

*A Model for Emergency Preparedness and Response in the 21st Century:
A Closer Look at the I-35 W Bridge Collapse and the City of Minneapolis's
Crisis Management System*

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Executive Summary:

One of the most critical roles for local government is to have an efficient and effective emergency preparedness and response system. A successful emergency preparedness and response system plans for and protects its citizens from potential crises, both expected and unexpected. The need for an effective system could not be made more evident than on September 11th, 2001 after the terrorist attacks on the World Trade Center and the Pentagon. Many valuable lessons were learned after that response including the need for clearer strategic planning and better communications. Six years later, the City of Minneapolis encountered an unexpected disaster when the I-35 W Bridge collapsed during rush hour on Wednesday, August 1st 2007. The emergency response to the I-35 W Bridge collapse was swift and massive with more than 140 different organizations involved in the effort. It took emergency responders less than two hours to rescue every survivor, and as I will argue throughout the paper, the crisis response to the I-35 W Bridge collapse is a model for effective emergency preparedness and response in the 21st century.

There were two very important lessons learned from this analysis. First, hierarchical and network characteristics within the crisis management system proved to be one of the most significant reasons the emergency response was so effective. The crisis management system utilized during the I-35 W Bridge collapse was the Incident Command System. The Minneapolis response illustrates that a successful crisis management system requires a balance between hierarchical and network elements. The second most important lesson learned was Mayor R.T. Rybak's decision to attend the Federal Emergency Management Agency's (FEMA's) training course in 2002. This

decision played a crucial role in the response and recovery efforts for two reasons. First, it was the initial step towards relationship building, and second, it illustrated weaknesses in the city's emergency response, which were amended before the 2007 I-35 W Bridge collapse.

Introduction:

When a crisis occurs, what is the most efficient and effective way to respond? Should organizations and institutions respond through a single hierarchy or should they be more flexible and function through networks? There is much debate in the practitioner and academic fields about what method and application is the most effective for emergency response. This begs the question to whether a hierarchy and a network can coexist and at the same time be effective for crisis response. These questions are important because emergency preparedness and response has and will continue to require characteristics of both hierarchies and networks to be effective. A hybrid of these factors was a major reason why the City of Minneapolis had an effective response to the 2007 I-35W bridge collapse.

This paper will begin to answer the question of how elements of hierarchies and networks can improve emergency response capabilities. The paper will also fulfill two other objectives. First, it will examine the literature behind emergency response and more specifically, the Incident Command System, which is a management system mandated by the Department of Homeland Security for all crisis situations. Second, this paper will use the emergency response literature to analyze the response to the 2007 I-35 W Bridge collapse in Minneapolis. The I-35 W Bridge collapse is an interesting crisis to explore because the emergency response was hailed by many as a success and Minneapolis

received high praise for the way it handled the crisis. The balance of hierarchical and network characteristics within the Incident Command System proved to be one of the most significant reasons the emergency response was so effective.

The paper is organized into the following sections. I first discuss the various methodologies used to gather information, which is followed by a literature review. In the literature review, I analyze the elements of crisis management, networks and hierarchies and the Incident Command System. The third section of the paper is an overview of the I-35W Bridge collapse. Using the literature, I then analyze Minneapolis's crisis response to the I-35W Bridge collapse. The last two sections are lessons learned and a conclusion.

Methodology:

For my professional paper, I gathered information through the literature on emergency preparedness and response, which included journals, articles and websites and in addition, I conducted two interviews. My first interview was with Tina Smith, who is currently the Chief of Staff to Mayor R.T. Rybak. It is important to note that she was also Chief of Staff to the mayor during the crisis and was with him in the Emergency Operations Center (EOC), which is located in the basement of City Hall. I interviewed her because I wanted to get the perspective of the mayor's office during all phases of the crisis. The second interview was with Rocco Forte, who is the Assistant City Coordinator, Emergency Preparedness and Regulatory Services for the City of Minneapolis. Rocco Forte was in charge of the EOC for the 10 days it was operational following the collapse of the I-35W Bridge. A list of the interview questions is as follows:

- What is your background, including education and past work experience and how long have you been in your current position?
- Where were you when the I-35 W Bridge collapsed and how were you informed of the crisis?
- What was your role during the different phases of the crisis response and recovery efforts?
- In your opinion, how did the EOC and the Incident Command System function during the crisis? What went well and what were some of the challenges you encountered?

Tina and Rocco answered these questions and also provided me with additional unprompted information. My goal was to make the interview flexible so that Tina and Rocco could freely comment and add information. I took their answers and incorporated the information throughout the analysis of my paper. Their answers helped support my argument that a balance of hierarchical and network characteristics within the crisis management system is essential for an effective crisis response.

I chose emergency preparedness and response for my professional paper topic because I have experience in crisis management. During 2005-2006, I was a member in the AmeriCorps *National Civilian Community Corps (*NCCC) program. AmeriCorps *NCCC is a team-based, national service program for men and women ages 18-24. My team and I were involved with crisis response and recovery work during our projects in New Orleans following Hurricanes Katrina and Rita and in Crown King, AZ where we served as wild land firefighters. During these two projects, we also used the Incident Command System.

