



***Crisis Leadership:
The Art of Adapting to
Extreme Events***

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The extreme environment of disasters conjures up images of raging floods and furious fires. However, some of our most intense memories come from the terrorist attacks of September 11, 2001. Within 102 minutes, we became part of a *global trauma*—a worldwide shocking event—by witnessing the deliberate crashing of four commercial aircraft and the tragic collapse of occupied high-rise office buildings from uncontrolled fires. The images of that day are forever woven into our memories and make us wonder how firefighters and other emergency responders can work in these harsh and dangerous environments. The unwelcome reality for all those in leadership positions is that, sooner or later, we will be faced with some kind of extreme event.

Leading at extreme disasters requires managers to make critical decisions under conditions of vast uncertainty and perform complex organizational tasks to protect life and property. They are asked to act decisively, yet remain flexible in a changing threat environment. In most routine emergencies, a hierarchical command-and-control structure is used to manage operations. But in extreme events, this kind of command structure is often inadequate and may even hinder inter-organizational response. Extreme events are multi-jurisdictional and overwhelm one organization's capacity to manage the incident alone.

We will examine the forces of a crisis, explore decision-making in extreme environments, analyze network response, evaluate command strategies, and identify skills needed for crisis leadership. Extreme events compel crisis leaders to rapidly combine a vertical command-and-control model for managing their organization with a horizontal network that can connect, collaborate and coordinate with others. The leadership skills needed to form networks for information-sharing and flatten the command structure for collaboration are critical for leveraging core competencies for coordination in a crisis.

These principles of crisis leadership used at emergencies can be applied to business and government or whenever organizations must interact under challenging, complex and novel events. Forward-looking crisis leaders should not only provide their organizations with routine emergency procedures, but also develop strategies that enable them to adapt to extreme events.

FORCES OF A CRISIS

By its very nature a crisis is often random, unexpected and novel. At times, the scale of the incident is unprecedented and overwhelming. Nevertheless, leaders ready themselves for a wide array of urgent circumstances, ranging from natural and manmade disasters, to financial crises and disruptive technology. These involve high-stakes risks and uncertain outcomes that are dependent on adaptive response.

Many crisis situations occur suddenly: the 9/11 attacks, the Gulf oil platform explosion, or the Great East Japan Earthquake and Tsunami. But some crises grow slowly and evolve from ordinary circumstances into an emergency. The nuclear power plant incident at Three Mile Island, as well as several major electrical blackouts, started with a simple failure, out of which spun an escalating series of failures until it was a major crisis.

Crisis management often focuses attention on the threat or physical environmental conditions of the event. However, crises have multiple forces that influence their outcomes. Those in crisis leadership positions need to understand how the physical threat environment influences incident management, as well as how psychological, social, operational and political elements impinge on their ability to deal with an emergency. Ignoring these five forces of a crisis creates an *illusion of control* for those who must lead in times of disasters.

FORCES OF A CRISIS

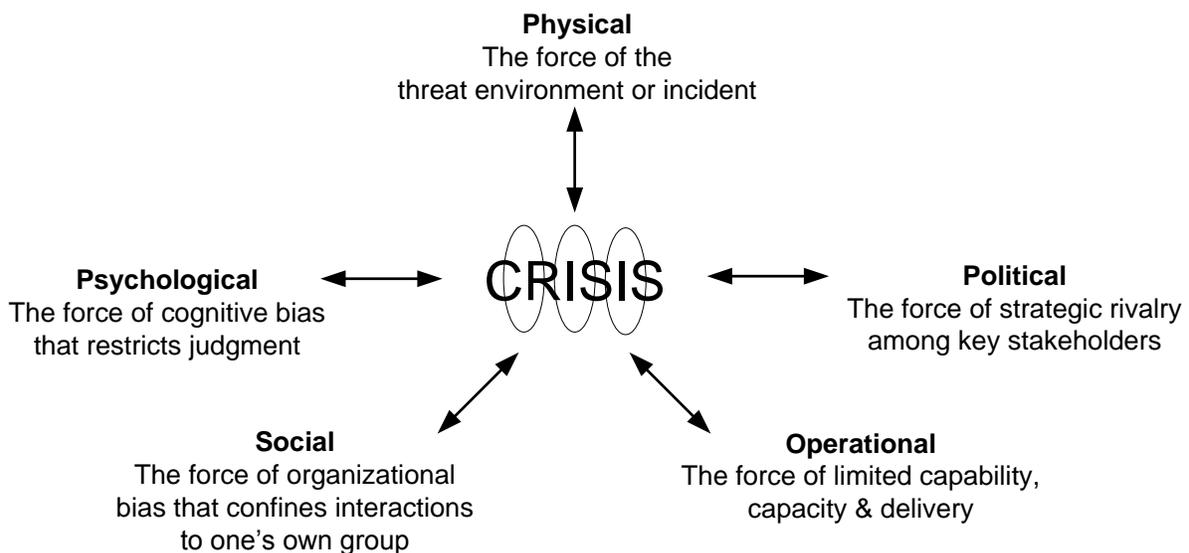


Figure 1: Multiple Forces of a Crisis that influence incident management and crisis leadership.

Physical Forces

Today's emergency responders encounter many kinds of disasters. They fight fires; perform emergency medical care; operate at vehicle, train and aircraft accidents; mitigate hazardous material and industrial incidents; perform search and rescue at building collapses, floods, hurricanes, blizzards and earthquakes; and take lifesaving actions at terrorist incidents.

