IMPROVISING 9/11: ORGANIZATIONAL IMPROVISATION FOLLOWING

THE WORLD TRADE CENTER DISASTER

by

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A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Sociology.

Spring 2004

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ACKNOWLEDGMENTS

I would like to acknowledge several people whose contributions and encouragement deserve special thanks.

The members of my dissertation committee have offered valuable comments on this research. My adviser and dissertation committee chair, Kathleen Tierney, has always set a high standard of scholarship and professionalism for her students. She has helped to make me a better writer, teacher, and researcher. She has shaped my approach to scholarship. I thank her not only for her comments on this dissertation, but also for her continual support and encouragement in my career. Over the years, Gary Webb has served as model for mentorship and teaching. Joanne Nigg has provided guidance while at the same time has encouraged me to follow my own vision. E.L. Quarantelli and Russell Dynes have shown enthusiasm for my work, have been quick to point to opportunities, and have always had an opened door to discuss my research. I continue to admire their ongoing commitment to the sociology discipline and the field of disaster research for over forty years.

A true collaborative partner in my work on the World Trade Center is James Kendra. The ideas in this dissertation are shaped by our conversations in the field and at the office since September 11, 2001. I value his insights, persistent wit, and friendship. I have enjoyed our years working together, and I look forward to many more years of

collaboration. Jasmin Ruback has shared my commitment to making a difference through research, and I thank her for her humor and her guidance. Thomas Hamill has empathized with the challenges of writing and has often motivated me to return to the process. I would also like to thank Richard Rotanz, whose commitment to integrating theory into practice is an inspiration. Without his support, this project would not have been possible.

I am especially grateful to my parents, Bill and Minnie Wachtendorf, who have always encouraged me to look beyond the safe and to challenge myself. My family's support over the years continues to be a source of strength and a place to come home to.

Finally, I must thank David Satran, who has always been my biggest supporter. His ability to so accurately explain the nuances of my research demonstrates the enthusiasm he has always shown for my work, which I deeply appreciate. His constant intellectual and moral support was instrumental in helping me finish this dissertation. More importantly, his love, encouragement, and persistence in ensuring that having fun remains part of the process continues to make this adventure an enjoyable one.

DEDICATION

Because the Disaster Research Center applies a strict standard of confidentiality in all of its research studies, I cannot name many of the people I would like to thank. But, without a doubt, this research could not have been conducted without the many people who welcomed or accepted our presence during the response and who granted us interviews once attention had shifted from response to recovery operations. Moreover, there were several key individuals and organizations that supported what we were trying to do. They recognized the value in having researchers who were trained in observing organizational responses to disasters – and who were not occupied with response tasks – document and generate lessons learned from this tragic disaster. One individual said, "You need to be by my side listening to everything going on. You need to tell us, after this is done, what we did well and where we went wrong." Others were perhaps less enthusiastic but accepted our presence and facilitated our research countless times. I appreciate the stress, grief, lack of sleep, time pressures, and the heavy responsibilities that were part of each of your many long days during the fall months of 2001. Despite all of these conditions, you not only allowed us to do our job, but also made an effort to share important information with us. It is your commitment to the job you undertook that motivated this research.

I know that I am not unique when I write that what happened on 9/11 impacted me on an emotional level. Being surrounded by many people who had nearly lost their lives, who had witnessed things no one should have to witness, and who lost so many close to them but continued to respond to the emergency was a humbling experience. I would walk by the Family Assistance Center at Pier 94 as we left the adjacent EOC. Reading the many missing-persons notices became part of our routine. There was the notice for the victim whose name was similar to mine and whose mother's handwriting resembled that of my own mother. There was the wife who posted a picture of her newborn on her husband's notice. There was the son who posted a letter on his father's notice, suggesting where search and rescue workers should look in the debris to rescue his firefighter father. The memories of these victims and many others instilled a sense of responsibility in the work I was doing in New York. As challenging as the research was, I considered it a privilege for me to be doing the work in which I was engaged. This was a window of opportunity to learn much about the social aspects of disaster. I hope that this and other work produced by the Disaster Research Center from this research have earned the opportunity and time given to us.

I dedicate this dissertation to the victims of 9/11, their families, and to those who responded to the disaster.

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ABSTRACT

Using the response to World Trade Center disaster as a case study, this research focuses on the interplay between organizational persistence and collective behavior emergence at the multi-organizational level. It explores the ways in which organizations engage in collective sense-making and improvised action under time constraints in ambiguous and turbulent environments. Analyses draw upon literature in disaster sociology; organizational theory; structuration theory; and jazz and theatre improvisation models. Findings are based on two months of systematic observation at key response locations in New York City following the attacks, in-depth interviews with decision-makers and responders, and an extensive analysis of documents. Research suggests that organizations engage in collective sense-making when faced with uncertainty and the need to act under time constraints. In doing so, they draw upon plans and experience and take cues from one another and the broader social environment to define emerging needs. Through this process, organizations determine whether they will maintain organizational continuity, shift to contingency plans, or instead engage in one of three forms of improvisation: 1) reproductive; 2) adaptive; or 3) creative. Reproductive improvisation is exemplified in this study by the reestablishment of the New York City Emergency Operations Center after the original facility was destroyed. Adaptive improvisation is illustrated by an examination of the credentialing and badge identification system.

Creative improvisation is discussed within the context of the activities surrounding the complex remains recovery and debris removal operation that emerged at the Fresh Kills Landfill site. Each improvisational form results from combinations of facilitators and impediments, such as a shared vision, the stability of other response elements, pressures to maintain existing systems, the diversity of response repertoires, the unanticipated consequences of previous improvisational activity, the relaxation of norms that would otherwise constrain organizational action, and the ability to interpret social cues. Although the sociological literature often uses the concept of improvisation broadly to describe unplanned-for novel actions, a closer examination points to variations in forms, objectives, and outcomes of improvisation. The study concludes with a discussion of the typology's implications for disaster policy and for understanding improvised collective action in both crises and non-disaster environments.

Chapter 1

INTRODUCTION

The subtlest change in New York is something people don't speak much about but that is in everyone's mind. The city, for the first time in its long history, is destructible. A single flight of planes no bigger than a wedge of geese can quickly end this island fantasy, burn the towers, crumble the bridges, turn the underground passages into lethal chambers, cremate the millions. The intimation of mortality is part of New York now: in the sound of jets overhead, in the black headlines of the latest edition. E.B. White, 1949, 50-51.

In the aftermath of the September 11, 2001 attack on the World Trade Center (WTC), the American public found a renewed interest in E.B. White's book, Here is New York (1949). White's reference to "a single flight of planes" that could "burn the towers" had in mind the vulnerability of any of New York City's tall buildings – indeed, his book was penned long before the World Trade Center was conceived of – but it resonated with a public that had witnessed the destruction of the Twin Towers by hijacked commercial airplanes. Perhaps even more notable in this passage than White's mention of burning towers is his recognition in the paragraph's first two lines of New York City's growing vulnerability to sudden and extreme impacts on its infrastructure and community. When writing in the summer of 1948, White's words were indicative of a post-World War II acknowledgment of the real threat of foreign attacks on American soil, the use and potential damage of weapons of mass destruction, and how New York City's prominent

position as a world-class city made it a particularly likely target of hostile aggression. The public and its governments recognized New York City's vulnerabilities; but, although individual departments had dealt with emergencies in the past, local governments were lacking more formalized structures to deal with complex disasters and relatively little systematic disaster research had been conducted in the United States.

Over the course of the latter half of the twentieth century, this "subtlest change" that "people don't speak much about" did gain considerable attention. At the time of the 2001 terrorist attacks, the City of New York had in place a high-profile emergency management organization that had prepared for a variety of disasters and had coordinated interagency emergency exercises on scenarios that included responding to the use of weapons of mass destruction. New York City had recently experienced an attack on the Twin Towers in 1993 and had considered, in its planning, actual terrorist incidents in other cities, such as the 1995 Sarin gas release in a Tokyo subway, an act of terrorism perpetrated by an obscure fanatic religious sect. State and federal levels of government also had developed emergency management systems to provide assistance and support to local communities impacted by disaster. In the 1950s, military agencies had begun funding disaster research on natural hazards with hope of extrapolating findings to better understand social responses to war-induced disasters. Soon after, social scientists also secured funding from other sources; and, over the next half-century, a flourishing scientific field focusing on the social aspects of disasters developed. By 2001, Americans were better organized to respond to disasters and better understood the importance of emergency planning. New York City was among the communities in the

United States that had made substantial gains in disaster preparedness. Yet on September 11, 2001, despite all planning efforts, it was not enough to fully prepare the city for the response that lay ahead.

This event was one of the most costly and deadliest disasters in U.S. history. An estimated 2,749 people were killed in the New York City attacks (Lipton, 2004) and an estimated 790 survivors were treated at area hospitals within forty-eight hours of the attack (Centers for Disease Control, 2002). In addition, many others received medical treatment in non-hospital settings including ambulances, clinics, and from passers-by. As of September, 2003, more than 10,000 people from 47 U.S. states had signed up to partake in the World Trade Center Health Registry in an effort to help give health professionals a clear picture of the short- and long-term health consequences of being present at the site during the building collapse and the subsequent response (New York City Department of Health and Mental Hygiene, 2003). In 2002, the U.S. General Accounting Office estimated that in the New York City area alone, the attacks generated $83 billion dollars in direct and indirect economic losses, almost 1/5 of which will likely not be compensated by insurance or other forms of assistance (General Accounting Office, 2002). Organizations responding to the World Trade Center collapse faced many unanticipated challenges, such as: contending with the collapse of the city's two tallest buildings; the deaths of thousands of people including hundreds of response workers; the waterborne evacuation of Lower Manhattan; the rerouting of major transportation corridors; the destruction of the City's emergency operations center; the fire-related and environmental hazards at the impact site; the complex rescue, recovery, and debris

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operations; the mass convergence of volunteers and family members; the site

credentialing of response personnel; and the distribution of responsibility in this complex

multi-organizational inter-governmental response. While vulnerability had been, as

White suggests, on everyone's mind, and while organizations had drawn from their many

established emergency plans, resources, and organizational structures, the disaster

exceeded the scope of prior planning efforts. Consequently, the resilience of New York

City to respond to the disaster demanded more than knowledge and planning; it required

the ability to effectively improvise.

Some may view the lack of established formalized plans or expected courses of

action that could fully contend with the array of concerns that confronted responding

agencies as a failure of vision on the part of the City of New York.   On the contrary,

while elements of New York City's emergency planning could have certainly been more

comprehensive and robust, the response to the World Trade Center disaster demonstrated

clearly that an effective disaster response involves both planned and improvised actions.

Indeed, disasters disrupt the patterns of what can be absorbed by routine procedures and

are largely defined by their need for improvised responses (Tierney, 2002) or, in other

words, the reworking of knowledge to produce a novel action under time constraints

(Mendonca, 2001). The scale, the magnitude, and the complexities associated with the

response make the World Trade Center an ideal site to explore the concept of improvised

collective action.

In this dissertation, I draw upon the classical literature in the sociology of

disasters and collective behavior, organizational theory, structuration theory, and jazz and

dramatic improvisation models to study the intersection between organizational

persistence and collective behavior emergence within organizations experiencing high

levels of unanticipated stress. I explore the different forms of improvised response

repertoires that develop under crisis; and in doing so, I provide a theoretical perspective

of the improvisation process, including a typology of improvisational forms. For this

analysis, I use data from over 750 hours of direct observation of response activities over a

two-month period following the 2001 World Trade Center disaster, primary and

secondary documents, and face-to-face interviews with over sixty key emergency

responders and response decision-makers. Focusing on the multi-organizational level, I

make two contributions to the sociology of disasters field. First, I develop a classification

system of multi-organizational improvisation that points to three types of improvisation

outcomes. Second, I examine the elements that facilitate or impede those outcomes in the

context the unexpected nature of the disasters. The World Trade Center crisis response

constitutes an important case study that can provide a better understanding of how

different forms of improvisation contribute to an emergent multi-organizational response

in the face of near-catastrophic or catastrophic events.

In Chapter 2, I provide critical review of the disaster literature dealing with

organization, emergence, and improvisation. I then introduce an analytic framework to

examine three different types of disaster improvisation: 1) reproductive improvisation; 2)

adaptive improvisation; and 3) creative improvisation. I present in Chapter 3 the

methodological approach to this study of the World Trade Center disaster and discuss the

data sources used. Each of the analytic chapters that follows (4-6) is a treatment of an

improvisation type through a close examination of the actions develops around three key response episodes. *Reproductive improvisation* is exemplified by of the reestablishment of the Emergency Operations Center (EOC) after this original resource at 7 World Trade Center (7WTC) was completely destroyed. *Adaptive improvisation* is illustrated by an examination of the credentialing and badge identification system as a reflection of the dynamic organizational structures constituting the broad range of emergency support functions. *Creative improvisation* is discussed within the context of the activities surrounding the complex remains recovery and debris removal operation, with a strong emphasis on the complex set of forensic and debris management activities that emerged at the Staten Island Fresh Kills Landfill site. In Chapter 7, I conclude by highlighting the implications of the different types of improvisation for disaster planning, our understanding of emergent collective action, and disaster sociology. I also outline directions meriting future research.

Chapter 2

DISASTERS, EMERGENCE, AND IMPROVISATION

Improvisation Frameworks

Disasters provide an opportunity to observe social structures as they emerge and how those structures function under stressful conditions (Dynes & Drabek, 1994; Kreps, 1989). The intersection between organizational stability and emergence is deeply rooted in the sociological research tradition on disasters. This research is well represented by a large body of literature examining emergent groups (Stallings & Quarantelli, 1985; Nigg, 1979), organizations that form new or altered organizational structures and perform non-routine tasks in a disaster (Dynes, 1970), organizational adaptation in disaster (Stallings, 1970), improvisation within organizational domains, human and material resources, tasks, and activities (Kreps et al., 1994), role improvisation (Webb, 1998), and struggles for enhancing improvisation through decision-support tools (Mendonca et al., 2001).

Samuel Henry Prince – who is often considered the first disaster sociologist (see Scanlon, 1988) – conducted research on social change and stability following the 1917 explosion of a munitions ship in Halifax, Canada. The early pioneers of disaster research at the University of Chicago's National Opinion Research Center (NORC) were also interested in the persistence and emergence of social arrangements and saw the disasters as strategic sites in which to study these phenomena. NORC researchers were initially

funded by the United States military to take an applied focus on their studies and produce

findings from natural disasters that were expected to hold true in the event of a war-based

scenario. In addition to the applied findings generated from their projects, the NORC

researchers also engaged in more theoretically-driven work. Sociologists predominated

the group, both in terms of the number of researchers and their holding of key

administrative research positions. (Quarantelli, 1994); and, because of their academic

backgrounds at the University of Chicago, the researchers were heavily influenced by the

symbolic interactionist and collective behavior approaches (i.e., Blumer, 1939; Park &

Burgess, 1921; Turner & Killian, 1987; Nigg, 1994; Webb, 1998). Collective behavior

involves new or emergent social phenomenon (Aguirre, 1994; Turner & Killian, 1987).