Literature Review:

Elements of Crisis Management

Crises are often unpredictable and complex.ⁱ A crisis can range from natural disasters such as hurricanes, forest fires and tornadoes to man-made incidents like terrorism. Crises are complicated because they can create situations where no single organization has the resources to respond effectively and as a result, many different individuals and groups with diverse cultures, talents and skills unite to accomplish a goal or multiple goals. An example includes the terrorist attacks on the World Trade Center and the Pentagon on September 11th 2001 in which multiple layers of government, volunteer groups, private organizations and the public were involved in the crisis response.ⁱⁱ Additional characteristics of a crisis can include rapid decision-making and having to respond efficiently and effectively in a short amount of time. All of these factors combined have the potential to create confusing situations, and this is no different for local emergency responders.

To effectively respond to a crisis, it is critical for emergency responders to have an efficient crisis management system. Crisis management refers to the activities that encompass planning and preparation, the immediate response to a disaster, recovery efforts, mitigation, and efforts to reduce the impact of possible future crises.ⁱⁱⁱ Such activities can span a few hours to several months and years.^{iv} Crisis management can be broken down into three general phases: crisis prevention, crisis response, and crisis recovery.^v

Prevention includes strategies and actions that are taken before a crisis begins. Response consists of the plan and strategies being put into place while the crisis is

transpiring, and recovery are the attempts to learn from the crisis to make adjustments, if needed, for the next emergency. Managing public perception plays an important role during the recovery stage.^{vi} While all three areas are important for effective crisis management, the second stage, crisis response, can become the most critical. Response has the potential to be the most important stage because it is when crisis managers make assessments and judgments that may save lives and lessen the effects of the crisis. The actions taken during this stage also influence public opinion about the crisis and an organization's handling of the emergency.^{vii} This paper will focus on all three stages of the emergency response to the 2007 I-35 W Bridge collapse.

In the United States, governments at all levels as well as nonprofits, private organizations and individual actors have encountered and responded to all types of emergencies and crises. The September 11th 2001 terrorist attacks on the World Trade Center and the Pentagon, the Oklahoma City Bombing and Hurricanes Katrina and Rita, which ravaged the Gulf Coast, are just a few recent examples. Throughout these three crises, local, state and federal governments came together with various nonprofits and the private sector to respond. Individuals from across the United States, who did not belong to a particular organization, also participated.

During the Oklahoma City bombing, emergency personnel including fire, medical, and law enforcement as well as voluntary organization workers and several private citizens all entered the bombed structure in a massive search and rescue effort. In some instances, human chains of all of these different actors were created to safely remove the victims.^{viii} In addition to domestic actors, a crisis response and recovery can include international actors as well. For example, Canada, Mexico, Singapore and

Germany sent supplies, relief personnel, troops, ships and water pumps to assist the rescue and recovery efforts in New Orleans.^{ix} It is also important to note that during this crisis, more than seventy countries pledged monetary donations or other assistance.^x These examples illustrate both the tremendous generosity of volunteers and countries throughout the world, and in addition, how emergency response can expand exponentially, which has the potential to create obstacles for effective emergency management. Challenges arise because as the number of organizations and actors increases during a crisis response, managing and overseeing these individuals and groups will require a wider range of skills and attention.^{xi}

The September 11th terrorist attacks, the Oklahoma City Bombing and Hurricanes Katrina and Rita illustrate that no crisis is the same and each incident provides a unique opportunity to explore and evaluate how organizations, institutions and individual actors came together and responded. One fundamental difference among these crises was the size and magnitude of the emergency. The Oklahoma City Bombing and the September 11th terrorist attacks did not affect any residential areas and the search and rescue operations were relatively small.^{xii} The size and scope of these two crises were not overwhelming and allowed responders to focus on a limited set of tasks. In contrast, Katrina and Rita responders had to engage in search and rescue operations over a wider area- Hurricane Katrina affected 92,000 square miles.^{xiii} It is clear that emergency preparedness and response is critical for not only resolving a particular crisis, and for potentially saving lives, and infrastructure, but in addition, it can be instrumental for improving responses to future crises. An example includes the actions taken by the City of Minneapolis in 2002.

The City of Minneapolis learned important lessons from the emergency response to the September 11th attacks on the World Trade Center and the Pentagon and as a result, has implemented advanced communication systems into their emergency response. During the September 11th attacks, incompatible radios and overcrowded frequencies plagued New York's rescue crews. Firefighters, police, and emergency workers could not communicate with one another. "Some survivors say radio problems increased the death toll that day."^{xiv} In 2002, under Mayor Rybak's leadership, Minneapolis began a five year \$ 60 million investment in advancing its emergency response capacity with \$ 20 million used to develop an interoperable communications system for first responders.^{xv} Tragic events such as September 11th, 2001 can provide opportunities for learning and transforming organizations to be more effective.