They frequently conduct these operations under conditions of extreme stress. For example, firefighters' self-contained breathing apparatus (SCBA) and protective bunker gear, along with the equipment they carry, weigh almost 70 pounds. Often, firefighters have to climb several flights of stairs, fire escapes or aerial ladders with this heavy equipment before they even start extinguishing the fire. When they arrive at a fire in a typical office space, they face temperatures of more than 1400° Fahrenheit and a toxic environment lacking enough oxygen to sustain life (O'Hagan, 1977). It is not uncommon for firefighters to be exposed to temperatures of 2000 °F during a chemical fire (FEMA, 2008)—hot enough to deform steel. Firefighters' protective clothing provides some thermal barrier, but can withstand direct flames for only a few seconds; moreover, their air tanks are limited to 20-30 minutes under working conditions. These environments prompted the Federal Emergency Management Agency (FEMA, 2008) to state that "the physical and mental demands associated with firefighting and other emergency operations exceed those of virtually any other occupation" (p. 3).

As powerful as they are, the physical conditions operating in such emergencies can easily overwhelm leaders' attention, so that they focus only on the threat environment and do not see—or give too little attention to—the other forces that play a significant role in the outcome of events.

Psychological and Cognitive Forces

As if physical factors were not difficult enough, emergency responders also must deal with psychological forces or cognitive biases, which restrict their judgment and can dangerously affect their ability to make critical decisions. Extreme events challenge emergency responders with unprecedented scale, complexity and novelty. The stress of the crisis creates a psychological force that limits emergency responders' cognitive ability to adapt to unfolding events.

Arnold Howitt & Dutch Leonard (2009) argue that the essence of a crisis is that it is *novel*, unfamiliar, difficult to spot, and therefore often underestimated or ignored. In a crisis, novelty demands that responders swiftly adapt to new threats, but too frequently they fall victim to cognitive biases by *overweighing* experience and *framing* extreme events as routine. This *normalcy* bias (Kahneman, 1982) combined with *heuristic* shortcuts blinds emergency responders from seeing the event as a crisis.

Even when emergency responders recognize an event as a novel crisis, they slip into routine operations. For many emergency responders, falling back on their training is necessary to manage an extreme event. However, the danger for those in leadership roles is having *overconfidence* in their ability to manage a novel incident by applying only standard procedures and concentrating on the

obvious routine tasks. Daniel Kahneman (2011) argues that too often this focus on what we can do and neglect of the ideas of others creates overconfidence in one's ability.

Under the cumulative stress of command, this cognitive narrowing can further regress into *operational addiction* by fixating on managing each presenting tactical issue. Psychologist Philip Zimbardo (2011) defines this as an "arousal addiction"—the need for a constant state of excitement and the desire for different experiences. Exploring the inner working of the brain, Jonah Lehrer (2009) explains that the emotions that trigger intuitive insight occur when the neural transmitter dopamine is released, which detects subtle patterns that are not consciously noticed. While this may be helpful in finding quick solutions in dangerous situations, the side effect for those in leadership positions is to become isolated, reactive, and unable to comprehend the larger strategic picture. Incident commanders have been observed walking away from the command post to be alone so they can react to new information and bellow orders by portable radio to their subordinates. Many commanders enjoy the dopamine reward of running operations and matching patterns to experience, but lack the social and analytical skills to lead in a novel multi-jurisdictional event.

Interpersonal and Social Forces

While cognitive bias may blind individuals to emerging threats, organizational and social factors may prevent the necessary integration of information until it is too late (Bazerman & Watkins, 2004). As events move from single to multi-agency, emergency responders tend to separate into functional tasks, such as firefighting, law enforcement and health care. Crisis managers often limit their connectivity to their own information network. Firefighters connect to other firefighters and police connect to other police officers. This tendency to provide information only within a group and resist information-sharing with others outside that group is known as *organizational bias* (Pfeifer, 2007). It is also seen in business, where product development, marketing and production create silos and only connect to their own group. What was once a convenient division of labor mutates into fiefdoms that essentially cut off contact between functions (Senge, 2000), which creates organizational blind spots in command capacity.

David Lazer and Maria Christina Binz-Scharf (2007) assert that while this behavior reduces the amount of diverse information received by organizations, it enhances intra-organizational information-gathering. But Richard Hackman (2002) argues that "members of an excessively homogeneous group may get along well together, but lack the full complement of resources needed to perform well" (p. 123).

In some businesses, this bias is necessary for maintaining an advantage over the competition. During extreme events, however, organizational "stovepipes" that limit information-sharing and situational awareness to one's own organization are barriers to commanding in time. A culture that does not address organizational bias and resists information-sharing produces two distinct behaviors in major disasters.

First, it leads to "homophily" —the propensity of similar individuals to migrate to each other (McPherson, Smith-Lovin & Cook, 2001). When providing information across groups, people are prone to give more information to members of their own group. There is also evidence that as the stress and complexity of a crisis increase, people tend to narrow their focus on aspects they judge to be most important to them (Weick, 1995). Kahneman (2011) refers to this cognitive and organizational myopia as the belief that "what you see is all there is."

Second, when people are faced with extreme events, they often feel little obligation to share valuable information with those outside their group, since responsibility for acting is diffused across the in-group. When asked why, most say that they thought someone else in their organization was sharing the information.

Organizational bias is a normally occurring phenomenon that must be dealt with during multi-agency emergencies. Failure to address the problem will result in a lack of situational awareness and coordination, which places crisis managers and emergency responders at a disadvantage in managing large-scale events in time to save lives. Extreme events, such as 9/11 and Hurricane Katrina, illustrate how organizational bias can create a dangerous and fragmented emergency response and command.

Operational Forces

Extreme events are defined by the Department of Homeland Security's *National Response Framework* (2008), as "any natural or manmade incident, including terrorism, that results in extraordinary levels of mass casualties, damage or disruption severely affecting the population, infrastructure, environment, economy, national morale and/or government function" (p. 42). The dynamic and unpredictable threat environment of natural and manmade disasters necessitates that leaders constantly evaluate the effectiveness of their organizational structure and response capacity (Sawyer & Pfeifer, 2006).