As Killian (1994: 278) explained, it includes "behavior in which people jointly create

new norms, new structures, or…a new social order…[Collective] behavior is extra-

institutional – not unrelated to previously existing structures and norms, but transcending,

opposing or modifying them and in so doing generating new forms."

Central to much of the focus of NORC's work and the research that continued at

the Disaster Research Center – first at Ohio State University and later at the University of

Delaware – was the emergence, persistence, and transformation of social structure in

disasters events. The early researchers placed a stronger emphasis on emergence and

improvisation than on behavioral and organizational stability; however, the founders of

the Disaster Researcher Center (E.L. Quarantelli, Russell R. Dynes, and J. Eugene Haas)

also focused on the organizational level and emphasized the interaction and applicability

of both organizational and collective behavior perspectives in the study of organized responses to disasters and other community crises (Webb, 1998).

Several approaches in the disaster literature provide alternative ways of characterizing the manner in which the social structure demonstrates both stability and change in the emergency period. These approaches consider the concept of improvisation – or the process of "[reworking] knowledge to produce a novel action in time to meet the requirements of a given situation" (Mendonca, 2001: 1) – in relation to organizational stability.

Based on the dimensions of task and structure, researchers (see Brouillette & Quarantelli, 1971; Dynes, 1970) have outlined – in what became known as the "Disaster Research Center (DRC) typology" – four types of functions and structures that characterize organizational behavior in disasters: 1) established (routine tasks and old structure); 2) expanding (routine tasks, new structure); 3) extending (non-routine tasks, old structure); and 4) emergent (non-routine tasks, new structure). Established organizations are exemplified by such organizations as fire departments and police departments. In an emergency, the organizational structure of such agencies remains the same as it was during non-crisis times, and the tasks these organizations perform are also consistent with routine tasks. For example, in the case of fire departments, these tasks could include fire suppression; while in the case of police departments, these tasks might include crowd control and site security). In contrast, the American Red Cross is an example of an expanding organization. The Red Cross routinely deals with disaster issues, but it staffs a limited number of personnel during non-crisis periods and then

expands its structure to include great numbers of volunteers during disaster events. Extending organizations maintain the same structure they had in place before the disaster but take on non-routine responsibilities. Construction companies that become involved with clearing debris during search and rescue efforts and restaurants that become free feeding stations for rescue workers are examples of extending organizations. Finally, emergent organizations are those that did not previously exist before the disaster; their structures and the tasks they perform are new. Spontaneously-formed search and rescue groups and newly-formed victim support groups are two examples of groups that often form spontaneously in disasters.

The DRC typology made substantial contributions the sociology of disasters and offered a useful method to conceptualize the variations of both organizational emergence and stability along the two dimensions of structure and tasks. However, the typology has been criticized as still too limiting to adequately account for the different types of organizational response: most specifically, behavioral emergence within established organizations (Stallings, 1978).

Quarantelli (1996) expanded the typology to consider this form of activity not adequately accounted for in earlier formations. Citing Drabek (1987) and Kreps (1991: 63) he wrote that "much improvisation is always necessary in organizational responses to crisis because every disaster presents distinctive combinations of demands and problems." Quarantelli recalled several disaster events in which emergence was apparent in what the original typology would have considered established organizations. In one flooding event, new behavior was observed in almost every group that operated

during the disaster. In addition, Quarantelli found cases in which groups changed

purchasing procedures and shifted schedules during a disaster in ways that did not reflect

prior planning efforts. Organizational volunteers as subunits of existing organizations

were deployed for different types of tasks in disasters (Quarantelli, 1996; Dynes and

Quarantelli, 1980). Even when preplanning had occurred, unexpected modifications

sometimes were made to an organization's structure or activities (Quarantelli, 1996).

Quarantelli attempted to reconcile the typology's failure to consider all types of

organizational response and behavioral emergence – such as new lines of authority and

command over auxiliary personnel from or operations by other organizations – by adding

the concept of quasi-emergence to the matrix. Quarantelli defined quasi-emergence as

instances in which "established groups…underwent no major alterations in their

structures or functions but nonetheless exhibited some temporary or minor emergent

qualities" (Quarantelli, 1996: 57). Quasi-emergence could occur on the structural level,

as in cases in which an extending group does not develop but in which slightly altered

structures emerge along side routine tasks. These cases are characterized by new social

linkages or networks. When a slightly new task is assumed but the structure remains

constant, quasi-emergence takes place at the task level. Quarantelli outlined seven types

of organizational responses, a more elaborate typology than the original provided in

1970:

- Established organizations with old tasks and old structures
- Established organizations with old tasks with minor behavioral
  emergence
- Established organizations with new tasks and behavioral task emergence
- Established organizations with old tasks but behavioral structural
  emergence

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- [Expanding] organizations with old tasks but new structures
- [Extending] organizations with new tasks but old structures
- Emergent organizations with new tasks and new structures

Quarantelli's revised typology attempted to compensate for a tendency in the original typology to overlook some forms of improvised activity. Although useful in differentiating types of organizations, the original and the revised typologies still do not fully account for all forms emergence in disasters. For example, emergent resources are not addressed in the typology and the approach does not differentiate among different types of non-routine structures and tasks.

Kreps and his colleagues recognized the same problem and approached the emergence and persistence of social arrangements somewhat differently. Kreps developed measures of both organizational change and the extent to which social arrangements are maintained in disasters (see Kreps et al., 1994 for a detailed account). Their approach consisted of three new constructs, each concerned with the level of role stability between the pre-disaster and the post-disaster periods. The first, status-role nexus, measured the consistency or inconsistency in role allocation. The second, role-linkages, measured the continuity or discontinuity of incumbent role sets with whom people generally are in contact. The final construct pertains to the level of improvising in the actual performance of roles in the post-disaster period. Their approach accommodated both a structuralist perspective that explains behavior as scripted by the social structure and an interactionist perspective that sees behavior as negotiated by the actor's definition of the situation and his or her interaction with others. In doing so, the approach considered both role continuity and role emergence in disasters. Where higher

proportions of change are present, Kreps et al. identified a trend toward role-making. Conversely, where higher proportions of stability are present, they identified a tendency toward role-playing (Webb, 1998).

Kreps et al. (1994) also developed a method to structurally code forms of organizations in disaster settings. Four elements comprise the organizational code: domains, resources, activities, and tasks. As Webb (1998: 27) described:

> Domains (D) are collective representations of bounded units and their reasons for being. Tasks (T) are collective representations of a division of labor for the enactment of human activities. Resources (R) are individual capacities and collective technologies of human populations. Activities (A) are the conjoined actions of individual and social units.

According to Kreps and his colleagues, all elements must be present in some form for an organization to exist. In situations in which one or more elements is missing, Kreps deemed the phenomenon an *organizing process* rather than an organization. Sixty-four code arrangements or forms are possible within the DTRA framework, only twenty-four of which represent organizations. The order in which the elements occurs indicate the extent to which an instance of collective action is established or emergent. The most formal and stable organization would be coded as (D-T-R-A), while collective behavior taking place at an organization level would be coded as (A-R-T-D).

Similar to the DRC typology, Kreps et al.'s approach integrated emergence and structural stability. Kreps and his colleagues have used the structural code to examine the origins, maintenance, and suspension of emergent organizations during disasters (Saunders & Kreps, 1987); the restructuring of established, expanding, and extending organizations (Kreps, Crooks, & Linn, 1987; Linn & Kreps, 1987); the formation of

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dyadic social networks during disasters (Francis & Kreps, 1984; Kreps & Bosworth, 1987), the life histories of civil rights organizations (Farmer, 1989); and the dialectic of social action and social order (Kreps, 1989).

Although it is a strong analytic framework, Webb (1998) criticized this approach, stating that Kreps et al. overemphasized improvisation. Using their dichotomized method of analysis, any improvisation, no matter how minor, would classify the activity as unconventional. A number of scholars have pointed to this shortcoming in Kreps et al.'s work (Turner, 1989; McKeon, 1997). Simply put, the criticisms directed toward Kreps et al.'s approach are the opposite to those levied against of the DRC typology. As McKeon (1997) stated, Kreps et al.'s approach overstates the amount of improvisation that occurs in disasters by classifying relatively routine roles involving subtle behavioral improvisations as improvised activity.

Webb (1998) expanded on Kreps' earlier work to examine the extent to which pre-disaster role systems remain stable or change during disasters. Webb's approach analyzed the extent to which various dimensions of role performance are consistent or inconsistent with a respondent's pre-disaster status as a way of measuring the degree of change or stability involved in disaster role enactment. For each measure (status-role nexus, role-linkages, and role performance), Webb counted the total number of components of an activity and divides it by the number of improvised activity components. Unlike Kreps' approach, which dichotomized improvised and pre-planned activity, the resulting percentages in Webb's adapted method provided estimates of the degree to which improvisation took place. It also allowed for different levels of

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improvisation in each of the measures. Both Kreps and Webb's approaches are strong in their treatment of improvisation at the role level.

None of the approaches discussed above differentiate different types of improvisation. However, the DTRA coding system does consider resources in addition to structures (or in Kreps' case, domains) and tasks. Furthermore, individual tasks are distinguished from activities, with the former consisting of individual actions and the latter comprising conjoined actions.

In his research on improvised decision-making in emergency response organizations, Mendonca's (2001) research goals were to operationalize theory concerning cognition in improvisation. He developed an innovative improvisation decision-support system. Research on jazz improvisation, an activity where knowledge is reworked in novel ways under time constraints, helped inform his study.

Mendonca (2001) described the procedures designed to ensure the continuity of systems. These include: 1) monitoring operations during normal conditions; 2) selecting a planned-for procedure when an event occurs that could disrupt operations but is still a part of an emergency or contingency plan; and 3) revising a planned-for procedure when needed due to unforeseen conditions (e.g. the unavailability of equipment or personnel); 4) developing and deploying in real-time new procedures when exposed to unexpected circumstances. What he outlined constitutes normal operations, an emergency plan, a revised plan, and improvised plan, the latter of which occurs under time constraints and is the focus of his analysis.

Mendonca examined the decision-making unit, the decision setting, and the tasks at hand. As his decision-making unit, Mendonca studied the emergency response organization as an "assembly of individuals who work together to respond to an emergency" (Mendonca, 2001 refers to Scanlon 1994: 4) and assemble in a place referred to as the emergency operations center (EOC). In his study, the setting was the emergency response itself and the tasks of those mitigating the adverse effects of unexpected circumstances. The event, the consequences, and the decision to change plans are all made in real-time. In these cases, stated Mendonca, it is important that the appropriate decisions are made and that they are made in the necessary time allotments.

Although routine, emergency planning and contingency planning are pointed to in Mendonca's work, and improvisation is dimensionalized according to the decision-making unit, the decision setting, and the tasks at hand, a classification of improvisation types within these dimensions is not addressed. The framework I develop later in this analysis of the World Trade Center response offers a typology that to more specifically addresses improvisation.

The Relationship Between Planning and Improvisation

The disaster literature has long emphasized the need to plan for unexpected events (Dynes & Drabek, 1994). Plans constitute institutional knowledge that extends beyond individuals who experienced prior disasters. The planning process is designed to imagine disaster scenarios not previously anticipated, foster the development of informal networks, and facilitate interagency coordination (Wachtendorf, 2000a; Wachtendorf, 2000b; Sylvain, 1991 as discussed in Hightower & Coutu, 1996; Gillespie, 1991; Auf der

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Heide, 1989). For the most part, social systems and the units that comprise them are

effective in responding to disasters; however, their response can be enhanced with proper

planning and the development of social mechanisms to coordinate inter-organizational

activities. When pre-planning does occur, the capabilities of the involved organizations

are enhanced (Dynes & Drabek, 1994). At the same time, the very definition of a disaster

implies that community resources are stressed or overwhelmed. Fritz (1961: 665)

defined disaster as:

> an event, concentrated in time and space, in which a society, or a relatively
> self-sufficient subdivision of a society, undergoes severe danger and
> incurs such losses to its members and physical appurtenances that the
> social structure is disrupted and the fulfillment of all or some of the
> essential functions of the society is prevented.

Kreps (1998: 34) later expanded upon this definition, stating that disasters are:

> nonroutine events in societies or their larger subsystems (e.g. regions,
> communities) that involve social disruption and physical harm. Among
> the key defining properties of such events are (1) length of forewarning,
> (2) magnitude, (3) scope of impact, and (4) duration of impact.

Disasters may cripple a social system, but they do not completely destroy it

(Dynes & Drabek, 1994). Indeed, the 'disorganization' that is sometimes seen after a

disaster event is primarily the process of communities adapting to a newly emerging

environment and new circumstances. According to Shibutani (1986: 269), "if the

normative framework does not provide an adequate guide to concerted action, the people

involved in the situation must work together to improvise some way of coping with it."

The new social arrangements that emerge in a disaster situation are tightly coupled to

previously existing arrangements (Kendra & Wachtendorf, 2003a; Kreps & Bosworth,

1993; Quarantelli & Dynes, 1977). Pre-arranged structures, planned actions and responsibilities, and acquisition of anticipated resources form the basis for decision-making in emergent environments. This planning informs decisions by anticipating possible challenges or pitfalls that could come as a consequence of improvised activities. Planning is designed to provide some element of stability – whether of organizational structure, role, task responsibility, resources, or the physical environment – when other elements are in flux or situations demand unplanned-for action.

At the same time, the very need for improvised action points to the inability of plans to adequately take into account one or more specific demands, sometimes quite understandably so, since it is not practical or feasible to plan fully for every possible scenario (Kendra & Wachtendorf, 2003a). Plans that claim to account for every contingency that disasters may present become "fantasy documents;" that is, documents that serve to show that planning has been done to contend with improbably events rather that necessarily providing justifiable assurance that the plan can fully anticipate every challenge that a disaster would pose (Clarke, 1999). Existing social arrangements are always subject to change (Kreps & Bosworth, 1993), particularly when coupled with the ambiguity and confusion that often accompanies large-scale disasters (Webb, 1998). As Kreps (1991: 33) observes:

> without improvisation, emergency management loses flexibility in the face of changing conditions. Without preparedness, emergency management loses clarity and efficiency in meeting essential disaster-related demands. Equally important, improvisation and preparedness go hand in hand. One need not worry that preparedness will decrease the ability to improvise. On the contrary, even a modest effort to prepare enhances the ability to improvise.