Networks and Hierarchies

How do public agencies, non-profits, industry and individual actors prepare and respond effectively to a crisis? While there are many ways to respond to a crisis, an effective response includes the following characteristics: strong leadership, adequate resources and funding, a clear strategy/plan, and effective communication.^{xvi} Given these elements, crisis management can be broadly categorized into two different areas. The two areas are hierarchal responses and the use of networks. Conventional wisdom places a strong emphasis on a hierarchal response to a crisis because hierarchies' clear chain of command, delineated responsibilities for every position and integrated communications. Therefore, while hierarchies are often described as a rigid, high centralized, command and control system, hierarchical organizations are effective at managing decision-making when communications are slow because it takes time for information to travel through the

ranks of the hierarchy to the decision maker.^{xvii} But is hierarchy the most effective crisis-response method when events are rapidly changing?

Much of the emergency preparedness and response literature today is examining the use of networks, which are seen as more flexible, decentralized decision-making systems which emphasize relationship building and trust. Governments at all levels, including emergency preparedness departments, are beginning to understand that the one-size-fits-all model is no longer capable of meeting the needs of ever changing and increasingly complex issues and incidents, including crises.^{xviii} More public administrators are trying new organizational models that achieve this flexibility, and thus a degree of reliability under turbulent conditions. Hybrid, network, and virtual are some examples of the terms that have been used to identify these new public administration and management techniques.^{xix} Networks have the potential to achieve levels of creativity and innovation that would not be possible under a highly structured system.^{xx} Given that networks are more flexible than hierarchies, they can respond quickly to new challenges, uncertainty, and unforeseen events and can also help public agencies overcome scale limitations and connect more broadly to constituents.^{xxi}

Because crises are complex and require a combination of skills that are often beyond a single organization's capacity, academics and practitioners are examining the efficacy of networks in crisis response. Where hierarchies depend on routines and are built on formal relationships, networks rely on the complementary strengths of members and open-ended relationships.^{xxii} Networks supply governments with the flexibility to undertake problems that are beyond the range of any one organization, and they have management traits and challenges that are separate from hierarchies. After the terrorist

attacks on the World Trade Center and the Pentagon, networks have grown in significance in the area of homeland security, where there has been an effort to exert clearer command and better coordination over the variety of responders. ^{xxiii}

However, networks do provide challenges that need to be addressed. Using networks means expanding the number of actors involved and this creates a whole new set of challenges for government managers. Specific challenges can include any of the following: aligning goals, providing oversight, communicating with many different types of individuals and groups who may not understand the language and terms associated with emergency response, coordinating multiple partners with different norms and cultures, managing the tension between competition and collaboration, and building trust in short period of time. ^{xxiv} Trust is established through repeated positive experiences of successful partnerships, and these understandings take time to develop, but time is not a luxury that emergency networks have. ^{xxv}

Effective coordination, clear communication and strategies, as well as strong working relationships among emergency officials are all necessary for successful crisis response. In effect, characteristics of both hierarchies and networks are vital for effective emergency preparedness and response. For the past thirty years, these two elements have been integrated into a model for crisis management, which is known as the Incident Command System. ^{xxvi}

The Incident Command System

The Incident Command System was created to supply federal, state, and local governments, as well as private and not-for-profit entities, with a consistent structure for the preparation for, response to, and recovery from any incident, regardless of the size,

nature, duration, location, scope, or complexity.^{xxvii} It is an organizational structure intended to manage several response organizations. The Incident Command structure overlays a simple hierarchy on the crisis response organizations, and typically allocates responsibilities among the crisis functions of operations, logistics, planning, and finance/administration.^{xxviii} During any crisis, an incident commander is put in charge of the management system, and if the crisis is large enough where it necessitates multiple organizations, a unified command can also be coordinated. Additional elements of the Incident Command System are as follows: use of common terminology, the ability to adapt to change through the use of networks if the crisis expands, management by objectives, daily meetings and a clear chain of command.^{xxix}

The Incident Command System came about because of wildfire destruction in California, which killed sixteen people and crushed 885 homes in the early 1970s.^{xxx} The Incident Command System was born in response to a network dilemma as local, state, and federal organizations struggled to organize emergency response efforts in the face of the wildfires.^{xxxi} During this time period, responders were facing numerous problems including the following:^{xxxii}

- An overwhelming number of actors reporting to a single commander
- A variety of emergency management structures
- Lack of information/clear intelligence about the specific crisis
- Lack of standardized communications
- No structure in place for planning and coordination
- No one knew who was in charge or who to report to
- Language and terminology differences between the organizations

- Unclear objectives

As a result, fire officials in California collaborated on how to best prepare and manage wild fires in the future and thus created the Incident Command System. To make the Incident Command System more effective, fire officials discussed new ideas and agreed to make the following changes: ^{xxxiii}

- The management system must be flexible to meet the requirements of any incident
- Organizations must be able to use the system on a day-to-day basis for routine situations as well as for major crises
- The system must be standard in a way that will allow a diverse group of individuals and organizations to both understand and put the system into action
- The management system must also be cost effective

Since the 1970s, the success and reputation of the Incident Command System has expanded to the point where emergency officials outside of California began using this model to respond to forest fires, and other crisis situations including earthquakes and floods. The 9/11 Commission stated, “The response to the 9/11 terrorist attack on the Pentagon was mainly a success for three reasons: first, the strong professional relationships and trust established among emergency responders; second, the adoption of the *Incident Command System*; and third, the pursuit of a regional approach to response. Many fire and police agencies that responded had extensive prior experience working together on regional events and training exercises.”^{xxxiv} After 9/11, all emergency officials, including federal, state and local governments receiving federal funding were required to use the Incident Command System in crisis situations.^{xxxv}