Routine emergencies are characterized as having a hierarchical command and control structure, good access to information, standard operating procedures and, usually, a single incident commander (Leonard & Howitt, 2007). However, under the cumulative stress of extreme events, hierarchical command structures tend to break down and personnel are hindered by a lack of information, constraints on innovation and an inability to reallocate resources quickly (Comfort, 2002). Extreme events push organizations past their operational experience to organizational breaking points that swiftly outstrip their capacity to respond. Many crisis leaders fail to evaluate the limits of their operational response and their ability to manage a crisis on three levels:

- Capability—an incident requiring more skills than organizations can provide
- Capacity—an incident requiring more resources than available
- Delivery—an incident requiring resources more rapidly than can be deployed

New York City has one of the best emergency response systems in the world. However, on 9/11, as the incident expanded and the towers collapsed, the situation suddenly exceeded the capacity of the entire City of New York to respond. Far beyond a city-wide response, the crisis required massive federal aid and assistance from many organizations. National Guard, mutual aid, volunteer rescuers, construction workers and many other organizations were needed at "ground zero" to enhance the city's ability to dig for survivors and recover those lost. It required a unity of effort and cooperation to manage an event of catastrophic scale. Understanding operational limits is critical for effective crisis leadership. Without such knowledge, leaders cannot effectively lead organizations nor can organizations effectively respond to the crisis.

Political Forces

The political force of strategic rivalry is the hidden element among operational responders, political leaders and societal groups. These three groups usually have different ideas on how best to deal with the effects of a crisis. In the aftermath of the WTC collapse, emergency responders worked tirelessly to recover those who were lost. New York City was left with the daunting task of recovering 2750 people, including 343 FDNY members, 37 Port Authority police officers and 23 NYPD police officers, who were buried under the rubble of the twin towers.

The operational group was heavily invested in continuing the recovery operation. For two months the city and the entire country listened to Mayor Rudy Giuliani voice the emotions of all and provide a strong sense of leadership. However, on November 2, 2001, Mayor Giuliani ordered a halt to recovery operations and heavy equipment brought in to clear the site and restore the city to normal. Both operational and political rivals were altruistically motivated, yet they differed in their approach.

The third rival group was the social element composed of family members who lost loved ones in the attacks. By November 2001, few remains had been recovered, and families were still grieving for missing loved ones. After the families objected to the halt in recovery operations, Mayor Giuliani quickly reversed his position and continued with recovery efforts for another nine months, until May 30, 2002, when the site was officially designated a construction operation. The societal rival force had overwhelmed political power.

DECISION-MAKING SKILLS

Emergency responders must make decisions while encountering extreme environments that are constantly changing. They are asked to act with certainty, yet remain adaptable to new information. Examination of critical decision-making shows that emergency responders combine quick intuition with experience and knowledge to adapt to evolving situations; yet, in the presence of novelty, they may also use deliberate analytical thinking (Pfeifer and Merlo, 2011).

On the morning of May 2, 2006, fire roared through a series of vacant factories and warehouses at the Greenpoint Terminal Market in Brooklyn, New York. Ten alarms, 400 firefighters and emergency medical personnel, and more than 80 pieces of firefighting equipment were required to manage the enormous, fast-moving and intense inferno. At the height of the fire, an entire city block was ablaze, with flames shooting hundreds of feet into the air. The fire's large plume of dark, black smoke—which stretched across the city and could be seen from miles away—was a powerful reminder of the incredible force and potentially horrific consequences of fire. Adapting to this environment required firefighters to understand the physical behavior of fire and make critical decisions on firefighting tactics by overcoming their cognitive biases of thinking of this incident as a routine fire.

Common belief is that a good decision only comes from gathering all the facts, analyzing the data, developing a number of solutions, comparing these options and finally selecting the best course of action. This may work well sitting at a desk, but this is not how firefighters operate at the scene of an incident. Firefighters commonly believe that decisions are made by gathering situational awareness, deciding on a course of action and implementing these tactics. Certainly this method is more streamlined for making quick fireground decisions, but it fails to clarify how firefighters know which course of action is correct. To fully comprehend crisis decision-making, it is helpful to examine research done by military, psychology and business strategists.

In the 19th century, Carl von Clausewitz wrote the first scholarly study on military strategy. He describes three key elements of commanding. The first is that during their pre-battle evaluation, great commanders, such as Napoleon Bonaparte, recognize how to win a battle in a "glance." Clausewitz (1832) uses the French expression *coup d'oeil*, which he describes as "the rapid discovery of a truth that, to the ordinary mind, either is not visible at all or only becomes so after long examination and reflection" (p. 142). This "glance" is the moment of insight during which commanders intuitively make sense of a situation by quickly envisioning a plausible course of action with its possible outcomes before developing a plan of action.

The second element of command is to resolve to implement and carry through with one's decision despite surrounding uncertainty. And the third key factor is for commanders to have the "presence of mind" not to ignore uncertainty, but to remain flexible to the unexpected. What Clausewitz discovered is that great commanders first see what needs to be done and then resolve to follow their intuition, while adapting to the unexpected.

To explain these concepts further, psychologist Gary Klein (1998) has done extensive research on the decision-making of firefighters, emergency room nurses and combat soldiers. Klein explains that firefighters make decisions by using cues to recognize a situation as typical and decide a course of action by relating it to their experience. Developing a course of action quickly is based on imagining how operations are carried out and adapting to the evolving situation. This analysis demonstrates that firefighters do not compare all the possible options, but rather choose the first likely solution they think

will work, based on experience. If the option is not working, it is customized or abandoned and a new solution is created. This permits firefighters to adapt quickly and not be paralyzed by evaluating the endless possible choices. But this pattern matching method of decision-making has its limitation.