In a disaster, improvisation must take place under increased time constraints and in environments that have a high degree of ambiguity. Improvising can be risky. At times, the improvised action is beneficial; in other cases, the improvised action may have negative consequences. Failure to improvise when situations require novel action carries major risks. Mendonca (2001), for example, points to Weick's 1993 study of the Mann Gulch Fire to show that during a crisis, emergency response organizations are often likely to return to original plans when they actually need to improvise. In the Mann Gulch Fire disaster, teams forced their conception of the emergency to fit one that they knew and had planned for instead of the one they were facing. At the same time, abandoning plans or established courses of action in favor of untested strategies could lead to consequences much more dangerous and damaging than those that would have occurred were pre-established strategies implemented. When, then, is it best to persist with existing plans, and when is improvisation the best course of action? Quarantelli (1996) suggested several conditions that influence emergent action, including the perception of a need to act on urgent matters, a supportive social climate for collective action, relevant pre-crisis relationships, and access to resources. Plans may be abandoned for various reasons: the plans may no longer be applicable (Turner, 1995); plans may need to accommodate many organizations involved in a larger emergency response organization due to the multi-faceted nature of an event (Mendonca, 2001); allocation of resources for one task may render them unavailable for other tasks (Turner, 1995); and responsibility for dealing with the unexpected circumstances may not have been assigned to a particular organization (Scanlon, 1994). While it is clear that both rigidly adhering to a plan that is

not appropriate and deviating from the plan when it is better to follow it can generate

negative consequences (Klein, 1993), little systematic research has been conducted on the

what facilitates and impedes organizations as they choose to adopt different

improvisational strategies in disaster situations.

As Weick (1998) notes, studies of organizations tend to place a greater emphasis

on orderly arrangements for cooperation rather than the mechanisms that change these

arrangements. However, improvisation and emergence, in addition to planning, are

central to disaster management. Moreover, creativity and flexibility are important

components of any effective disaster response. According to Dynes and Drabek (1994),

the skills of emergency management are not necessarily easily borrowed from other

professions. Emergency managers and emergency management organizations must

demonstrate knowledge in interagency facilitation, understand potential hazards and their

impacts, and understand the socio-behavioral aspects of hazards and disasters. At the

same time they must also maintain flexibility and adapt to new problems (Dynes &

Drabek, 1994; Kendra & Wachtendorf, 2003a; Kreps, 1991; Mendonca, 2001; Weick,

1993). This balance of planning and improvisation, which characterizes the organized

response to major disasters, was evident after the World Trade Center (WTC) disaster as

a highly organized and complex emergency management community faced an extremely

ambiguous crisis accompanied by a demand for response resources that exceeded the

community's immediate capabilities.

The United States had not suffered a disaster of the magnitude of September 11th,

2001 in its recent history. Only the Galveston Hurricane of 1900, with a death toll of

6,000, generated a greater number of fatalities in the U.S. history of disasters (see Noji, 1997 for death tolls from twentieth-century disasters). Disasters such as the 1994 Northridge earthquake (with an estimated $44 billion in direct losses), Hurricane Andrew ($30 billion), and the 1993 Midwest Floods ($19 billion) resulted in significantly lower monetary losses that the $83 billion in direct and indirect losses caused by the World Trade Center attack (General Accounting Office, 2002; estimates for other disaster losses based on National Academy of Science, 1999). The WTC disaster offers the opportunity to study organizational response in a disaster characterized by large loss of life, high levels of ambiguity, costly and deadly losses of emergency response resources, persistent perceived threats, and many emergent issues related to the complexity of the event and the lengthy emergency response period. Despite the infrequency of such events in the United States, we cannot predict how regular these types of disasters may become. However, when they do occur, the potential for losses and disruption is great.

Because the significantly large loss of life and damage to physical structures that resulted from the September 11 attacks, there may be a tendency for those unfamiliar with the literature on disasters to mistakenly view the emergency response efforts in New York City as atypical and entirely unique. On the contrary, while the crisis was of an extraordinary nature, the impacts and responses – though large in scale – are similar to those documented in hurricanes, floods, earthquakes, and technological disasters. Findings from these types of disasters inform our understanding of organizational continuity and improvisation during other types and scales of disaster, including the World Trade Center attacks.

Yet the unexpected does not confine itself to catastrophic terrorist attacks. Any

extreme event – or circumstance that has exceeded a community's ability to adequately

cope – pushes the boundaries of comprehensive planning, whether due to a failure to

envision particular scenarios or the inability (or unwillingness) to devote pre-event

resources to manage such events when they present themselves. Improvisation can occur

during smaller-scale disasters as well as larger ones. Further, both individuals and

organizations improvise during non-disaster periods, employing novel strategies under

time constraints in a variety of contexts. Examples of improvisation during non-disaster

events might include: the teacher whose students' books – which are necessary for the

prescribed lesson plan – did not arrive at the start of the semester; the family whose sole

income provider lost his or her job just before a number of bills are due; the financial

trading company that experienced a power outage; or the various transportation-related

organizations that reroute commuters and commercial trains when a rail infrastructure

problem renders a line temporarily unsafe. Be it on an individual, small-group,

organizational, or multi-organizational level, improvisation occurs both during disasters

and in everyday life. In many ways, instances of improvisation are easier to analyze in

the aftermath of the World Trade Center attack than in disasters of smaller scale or

improvisation in everyday life because the extreme circumstances of the disaster

necessitated that responders employ an abundance of novel strategies. In every way and

at all points in time, it was possible to observe large-scale operations that were being

improvised in whole or in part. Consider, for example, the emergent waterborne

evacuation of hundreds of thousands of people from Lower Manhattan, or the process of

cordoning off the island's bridges and tunnels from incoming traffic. There was also the

reestablishment of the city's EOC, the central hub of emergency coordination during a

disaster response, which was completely destroyed as a result of the Twin Towers'

collapse. The debris removal operation and associated search and rescue efforts, the

health and safety policies and practices implemented at the collapse site, the security

system at key response locations, and the management of spontaneous volunteers who

converged to assist in response and recovery efforts are all further instances in which

organizations and individuals improvised to contend with unexpected circumstances.

As Dynes and Drabek argue (1994), it is incorrect to view the maintenance of

social order and control of the public as the main objectives of disaster planning. Instead,

such planning should be oriented toward enhancing the human and material resources of

the organizations and groups involved in the event – including their ability to improvise

when they believe circumstances warrant such action. Disaster planning may stifle

improvisation, but it can also anticipate and incorporate improvisation (Quarantelli,

1996). Distinguishing the types of improvisation and their facilitators and impediments,

which is the goal of this analysis, can not only aid in the emergency management

planning process, but under the proper circumstances is can also lead to a better

understanding of improvisation as a sociological concept.

Analytic Framework

In his comments on the 2003 Top Officials (TOPOFF) disaster drills held in

Seattle and Chicago, Tom Kneier (2003) of the Federal Bureau of Investigation likened

the need to effectively plan and communicate in a disaster response to an orchestral

performance:

> It's almost like an orchestra. They can be the best trumpeters and clarinet players in the world, but unless they're all on the same sheet of music, it's just noise.

Kneier's musical metaphor is appropriate. It underscores the significance of a shared

vision and coordinated collective action in emergency response. Indeed, resilient

organizations – that is, those that are able to appropriately improvise – develop 'virtual

role systems' that are understood by members of an emergency response organization

network (ERON) and that are capable of maintaining a shared vision of the response

system despite environmental risks, complexities, and ambiguities (Weick, 1993). The

ERON constitutes the meta-organization of individual organizations designated prior to

an emergency event to come together and coordinate activities in an emergency response

effort. These are the individuals from a broad range of organizations who, in accordance

with emergency management plans, are designated to work along side other community

organizations in a systematic way, becoming a distinct decision-making network. The

individuals from health, police, fire, planning, emergency management, non-profit groups

like the American Red Cross and Salvation Army, and other departments still are

members of their departmental organization, but as representatives to the EOC or various

response-planning meetings, they also become members of an emergency response

organizational network. As will be discussed in subsequent chapters, the ERON, as well

as segments of the ERON that are focused on specific response functions, can develop

into an emergent multi-organizational network (EMON). Drabek (1996: 21-11) defines

an EMON as the "structure of relationships that form among organizations, or segments

of organizations, that are focused on a specific [activities or response functions]" These

emergent networks develop during the emergency period for a limited time in order to

address emerging needs.

But just as orchestral sheet music can be compared to emergency plans, so too can

jazz improvisation be used as a model of improvised activity in disasters. As Weick

(1998: 546-547) explained:

> Considered as a noun, an improvisation is a transformation of some
> original model. Considered as a verb, improvisation is composing in real
> time that begins with embellishments of a simple model, but increasingly
> feeds on these embellishments themselves to move father from the original
> melody and closer to a new composition. Whether treated as a noun or a
> verb, improvisation is guided activity whose guidance comes from elapsed
> patterns discovered retrospectively.

Indeed, the study or organizational improvisation has much to draw from the study of

jazz improvisation. "Managing shares with jazz improvisation such features as

simultaneous reflection and action, simultaneous rule creation and rule following,

patterns of mutually expected responses akin to musicians moving through a melody

together, action informed by melodies in the form of codes, continuous mixing of the

expected with the novel, and the feature of a heavy reliance on intuitive grasp and

imagination" (Mangham & Pye as cited in Weick, 1998: 549). As Berliner (1994: 492)

explains, improvisation is more than simply "making something out of nothing." In the

case of jazz improvisation, this form of spontaneous music composition and performance

depends on the knowledge and experience of the musicians. In order for jazz

improvisation to sound like music instead of noise, the musicians must draw upon the

same language and traditions and pay attention to the cues of others within the ensemble to effectively improvise their performance repertoires. "Improvisation involves reworking pre-composed material and designs in relation to unanticipated ideas conceived, shaped, and transformed under the special conditions of performance, thereby adding unique features to every creation" (Berliner, 1994: 241). Past experience is rapidly processed to spontaneously guide action (Crossan & Sorrenti, 1997). In the case of emergency response organizations, improvisation also depends upon the pre-existing knowledge of the actors that is reworked under time constraints in answer to emerging needs. Original response plans and past experience serve as a crucial point of departure when improvisation is deemed necessary. Furthermore, original plans continue to exert their influence as the response improvisation process continues, just as in jazz improvisation in which the melody is not only an early influence but a continuing one (Weick, 1998).

In a disaster – an event that has truly exceeded a community's ability to cope without assistance – organizations find that the social environment within which they are accustomed to working has suddenly and unexpectedly changed. Illustrating this element of surprise, participants in focus groups conducted by DRC for a separate study on hospital adoption of risk reduction measures provided a tongue-in-cheek description of disaster as the "Oh, shit" moment; the instant when the organization realizes the plans or resources in place at that point in time are inadequate to contend with an altered and rapidly changing environment (see Aguirre, Kendra, & Connell, 2003 for a more detailed

discussion of this project)[1]. The need for improvisation that stems from the inadequacy

of the existing system may manifest itself well before the organization adjusts its

operation; however, the "Oh, shit' moment symbolizes a collective acknowledgement

that improvisation is necessary.

The ERON or set of organizations involved in a particular crisis response activity

must then respond within and to that social environment while at the same time beginning

both planned activities and engaging in manipulating or molding that environment into

something else – an emergent environment that is rendered more manageable as a

consequence of improvisation. Rarely are all aspects of this social environment altered.

Instead, we are likely to see many organizational response elements continue to persist,

other elements where contingency plans have adequately accounted for changes, and,

depending on the magnitude and scope of the disaster, a varying number of emerging

circumstances that call for improvisation. In responding, the ERON continues to operate

in the context in which the environment has remained relatively stable while at the same

time improvising to render other action contexts more manageable. In our conception of

disaster response as performance, it is possible to see both a well-practiced orchestra and

a jazz ensemble playing at the same time.

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[1] When asked what type of event has to occur in order for the hospital to activate its disaster plan, the focus group participated state the following: "Well, let me give you my (name) line because it is the one I use in my own mind all the time. (Name) was an emergency preparedness nurse and she said that the question is always, 'When do you institute a disaster plan? When do you know it is time to push the button and change the way you do business?' She played a couple of tapes, and one of them is an ambulance going to (hospital name) during the earthquake and you hear the siren, the guy is talking to this guy who is having a heart attack, going up over the top of the hill, and he gets to the top of the hill and sees that the hospital is laying on its side and he goes, 'Oh shit' and that theme comes over; she says when you see a situation and that is the first word out of your mouth, that's when you do it. And that is what I do. I ask, 'Is it a situation that provokes that kind of emotion in me.' "

I argue here that it is important to better understand variations in improvisational processes and the circumstances that lead to their emergence for several reasons. Most significantly, the processes involved in different forms of improvisation, and therefore the facilitators and barriers to effective improvisation, are different. In some cases, we see the ERON working to reproduce structures, activities, resources, or tasks that have been destroyed. In others, we see the ERON or developing EMON proactively changing structures, activities, resources, or tasks given newly identified needs. Finally, we see the creation of structures, activities, resources, or tasks where none were previously in place. In the emergence of the organizational social environment, the degree to which these elements – more specifically structures (or as Kreps calls domains), resources, activities, and tasks – are dynamic or remain stable is shaped by collective action of the ERON's or EMON's members.

The contexts or factors that lead to the emergence of each of the three ideal improvisation types – reproductive, adaptive, and creative improvisation – or to continued organizational stability can be reduced to three fundamental questions: 1) Is there an established plan of action that outlines the particular structure, activity, task or resource to be used under the circumstances the ERON faces? 2) If there is a plan of action in place, can the plan associated with the four elements – i.e. structures, resources, activities, and tasks – be carried out? 3) Given the circumstances, is it appropriate to carry out the existing plan of action, or is another course of action more appropriate?

In the context of this discussion, the term "plan" can refer to one or more formalized documents outlining such information as roles, responsibilities, organizational

structures, and available resources. However, the term can also refer to other normative

or agreed-upon courses of action that are not necessarily codified or documented in

writing. An organization can have a planned course of action if it shares a general

understanding regarding what steps should be taken given a particular circumstance. For

example, an organization may not have a written emergency plan, but day-to-day

operations could signify to personnel that the office manager, in charge of operations

during routine periods, is in charge of operations during a disaster. In a like manner,

informal decision-making and past experience in particular situations could form the

basis for pre-existing planned-for action, even if such action is not outlined in a formal,

written plan. If an organization has re-grouped in a particular building after three prior

evacuations, personnel could consider re-grouping at that location as part of a pre-

established plan even though the activity is not formally codified. Even improvised

action can trace its origins back to prior understandings and practices. An organization

not typically involved in mass food provision may have to improvise a food service plan

– one that is not written but instead decided upon through informal discussions and

interactions – to feed response workers. After some time, that plan of action may not

satisfy emerging needs and additional improvisations to *the plan* may prove necessary.