The Incident Command System is characterized by many as a straight hierarchy, which leaves little room for the acknowledgement and analysis of networks. In viewing the structure of the Incident Command System, it is easy to identify it only as a hierarchy, disregarding the elements of networks including relationships (both formal and informal) and trust. Some practitioners do consider the use of networks in the Incident Command System, but this is usually only during a time when a unified command structure is put into place.^{xxxvi} The reason some practitioners concede the use of networks during a unified command is that many different agencies including non-government responders may work together during this time to manage a crisis.^{xxxvii} Other examples of hierarchical characteristics within the Incident Command System include the following:

- The management system is highly formalized with many rules, procedures, policies, and instructions
- The jobs within the Incident Command System are specialized, and are based on standardized routines, and require formal training
- The positions are arranged hierarchically and are based on formal authority
- Basic system objectives and plans are developed at the top of the hierarchy
- Additional hierarchical aspects identified by the Incident Command System include a clear chain of command, and centralized planning, communication and accountability procedures

However, if we look more closely at the Incident Command System, it is clear that networks play an important role in carrying out the goals and objectives for effective crisis response. A strong case can be made that network elements including trust, formal and informal relationships and horizontal management methods are all incorporated

within the Incident Command System. Because crises are often unexpected and spontaneous, they require network characteristics including flexibility and the role of additional actors, including volunteers with different cultures and skills. In effect, the Incident Command System utilizes aspects from both networks and hierarchies for effective crisis response.^{xxxviii}

When a crisis occurs, multiple organizations can be working together, including, but not limited to, fire and police departments, medical providers, volunteers, and private organizations. Each actor has its own norms and cultures, and provides a different set of skills, which are all required by the particular crisis. For example, when the I-35 W Bridge collapsed in Minneapolis, more than seventy-five local, state and federal agencies played a role in the emergency response.^{xxxix} Federal assistance included the FBI, Secret Service, Navy, FEMA, and the Department of Defense.^{xl} State and local response included the fire and police departments, and in addition, volunteers from local counties including Anoka, Carver, Dakota, Ramsey and the Red Cross also assisted. Crises require a collaborative solution, which cannot be carried out by one single organization or hierarchical structure.

Moynihan has termed the Incident Command System as a “hierarchical network” and also as a form of “network governance.”^{xli} A “hierarchical network” and “network governance” successfully blends the elements of both networks and hierarchies. “It is a form of social coordination that uses hierarchical control, in the form of unified and centralized command, to help manage a network of organizations pursuing a shared goal.”^{xlii} It must be clear that a “hierarchical network” and “network governance” is neither a hierarchy nor a network and it would be imprudent to claim that the Incident

Command System performs only one responsibility. During a crisis, organizations do fall under a single command, but this authority does not have characteristics of a strong hierarchy, having only limited control of its members. Since the Incident Command System is temporary, members have freedom and autonomy between incidents and their loyalty is to their home organization. A “network governance” view proposes that the Incident Command System is a means of managing a network of multiple organizations, albeit a very centralized one, while recognizing and understanding the complexities developed by the network setting.^{xliii}

The information above begs the question to whether or not we can determine the efficacy of the Incident Command System in all crisis situations. If crises are never all alike, is it best to have just one standard system? As Moynihan states, “By mandating the use of Incident Command System, the Department of Homeland Security assumes it is generally applicable to all forms of crises.”^{xliv} However, there is not enough empirical evidence to support this claim. While there is little argument that the Incident Command System is effective for forest fires, there is less evidence illustrating the efficacy of its use in other crises.^{xlv} With this being said the Incident Command System is the current crisis management system used by government and is what I will use in my analysis.

Overview of I-35 W Bridge Collapse:

The I-35 W Mississippi River Bridge was forty years old, 1,907 feet long (7-8 city blocks), and 100 hundred feet above the water. With approximately 140,000 vehicles north and south traveling over four lanes daily, I-35 W was one of the busiest bridges in the country over the Mississippi River.^{xlvi} One of the major complicating factors about the I-35 W Bridge is that it crosses multiple government jurisdictions, which has the

potential for massive confusion during crisis response. In this particular case, I-35 W was a federally funded bridge, owned and maintained by the state of Minnesota, and when it collapsed, it fell into the river with county jurisdiction, and the riverbanks were owned by the City of Minneapolis.^{xlvii} This issue could have been a significant problem during the crisis response, but with strong network and hierarchical elements among the responders, the consequences were mitigated. I will discuss the hierarchical and network elements later in the analysis section.

On August 1st, 2007, at 6:05 pm, during rush hour, the I-35 W Bridge collapsed into the Mississippi River, killing thirteen people and injuring 121. The victims came from all walks of life, including a Somali immigrant, and her two-year-old child, an immigrant from Mexico, a Ho-Chunk Indian, a young adult with Down syndrome and his mother, a construction worker, and other Minnesotans.^{xlviii} When the bridge collapsed, 575,000 pounds of construction supplies and equipment were also on the bridge, and four of eight lanes were closed for resurfacing. Because there was construction taking place on the bridge, there were fewer vehicles on it than usual, and as a result, the consequences could have been much worse, including additional injuries and deaths.