At the Greenpoint Terminal Market, fire chiefs followed this instinctive pattern of decision-making. While obtaining situational awareness by scanning the environment, the chiefs imagined how they would attack the fire. Since it was a vacant building, the combination of exterior water streams on the fire and use of interior fire hoses to protect the adjoining buildings would be typical. However, the chiefs had the "presence of mind" to remain flexible and not be limited by their cognitive biases for standard methods of firefighting. Instead, chiefs use the analytical (prefrontal cortex) part of the brain to envision that placing firefighters in exposures to stop the spread of this fire was too dangerous and would not limit the expanding fire, due to the heavy timber construction and large volume of fire on each floor. An exterior firefighting strategy was developed based on this moment of insight.

Each chief resolved to maintain this exterior strategy. At one point, a lieutenant tried to convince a sector chief that the fire could be controlled from the interior. The chief, observing the fire behavior, explained to the lieutenant that his overconfidence in his firefighting skill was dangerous and he failed to observe the interior spread of fire above them. The lieutenant's decision-making was seriously impeded by his own cognitive biases. So why did the lieutenant not see what the chief so clearly saw? What makes one decision maker better able to adapt to danger and make sound, critical decisions than another?

Columbia University business strategist from Columbia University, William Duggan (2005) points out that both Clausewitz and Klein see knowledge and experience as the foundation for decision-making. For Clausewitz, this comes from the study of military history. But for Klein, rapid decision-making is accomplished by recognizing an event as something similar to past experience. Even if things do not fit into a previous pattern, the abnormality directs emergency responders to an action to take.

This "recognition primed decision-making" (Klein, 1998) is developed through experience, knowledge of procedures and study of after-action reviews (AAR) of past incidents. Duggan argues that the more you learn, the faster and better your intuition will become. He also maintains that such expert intuition is not a guess, but rather the art of intuitively combining the knowledge of what has worked in the past with the current situation. This implicitly requires good situational awareness for "sense-making" and knowledge of emergency response procedures. Karl Weick (1995) describes the basic process of sense-making as a "search for context within which small details fit together and make sense" (p. 133). In Brooklyn, incident commanders used their experience and knowledge of firefighting to make sense of fire conditions and adapt to the extreme environment of the inferno.

At the most intense part of this incident, the fire developed into a rarely seen urban "fire storm," creating its own wind storm and weather pattern. Powerful winds were sucked into the fire at

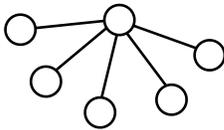
ground level and exploded into a fireball high above the buildings. This novel event did not match anything experienced by those in command that morning. The chiefs used skills of intuition and analysis to think through what had to be done. They received situational awareness reports, anticipated fire spread, repositioned fire units and collaborated with police to evacuate residents in the area. Their adaptive skills of using both intuition and analysis guided them to make critical decisions for life safety and control of the fire. While this incident was a fire department operation, most extreme events involve multiple agencies, which increase complexity.

NETWORK ANALYSIS REVEALS COMPLEX SYSTEMS

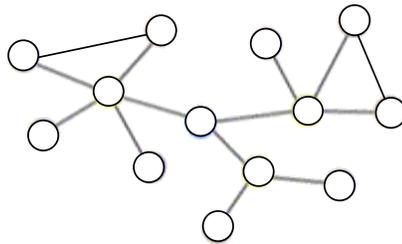
Networks are frequently used to address complex problems, but the exchange of time-sensitive information and the need for coordination during disasters present new challenges for networks. Extreme disasters are complex because they are permeated with novelty, which requires an ever-changing interaction of multiple organizations as the event evolves. Not only must organizations adapt to novelty, but their collective interaction emerges into complex systems for response and recovery.

CATEGORIZING RESPONSE NETWORKS

Hierarchical-Hub Network



Cluster Network



Random-Decentralized Network

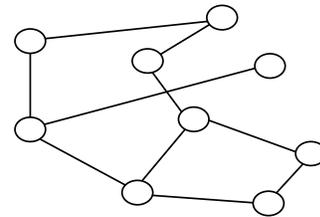


Figure 2: Identifying and understanding the emergence of different response networks during disasters.

Disasters are divided into routine emergencies, crises, and catastrophic events, each having a distinct network structure. Routine emergencies, such as a house fire or a car accident, use a hierarchical or central hub (scale-free) type network for command and control. In a crisis or catastrophic

event, such as a major hurricane, earthquake, tsunami and terrorist attack, we notice the formation of random networks that are haphazardly connected and with no one central leader controlling the entire incident. Ted Lewis (p.121, 2011) argues that "networks evolve from random to cluster and eventually scale-free [hub] networks." The same evolutionary process for crisis management occurs during a catastrophic event. At the early stages of a catastrophe, random networks are formed and then emerge into a more organized cluster pattern, which near the end of the incident often gives way to a centralized hub-type network. Response to extreme events is a process of emergence, which starts by a convergence of responders and people to the scene of the event. From little order emerges a complex social system of clusters. Crisis leadership is about forming clusters and getting clusters to communicate with each other.

Immediately after the collapse of the World Trade Center, random networks of emergency responders, construction workers and military personnel began to converge on the rubble pile. These groups emerged into four geographical clusters formed by the physical collapse of the building. Later these clusters were subdivided into function and organizational nodes. A similar type of *emergent complexity* took place with Hurricane Sandy among governmental and non-governmental organizations for disaster recovery. Emergent response and relief efforts are complex because it requires social interaction among the different groups.

Louise Comfort (2004) asserts that it is important to identify critical nodes through which information is exchanged and verify the number of links needed to obtain critical information under urgent conditions. In most major emergencies, fire, police and health care agencies are the critical nodes in an emergency response network. What is not understood is whether bridges exist between these organizations for two-way information exchange and to what other organizations they can link to exchange critical information and mobilize resources. In their work on social networks, Rob Cross and Andrew Parker (2004) maintain that managers can improve collaboration and communication across agencies by using network analysis to find and fix critical disconnects.