Throughout this work, then, *plans* refer to both codified formal documents and the less

formal normative action expectations of organization members unless otherwise

specified.

The subjective assessment of individuals and organizations when answering the

questions outlined above determines the course of action the collectivity engages in, not

any objective assessment regarding the "correct" action. Simply stated, the motivation

behind different action outcomes is driven not by *what is* but instead by *what is perceived*

as existing, possible, or appropriate. While there may be an overall emergency plan in

place, the organization will still assess the extent to which that plan accounts for each

element in each circumstance. A plan or set of expected actions could also be in place

about which an organization is unaware. Because different participants making up the

organization or groups of organizations can possess varying levels of awareness about

what types of plans are in place, the answer to whether or not a plan is in place is based

on the subjective knowledge of those enacting the response. Alternatively, an

organization could decide to deviate from existing plans, deeming them inappropriate or

inadequate for addressing emerging needs, when in fact the "better" course of action

would have been to follow existing procedures. Here again, whether or not a course of

action or an expected procedure is objectively "appropriate" is not the key force

influencing collective action. Instead, the members of the collectivity are motivated to

engage in particular forms of organizational behavior, depending on how they

subjectively make sense of the social environment, regardless of how such actions might

be "objectively" assessed.

Taking into account the three questions above, five alternative processes are

possible (see Figure 1):

1) Organizational continuity: When a plan or expected action course
exists, the organization can choose to maintain plans or routines.
Although other elements (structure, resources, activities, or tasks) of
organizations may have been impacted by the disaster, the elements
under consideration in within this context remain stable.

2) Organizational contingency: When the impacts have exceeded the organization's ability to cope, the organization can chose to implement an alternative pre-existing plan that provides for alternative structures, activities, or resources, and tasks – a plan that was outlined as an anticipated, secondary option. Or put simply, the organization resorts to 'Plan B.'

3) Reproductive improvisation: The organization can have a system in place, but it is then disrupted in such a way that those involved are compelled to improvise to make do or employ a substitute to achieve the same result.

4) Adaptive improvisation: A system can be in place (either pre-existing or improvised) and, because of intermediate considerations, the organization can decide to adapt and opt for a novel alternative approach. This adaptation is linked to the planned-for action or the action already improvised, but involves additional improvisation that causes a directional shift away from the structures, activities, or resources that were in place previously and toward a slightly different action repertoire. The term "adaptive" denotes an adjustment made in light of emergent conditions and is not intended as a judgment of whether or not the adjustment ultimately had positive or negative outcomes.

5) Creative improvisation: In cases in which no pre-existing plan exists to contend with a emergent environmental demands, and in which other lines of action are deemed unsuitable, organizations can employ creative improvisation to establish a new course of action. The new approaches to the organizational structures, the activities, or the resources are not completely divorced from the routine but do involve new social arrangements that are emergent in character.

This heuristic framework will be used throughout the analysis in conceptualizing the processes that differentiate the three different types of improvisation. However, it should be noted that these are ideal types and that in practice different forms of improvisation often include elements of other forms.
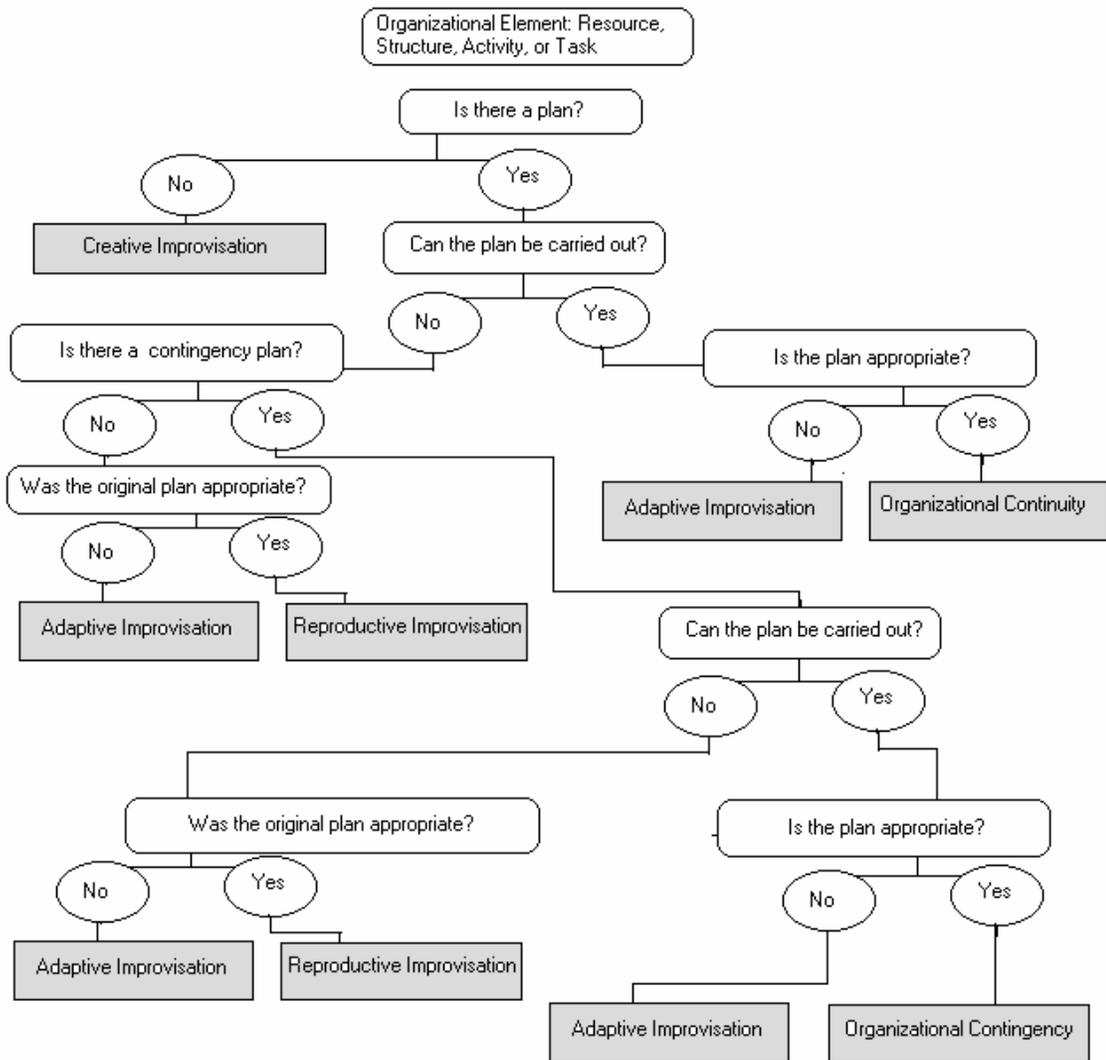
Figure 1. Organizational Improvisation Decision-Tree

Giddens' (1984) theory of structuration is helpful in our examination of improvisation in crisis. In this approach, both structure – the rules and resources that govern social systems – and agency – the power of human action to enact on the system – are at play in the constitution of social relations, with neither accorded primacy. It is the duality of structure and agency, by which structure both constrains and enables agency and by which agency both is constrained by and enacts upon the overall structure, that forms social systems. Giddens (1976: 104) uses language as an example to explore the duality of structure, where language involves "interpretive schemes to make sense not only of what others say, but of what they mean," essentially sense-making through use of contextual cues as well as mutual understanding through interaction." Moreover, language provides a structure or abstract set of rules that guide the language, even if in ways are relatively abstract so as not to be easily explainable by those it guides. Similarly, according to Weick (1993), on the one hand people create meaning, socially constructing their environments through their collective interactions and interpretations. On the other hand, meaning is imposed. The framework of roles, regulations, delimited activities, and structured relationships constrain social construction but at the same time reflect what was constructed. "Meanings affect frameworks, which affect meaning" (Weick, 1993: 645). Or as Morgan, Frost, and Pondy (1983: 24) state, "Individuals are not seen as living in, and acting out their lives in relation to a wider reality, so much as creating and sustaining images of a wider reality, in part to rationalize what they are doing. They realize their reality, by reading into their situation patterns of significant meaning." Put another way, Weick (1993: 635) observes, "Reality is an ongoing

accomplishment that emerges from efforts to create order and make retrospective sense of what occurs."

While the rules of structure guide both individual and collective human interaction, people create, recreate, and reshape the rules of social order through their interaction and assignment of meaning to their situations in which they find themselves. I argue that in the time-constrained environment of disaster response, this enactment on the emergency response system is achieved through the process of improvisation: reproductive improvisation when the collectivity of organizations is recreating a degraded or disrupted element of the system (structure, activity, resource, or task); adaptive improvisation when the collectivity of organizations is reshaping a system element no longer understood as appropriate; and creative improvisation when the collectivity of organizations is creating an emerging system element.

Returning to the example of the Mann Gulch fire, the more the fire moved away from what the responding group's original conception of what a fire was, the more difficult it became to socially construct (Weick, 1993). The same was true of the World Trade Center response. The farther the disaster moved away from what was a *typical* emergency response, in other words, the less appropriate or less possible established contingencies became, the greater was the pressure toward the more complex improvisation.

Again employing music as a metaphor, Weick (1998) describes improvisation as occupying an end point on the continuum of composition, where interpretation, embellishment, and variation occupy points lower on the scale. Interpretation occurs

when minor liberties are taken with a melody and the piece is performed as written, albeit with novel accents or dynamics. Embellishment takes place when whole phrases are anticipated or delayed and the melody is rephrased but recognizable. Variation involves inserting a cluster of notes while maintaining the relationship of the piece to the original melody. When improvisation takes place, musicians transform the melody into patterns bearing little of or resemblance to original or inventing new phrases by using melodies different than the original (Berliner as cited in Weick, 1999). According to Weick (1998: 544-545), "The progression implied is one of increased demands on imagination and concentration," and "activities that alter, revise, create, and discover are purer instances of improvisation than are activities that shift, switch, or add."

I argue, however, that at the end-point of improvisation, as it grows in complexity, the processes do not simply move along degrees on a continuum of improvisation. Instead, there is a qualitative shift in the objectives and motivations behind the each type: be it to recreate, reshape, or create new resources, structures, actions, or tasks.

Focus of Succeeding Chapters

The emergency response to the World Trade Center attack demanded organizational improvisation on a wide range of response activities or sets of actions by organizations directed toward the performance of critical emergency response objectives. This dissertation analyzes alternative improvisational processes and outcomes by focusing on three specific activities: the reestablishment of the city's EOC (a component of emergency coordination) as a reproductively improvised resource; site security

credentialing as a reflection of an adaptively improvised response structure; and debris

removal and remains recovery as a creatively improvised activity (see Table 1).

Table 1. Chapter Analysis of Improvisational Forms

	Chapter 4	Chapter 5	Chapter 6
	Resources	Structure	Activities
Reproductive Improvisation	Reestablishment of the Emergency Operations Center Facility		
Adaptive Improvisation		Credentialing and Site Access Security of Emergent Multi-organizational Network	
Creative Improvisation			Debris Processing/Remains Recovery at Staten Island Fresh Kills Landfill

The last-mentioned activity involved a massive coordination of hundreds of agencies

across the entire city. For purposes of this work, I will center on the end-point of this

complex operation, which took place at the Staten Island Fresh Kills Landfill site.

Improvised tasks are common across a broad spectrum of the response. For this reason,

this analysis uses the more complex aspects of the response – structures, activities, and

resources – to examine improvisational types, although a similar treatment could be used

to examine improvised tasks. As discussions will show, each example reflects different

emergent or stable processes. As I present the three sets of examples, I will also highlight

the facilitators and impediments to the improvisation processes. Those factors include

the development of a shared vision, the stability of other response elements, available

substitutions, pressures to maintain existing systems, the diversity and availability of

response repertoires, impacts of unanticipated consequences of improvisations,

communication of changes, the relaxation of norms, and the ability to read social cues.

Chapter 3

METHODOLOGY

The organizational response to the 2001 World Trade Center attack was both

large and complex. The September 11, 2001 tragedy struck the heart of the largest city in

the United States, with a diverse and densely populated area of over eight million

residents. Thousands of organizations from within the city and from across the country

responded to the disaster. Responders and key decision-makers had to contend with a

hazardous and dynamic environment fraught with ongoing and ambiguous terrorism

threats. They had to balance a search and rescue (and later remains recovery operation)

with a forensic investigation and massive debris removal operation. They had to

reconcile pressures to return to normalcy and reopen the city with the need for ongoing

safety precautions and desires to treat the site of the collapse with reverence. They

searched for resources to address emerging needs while attempting to manage an influx

of donations and volunteers that overwhelmed logistical management systems. Never

before had the city's organizations come together to engage in these activities at these

levels and with these resources. Although DRC routinely uses multiple methods of data

collection and triangulates sources, methods, and perspectives in the data analysis phase,

the scale and complexity further necessitated that these strategies be carefully employed

in this study of organizational continuity and improvisation. The complexities outlined

below point to the need to triangulate data sources to add credibility to findings (see Denzin, 1989).

In the immediate aftermath of the plane strikes and the building collapses, and more so over the weeks and months that followed, the full number of organizations that formally and informally participated in the broad range of emergency response functions approached not the hundreds, but the thousands. Many of these organizations were based in New York City or New York State, yet a large number were from elsewhere in the region, the country, and the world. Many had previously established working relationships or were familiar with the organizations with which they interacted over the course of the response; however, a large number also encountered for the first time other organizations with which they had no prior working relationship. The result of this organizational influx and interaction was a rapidly growing number of organizations about which to learn, whose participation required documentation, and whose involvement needed to be analyzed. The sheer scale of this multi-organizational involvement presented major data-collection challenges.

Second, the response environment in New York was ambiguous, urgent, and dynamic. The response environment at the collapse site shared similar characteristics to that of the city, but it also presented those working in its proximity with extremely hazardous conditions. The ongoing search and rescue effort, which eventually evolved into an immense remains recovery operation, and the dangers associated with the high-intensity fires that burned for weeks, the large overhead hazards, the debris removal, and the unstable surfaces all limited DRC's access to the operations at the collapse site itself

to the immediate perimeter of "the pile," as response workers called it. We constantly

negotiated or renegotiated access to response locations and planning meetings. In part

due to an ongoing perception by some officials and security authorities that future

terrorist attacks were likely or even imminent, full access to some sites and settings was

not always possible. Changes in response directives, locations, status, and personnel

occurred regularly, sometimes on an hourly basis.