Prior to the collapse, the U.S. Department of Transportation labeled the bridge as “structurally deficient”, citing significant corrosion in its bearings, and in need of possible replacement.^{xlix} It must be noted that 75,000 bridges across the United States had also been labeled by the federal government as “structurally deficient.”¹ In fact, the I-35 W Bridge had a grade near the bottom of federal inspection ratings nationwide. The federal inspectors used a scale which ranked bridges with the highest score, 100, to the lowest score zero. In 2005 the I-35 W bridge was graded at a 50, illustrating that

replacement may have been in order. Out of over 100, 000 heavily used bridges nationwide, approximately 4 % scored below 50.ⁱⁱ On September 18th, 2008, the bridge was officially replaced.

When the bridge collapsed, 120 vehicles were on the bridge carrying approximately 160 people. The impact of the fall broke the span into several lanes of broken steel and crushed concrete with cars, buses, and trucks all resting dangerously along guardrails.ⁱⁱⁱ As stated above, 13 people lost their lives, with 12 dead on site, and 1 person died on route to the hospital. Responders saved everyone that could be rescued in the first 1.5 hours of the emergency and no rescue workers sustained significant injuries during the response.^{liii} The emergency response to this crisis was swift and massive, and has been considered by many as a model of effective emergency response.^{liv}

The next section of this paper will evaluate the reasons why the emergency response to this crisis has been widely praised. Analysis of the emergency response is broken down into three sections: crisis prevention, crisis response, and crisis recovery.^{lv}

Analysis:

Crisis Prevention

Network elements, including years of pre-planning, training and relationship building strengthened the emergency response to the I-35 W Bridge collapse. These network characteristics cannot be over emphasized. The excellent working relationships created through joint interagency training, planning, and previous crises were one of the main reasons that response and recovery operations were completed efficiently. As one leader commented, “We didn’t view it as a Minneapolis incident; it was a city/county/state incident.”^{lvi}

One critical reason for the strong working relationships, which led to the successful crisis response, was the decision to attend a one-week Federal Emergency Management Agency (FEMA) training course on crisis response in Mt. Weather, Virginia during the month of March 2002. This decision to attend the training course was in response to the 9/11 attacks, and the City of Minneapolis wanted to evaluate its strengths and weaknesses. Mayor R.T. Rybak won the mayoral primary on 9/11 and as a result, one of his priorities for the administration was emergency response.^{lvii} The Mayor of Minneapolis brought 60 employees, with 10 county employees and 10 state workers to the National Emergency Training Center for a Minneapolis-specific course.^{lviii}

The training course at Mt. Weather, Virginia proved to be both educational and instrumental for how to plan and implement an effective emergency response. Some of the training scenarios at Mt. Weather included the following: a mini-chemical spill, a terrorist event at the Minneapolis Convention Center, a high rise fire, a broken water main and a tornado strike. These crises were all relevant to Minneapolis because the city could potentially encounter any of these incidents.

The emergency training at Mt. Weather accomplished three main goals. First, it was the initial step towards relationship building. Jim Clark, who was the Minneapolis Fire Chief at the time, stated “We fumbled our way through the first exercise, we got better on the second one and by the third, we were pretty good. The theme around the whole thing was knowing the people personally, and having their cell phone numbers in each others’ cell phones. Those personal relationships were crucial.”^{lix} The interpersonal connections during the training proved critical when the I-35 W Bridge collapsed.

In addition to network elements, hierarchical characteristics were also strengthened during the training course, which proved to be very valuable when the bridge collapsed. Rocco Forte, who was the assistant city coordinator at the time, stated “People knew they had to take orders and report to somebody. That sounds very simplistic, but it is very important during a large event like this.”^{lx} He went on to say, “Five years ago, there’s no doubt in my mind that we would have stopped and looked around and said, ‘Ok, who’s in charge here?’ But now we were able to immediately identify who’s in command and put our first responders in place.”^{lxi}

Third, the training proved to be effective because it illustrated weaknesses in the city’s emergency response. FEMA’s analysis demonstrated needed improvements in Minneapolis’s communication systems, including its computer aided dispatch system (CAD), emergency response readiness for structure collapse, hazardous materials and bomb squad, security of infrastructure for the city’s water supply, more in depth training of the Incident Command System and security of City Hall.^{lxii} As a result of this training and analysis, the City of Minneapolis responded with a five year major investment totaling \$ 60 million in most of these areas mentioned above.

Minneapolis earmarked \$ 20 million to purchase a new state of the art 800 MHz radio system, which expanded the system’s capacity to all first responders, and \$ 5.2 million on a new CAD system which was capable of mapping the locations of all GPS equipped emergency response vehicles during the bridge collapse. The updated telecommunications system proved to be one, if not the most important improvements the city completed. It took several years to set up the new 800 MHz radios, but all of them were fully operational by the time of the bridge collapse. “That probably was a lifesaver,”

stated Turnbull, Hennepin County's Director of Emergency Management.^{lxiii} With policies in place as to which channel each agency was using, it was possible to dispatch effectively and still have necessary conversations between different agencies. Turnbull later commented, "Everybody could talk to everybody else."^{lxiv}

As illustrated above, technology can play a crucial role in strengthening hierarchical and network elements during all phases of a crisis. First, if an important decision needs to be made by a top commander, high tech communications provide opportunities for information to travel faster to the decision-maker, who may not be close to the crisis. In this instance, technology supports hierarchical characteristics. High tech communications can also support network elements by allowing many different responders including government, nongovernmental organizations and private citizens to communicate with one another. These organizations may not have prior working relationships, and technology can strengthen relationships and help build trust in a short amount of time. Thus, high tech communications can simultaneously support hierarchical and network elements.