Network gaps that are not bridged, even when people are only a few feet apart, may prevent mutual exchange of information (Milgram, 1967; Cross & Parker, 2004). To avoid organizational disconnects and turf battles among emergency responders, Mayor Giuliani, in 1997, issued a Mayoral Executive Order on response protocols for command. This order states, "For fires, all emergency responders will report to the Fire Department and for police matters, like criminal investigations, agencies will report to the Police Department." The purpose was to designate one command post for information exchange and coordination. Wayne Baker (2000) explains that physical proximity encourages the formation of some networks and a lack of proximity constrains the formation of others.

The World Trade Center response illustrates the consequences of a disconnected command structure composed of organizational silos. As emergency responders converged on the scene, they automatically formed random networks and established isolated organizational commands at separate

locations. As a result, the emergency response was fragmented, and incident commanders were not easily able to exchange information. Similarly, network analysis of Hurricane Katrina reveals disconnects among city, State and Federal agencies, resulting in command fragmentation and a delay in resources (Scott, 2006). Separate commands indicate a failure to follow executive orders and a failure in leadership to move to a more effective unified command that connects emergent system of response.

Network analysis reveals that the formation of parallel commands, such as happened at the World Trade Center, often results in a disconnect among first responders. Social network research literature focuses on the importance of connecting ties and bridging gaps between individuals. Ronald Burt (1992; 2001) points out the importance of having connections span structural holes or gaps that exist in a network when there are two or more nodes that have ample information but do not communicate with each other.

Adapting to extreme events requires information because of the novelty of disasters and the lack of familiar patterns. While many watched the collapse of the South Tower at the World Trade Center on television, the fire chiefs in the North Tower did not have this bird's eye perspective. As a result of organizational bias, there was no information was given to the Fire Department from other agencies' helicopters alerting them to the deteriorating conditions. Fire commanders, however, escaping their cognitive biases, used mismatched cues and unconnected pieces of information from disconnected networks as an indication that something had gone very wrong and made the unprecedented decision to evacuate rescuers from the building.

Relationships or ties between organizations play an important part in a networked world during extreme events. Yet, organizations become isolated and organization-centric, concentrating only on their own agency. As extreme events unfold, organizations become more dependent on inter-agency information-sharing, but nonetheless often operate independently. Instead of spending time on causation, organizations should think about how best to set conditions for the desired outcome (Hackman, 2002). Organizations that can create the conditions for information sharing and collaboration across network clustering will adapt better than others to extreme events.

ADAPTING TO EXTREME EVENTS

The critical question is, how can organizations adapt to a wide spectrum of crises to enable them to lead in times of extreme events? Many organizations believe they are prepared for the next extreme event by wrongly assuming a predictable threat environment that can be controlled by standard procedures, hierarchical systems and adequate time to allocate resources. However, extreme events are distinguished by a dimension of novelty in the form of a threat or event that has never seen before, a response demand that exceeds the available resources and a level of emergent complexity that requires an interdependent response from multiple groups. Unless organizations develop an

adaptive response strategy that can adjust leadership and management elements to effectively respond to the forces of a crisis, they will find themselves confronted with the same difficulties of past extreme events.

Traditionally, crisis managers have used command and control (C2) systems for giving directions at incidents. This works well for tackling routine matters, but is not sufficient during a major disaster. Repeatedly, leaders are caught up in managerial tasks, which limit their ability to exercise leadership over the entire incident. To respond to a disaster, organizations must blend crisis management with crisis leadership skills.

Crisis leadership exercises command on five levels (C5) to get others to recognize novelty and quickly move to a network system for command and control that connects, collaborates and coordinates an adaptive response. Accomplishing this during a crisis calls for leaders to structure their organizations to cope with the forces of a crisis and adapt the command element for both leadership and management. Those who are leading in a crisis need to take the following adaptive actions:

- Hastily form networks for situational awareness by *connecting* to others
- Flatten command for *collaboration*
- Leverage core competencies to rapidly deploy and *coordinate* resources
- Manage the incident by using a unified system for *command and control*

The speed with which leaders are able to establish a management structure for command and control and exercise crisis leadership skills to connect, collaborate and coordinate is critical. The main challenge is how to lead in a crisis, while managing the incident.