Many aspects of the response environment rendered the acquisition and use of

documents problematic. Documents describing the response environment were often

quickly outdated and not always replaced with current reports due to the high pace and

pressing nature of the emergency. In keeping with the heightened security, participants

in the emergency response did not distribute all documents. Some documents that were

available at one point in time became unattainable after the demand on response activities

began to subside, possibly due to security concerns or alternatively due to a fear of

litigation and concerns about criticism to individual organizations.

Finally, collecting data was extremely challenging because many of those who

were most closely associated with the emergency response were impacted on physical

and emotional levels. Many responders deployed to the World Trade Center following

the terrorist attacks had nearly lost their lives or had suffered injuries when the towers

collapsed due to their immediate proximity. For some responders, it is possible that the

confusing and rapidly changing environment, as well as the physical or emotional trauma

they experienced, clouded their perception of what was taking place around them. Others

claimed to have very clear memories of what took place in the immediate destruction of

the buildings, using commonly heard phrases such as "it is etched in my mind" when referring to those moments, but were less able to recall events that took place in days that followed. Notably, many emergency responders active in New York City after this event were experiencing grief after having lost family members, close friends, and colleagues. They were exhausted due to working extremely long shifts and sleeping very little and were heavily burdened with arduous and time-constrained workloads. Understandably, while responders may been able to recollect a great deal about some of their experiences, they may not have been able to authoritatively recount other activities they observed or carried out.

Direct observation of ongoing emergency activities was particularly valuable in this case precisely because the nature of the event itself seriously hampered record-keeping and clouded the memory of some emergency responders. With key decision-makers often unable to recollect what was happening literally from one moment to the next, the ability to actually be present as decisions were made was critical for later efforts to reconstruct events. The fact that research team members had actually been present during the emergency period also facilitated rapport in later face-to-face interviews and added validity to information obtained in those conversations.

Despite these challenges, DRC was able to obtain an incredible wealth of rich data. To contend with the research challenges described above, I draw upon the variety of data sources and employ multiple qualitative data collection strategies – among them direct exploratory observation, primary document collection and analysis, secondary document collection and analysis, as well as in-depth face-to-face and telephone

interviews – to triangulate emergency response information. Comparing information collected from one source with another provided a means to check for data validity (Denzin, 1989). Using several sources and approaches to data collection both filled gaps in the chronology of events and provided a more complete picture of the organizations and their involvement in particular response functions. Field observations and review of primary documents in the first two months formed the basis for many of the ideas expressed here. Review of secondary documents at a later stage provided important examples of improvisation. Interviews allowed for more in-depth exploration of the process of improvisation and shed new light on the analysis of field notes and documentary material. Although the quotes in this study are drawn from interview transcripts, each data source was instrumental for this analysis.

Direct Exploratory Observation

Within an hour of the first plane hitting the north tower of the World Trade Center, faculty and staff at the Disaster Research Center knew that it was both appropriate and likely that they would engage in some form of research in New York City in the days that would follow.

The skills and expertise required to carry out a reconnaissance research trip in a highly ambiguous disaster environment were well established at the Center in the fall of 2001. The Center provides its researchers with training and has in place set procedures governing quick response data collection. These researchers are familiar with the scientific literature on disasters and are attuned to notice phenomena that are consistent with or contradict those documented in other disaster studies – skills that researchers new

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to the disaster field lack (a critique made long ago by Drabek, 1970). The Disaster Research Center has a long tradition of conducting quick response disaster fieldwork and has responded to a diverse and impressive range of crisis events over its forty-year history. Early studies in 1963 at DRC, such as research trips following the Vaiont Dam overflow in Italy and the Indianapolis, Indiana coliseum explosion, set the stage for future domestic and international studies by the Center. The immediate response period had subsided by the time DRC researchers arrived at these two disaster sites[2] but in other disaster events, researchers from the center arrived while the response phase was still developing or was still ongoing. The long list of DRC's quick response activities following major disasters includes field work following the 1997 Red River flood in North Dakota, Minnesota, and Manitoba; the 1994 Northridge, California earthquake; Hurricane Andrew in 1992; Hurricane Hugo in 1989 with researchers stationed in San Juan, Puerto Rico and in Charleston, South Carolina; the 1983 floods in Salt Lake, City, Utah and Fort Wayne Indiana; the 1979 chlorine gas threat in Mississauga, Ontario; the 1974 tornado in Xenia, Ohio; the 1967 floods in Fairbanks, Alaska; the 1965 Watts riots in Los Angles; and the 1964 Alaskan earthquake.

Two other factors further compelled an interest in activating a quick response team to New York City, as opposed to Washington, DC or Shanksville, PA (the sites where the other hijacked planes crashed or attacked). DRC was already engaged in research related to emergency response capabilities and preparedness activities in the New York City area. This prior research provided the necessary background for

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[2] However, search and rescue activities were still under way when researchers arrived following the Vaiont Dam overflow.

reconnaissance work, and subsequent research would directly inform findings from these other studies. Moreover, DRC had an existing relationship with the Mayor's Office of Emergency Management prior to September 11. Although DRC was unable to speak with its contacts immediately after the collapses due to damage to this organization's building and communication links, the Center was reasonably assured that these contacts, when found, would provide at least a minimal degree of information and access to response facilities. Indeed, these contacts later stated that they had attempted to contact DRC to request that researchers observe the response.

Two days after the September 11 attack, five researchers from the Disaster Research Center deployed to New York City to begin exploratory observation of the emergency response. For two days, this research team observed activities at sites including but not limited to the one of the headquarters for the emergency response, hospitals, security checkpoints, volunteer staging areas, the family assistance area where relatives of missing victims assembled, fire houses, businesses that were evacuated after the attack but had since reopened, and public sites of emergent gathering and memorializing   Along with another researcher from the DRC – Dr. James M. Kendra, I remained in New York City for much of the next two months. We were relieved intermittently for short blocks of time by other DRC researchers, including senior scholars at the Center: Director and Professor Kathleen Tierney and Professor Emeritus E.L. Quarantelli.

DRC researchers spent over seven hundred and fifty collective hours of direct exploratory observation at many of the locations most connected to the emergency

response. In particular, we closely observed key coordination and response activities at highly-secured facilities, including the emergency operations center, incident command posts, and the federal disaster field office. We attended meetings focusing on daily interagency coordination, federal support and involvement, security, logistics, safety, medical issues, city operations, and debris removal – meetings at which critical planning took place and decisions that guided the response efforts were made. We spent extensive periods observing operations at volunteer, supply, and food staging areas, the "Ground Zero" area, family assistance centers that were established for victims' families, and respite centers that were established for rescue workers. We spent time observing activities at major security checkpoints in Lower Manhattan and at locations central to the emergency response. In the course of our fieldwork, we generated a large volume of notes providing rich description of observations and experiences. We also took over five hundred photographs and sketched and collected floor plans of various facilities to track spatial - organizational changes over time.

Quick deployment and significant access worked to the Disaster Research Center's advantage. Ultimately, these considerations are important when conducting fieldwork on disasters and impact the success of the data collection (Quarantelli, 1998). Delay in the data collection phase of a research project can reduce the validity of the information (Drabek, 1970). Memories fade. What might start out as a clear and accurate recollection for response workers may cloud as time passes, intertwining and finding its place mixed anachronistically with the memories of other events or with stories told by others. Through the process of conversing with others about the disaster

and being exposed to media accounts, predictably respondents – who are of course, unaware of the influence these sources are having on their memories – construct new or revised narratives describing what happened, which, although rich in their vividness of the account, are not always entirely accurate (Quarantelli as discussed in Drabek, 1970). Direct observation in a disaster's aftermath allows for the documentation of this critical perishable data. Researchers record accounts of memories while they are fresh, note the immediate outcomes of decisions and the impressions of participants regarding the activity around them, both of which, in light of the larger response effort, may be forgotten or seem inconsequential in a discussion with the same participants months later. The speed with which we were able to organize a well-thought out research plan, our relatively rapid arrival at the impacted area, the large amount of time we spent in New York City, and the unique entrée we were accorded allowed us to collect an impressive wealth of data.

Although our arrival in New York City was expeditious, we were not at the collapse site or other response locations immediately after the initial impact. Nor did DRC have the unlimited resources to station a researcher at every location that was important to the response. Abiding by one of the ethical quick-response procedures impressed upon DRC researchers, at no time did we put our research agenda above the extremely important emergency response work underway in New York City, and, as a result, we avoided collecting perishable data when we assessed that doing so would be burdensome to responders. Admittedly, our ability to observe, account for, and document potential perishable data was as much subject to constraints as opportunities.

Nevertheless, even with these limitations, access allowed for the collection of enormous amounts of data. Among the perishable data we collected were information about significant questions that remained to be answered more fully at a later stage in the research as well as information about the participants and organizations that would be able to provide information at a later date about the activities we were unable to observe. In other words, even though some of the data itself may have perished, the awareness of what data were once there and the pertinent research questions themselves had not. We were also able to build a rapport with others at these key facilities because of our established presence in both the emergency operations center and other response locations. As the work of Quarantelli (1998) and Drabek (1970) suggest, this presence better-positioned DRC to approach organizational personnel for interviews and to seek additional information once response efforts came to a close, in contrast with researchers who only arrived months later and were less identifiable with the event.

Of primary interest were the activities of formal and informal organization and the multi-organizational response elements that were active in the disaster environment. That is, we were concerned with identifying which organizations were involved in particular aspects of the response and early recovery, the activities in which these organizations were engaged, the level and success of inter-organizational interaction or lack thereof, the degree to which planned emergency response activity was implemented, the extent to which alternative response strategies emerged, and the successes and challenges encountered by those responding to the disaster. Still, the research carried out during the first two months was quite exploratory in nature and relied heavily on techniques

discussed in the literature on inductive qualitative research (for overviews of the approach, see Glaser & Strauss, 1967; Lincoln & Guba, 1985; Strauss & Corbin, 1990; Lofland & Lofland, 1995). Because of DRC's prior research on organizational resilience and inter-organizational response, the initial research team was instructed to pay particular attention to instances where these concepts could be further explored. Still, a primary research question had not yet been determined.

On September 11, 2001, DRC intentionally decided to commence an exploratory study. In launching this effort, we were not setting out to test an established theory. Our training in quick response research encouraged us to open our investigative minds to the range of social and organizational activity we witnessed. Our strategy was to maintain flexibility in the early stages of the investigation, collect as much data as possible, and later decide on a specific focus as important themes emerged. The relationship between collecting data and building theory was a reciprocal one, and these two processes occurred simultaneously.

Field Procedures

During our time in the field, Kendra and I met periodically over the course of each day. On days we logged in over sixteen hours at response locations, we met as many as six or seven times a day to debrief each other on information collected. Occasionally we attended the same meetings and opted to sit at opposite ends of the room, or we visited response locations together. When we met following these occasions, we would fill gaps in information the other had missed due to the fast pace of the proceedings, the proximity to soft-spoken individuals, or comments shared by

individuals only with one of us. We would also share our interpretations of what we had observed.

More often, we would conduct our research days independent of one another in order to collect more data. We would attend different meetings, observe activities in different areas of the same response location, or visit different response locations. Information was also exchanged with other DRC researchers, both those who entered and left the response environment and those who were not in New York but could contribute information.

As we collected and shared observational data, we also began to conceptualize the response. Informed by the disaster literature and the activities under way, we were able to identify fruitful areas of study. We attempted to document everything we observed, but we also began to seek out information on specific issues, eventually began to look for instances in which those phenomena were or were not present, and then finally started to consider what influenced their presence or absence. Even at these early stages, we inductively incorporated our findings back into the data collection process and began to build theories of the overall response.

Through these data-gathering efforts and with subsequent qualitative analyses of the observational field notes, I am able to accomplish several analytical objectives. First, I can document the evolution of the re-established emergency operations center and other response operations from very early stages. The data make it possible to chart, according to a timeline, the decision-making and implementation process involved with a variety of response functions and tasks. Third, DRC field records provide rich data concerning the

context in which these activities and decisions took place, including the overall mood of

meeting participants, the tone in which statements were made, the non-verbal cues that

accompanied behavior, and the physical conditions under which events took place. The

observational data meets another methodological objective by helping to corroborate

other primary and secondary data collected. Observational data records what was

observed rather than what was reported to us. Finally, the data supports a recounting of

the activities in question with rich description.

Primary Document Collection

While in New York City, we systematically collected all documents related to the

emergency response that were made available to us. This material was collected because

the literature on qualitative methods suggests that such documents typically yield

contextually relevant information (Lincoln & Guba, 1985). Equally valuable, the written

material helped to identify the key participants in the emergency response. Both primary

and secondary documents were obtained. Primary documents consist of any document

that was produced by an individual or organization that participated in some aspect of the

response or recovery. These documents functioned in various ways in the response.

Some provided information to others, instructed other organizations, or reported on

internal operations within a particular organization or of other organizations – as in the

case of organizational situation reports. Others included reports or accounts written by

those individuals directly involved in the response or by victims and organizations that

interacted with the response and recovery operation. Primary documents are to be

distinguished from what we classified as secondary documents, or documents that were

created by one group interpreting and reporting on the activities or experiences of others. Secondary documents include second-hand accounts, newspaper reports, and article written by other researchers. Secondary documents will be discussed in a subsequent section.

The source and form of the primary documents varied substantially but included Geographic Information Systems (GIS) maps produced in the EOC, schedules, emergency plans, press releases, internal situation reports, internally and externally produced memos detailing procedures and response locations, meeting rosters, meeting minutes, requests for information, requests for personnel, requests for supplies, examples of clearance badges, maps of response facilities, directories, and work plans.

Complete sets of some types of primary document were not always obtainable. As noted earlier, not all documents were made available to DRC researchers, sometimes because of security precautions and other times because DRC was not present at locations or meetings when material was distributed. Furthermore, complete sets were not always produced. For example, because of the intensity of the response in the first few days following the attack, the first issues of some reports were not written and distributed until days into the response. In other instances, gaps in production let to incomplete sets. Occasionally meeting minutes and rosters were produced, but at other times they were not. Material was also lost; by a simple default of personnel taking home notes and other records, some documents became the personal property of the responders. A large amount of potentially relevant information was destroyed, most notably when 7 World Trade Center which housed the city's emergency operations center collapsed. Many

documents were produced in formats that were not easily obtainable (e.g. video, audio

recordings, information technology based systems), and, although DRC had access to or

knowledge of them during the exploratory observation period, these materials were later

not made available to DRC by lead organizations.[3] This notwithstanding, the amount and

variety of material collected were immense and impressive.

