development of Telework Program

Disney already has an informal telework program and is piloting a program that will lead to an official structure. Although the telecommute program's technology infrastructure is already in place, the company is looking into expanding its telecommuting options specifically for the purposes of maintaining continuity in the event of a disaster.

Case Study B: Seattle, Washington

Seattle faces the threat of earthquakes, wind and ice storms, and floods – all for which the county must be prepared. King County, the nation's fifth largest county, has taken significant steps to prepare for an emergency. This case study highlights these steps as they specifically relate to establishing communication networks and making them widely available to stakeholders.

Alert System: A Regional Public Information Network (RPIN)

Shortly after 9/11, King County developed a Regional Public Information Network (RPIN) designed to facilitate communication across government and non-government lines. The network includes 200 members representing 75 public and private entities. Member agencies and companies include transportation, utility, emergency response, law enforcement, and hospitals. The network is set up to provide coordinated messages and information quickly to the public in the event of an emergency. For example, coordinated messages may be distributed on alternative transit routes in the event that roads are closed after an emergency.

The RPIN is especially important for business continuity because it allows for uniform information to be passed along to private companies that want to know how their employees can get home from and back to work. The RPIN site also includes mapping capabilities to provide directions and routes to employees who do not usually commute.

511—Use after Major Storms

The Washington State DOT operates a 511 system that has the ability to handle up-front (or flood gate) messages which are used in emergencies for dispensing critical information. The up-front message is the first thing heard by callers when they access the system. The system provides information about significant detours, major closures, and other events that have a potential to impact many people or have a statewide or large regional significance. Last winter, this feature was used several times when major weather events closed the cross Cascade highways and the I-5 corridor. There is no pre-established alternate route messaging, so the messages need to be generated based on the event as it unfolds.

Coordination with Public and Private Entities

Because private companies began to become more vocal about how regional assets would be shared, regional meetings hosted by the City have been extended to the private companies. However, for King Country Transit, the question is not about the availability of resources (i.e., buses), but the availability of drivers and knowledge about navigating new routes.

Lessons Learned after Earth Quake Preparedness Plan

Seattle's Soundshake 2008, a regional earthquake preparedness exercise, is planned by city, county, and state officials. Soundshake 2008 includes seminars, drills and table-top exercises that take place throughout the year. Counties, cities, businesses, hospitals, tribes, and schools were invited to take place in the drill to test the state of preparedness in the community. Public information dissemination and resource allocation are two subjects to be evaluated at the exercise. An After Action Conference is held after the series of events to discuss ways to improve the state of preparedness. The exercise offers practical training, templates and improvement plans for participants.

Case Study C: Genentech, South San Francisco

Genentech, a biotechnology company employing more than 8,500 employees, offers an employee commuting program that provides a flexible range of options, such as neighborhood bus pools and free shuttle buses, serving major transportation hubs in the area. It makes use of a fleet of passenger motor coaches during the day that are used for commuter services for their employees. This case study highlights a private company's approach for planning for business continuity in the event of a small- or large-scale emergency.

Contingency Planning with Rideshare Facilities

Genentech is developing contingency plans for employee mobility to mitigate the impact of an event occurring during business hours. Genentech's plans would call for the triaging of their campus community needs and organizing employees into groups to make use of buses to provide trips home for their employees. The assumption is that employees either would not have cars on campus because they accessed the site using an alternative commute mode; or, employees may have personal vehicles on campus, but could not make use of them due to corridor closures or employees not having enough gas to drive alternative routes back home.

Partnerships/Resource Sharing

In developing their emergency response and recovery plans, Genentech is actively thinking about worst-case scenarios, such as bridge closures, unavailability of mass transit, and off-line gas stations. From these assumptions, they are developing plans that rely on current TDM services, with the support from a hired company providing emergency services communications. In order to provide employees with commute options, Genentech is reaching out to private and public sector transportation service providers. A current challenge with developing agreements with these service providers is that there is no guarantee that the resources tagged for Genentech's use will not be appropriated by government authorities for other uses in the event of an emergency.

Additionally, even if resources were made available, there needs to be greater assurance that public (or private) asset entities would be able to ensure that staff would be available to manage and operate the resource. For example, Genentech is exploring the development of a water transit evacuation plan. They have been in dialogue with the Water Emergency Transportation Authority, a public agency, to determine whether ferries would be available for use in the event of an emergency. As an alternative, Genentech has also been exploring agreements with private vessel operators. A similar challenge arises in that complete assurance cannot be provided to Genentech given that these private resources could also be co-opted for other users.

Shelter in Place

Shelter in place is a part of Genentech's overall strategy for recovery and continuity, one of the reasons being that they likely will not have sufficient transportation resources to provide evacuation services to all staff during the first day's daylight hours. Furthermore some of the work that is done on campus needs to be supervised by technicians and it might be necessary and/or preferable to house these key personnel at or near the facility.