Other investments included a new emergency operations center, security cameras located throughout the city, three special response teams, which included the fire department's hazardous materials unit, a collapse structure team and the police department's bomb squad which totaled \$ 8 million, and most importantly, a clearer strategy on how to handle a crisis. Additionally, more than half of the employees working in the City of Minneapolis have received National Incident Management Systems (NIMS) training, which is the national policy for incident management. NIMS

mandates that the Incident Command System be put into place and also outlines roles and responsibilities across organizations and jurisdictions during crises.^{lxv}

Crisis Response including Search and Rescue

Although the bridge collapse was complex, which included recovery and debris management activities that lasted for weeks, the rescue phase was completed in a relatively short time. Emergency personnel assessed the incident quickly, determined priorities, and performed needed rescue and emergency care. All emergency responders received prior training and education in the MNNIMS, Minnesota's version of the National Incident Management System (NIMS), and all operational leaders, and administrators fulfilled required training according to their levels of responsibility.^{lxvi} This was crucial because responders knew where they had to be and to whom to report.

Throughout a crisis, but more importantly during the beginning, hierarchical elements are critical in bringing structure to a confusing and chaotic situation. Emergency officials need to know who is in charge, where to go and what steps to complete for effective crisis response. Evidence of hierarchical elements including structure and formal roles can be found throughout the Minneapolis response in large part due to NIMS training and the Incident Command System. Richard Stanek, Hennepin County Sheriff stated "If you understand NIMS and know what it means, it gives you that sense of organization within the chaos. And we all had the training: Here's who is working on rescue, here's who is working on recovery, here's who is going to coordinate the media. At the same time, someone has the role of thinking ahead three or four days out."^{lxvii} The Incident Command System was put into place immediately after the bridge collapsed.

The first priority for emergency officials after the bridge collapsed was to rescue and save as many lives as possible. With more than 100 vehicles and 160 people on the bridge when it collapsed, emergency response was confronted with many separate crises.^{lxviii} These crises included many vehicles on fire and several that were hanging off the guardrails, victims were submerged with their vehicles in the Mississippi River, and onto the riverbanks, and third, the possibility that hazardous materials both known and unknown would increase the severity of the incident. Officials were also unsure of what caused the bridge to collapse. Besides the failure of physical infrastructure; terrorism, both foreign and domestic were also real possibilities. Officials were also worried that the bridge collapse could cause other physical infrastructure nearby to fall down. The lack of credible information heightened the severity of the crisis, because emergency responders were not 100 % sure what they were dealing with.

On top of these crises, responders were faced with another potentially threatening situation-which agency had jurisdiction? Although jurisdictional issues seem less critical or significant when compared to the collapse itself, interagency struggling over who is in charge can waste energy and time that could be better served for rescue operations. Jurisdictional confusion had the potential to make this crisis a lot more complex as can be illustrated in the following statement by Rocco Forte. “The bridge was owned by the federal government, and was operated and maintained by the State of Minnesota. After the collapse, the bridge was lodged in the river where, under Minnesota statute, the Hennepin County Sheriff’s Office Water Patrol has jurisdiction; and along the river banks, which are under the jurisdiction of the City of Minneapolis.”^{lxix}

These jurisdictional issues had the potential to threaten all aspects of the emergency response. However, officials from state and local agencies, including fire and police knew what to do and how to do it based on network elements including past training and relationship building. Turf battles, which are not uncommon in crises of this size, were not a factor because of relationships that had been created over the years.^{lxx}

Both the Minneapolis Fire and Police Departments put incident Command posts into place within the first half –an-hour of the crisis. The Minneapolis Fire Department set up its Command Post on the 10th Avenue Bridge, and the Police Department set up its Command Post closer to the bridge collapse at the Red Cross Building. These initial separate command posts were not the ideal. The fire department decided to position early operations from the 10th Avenue Bridge, because from their perspective, it was the best location to observe and monitor rescue and fire suppression operations. It would have been more efficient if police command had been established with fire command on the bridge at the beginning of response activities, so that a unified command operation could be managed.^{lxxi} When the bridge first collapsed, there was some initial confusion about NIMS protocol, but the Minneapolis Police Department and Fire Department eventually formed a unified command. As the Incident Command Posts were being set up near the crisis, the Emergency Operation Center (EOC) was in place at 6:20 p.m. in the basement of City Hall.