THE ART OF CRISIS LEADERSHIP

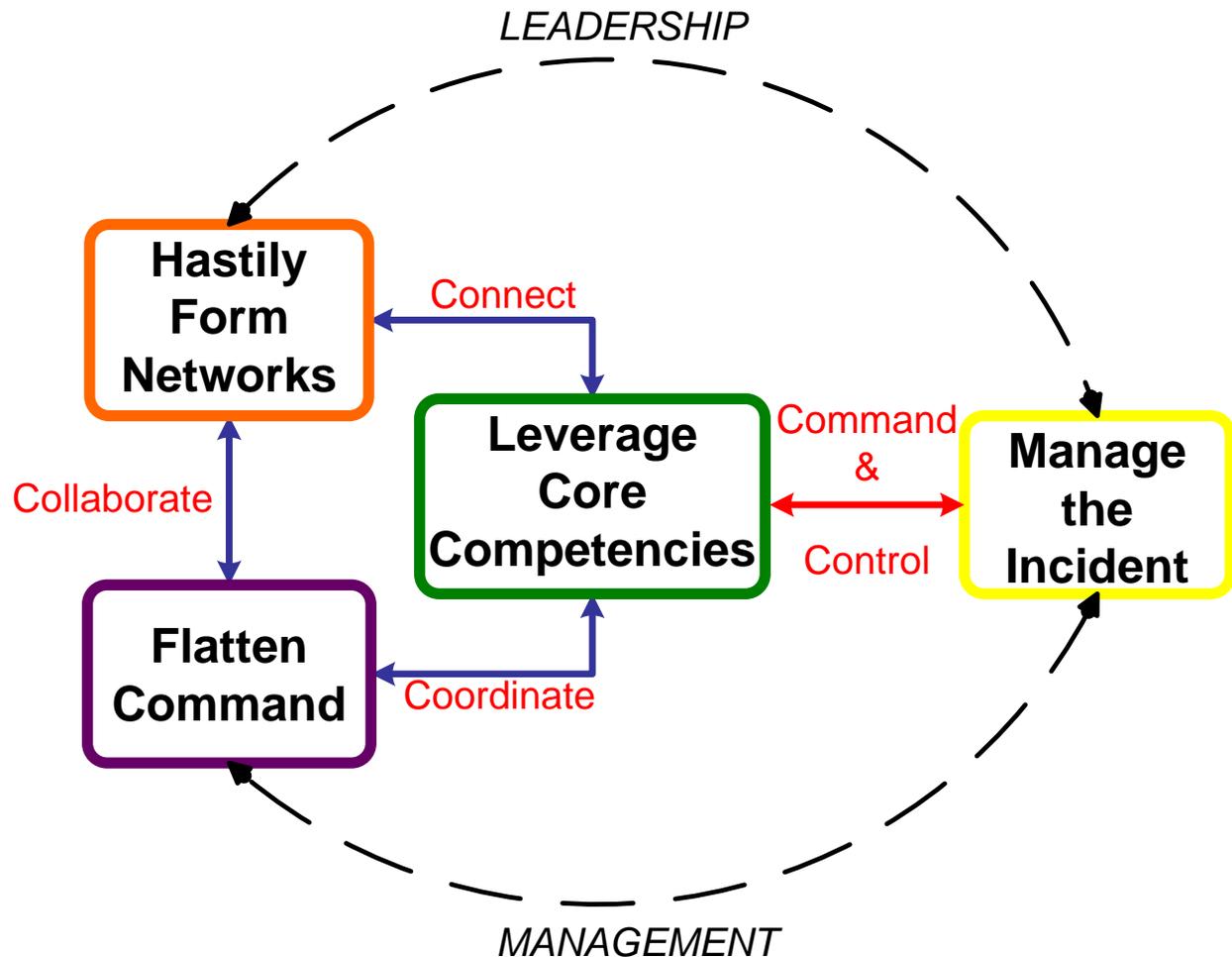


Figure 3: Crisis Leadership (C5) is the art of getting others to adapt to the novelty by quickly moving to a network system for command and control that is able to connect, collaborate and coordinate to create public value.

Command and Control

In 2003, *Homeland Security Presidential Directive* (HSPD-5) mandated the establishment and use of a *National Incident Management System* (NIMS) for all major emergencies, which was largely derived from the California fire service model. NIMS requires incident commanders to think systematically about managing an incident by delegating tasks into a system of operations, plans, logistics and administration. Homeland Security grants were released to those state, local and tribal jurisdictions that

adopted this new standard. However, such organizational change does not happen with just a stroke of a pen; rather, it occurs by identifying the skills and conditions needed for incident command.

During a crisis, an incident management system should ensure both organizational structure and crisis leadership. Managers quickly match patterns from past experiences to solve problems and provide subordinates with directions on how to operate. But as an incident increases in scale and complexity, it is important for incident commanders not to get seduced into taking only the actions of managing. Instead, incident commanders should view crisis management as operational command and control, and crisis leadership as the art of getting others to adapt to novelty. Leadership is about stepping back and detaching from the management of the incident to analyze what is taking place and project future actions; then leaders reconnect to guide managers in adapting to novelty. In describing leadership, Ronald Heifetz (2002) uses the metaphor of getting up on the balcony to watch the action below. Here leaders find time to connect, collaborate and coordinate with others to devise innovative ways to solve novel problems.

The separation of management and leadership is not a new concept. It first was discussed in *Harvard Business Review* by Abraham Zaleznik (1977) and then John Kotter (1990 and 2001). Management is seen as coping with the intricacy of an event, while leadership concerns itself with adapting to change (Kotter, 2001). For this to take place during an extreme event, leaders must coach operational chiefs to manage the details of the incident, so they are free to analyze all aspects of the event with other stakeholders and decision-makers. The ability to build relationships with others who also share command responsibility is a critical part of crisis leadership.

A week after the collapse of World Trade Center, an incident command system was more fully developed when the planning section chief sought the help of Incident Management Teams (IMTs) that primarily fought wildfires on the West Coast. This innovation occurred by pausing from management tasks to think systematically. In front of the WTC Command Post on Duane Street in lower Manhattan, the Planning Chief talked with the Incident Commander from the Southwest IMT about how a wildland fire incident management team could assist at a disaster where there was only one surviving trees. The IMT was quickly put to work—not for its wildland fire experience, but for its management skills—writing incident action plans, which gave the command staff time to exercise crisis leadership principles—connecting, collaborating and coordinating with dozens of government and non-government agencies. The system of command was an emerging process that coupled leadership with management to adapt to the complexity of the event.

Connect

The possession of information has been a long-established sign of power and authority, which has led to information silos and management fragmentation during a crisis. In a network world, however, power is achieved by linking the unconnected. Peter Denning (2006) describes the urgent

need during disasters to *hastily form networks* for communication with multiple groups of emergency responders, government agencies and non-government organizations for information exchange. Crisis leaders are encouraged to form networks at the incident scene and connect to networks away from the scene to enhance situational awareness.

Network Command

Connects voice, video and data networks for situational awareness, incident management and crisis leadership.

- **Connect Responders at the Scene**
Swiftly form networks that connect multiple organizations at the scene of an incident for information exchange and collaboration.
- **Link Emergency Operations Centers and government officials**
Link emergency operations centers together for sharing critical information and to mobilize resources.
- **Leverage Technology**
Utilize technologies to create a common operational picture and interoperable information networks at and away from the scene for coordination.

Figure 4: The axiom of connectedness for network command is observed in the leveraging of technology to hastily form networks and link Emergency Operation Centers.