Case Study D: Atlanta Regional Commission, Olympic Transportation Planning

The Atlanta Regional Commission (ARC), the designated MPO for the 10-county area in Georgia, played a significant role in planning for transportation for the 1996 summer Olympic

Games and worked with a variety of public agencies in the process. One of the ARC's tasks was to develop an Olympic Transportation System Plan, which included developing TDM strategies and recommending incident management strategies. This case study highlights the best practices associated with an MPO's involvement in transportation and security planning.

Advanced Transportation Management System (ATMS)

The ARC was invested in improvements in the transportation system that would have a lasting and useful effect after the Olympic Games. One of the legacies of the improvements made for the Games is the Advanced Transportation Management System, a data collection and management system. The system includes 125 miles of surveillance, 25 changeable message signs that can alert drivers to travel advisories, a Traveler Advisory Telephone System, and 130 electronic kiosks providing information on all modes of travel.

Commuter Connections: TDM Strategies Promoted to Employers

Just prior to the Olympic Games, the ARC, with support from the Atlanta Committee on the Olympic Games (ACOG), Georgia DOT (GDOT), Federal Highway Administration (FHWA), Federal Transit Administration (FTA) and Metropolitan Atlanta Rapid Transportation Authority (MARTA), created and implemented a Commuter Connections program to advertise the free resources available for businesses to create employer commute programs, which included telecommuting and carpooling. ARC recognized that reducing trips into and out of the city, or encouraging trips only during non-peak time, would be critical to limiting congestion in the area during the Games.

After a distribution of information to businesses across Atlanta, 328 companies appointed a transportation coordinator at their business site to organize the employer commute program. The timely implementation of the Commuter Connections program, which has continued to gain momentum, was especially critical to one of the goals of the Olympic Transportation System Plan to reduce congestion.

Incident Management Planning and Needs Gap Assessment

ARC worked with the Department of Defense (DoD) to develop standard operating procedures (SOPs) for incident management based on a variety of hypothetical scenarios. The SOPs included direction on which agency would take the lead in responding to the situation, how guidance would be issued to the public, and what information would be necessary to coordinate multiple agency responses to the situation. The team held four table-top exercises to develop clear procedures on several hypothetical scenarios and hired a consultant to provide feedback. By conducting these drills prior the games, many of the needs for responding to incident management were identified early on (including the need for radio communications and the necessity of video surveillance of freeways).

Case Study E: CommuterLink, TMA in New York City, NY

A robust emergency management network exists in New York City, led by the NYC Office of Emergency Management. This case study highlights lessons learned by CommuterLink, a local TMA, after the transit strikes and 9/11.

Lessons Learned from September 11, 2001

Immediately following the attacks, most people left the city of Manhattan by foot or by ferry. The subways, commuter rail services, tunnels and bridges were all abruptly closed. By midday, service was back up for subway lines not directly impacted by the attacks, and fares for transit via subway, bus or rail were suspended to facilitate the expedited evacuation of the public where service was available. Nearly full subway service was available on September 12, with the exception in the lower Manhattan area. Additionally, MTA made a fleet of buses available to shuttle police officers and Ground Zero workers through security check points for recovery efforts.

The NYMTC building was destroyed in the World Trade Center, so it could not participate in any of the emergency response efforts. Employees of CommuterLink, the TMA in New York City, could not access their offices until September 13 because it was not transit accessible. They have since moved offices to a transit accessible building. CommuterLink immediately increased its daily hours and began responding to thousands of inquiries about transit. This level of service continued for approximately three months. At the time, there was no online ride matching available, so CommuterLink manually responded to inquiries based on their own database of materials. CommuterLink's phone number was broadcasted through media and the TMA became a vital resource for New Yorkers to identify alternate routes and learn about available transit options and routes.

Lessons Learned from the 2005 Transit Strikes

New York City Department of Transportation (NYCDOT) was able to develop a transportation contingency plan in advance of the transit strikes since the strikes had been anticipated. In response to the striking, access to the city was only permitted south of 96th Street in Manhattan if there were three or more people in the vehicle. In preparation for the transit strikes, CommuterLink expanded its hours from 7am-9pm and provided information to residents about how to take transit, point-to-point directions, available transit options, and alternate routes. CommuterLink's services were advertised in advance of the transit strikes. Consequently, calls to the TMA increased significantly immediately prior to and during the strikes.

After debriefing with the TDMs, it was agreed that coordination of messages for the suburban population coming into the city was lacking, and messages were disjointed. It was determined that the main cause was due to their not being a designated entity with the authority to coordinate agencies and emergency information.

CONCLUSION

Based on the recommendations and summarized lessons learned in this report, MPOs and other transportation planning organizations, with local stakeholders, can continue forward with emergency preparedness planning efforts, increasing collaboration with local cities, counties, and transit operators to make implementation more comprehensive. MPOs and others may consider implementing many of these recommendations with particular emphasis on enhancing their 511 and rideshare systems. Additionally, based on these findings, development of a comprehensive business continuity resource guide aimed at the promotion of employee transportation options could be considered. The guide can be distributed to public and private employers interested in learning more about maintaining business continuity immediately following an emergency.

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