An EOC is a central command and control facility responsible for carrying out the principles of emergency functions at a strategic level in a crisis and ensuring the continuity of operation of a company, political subdivision or other organization. Ultimately, the EOC is responsible for the strategic overview of the disaster.^{lxxii} The

Minneapolis EOC was under the control of the city emergency manager with six chief areas under his command: liaison, public information, operations, planning, finance and logistics.¹ The EOC was up and running until the last body was recovered, on August 20th.^{lxxiii}

A brief description of these chief areas is as follows:

- *Liaison*- A Liaison Officer was appointed to supply services between the EOC and the incident, and the EOC and political leadership. The EOC Liaison also helped the Public Information Officer in managing the media, particularly as national media and VIPs arrived in Minneapolis.
- *Public Information Officer*-The Public Information Officer was responsible for setting up a Joint Information Center (JIC), coordinating information and communication with other local and state public information officials and for establishing a central location for holding press conferences and interviews.
- *Operations/Planning*-The Operations and Planning segments worked with Incident Command and responding organizations to determine when Command would shift to different organizations. Additionally, the Planning Section Chief was in charge for documentation of all resources used and needed.
- *Logistics*-The Logistics division was responsible for ensuring that all aspects of the incident had the supplies and services necessary to operate. This included food, security incident transportation services and many others.

¹ When the EOC opened its doors at 6:20 pm, more than 100 people were in the room including the Mayor and the Governor. It must be noted that the EOC is comfortable for 12 people, and the Department of Homeland Security reported afterwards that the crowding could become a major safety issue. (As a result, Minneapolis expects to finalize a multimillion dollar upgrade to the EOC facility within the next few years.)

- *Finance and Administration*-The Finance Department was responsible for tracking emergency expenses. This is a vital part of EOC operations, because good financial records enable communities to submit requests for eligible State and Federal reimbursements.^{lxxiv}

While the Fire Department took charge in rescue operations, the Minneapolis Police Department and Hennepin County Sheriff's Office were responsible for securing the area and potential evidence to determine why the bridge collapsed. They were the primary law enforcement agencies responding to the incident; the police department had jurisdiction of the land and the sheriff's office had jurisdiction over the Mississippi River.^{lxxv} It is important to note that the three chief law enforcement commanders were all skilled in strategic planning and all had trained with other Minneapolis first responders as well as state and federal law enforcement agencies. "Most of the major stakeholders knew each other, which made communications smoother and facilitated cooperation."^{lxxvi} Once again, this illustrates the importance of network elements including relationship building for an effective crisis response.

Other agencies, including the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives, the U.S. Secret Service, the Federal Bureau of Investigation and the Saint Paul Police Department also assisted in the emergency response. In addition to controlling the perimeter around the bridge collapse, all of these organizations mentioned above began an investigation to determine if the bridge collapse was a potential terrorist attack. At that moment, terrorism was considered a real possibility and every precaution had to be taken to make sure there was not another attack.

In 2006, the Minneapolis Federal Bureau of Investigation Office completed a Domestic Terrorism Threat Assessment and identified several potential threats including left and right wing groups, and lone-wolf actors. Timothy McVey was known to have checked out the Federal building in Minneapolis before deciding on the Murrah Federal Building in Oklahoma City. In addition to domestic terrorist groups, Zacharias Moussaoui and other foreign terrorists were arrested within the Twin Cities metropolitan area.^{lxxvii} Because of this concern, the Minneapolis Police Department put a practice called “tactical mingling” into place. Tactical mingling meant placing plainclothes officers within the large crowd of civilians to evaluate whether or not anyone else was involved, if there were any suspicious people or threats and to make sure that no one would cause any additional problems.

The Minneapolis Police Department was also in charge of identifying all of the victims involved in the bridge collapse. This was difficult to manage because during the crisis, there was a list of 1,200 people that were first reported as missing. To manage this high volume, the Minneapolis Police Department prioritized the missing persons list based on the call and where it emanated and within 48 hours, the list of 1200 was narrowed down to eight. This list of eight were all found later to be a casualty of the bridge collapse and eventually recovered.^{lxxviii} To allow a safe place for family members and friends to receive information and to maintain rumor control, a family assistance center (FAC) was established at the Holiday Inn-Metrodome. The FAC was opened within two hours of the bridge collapse and would later be moved to Si Melby Hall at Augsburg College because the hotel had a prescheduled event.

The Minneapolis Police Department's Chaplain made sure the FAC was up and running and coordinated staffing arrangements with the Red Cross, the City's Department of Health and Family Support, and other Hennepin County offices.^{lxxix} However, it must be noted that operating the FAC was a shared responsibility among all of these agencies. Volunteers from the Medical Reserve Corp were also activated to assist at the FAC to supply psychological support and current information to the families of the deceased. This was critical because no one had to learn about the loss of a family member through the media. The FAC was also the location where formal briefings were made by the Minneapolis Police Department, the Hennepin County Sheriff's Office, the Medical Examiner, and the FBI.^{lxxx}

During the crisis, there was potential for mass confusion at the FAC because there were no guidelines in NIMS or through the Minneapolis Emergency Operations Center about what agency was responsible for and in charge of running the operations at FAC. The specifics for cooperation and collaboration at the FAC had not been written down or discussed beforehand. However, because of strong network elements including trust, relationship building and years of collaborating with one another, confusion and chaos were mitigated. The City of Minneapolis with other key stakeholders made the necessary changes concerning FAC operations.²

Crisis Recovery

² All agencies involved with the FAC effort were given an opportunity to provide input and ideas for improvements. Some of the changes include the following: Staffing protocols should be developed beforehand to provide consistency and ensure smooth transitions and activation procedures for a Medical Reserve Corps and other health resources should be clear.