Crisis leadership is about looking at an event from different perspectives, which enables executives to see different aspects of the same emergency. Developing networking skills is critical if leaders wish to increase their access to serendipitous information from within and outside their organizations. The web-like structure of networks connects to diverse information sources to develop a comprehensive operating picture of the event and its rippling effect (Pfeifer, 2009). Leaders ensure that others are plugged into information sources by leveraging technology to create an interoperable platform for sharing voice, video and data. As examples of new technologies that promote connectedness, FDNY's electronic command board (ECB) displays building unit deployment, and MIT's next generation of the incident command system (NICS) provides an area view. Together, they create a common operating picture.

Emergency operations centers away from the scene can supply additional information that is often difficult to obtain at the incident. These centers act as a conduit for information flow from diverse parts of emergency response systems to the scene of an incident. They can connect to other operations centers and databases to provide maps, plume modeling of chemical vapor clouds, intelligence, video, floor plans, risk assessments, pre-incident plans and other data. Incident commanders can request specific information from emergency operations centers, which is gathered through a combination of established ties to other organizations. The information then is converted into usable data for incident commanders.

Understanding the need to connect to different organizations is a critical component of crisis leadership. Fire departments have agreements not only with police departments to receive live-video feeds from police helicopters during large-scale incidents, but also with the news media for video imagery from their helicopters. In addition, information is exchanged with other government agencies and the Department of Homeland Security.

On January 15, 2009, the importance of connecting was vividly demonstrated when U.S. Airways Flight 1549 made an emergency landing in the icy waters of the Hudson River between New York and New Jersey. Fire and police departments, the U.S. Coast Guard, emergency health care responders, and private ferries hastily formed networks at the scene to collaborate and coordinate the rescue effort and establish an incident command system. Commanders at the scene connected to emergency operations centers away from the scene to enhance situational awareness and incident management. Video pictures were obtained from the new media, and information was exchanged among local emergency operation centers, hospitals, law enforcement, the control tower at LaGuardia and the National Operations Center outside of Washington, DC. FDNY contacted the control tower at LaGuardia Airport to get a list of passengers and crew. The list was then cross-referenced with EMS and hospitals. This information created a common operating picture and was used to brief the Secretary of Homeland Security and the Situation Room at the White House. The near-miraculous landing by the pilot, coupled with the emergency response, resulted in the survival of all 155 passengers and crew aboard the aircraft.

As emergency responders develop network connections for command, they must ensure that the systems are resilient enough to withstand continual use under extreme conditions and avoid single point-of-failure by having redundant means of transmitting information. These systems also must meet a high level of encryption for securing sensitive information. Finally, these new network command systems and tools for connecting must be simple and intuitive to operate under the stress of an expanding incident.

Collaborate

Extreme events, such as terrorism, natural disasters or major emergencies, quickly exhaust a single agency's ability to manage the incident without assistance. Adapting to these events requires incident commanders to rapidly move from a single organizational command model to a system of collaboration with other agencies. It is not enough simply to co-act at a command post; instead, key decision-makers must collaborate with each other to manage the incident.

Critical decision-making at extreme events improves when different perspectives are included in the mix. James Surowiecki (2004) refers to this as the "wisdom of crowds," which is characterized by diversity of opinion from independent and decentralized sources. Ideally, key decision-makers must be in proximity to each other to take advantage of joint decision-making at critical times.

To foster collaboration and coordination across different levels of a crisis, leaders flatten the command structure by unifying disparate groups to eliminate dangerous management deficiencies. As an incident grows in scale, there is a tendency to build a management structure with a single person in charge or split into separate and independent management systems. This can lead to cognitive and organizational biases that limit the ability to function in a crisis. Under such configurations, there is a narrowing focus on matters important only to the group in charge. Organizations are lured into a sense of control and overconfidence in their response capabilities and understanding of the crisis. This tends to reinforce the assumption of a static event and reduce the need to search for and exchange information. The results are paralysis, ineffective utilization of resources, blind spots in leadership and the emergence of dangerous information silos and management fiefdoms. In effect, there is a failure by executives to lead in time by not recognizing the incident as extreme, which requires a flatter command.

Instead, executives must view the crisis as dynamic, and constantly challenge themselves during an event to see the world differently in order to better identify those critical uncertainties that exist in the operating environment (Sawyer & Pfeifer, 2006). A flattened command invites key decision makers, subject matter experts and liaisons into the command structure to share information and elicit insights. Individuals in these groups tune in to subtleties found in small bits of information that may not be recognized by others.

Atul Gawande (2010) describes how important it is for members of a surgical team to introduce themselves at the start of surgery. This gesture grants nurses the same standing as surgeons to speak up when something does not seem right. It is equally important for members of a unified command team to introduce themselves and exchange ideas throughout the crisis. At the start of the first interagency meeting, decision-makers should go around to each agency representative, shake hands, and introduce themselves by name and role. The result will be better information-sharing and collaboration. People will feel personally part of a team and be more forthcoming in voicing suggestions and concerns.

A flattened command requires crisis leaders to develop good negotiating skills for complex multi-party interaction at extreme events. Mutual decision-making forces leaders to be responsible not only for their respective group's actions, but also for all incident outcomes. Leaders need to develop the ability to exchange information, listen to others' concerns, articulate key issues and collaborate to reach a mutual decision on incident management objectives and shared goals.

On 9/11 at the Pentagon, the Arlington, Virginia, Fire Department, the FBI and the military flattened command and situated themselves next to each other for immediate exchange of critical information. When the Arlington Fire Department decided to evacuate all rescuers from the Pentagon 35 minutes into the operation, Assistant Fire Chief James Schwartz personally communicated with FBI Special Agent Chris Combs, and every agency that was operating in the danger zone was given the same evacuation message simultaneously (Schwartz, 2012). Twenty minutes after the order was issued,

portions of the Pentagon collapsed; there were no fatalities among emergency responders. Network analysis indicates that strong ties among the Arlington Fire Department, the FBI and the military, which were developed through years of familiarization drills, facilitated this level of collaboration. (9/11 Commission Report, 2004).