Much of DRC's work focused on the documenting emergency response activities

and interorganizational relationships. Researchers from DRC collaboratively developed a

coding and network mapping approach for the various forms of data that were collected.

Based on our direct observation in the fall of 2001, the existing literature on

organizational response to disasters, and the division of labor practiced and outlined by

the emergency response organizations in New York City, we developed a list of

response-related emergency functions, such as building inspection and repair, counseling,

debris management, emergency coordination, logistics, search and rescue, and security

(see Table 2 for a full listing). Many of these functions overlap empirically but still can

be distinguished analytically. For example, while some activities related to debris

management are clearly distinct, other tasks which may first seem appropriately

categorized under this function arguably could be classified under functions such as

building inspection and repair, damage and situation assessment, debris removal, or

occupational safety. We constructed definitions for each category that clearly

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[3] The threat of litigation against the City of New York spawned resistance by several city departments and offices to share information. For example, many personnel were instructed by their superiors not to give interviews and not to share documents related to the disaster response. Organizations – including the National Institute of Standards and Technology, the organization charged under the October 2002 National Construction Safety Team Act to investigate the causes of the building failure and evaluate the technical aspects of the response and evacuation procedures – experienced difficulty reaching agreements with the City for access to response related documents.

Table 2. World Trade Center Functional Coding Categories

Building inspection/repair
Business recovery
Cable restoration
Counseling
Credentialing
Forensic investigation
Damage and situation assessment
Debris management
Debris removal
Donations
Electricity restoration
Emergency coordination
Financial assistance
Fire suppression
Food provision
Gas restoration
Housing/shelter provision
Transportation infrastructure restoration
Injury treatment
Law enforcement
Legal issues
Logistics
Mapping
Occupational safety
Public information/relations
Remains identification
Responder support services
Response to new threats
Search and rescue
Site and facility security
Site stabilization
Space provision
Support to victims or victims' families
Technical support services
Telecommunications
Victim transport
Volunteer coordination
Water restoration
Wireless telecommunications restoration/provision

distinguished what activities we defined as part of particular functions (see Appendix A). This approach occasionally resulted in lines being draw in the metaphorical sand, as illustrated by the distinction between credentialing and site security. The process of credentialing involved many types of tasks, such as identifying personnel authorized to access secured locations, issuing documentation such as badges to prove authorization, acquiring the documentation, and disseminating information about valid credentials. The function of credentialing, as DRC bounded it for coding purposes, ended when actors reached the checkpoint. At the point at which a guard or officer inspected credentials prior to allowing access to secured sites, the activity was then coded as site security. By employing this codification approach we were able to distinguish among functions while still allowing for an aggregation of like-functioned codes at a later time if we considered it appropriate. We provided coders with detailed instructions regarding what activities to include or disregard (see Appendix B), coding training, regularly reviewed documents, and took other steps to ensure coder reliability.

For each mention in a primary document of an organization's involvement with a response activity, coders documented the name of the organization, the organizational type, whether the organization was already established before the disaster, whether it was an emergent group or existing organization, whether the activity was routine or non-routine to the organization's responsibilities, the time period within which the activity occurred, and the document source type. At the time of this writing, researchers were still coding and entering data from over two hundred document sources. For the first twelve-day period alone, researchers generated over eight thousand three hundred

ninety-five code sheets documenting the activities of over thirteen thousand organizations

(see Appendix C for a sample of the code sheet). All codes were entered into a statistical

software database.

These primary documents provided a detailed and rich description of which

organizations were involved in key response functions, for how long, and to what extent.

Triangulated with other document sources as well as other WTC-related data sources, we

were able to derive significant information about both emergence and improvisation

during the emergency response. Currently we are also in the process of mapping the

emergent organizational network that carried out emergency response based on the

database described above. Elements of this effort will lead directly to an analysis of the

emergent network surrounding specific improvised activities.

Secondary Document Collection

Within hours of the first attack, the Disaster Research Center began an ongoing

persistent effort to obtain secondary documents – in other words, documents created by

groups interpreting and reporting on the activities or experiences of others – related to the

emergency response efforts underway in New York City. At first, we collected any

information from print and web-based sources that we found pertinent to the terrorist

attacks. DRC conducted extensive searches to collect as much data as possible on all

aspects of the disaster. At that point, we had yet to focus on specific research questions,

were attempting to find information on the situation in New York to facilitate our

upcoming reconnaissance trip, and sought not to gloss over potentially important

information sources. On September 14, 2001, we began systematically to search for

articles related to the terrorist attacks from twenty-two news and disaster information outlets (see Table 3) as well as additional sources we encountered. In this first stage, essentially every reaction, response, opinion, and suspicion was deemed relevant to our data-gathering efforts. These data also includes such varied topics as world leader reactions, disaster cost estimates, victim lists, personal accounts, and world financial markets news. The volume of data generated was enormous.

The sheer amount of available data, the restricted amount of time for coding and analysis, the number of personnel at DRC who could devote themselves to the task in light of other data collection initiatives, and the fleeting nature of web-based information demanded that DRC reduce the number of sources it systematically consulted. Two weeks after the attacks, we narrowed the search criteria to those sites providing the greatest number of documents and most regularly-updated information. We also instructed those saving this information to concentrate on articles that specifically focused on the World Trade Center attack and the subsequent response, recovery, and impacts. At this time, we also began electronically archiving image and print sources. One month after the disaster, we again tightened search parameters to include only two major newspaper websites – The New York Times and The Wall Street Journal – as well as secondary sources collected in a less systematic way. The number of articles directly relevant to the DRC research objectives in New York City declined substantially as the length of time from the disaster increased. Systematic data collection of these secondary sources ended six months after the attacks. Within the six month period, 2,249 articles were archived. These included items such as articles from major periodicals, books, and

Table 3. News and Disaster Information Outlets Searched Consistently Beginning September 14, 2001

Hard-copy newspapers	Online editions of newspapers	News wire services	Online broadcast news services	Local sources[4]	Disaster services online sources
The New York Times	The New York Times	Associated Press from The New York Times	Fox News	New York University	Federal Emergency Management Agency
The New York Post	The New York Post	Associated Press International	CNN	Senator Charles Schumer press releases	American Red Cross
The Wall Street Journal	The Wall Street Journal	Reuters	A UK web search site [GET NAME OF SITE]	Mayor Rudolph Giuliani press releases	
The Boston Globe	The Boston Globe	Kyodo News Service			
The Washington Post	The Washington Post				
The Daily News	The Boston Herald				
The University of Delaware Review	The San Francisco Chronicle				
	The Las Vegas Sun				
	The Los Angeles Times				

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[4] Local sources include information distributed by organizations in communities where the hijacked planes departed or crashed.

information from many other government, charity, community-based, individual, and private Internet sites that emerged after the disaster event. New and relevant sources continue to be added as they become available.

Secondary data complemented primary data in that the combined perspectives of the many information sources provided insight into a greater number of activities. Relying solely on secondary data for data analysis is less than ideal because of the common difficulties in determining the strengths and weaknesses in how the data were collected. Analysis of secondary documents relies on a third party interpretation of response activities – an interpretation that may not fully disclose its own limitations. In other words, the author's interpretive lens can cloud the looking glass. For example, a reporter may write in one article that a witness to the collapse saw many lay-people helping building occupants evacuate from the Twin Towers. Based on that one account, we cannot know if such activity was just occurring in the vicinity of the witness nor can we assume to know what the witness understands as 'many.' In some articles, it is also difficult to determine if a statement is a report or an interpretation of facts. When one compares secondary documents such as new articles with face-to-face interviews and primary documents that support or contradict the statement in question, the secondary document analysis provides a valuable method to triangulate primary data or point to interesting research questions worthy of exploration.

Analyses of secondary documents followed the identical procedures used to code and analyze primary documents. Researchers used the same coding sheets and recorded organizational activity based on the same response functions. Not all secondary

documents were coded. Articles concerning activities that were not part of the response

and recovery effort – such as the many articles collected in mid-September that

concentrated on the terrorists, airport security, and victim impacts that did not involve an

organizational response – were not used for this analysis. Data coded on 1004 code

sheets were entered into a separate database specifically for secondary data. These data

were triangulated with primary data sources and used in a manner similar to the primary

documents, providing detailed and rich description of which organizations were involved

in key response functions, for how long, to what extent, and their place in the emergent

organizational network.

Interviews

In fall, 2002, DRC began the fourth phase of its data collection procedures. In

this phase, we conducted in-depth face-to-face and telephone interviews with over sixty

key participants in the World Trade Center emergency response, obtained twenty oral

histories from responders to the waterborne evacuation of Lower Manhattan, and are in

the process of conducting additional interviews as of this writing. The interview

instrument included a range of questions centering primarily on the coordination of

response activities and lessons learned. Questions investigating this dissertation's focus –

organizational improvisation – were among those incorporated into the interviews (see

Appendix D for listing of interview questions).

Many of the questions in the interview instrument were open-ended and designed

to elicit as much information as possible about the interviewee and his or her

organization's involvement in response-related activities. Also included were more semi-

structured questions that specifically addressed issues and questions developed during the analysis of exploratory and document data.

Interviews did not begin until after the one-year anniversary of the attacks. In the months that followed the exploratory phase of the research, many of the personnel DRC planned to interview were still engaged in extended response and recovery activities. Ongoing investigations in which liability issues were being considered were also under way or planned, and as a result several organizations took a decidedly closed-door approach to interviews. As the one-year anniversary approached, DRC anticipated that the schedules of many of the responders most intimately involved in the emergency efforts would be filled with memorial activities. Although informal 'conversations' took place with several key responders between the time of the attacks and the time formal interviewing was initiative, DRC decided to wait until after mid-September 2002 to contact most of the potential interviewees. The time lapse between the event and the interviews constituted a barrier to the participants' memory recall. In order to overcome this barrier, we worded and ordered questions in ways that first discuss specific time and places of the emergency response and follow by chronologically "walking respondents through" their activities in the context of what was going on around them at the time. Rather than asking questions regarding activities that took place on certain days or at certain times, we asked information about activities that took place in relation to pivotal points in the response, such as when the towers were struck, when interviewees first heard about the attack, when they evacuated, when the buildings collapsed, and when

they arrived at certain response locations (for a more detailed description of this interviewing technique, see Balan, Browning, & Jelin, 1973).

There were potentially tens of thousands of people to interview who were in some way involved in the New York City emergency response efforts. Not only is it simply not feasible to conduct this many interviews, it is also unnecessary. The accounts and experiences of many individuals would provide fascinating information, but for the purposes of this study as well as the larger research objectives of DRC, interviewing key informants from a variety of organizations that were most involved with overseeing or coordinating different emergency response functions was a more effective approach. This purposive sampling approach is more appropriate to collecting data relevant to our research questions. As a consequence of our early entry into the field, we were able to identify interviewees. Many of the people whom we encountered on our reconnaissance trips encouraged us to contact them for interviews at a later date and proved important sources of information. We were also able to generate a contact list of individuals involved in specific response functions through coding the document material collected during the emergency response. Finally, DRC employed a snowball sampling approach; we followed up on recommendations of knowledgeable interviewees regarding other individuals who could best speak to the issues we were examining. The people we spoke with played important decision-making roles and represented a broad range of New York City agencies, agencies from surrounding communities, state government, federal agencies, non-profit and community-based groups, the private sector, and emergent response groups.

Again, in the formal interviewing phase, we were extremely successful in obtaining rich detailed data about the emergency response. Interviews typically lasted between one to three hours, and interviewees were often eager to share their stories once the interview began. All interviews were tape-recorded and transcribed to permit in-depth qualitative analysis.

Drabek (1970) cautions that cross-validation of data is necessary to ensure that a respondent's accounting of a disaster's sequence and details is indeed accurate. The large number of interviews with key participant in various aspects of the New York City response that were conducted, in conjunction with an analysis of other data sources, will allow for greater confidence in the analysis of the improvisational processes that were so integral the response.

Confidentiality

All respondents received guarantees of confidentiality to encourage candid responses to the research questions. This guarantee is required by the University of Delaware's regulations regarding any study involving human subjects (see Appendix E and F for the informed consent statement interviewees signed and the research approval form the University of Delaware's Internal Review Board on the protection of humans subjects). Because of the public evaluations and potentially litigious investigations of the World Trade Center emergency response that were underway during the data collection process or proposed for the future, DRC's assurances of confidentiality were also necessary to encourage open and honest responses by those interviewed.

Overtime, some New York City organizations established procedures to discourage their employees from discussing response activities to the Word Trade Center disaster, even for research purposes. It also became necessary to negotiate with the New York City Law Department, which was charged with a gate-keeping function in order to protect the City from litigation. However, cooperation on the part of interviewees was generally quite good. Several key decision-makers had since retired or left the public sector and were not bounded by those agencies discouraging participation in research. Most respondents felt comfortable participating in this study because they understood the value of learning from what had occurred on and after September 11. In an added step, DRC informed the New York City Mayor's Office of its research and received its endorsement (although at no time did DRC disclose the names of potential interviewees). When a respondent requested assurances that the City of New York was not opposed to our research, we would provide the respondent with the telephone number of the designated contact at the Mayor's Office. It was left up the individual to decide whether or not he or she chose to call the Mayor's office. In a few cases, potential respondents who were contacted declined to participate in our study. In all cases, we were able to find other key decision-makers from those same organizations willing to be interviewed.

Occasionally, the discussion included in this dissertation will speak to the actions of specific individuals. When it is possible to deduce the identity of individual decision-makers in the accounts that follow, it should not be assumed that DRC interviewed these individuals. Indeed, I do report on the actions of people who were not interviewed, but whose involvement and activities have been described in various public records (often by

the individual himself or herself), when those descriptions have been triangulated through other sources or through direct observation.

<div align="center">**Chapter 4**</div>

<div align="center">**REPRODUCTIVE IMPROVISATION AND THE WORLD TRADE CETNER
DISASTER: THE ART OF REESTABLISHING NEW YORK CITY'S
EMERGENCY OPERATIONS CENTER**</div>

Introduction

Reproductive improvisation involves the time-constrained and unplanned-for

substitution of an original or recently implemented organizational element consisting of a

structure, an activity, a resource, or a task. This chapter outlines conditions under which

reproductive improvisation occurs. Using the reestablishment of the emergency

operations center following its destruction during the World Trade Center disaster, I

discuss how factors such as system stability, pressures to maintain the status quo,

substitution accessibility, and development of a shared vision facilitate reproductive

improvisation.