Recovery operations officially started during the morning of August 2nd when all individuals on the bridge and in the water were rescued. At first, dive teams from Hennepin and nearby counties helped with recovery of victims. However, it became clear that more diving experience was necessary to search under tons of collapsed debris. Therefore, the federal government sent U.S. Navy and FBI divers on August 6, 2007 to ensure that all missing victims were found and recovered from beneath tons of wreckage and debris. The federal government provided specialized equipment including side-scan sonar and two submarines.^{lxxxix}

It took almost three weeks until the eighth and final victim was found and recovered. A total of fifty-eight divers worked over five days to complete debris removal, evidence collection and body recovery.^{lxxxix} The collapsed bridge site was then turned over to the Minnesota Department of Transportation and its contractors for debris removal and new bridge construction. A replacement bridge, the I-35W Saint Anthony Falls Bridge opened on September 18th, 2008.

Lessons Learned:

The I-35 W Bridge collapse was an unexpected crisis, but the City of Minneapolis managed it efficiently and effectively. The analysis of this crisis is important for many reasons. First, one of the most critical roles for local governments is to have an effective emergency preparedness and response system to plan for and protect its citizens from potential crises. This could not be made more evident than on September 11, 2001 after the terrorist attacks on the World Trade Center and the Pentagon. Second, this analysis provides important lessons about the use of hierarchical and network elements within the crisis management system, the significance of planning and relationship building and the

use of technology for an effective response. Technology can play an important role in strengthening both hierarchical and network elements. Some important lessons learned from this analysis are as follows.

- **Balance of hierarchical and network elements in a crisis-management system are critical.** Hierarchical and network characteristics proved to be one of the most significant reasons the emergency response was so effective. This case illustrates that a successful crisis management system requires a balance between these two elements. Although one element may be more appropriate or useful during a specific phase, (for example, network elements employed during the crisis prevention stage when relationship building and trust are vital for training or hierarchical elements in the crisis response phase to bring structure to a chaotic situation), it is essential to have an overall balance between these two elements.
- **Network elements tend to be overlooked, but are as important as hierarchical characteristics.** A key to successfully managing major disasters is the understanding of roles and the development of relationships prior to a crisis. Clear roles and solid interpersonal relationships are essential to manage a crisis. These factors were strengths in the Minneapolis response, as most participants from Hennepin County and the State of Minnesota had worked on or participated in exercises with their Minneapolis counterparts. Time after time, the individuals interviewed stated that relationships as the single most important reason why the response went as efficient and effective as it did.^{lxxxiii}
- **Training and practice are essential for an effective crisis response.** Mayor R.T. Rybak's decision to attend the Federal Emergency Management Agency's (FEMA's)

training course played a crucial role in the response for two reasons. First, it was the first major step towards relationship building. The mayor brought 60 employees, with 10 county employees and 10 state workers to train with one another. Fire Chief Clack stated “We got to know each other very well then because we were immersed with each other 10 hours a day, away from the city.”^{lxxxiv} Second, the training proved to be effective because it illustrated weaknesses in the city’s emergency response. FEMA’s analysis demonstrated needed improvements in Minneapolis’s communication systems, including its computer aided dispatch system (CAD), emergency response readiness for structure collapse, hazardous materials and bomb squad, security of infrastructure for the city’s water supply, more in depth training of the ICS and security of City Hall.

- **Technology is crucial for a successful response.** Technology and more specifically, the 800 MHz radio system, which expanded the system’s capacity to all first responders, and the new CAD system which was capable of mapping the locations of all GPS equipped emergency response vehicles during the bridge collapse, proved to be extremely valuable. The 800 MHz radio system allowed responders to listen and talk to everyone else. (This was a major problem during the September 11th emergency response.)
- **Understanding the National Incident Management System (NIMS) is critical for an effective crisis management system.** NIMS training was very important for emergency responders because it standardized the steps and processes for an effective response. All emergency responders received prior training and education in the MNNIMS, Minnesota’s version of the NIMS and all operational leaders, and

administrators fulfilled required training according to their levels of responsibility. Additionally, more than half of the employees working in the City of Minneapolis have received (NIMS) training. NIMS reiterates the importance of hierarchical characteristics for an effective crisis management system.

- **The Incident Command System was an effective model for crisis management.**

Those responsible for managing the response understood the importance of both hierarchical and network elements within the Incident Command System. These characteristics include relationship building, trust, formal roles and structured decision making.

Conclusion:

The crisis response to the I-35 W Bridge collapse is a model for efficient and effective emergency preparedness and response in the 21st century. Although no crisis is the same and no response is perfect, Minneapolis's use of hierarchical and network elements within the Incident Command System is one of the major reasons it was so successful and why it received high praise for its response. If the Incident Command System can be perceived and understood as a "hierarchical network" or a form of "network governance" it will continue to be an effective crisis management system. The Minneapolis case illustrates that these distinct and often competing elements must come together for crisis management to be effective in the 21st century.

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