Coordinate

In extreme events, command and control is replaced with a *common operating picture* (a shared visualization of the event) for multi-agency collaboration and coordination (Denning and Dunham, 2010). Crisis management focuses on deploying resources from one's own organization; on the other hand, crisis leadership coordinates a multi-group approach to solve problems. Leaders maintain a shared situational awareness and leverage key people from different groups to help find innovative solutions to novel problems. In the aftermath of Hurricane Katrina, the United States Coast Guard sent helicopters to spot fires; the New Orleans Fire Department, assisted by the New York City Fire Department, extinguished the fires, while law enforcement provided force protection. This multi-prong approach of networks, which leveraged core competencies of different agencies, recognizes the need for a common operating picture and interdependent coordination.

Coordination is the social process of bringing people together to create value through information and innovation. This often requires customization of standard operating procedures and improvisation to deal with novel situations (Leonard and Howitt, 2007). For example, the 16-acre World Trade Center site had few recognizable landmarks after the collapse, hampering rescuers' ability to accurately map the points in the rubble where they found victims. The FDNY brought in private and public sector organizations to discuss the problem. Working with a network of technical experts, the department created and deployed to Ground Zero a global positioning system that, using a small handheld computer, automatically captured time, date and location of victims. Leveraging core skills from several organizations accelerated the development of the new technology, which was deployed three days after the initial meeting.

Emergency responders must also be able to move quickly to manage several complex events at one time. The 9/11 attacks, as well as the terrorist attacks in Mumbai, London, and Madrid, are characterized as "swarming attacks"—synchronized strikes on several targets within a short period of time (John Arguilla, 2009). Natural disasters, such as hurricanes, earthquakes, and tsunamis, are also complex events that affect multiple locations at one time. Leveraging and coordinating the core competencies of police, fire, emergency medical, and other agencies are critical tasks for those who must lead during disasters.

To ensure optimal preparedness for its core mission of responding to fires, medical emergencies, hazardous material incidents and structural collapse, FDNY has created a tiered response system incorporating incrementally higher levels of capabilities (FDNY, 2007). This tiered system or

supply chain of services, with decentralized resources and skills located throughout the city, facilitates a rapid response to several simultaneous events. Similarly, a combined multi-tiered response from a variety of agencies would enable a city or region to be more agile and resilient in meeting the need to "surge" during extreme events.

RESEARCH ISSUES AND CONCLUSION

The aim of this paper has been to demonstrate that achieving the key goals of successful crisis leadership—sharing vital information at critical times and coordinating scarce resources during complex incidents—becomes easier when groups that ordinarily act independently are connected by networks. To understand how such a paradigm shift can be created among organizations, we examined the adaptive skills of emergency responders and the conditions for collaboration. Crisis leaders can prepare their organizations to better operate in extreme environments by strengthening adaptive skills. We also analyzed the key tasks of high performance organizations: hastily forming networks to enhance information-sharing, flattening command by establishing a unified command for collaboration, leveraging core competencies for a coordinated response, and establishing a management system for command and control.

The more novel and complex an event is, the greater the need for command diversity to shape decision-making. Additional research could employ network analysis to examine prior events and predict future levels of preparedness for emergency response organizations. Researchers might wish to explore whether network analysis is able to warn organizations of existing disconnects that may hamper emergency response. Can network analysis demonstrate that the more organizations are able to collaborate and coordinate, the better prepared they will be to adapt to extreme events?

Other research questions could focus on inter-organizational decision-making. If collaboration is essential to incident management at extreme events, how do organizations make decisions in a unified command structure? Do executives in a flattened command use more intuitive or analytical decision-making to arrive at a common course of action during crises? And does evidence support the concept of a common operating picture as the means of attaining the "wisdom of crowds" for decision-making during extreme events?

CRISIS LEADERSHIP	HIGH PERFORMANCE ACTIONS	ADAPTIVE SKILL-SETS
Connect	<p>Hastily Form Networks</p> <p>The ability to swiftly form networks to connect organizations at the scene and link to operation centers away from the scene to develop a common operating picture.</p>	<p>Situational Awareness Skills</p> <p>The ability to search and make sense of information about the threat environment.</p> <p>Networking Skills</p> <p>The ability to connect to a diverse group of people and sources of information at and away from the scene of an incident to develop a comprehensive operational picture.</p>
Collaborate	<p>Flatten Command</p> <p>The ability to flatten the command element for better collaboration with multiple agencies for choosing objectives and a course of action.</p>	<p>Negotiating Skills</p> <p>The ability to collaborate with others whenever objectives or solutions cannot be achieved alone.</p> <p>Decision-Making Skills</p> <p>The ability to quickly combine intuition with analysis to choose a course of action under stress and uncertainty.</p>
Coordinate	<p>Leverage Core Competencies</p> <p>The ability to adapt and synchronize capabilities to rapidly deploy resources based on core competencies to accomplish desired objectives.</p>	<p>Envisioning Skills</p> <p>The ability to anticipate and conceive ways to customize and improvise procedures to get things done during a crisis.</p> <p>Partnering Skills</p> <p>The ability to recognize interdependencies and work with others to adapt to the new threat environment.</p>
Command & Control	<p>Manage the Incident</p> <p>The ability to utilize personnel in a unified incident management structure to accomplish goals and objectives that will control the crisis.</p>	<p>Communicating Skills</p> <p>The ability to receive and convey timely voice, video and data information throughout a crisis.</p> <p>Managing Skills</p> <p>The ability to systematically organize and carry through with decisions, yet remain flexible for the unexpected.</p>

Figure 5: Crisis leadership checklist for high performance in extreme environments.

Throughout the world, people depend upon and expect high performance from firefighters, emergency medical personnel, law enforcement and other emergency responders to respond in times of crisis and assist them in their greatest moment of need. Leadership in these extreme events is the art of getting others to adapt to novelty.

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