Reproductive Improvisation

In disasters, it is often the case that the organization has a system in place, but this

system is then disrupted in ways that negatively affect the performance of activities and

tasks, destabilize organizational structures, or destroy or compromise resources. At the

same time, the organization collectively determines that those original elements are still

needed and appropriate in order to respond to the newly emergent environment. Despite

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the circumstances posed to the organization by the disaster and its inability to implement the original structure, resource, activity or task, those elements are collectively seen as the most appropriate to emerging needs. As a consequence, those involved with the organization are compelled to improvise to 'make do' or, in other words, employ a substitution to achieve the same outcome the original measures had intended.

To a greater extent than adaptive or creative improvisation (see Chapters 5 and 6 respectively for a discussion of adaptive and creative improvisation), reproductive improvisation is heavily influenced by what was originally in place. Original plans and procedures form the basis of a shared vision the organization strives for even though novel strategies are used to reproduce them. The organization, or in some cases group of organizations, find meaning in the environment and look to each other to collectively determine that the original element is no longer viable and, moreover, look to each other replicate the original element as closely as possible with the use of one or more substitutions.

As with creative and adaptive improvisation, the collective determination that the original structure, resource, activity, or task was appropriate or inappropriate is a social process. This does not necessarily mean that the original element did in fact constitute the best possible course of action. Rather, it is the organization's collective determination of planned-for elements as appropriate that determines whether or not the original model is abandoned in favor of alternatives. The organization collectively reflects on the original model to help determine its future course, engaging in what Weick terms "retrospective sense-making" (1998: 547). Meaning is created through a social

process of looking back on what has occurred, assessing the structures, activities, resources, and tasks in place, and, as a group, *making sense* of the original as the best option or *making sense* that there is a need for something else. In the case of reproductive improvisation, the process can be as explicit as organizations coming together in a meeting and expressing a will to recreate the original model, as implicit as one organization taking steps toward reproduction with other organizations reinforcing those steps with their own novel substitutions or, at the very least, not working against the reproductive improvisations in which others are engaged.

Reproductive action consists of substitutions brought about by an organization to achieve similar results as a previous but no longer available structure, resource, activity, or task, based on the interpretation of environmental cues that suggest the substitutions are necessary. Organizations make reproductive substitutions during routine periods, as well as during disasters. For example, a small community may look at the emergency management agency of a larger, wealthier community and determine that it should establish that type of organization locally. However, due to limited financial resources, the smaller community may not be able to afford to establish the agency in exactly the same way. Instead, it may choose to make use of substitutions in hopes of achieving the same results. Instead of having a stand-alone emergency operations facility, the smaller community may use the basement of a police station. Instead of employing paid staff, the community may choose to make use of both paid and volunteer staff. Instead of using expensive data software systems, the community may try to achieve similar results with less expensive systems. Instead of sending staff for training at distant facilities and

workshops, the emergency management agency in the smaller community may try to reproduce those lesson plans and use an expert from the community to train staff locally. Even if the community were to implement the exact same agency after securing adequate funding, it would engage in reproductive action because it would be substituting its own resources for those of the original. Accessibility is central to the need for reproduction, for if it were possible to enact the original measures, there would be no need to reproduce.

In contrast to the routine substitutions described above, *reproductive improvisation* occurs when those decisions are made under conditions of uncertainty and under tight time constraints. The organization has little time to choose substitutions, yet must do so while simultaneously making sense of what requires substitution and what substitutes are readily available. In the turbulent environment of a disaster, the organization must make sense of its own environment while simultaneously moving forward with its improvisation strategies. Reproductive action in routine periods allows for the consideration of viability and appropriateness before the decision to reproduce it is made. Reproductive improvisation in turbulent environments involves the consideration of those same questions in a dynamic and highly ambiguous environment while the organization is engaging in disaster-related tasks. Using jazz as a metaphor, the process is like that of musicians improvising the reproduction of an original score by employing substitutions while they are performing the piece as opposed to the less constrained process of reproducing the original by employing substitutions during a meeting a week prior to the performance.

As I will emphasis in each analytic chapter, "[considered] as a noun, an improvisation is a transformation of some original model. Considered as a verb, improvisation is composing in real time that begins with embellishments of a simple model, but increasingly feeds on these embellishments themselves to move farther from the original melody and closer to a new composition" (Weick, 1998: 546-547). In the case of reproductive improvisation, Weick's definition does not fully account for the process involved, for in this type of improvisation, there is significant movement toward returning to the original model to the greatest extent possible, but by using novel substitutions at hand. Instead of moving father from the original "melody," improvisers attempt to move closer to the original, making do with substitutions when the original is not longer viable.

Reproductive improvisation in disasters is consistent with improvisation in contexts such as music and theater. The script, the score, or the plan forms the shared vision for an ensemble; however, the ensemble recognizes that limitations demand that substitutions be employed. The realization that several keys on a piano are broken may require the pianist to improvise the melody of a performance by substituting notes to best reproduce the original score and cause fellow musicians to improvise accordingly. The absence of a critical prop item during a theatrical performance may necessitate actors on stage to substitute the item with another, changing lines accordingly to incorporate the substituted item until they move on and can gradually return to the original script. The death or injury of key emergency response personnel during a disaster could require an organization to substitute these personnel by promoting lower ranked personnel to higher

positions, bringing in personnel from outside areas, or making use of retired staff. In

each case, the improvisers must continue to perform, to act, or to respond while

simultaneously seeking and implementing a substitution that will eventually bring them

to a close reproduction of the original model. In the response to the World Trade Center

disaster, many instances of reproductive improvisation took place on an individual level,

in particular at Ground Zero in the early hours of the search and rescue operation. For

example, when responders repeatedly used pieces of debris and items at hand to serve as

makeshift tools. Although later admitting to the adaptive and creative improvisation that

permeated the response, one deputy inspector from the New York Police Department

(NYPD) described the reproductive improvisation he was involved in during the initial

response to the World Trade Center site:

> There really wasn't too much of a difference [from a more typical
> disaster]. It's-it- the basic lines of what you wanted to do existed. You
> wanted to evacuate and you wanted to contain. You wanted to get the
> people out of there, and you want to make sure that the area was secured
> for anybody else who would look to go in. And that basically remained
> the same…But [keep] in mind, that we did not have the resource of the
> police offices there. So, what we did was just made do. I had custodians;
> I had building workers [helping out].

On an organizational level, fewer large-scale examples of reproductive improvisation

were apparent when compared to the number of adaptive and creative improvisation

examples. For the most part, organizational continuity and contingency still persisted

despite the disaster. When the situation called for improvisation, it most often involved

elements that were no longer appropriate given the emerging needs or elements in

situations that had not previously been considered in planning activities. Still, the most

dramatic example of improvisation during the response was one of reproductive

improvisation: the reestablishment of New York City's emergency operations center (EOC). With the destruction of the EOC, a critical resource for the effective response to a disaster of the magnitude of the World Trade Center collapse, city officials urgently needed to substitute the old EOC with a new facility. The discussions in this chapter examine the reproductive improvisation of reestablishing the EOC by tracing the process of its reconstitution.

Setting the Stage: The Destruction of the EOC at 7 World Trade Center

Quarantelli (1979) identifies six functions of EOCs: coordination of emergency response and recovery activities, policymaking, operations management, information gathering, public information, and hosting visitors. An EOC is a place where agency representatives can convene, coordinate response efforts during an emergency, and provide information and support to personnel engaged in operational response implementation at the emergency site. The EOC offers a centralized location for multi-agency information distribution, resource sharing, and decision-making. The EOC is a physical place, but it is also a process involving the centering of a multi-agency emergency operation that supports a decentralized implementation of the response. The social and physical structures through which disasters are managed are interconnected. The physical structure reflects the social arrangements that are in place and supports the effective functioning of those social relationships and interactions. Still, the resilience of the EOC's structure is distinct, although not entirely independent from, the EOC's physical structure and resources. In other words, the EOC is a physical resource that supports the structures, activities, and tasks of an emergency response.

The resources of the EOC are thus physical as well as social. As Quarantelli states (1997: 52):

> At one level, the place—particularly the physical facilities—is of relative importance. As a minimum, adequate communication provision, computers, sufficient work space and certain resources, such as maps and equipment inventories, are required. However, the physical facilities in themselves cannot make up for social factors.

EOCs serve as physical resources to response organizations, but they also are social resources. They allow for a specific kind of coordination and communication process by centralizing and decentralizing certain activities, supporting particular organizational structures, providing access to information and resources to certain participants, and offering a forum for structured coordination.

Decisions in the field at remote response locations are informed by decisions made at the EOC, while at the same time response-related questions and resource requests are conveyed back to the emergency response organizational network (ERON). A wide range of information is compiled at the EOC from participating organizations – including resource inventories, maps, information on damage and casualties, weather reports, statistical data, and developing procedures – and then distributed out to organizations through their EOC representatives. Not only does the EOC serve as a clearing-house of information and resources, but it is also quite often the place (although not always the sole site) at which important response decisions are made.[5] As a dynamic response environment emerges, the EOC attempts to manage that environment by bringing together the agencies that need to play a role in the response. EOCs are not fully

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[5] Crucial decisions were made at a wide range of locations during the World Trade Center response, including incident command posts set up near the collapse site.

staffed at all times; rather they are activated only when an event crosses a certain magnitude threshold requiring a multi-agency response.

The New York City EOC on the twenty-third floor of 7 World Trade Center (7WTC) was constructed in 1999 and was one of the most sophisticated facilities of its type in the world. As one high-ranking Mayor's Office of Emergency Management (OEM) official stated, the EOC had "more bells and whistles than [one] could imagine." The $13 million facility was built to withstand winds of up to approximately two hundred miles per hour. The exterior walls were constructed with steel framing, numerous layers of drywall, and Kevlar. The facility had three 500 KVA backup generators, a 6,000 gallon fuel-tank, an 11,000 gallon portable water supply, and a backup system for heating, ventilation, and air conditioning. The EOC provided responding agencies with impressively equipped workstations and communication systems, as well as access to databases and specialized systems monitoring city lifelines, critical facilities, roadway traffic patterns, waterways, airports, weather, and news channels.

At the time of the World Trade Center attack, the facility at 7WTC was outfitted with computer-equipped workstations for up to sixty-eight agencies, arranged into groups called pods, which were organized on the basis of multi-organizational response functions such as health and medical, utilities, law enforcement, infrastructure, human services, transportation, government, and administration. The facility also had the ability to expand by another forty workstations if the need arose (OEM, 2001). Workstations were equipped with software that made it possible for the various constituent agencies to perform the specialized tasks. A raised "podium" provided selected staff, principally

from OEM, an overview of the EOC's operations and allowed for access to a variety of sources of weather information – including direct National Weather Service feeds – as well as video conferencing, and ARCVIEW and MAPINFO Geographic Information Systems (GIS) packages. Podium staff could use databases and maps to visualize the location of critical systems and facilities, such as the electric power grid, the water system, and hospitals (OEM, 2001). As the "administrative workstation" of the EOC (OEM, 2001) the communications equipment on the podium could provide links with all New York City command centers and field units. The facility also had access to continual feeds from local television stations, CNN, and other media outlets.

In addition to its explicit, instrumental functions, the EOC at 7WTC fulfilled another more symbolic emergency management role: the projection of the City's authority and influence. In a separate boardroom within the EOC, a large table dominated the Mayor's conference room, with a telephone for each person seated at the table. Projection screens along one wall facilitated the display of maps, charts, and images. Windows enabled policy-level conferees to look out across the work floor of the EOC, where the representatives of the different agencies staffed the workstations. The Mayor and upper-level staff from OEM were assigned a privileged space that both symbolized and facilitated their leadership. At the opposite end of the EOC was the press briefing room; the wall behind the lectern was transparent and allowed for a view of the EOC work floor, where dozens of personnel from various agencies could be observed working during a typical emergency. During news conferences or broadcasts, cameras directed at the speaker would also look out at the work floor and project to the public

images of response personnel as a backdrop to the messages being delivered by the Mayor or other officials at the lectern.

The focal point of the work floor itself was the podium, installed on a raised platform and staffed by officials of OEM whose job was to coordinate the interaction among the other agencies. For example, one feature of this process involves calling agency representatives "to the podium" to give or receive information. The OEM official assigned to podium duties thus was in a commanding position both physically (looking down on the agency representative) and organizationally (that is, able to influence though not totally control the information flow). During emergencies, as well as during the city's disaster exercises, the visual impression from all directions was that of a busy, competent, technologically advanced emergency response in a well-designed, well-equipped facility.

However, the structure housing the emergency operations center at 7WT was not able to withstand the impact of the September 11, 2001 attack and the subsequent collapse of the Twin Towers. Despite the structural reinforcements and the advanced technology employed in its construction, the building succumbed to the Twin Tower debris fall-out and to fire, and it collapsed at 5:20pm on September 11. The destruction of forty-seven story building at 7WTC was the only recorded case of the collapse of a large steel-frame high-rise building solely as a result of fire (Federal Emergency Management Agency, 2002).

Although the building housing the emergency operations center was destroyed and the vast resources within were rendered useless, the ERON that would typically

respond from the EOC repositioned itself over a series of locations and time periods.

Initially, a handful of officials scattered to One Police Plaza, the site of the primary

NYPD command post. Some deployed to the OEM mobile command bus, a designated

back-up resource, while others simply made their way north, away from the Twin

Towers. Many made contact with the Mayor and his entourage of support staff and

commissioners as the group moved north to a series of buildings, ultimately regrouping at

a firehouse on Houston to which the command bus was deployed. The EOC was

activated at the Police Academy library at approximately 2pm on September 11, and was

eventually reestablished at the Pier 92 facility along the Hudson River. Representatives

were instructed to report to the Pier 92 EOC for the 6:00pm shift on Friday, September

14, although staffing at the Police Academy continued overnight during the transition.

Ability to Carry Out a Plan

As outlined in the improvisation decision-tree (see Figure 1), organizations acting

under time constraints must first determine whether or not a plan for a particular

organizational element (structure, resource, activity, or task) is in place to contend with

the scenario presented. Regarding resources for coordinating a multi-organizational

disaster response, New York City did have in place the sophisticated, well-equipped EOC

at 7WTC. The ERON relied on this resource and had incorporated it into the city's plans

to monitor and respond to a host of emergency situations. Because a planned resource

was in place, creative improvisation was unnecessary. The subsequent points in the

improvisation decision tree question whether the plan can be carried out and, if not,

whether a contingency plan is in place. Unfortunately for New York City, neither was the case.

Almost immediately after the first plane attacked, OEM officials began the process of notifying agencies to report to the activated EOC. Many agencies, particularly those with a presence in Lower Manhattan, already knew they needed to report. New York City had disaster response plans in place and had experience responding to major emergency events. As the September 11, 2001 disaster began to unfold, initially there was no reason to believe that established plans and procedures – to use 7WTC as the EOC resource – would not be adequate to contend with the emergent needs brought about by the attack. Although some personnel went from 7WTC to the Twin Towers and returned to the EOC with information, and although television news reports were being broadcasted in the facility (the volume was off to allow for better communication within the EOC), EOC personnel were still struggling in the early moments after the attacks to make sense of what had happened. However, due to the proximity of 7WTC to the towers, agency officials in the EOC soon began discussing with OEM staff whether or not they should evacuate the building.

Even with 7WTC at risk, organization representatives were hesitant to evacuate the EOC because it signified an abandonment of the plan or the script. They were, after all, in a state-of-the-art emergency hub for the city and had in the EOC a tremendous amount of resources at the their fingertips. They knew they would be best able to handle an emergency of this scale from 7WTC. At this time, OEM personnel were unaware that off-site back-up of electronic computer files and databases had not actually taken place

and that they would eventually need to improvise these resources as well. At the same time, officials were very reluctant to abandon the operations facility because there was no clear procedure to follow to move to or establish another site. Although some personnel were considering leaving the EOC they were also aware that they were without a clear alternative. As one official who was part of the discussions about whether to evacuated stated:

> I was still for staying because it was our EOC and I couldn't think of where we would go if we left the EOC because at that time we didn't have a backup facility. We kind of had ideas of where we would go but we didn't actually have a place that we could walk [in] and turn [on] a light switch and it would an EOC waiting for us.

OEM and other city agencies had relied on the resources they had put in place in the EOC as well as on the symbolism that facility provided. As noted earlier, the EOC was laid out in a manner that both symbolically conveyed and practically facilitated the interaction that officials needed to bring about a disaster response. Agencies were clustered in work pods designated according to their emergency functions, and situated in a privileged position on a raised podium above all of the agencies were OEM staff, reinforcing the agency's role as coordinator. Not only were data, monitoring, and communication systems available, but so too were areas denoted to organizational coordination and media briefings.

Of course, it is not as though OEM personnel had never considered where they could set up an appropriate back-up facility. Some of the ideas that had been suggested included city phone banks that would have made available a large number of communication lines, or the New York City Police Department's (NYPD) Command and

Control Center. Most of these limited discussions had centered on the potential need for a temporary facility during small or moderate-scale emergency. Discussions had never considered a catastrophic event like the one that was unfolding on September 11, and the City had never formally established a secondary site equipped with resources comparable to 7WTC. Moreover, despite the fact that operation centers had been destroyed or disabled in other U.S. disasters, there was no formalized evacuation plan for the EOC.

Political concern was another factor that contributed to the hesitancy to evacuate 7WTC, which is consistent with research on fast-paced industries that suggests that politics seems to slow decision-making (Eisenhardt & Bourgeois, 1988). OEM officials were acutely aware of the political consequences of evacuating the EOC. Indeed, in the late 1990s, several OEM personnel who were still with the agency on September 11 had been involved in promoting 7WTC as an appropriate site for the EOC, often against considerable skepticism and opposition. Some had even argued that it would be the "safest floor in the city." Now those same officials were faced with the possibility of abandoning not only the facility, but also the notion that the location was indeed safe. As this official recalled:

> Believe it our not running through my mind at that time [was] do we order an evacuation of this facility during the worst disaster this city has ever seen and abandon our post or do we stick it out. And the only reason we evacuated was because we heard there was a third plane out there.

The notion of widespread panic in emergencies is a myth the disaster literature has long debunked (Johnson, 1987; Quarantelli, 1980; Quarantelli & Dynes, 1977; Wenger et al., 1975). The images put forth by disaster movies often show a fearful

public overreacting to a threat and fleeing from a disaster site without regard for the safety of others. Contrary to this myth, research has demonstrated that encouraging people to leave an endangered area is a challenging task. In threatening situations, there is a tendency to stay rather than leave, to maintain routine behavior and carry on as normal or at the very least, attempt to follow existing emergency procedures. For example, emergency response organizations are more likely to encounter the challenge of convincing people to evacuate their homes when threatened by an impending hurricane or flood than that of stemming panic in such circumstances (Quarantelli & Dynes, 1977). One need only recall the difficulty in initially encouraging passengers to leave the damaged Titanic or the tendency of people to dismiss fire alarms as annoyances unless other cues of danger are present to identify examples of a tendency toward maintaining routine behavior. The emergency operations center staff was not immune to this kind of 'normalcy bias.'

OEM officials initially decided they would stay in the building, while some agency representatives who had converged to the EOC decided to leave. Many of the agencies had comparatively weaker ties to 7WTC than OEM because it was a space they used only during emergencies or disaster drills. In contrast, not only were OEM personnel considering leaving the EOC, but they were also considering leaving their daily working environment. Unlike other agencies that still had the continuity of their office space, OEM officials would find themselves without offices, technology, and support services were they to abandon 7WTC.

Milling and keynoting, phenomena common to collective action episodes, were instrumental in decisions to stay or leave. Milling is quite common in situations characterized by ambiguity and the need to act. Turner and Killian (1987) explain how individual behavior in crowds often emerges after an initial period in which the crowd develops a definition of the situation. Through verbal and non-verbal cues, individuals within the crowd look to one another for signals about how to interpret their environment. They may even draw upon information from other sources by reaching out through telephones and feeding that information back to the group. Are others afraid or do they seem secure in their surroundings? Are others staying or are they leaving? If they are leaving, which way are they going? As individuals within the collectivity make verbal or physical movements, they influence the movements of others and become influenced by others. The collective action of the group results from interaction among individual actors. On September 11, EOC officials initially looked to each other for cues as to whether or not they should evacuate. Because of high organizational response investment and elevated sense of security in the EOC, and because of ambiguous external information as to the threat posed against the 7WTC building, the milling among those at the EOC immediately after the planes struck contributed to the sense that people should stay rather than evacuate. Milling continued at the EOC as officials continuously received new information and as a sense of unease about staying grew.

Keynoting involves a strong cue provided in times of ambiguity that helps define the situation for others. A keynote, which can be as explicit as a direct statement or as subtle as a gesture, can be accepted or dismissed by others in the group (Turner &

Killian, 1987). In the case of the EOC, some personnel saw the evacuation of federal

agencies located in 7WTC, such as the Central Intelligence Agency (CIA), as a cue to

leave. Personnel from these federal agencies had converged to the EOC immediately

after the attacks. Interestingly, many OEM and agency representatives were unaware that

these agencies maintained office space in the building before the disaster. Some of the

EOC personnel who were there at the time concluded that if U.S. intelligence agency

officials deemed the situation serious enough to leave, others in the EOC should leave

7WTC as well. Eventually, representatives in the EOC decided to leave as a result of an

order, or successful keynote, by a high-ranking OEM official. After both towers had

been struck, and after hearing that another plane was in the air and missing, an OEM

deputy director who had just returned from the multi-agency command post in Tower

One ordered the evacuation of 7WTC approximately thirty minutes before the collapse of

the south tower of the World Trade Center.[6]

However, direct statements calling for evacuation were not always enough to

convince people that the EOC was no longer a viable location and to facilitate the

abandonment of original plans. Indeed, one city agency representative would not hang

up his telephone call until an OEM official took a more explicit keynoting step:

> There was one guy on the phone. I said, 'Lets go!' He says, 'I'll be right
> there.' So I took a pair of scissors and cut the phone line. He goes,
> 'What's your problem?' So I go, 'We're going to get hit. Get out!'

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[6] Reports vary regarding the precise time of the evacuation of 7WTC. For example, one written chronology produced by an OEM official records 9:20am as the evacuation time, while interviews suggest the evacuation time was approximately 20 minutes later and slightly closer to the time of the collapse of Tower One.

Officials then scattered to various points, including the command post at the Twin Towers and the mobile command unit bus. Yet many agency representatives and OEM staff went to the lobby of 7WTC, a movement that illustrates the extent to which individuals and groups adhere to daily routines even in major disasters. Gathering in the lobby to discuss "the next move," as one official described, is an activity that is consistent with routine behavior, and the use of this space as a congregating point for members of the ERON was logical choice. At this point, other agencies representatives had just begun to arrive. They met EOC evacuees who were waiting in the lobby deciding what to do next. One city official that met representatives in the lobby of 7WTC described their activities as follows:

> There were a lot of people that were just kind of milling about…They were trying to figure out where it was that EOC going to go.

In other words, they were looking to each other to collectively make sense of the newly emerging environment and rely on one another for cues for subsequent collective action. In the case of the 7WTC, milling and keynoting in both the lobby and upstairs on the twenty-third floor were important factors precipitating the abandonment of the EOC and the departure from standard emergency procedures.

Whether for political reasons, a tendency to normalize the situation, lack of information about the extent of the damage and threat from neighboring buildings, a lack of contingency planning, or hesitancy on the part of a lead organizations to abandon its office, there was a reluctance to leave the EOC and its resources behind. In the fast-paced environment of that initial hour (and later as well) the ERON was trying to collectively make sense of the environment and social cues, and it eventually moved into

a response milieu that demanded improvisation, particularly after the building collapsed.

In the end, the various organizations could have collectively determined that the EOC at

7WTC was indeed still viable and decided to remain in the facility. It is impossible to

know if that prolonged resistance to evacuating would have cost lives at 7WTC. The

possibility of an imminent threat (the missing plane) and the keynoting of several

officials facilitated a process by which the ERON collectively determined the EOC was

no longer viable, even when environmental cues could have led organizational personnel

to an entirely different decision. Admittedly, most officials who evacuated 7WTC

thought they were only temporarily abandoning the EOC resource. As they left the

building, many believed they would be returning later that day. They did not anticipate

that the building would succumb to fire and collapse that same afternoon. Once the

building collapsed, the question as to whether or not 7WTC was still a viable resource

became moot.

Appropriateness of the Plan

      With an original EOC resource having been in place and facing the loss of that

resource with no contingency plans outlined, organizations involved in the disaster

response quickly moved to consider the appropriateness of 7WTC as a resource best able

to contend with the emerging disaster environment. This step is outlined in the

improvisation decision-tree (see Figure 1). The decisions about whether original

elements are appropriate and should be reproduced are not necessarily linked to objective

measures of whether the planned structure, action, resource, or task is indeed *the best*

approach. Instead, the decision to engage in reproducing what was originally in place is

in itself based on collectively-developed organizational definitions of appropriateness. Perhaps a better course of action is available; however, if the organization collectively determines that the original structure, resource, activity, or task was indeed appropriate, it will choose reproductive improvisation over adaptive improvisation. As with other points on the decision-tree, this collective-sense making under time constraints less often involves one clear decision that articulates the collective assessment of the appropriateness of the original element and more typically involves a combination of subtle improvised movements and processes of collective action that together reinforce the process of assessing whether or not the resource is appropriate and worthwhile reproducing. After New York City lost 7WTC, the process of collective sense-making by organizations, leading to the conclusion that 7WTC was an appropriate resource, was tightly coupled to the process of reproducing the EOC itself. That is to say, the decision-making process occurred in concert with the reproduction process. For this reason, the section below discusses the process of determining appropriateness along with the process of reproducing the EOC.

As described above, the EOC at 7WTC was a highly sophisticated facility. It was designed and built in the late 1990s, and OEM staff had worked to put in place the kind of facility they believed would best facilitate their own and other agencies' roles in a disaster response. Many of the higher-ranking personnel at OEM had played instrumental roles in influencing the type of facility 7WTC had become. Had its integrity not been compromised, the EOC at 7WTC would have been considered a formidable site from which to launch an effective emergency response. Its design was purposeful,

representing the way OEM envisioned the designation of disaster-related responsibilities. It was comprised of resources and space that supported the execution of emergency-related tasks. Indeed, the Mayor himself heavily endorsed OEM and the EOC, agency representatives had reported to 7WTC, they were hesitant to abandon it, and after the evacuation they gravitated to the Mayor and OEM staff in efforts to recenter the operation. In other words, while the city could not carry out its plan of using the 7WTC EOC as a resource in the disaster response, the lead coordination organization, OEM, as well as the broader ERON still considered the form of that original resource appropriate given the emergent task environment. As a result, OEM and other agencies began the ambitious process of reproductive improvisation, of establishing a new EOC in a way that mirrored the original.

Members of the ERON began the reproduction process by moving toward two key symbols of the EOC: the OEM mobile command unit bus and the Mayor himself – the coordinating agency of the EOC was, after all, the *Mayor's* Office of Emergency Management (emphasis added) – as he walked with his entourage away from the collapse site to several buildings. Even though both the command unit bus and the Mayor were on the move, the people who looked to them for direction, information, and coordination had begun to reinforce the legitimacy of the EOC even after it was destroyed. Instead of improvising new resources that led to new ways of coordinating the response, the ERON had already begun to look for substitutions that closely resembled the original EOC.

It should be emphasized that these sense-making movements by the collectivity of organizations worked to help define the original EOC as an appropriate resource to

reproduce. Although it was difficult for many of those we interviewed to recall the exact

chronology of their movements and interactions during the immediate aftermath of the

collapse, they did report a number of interactions that fostered and reinforced steps

toward reproductive improvisation. While some personnel responded to directions they

heard over their radios instructing them where to regroup, others identified in the midst of

the post-collapse environment the mobile command unit bus or the growing entourage of

agency heads surrounding the Mayor and reinforced the social resource of the EOC by

opting to follow these two lasting symbols of that EOC resource. The process of moving

toward the Police Academy and the set-up of Pier 92 were in part initiated by intense

discussions at a firehouse where the Mayor's entourage and the mobile command unit

stopped, but there were still other alternatives that could have been followed. The Mayor

could have directed all personnel back to their respective departmental headquarters (or

other departmental offices since many agency headquarters were located in Lower

Manhattan and no longer accessible). Alternatively, EOC personnel could have opted to

return to and stay at department offices, at least temporarily. Yet discussions at the

firehouse initiated movement toward gathering at a central facility and actions by the

collectivity of organizations reinforced that movement. The process of making sense of

the appropriateness of the EOC continued at the Police Academy in as organizations

grouped themselves into work pods similar to those that were in place at 7WTC, and

OEM reinforced that reproductive arrangement by creating banners designated to

particular work areas, designating a specific area (albeit an inadequate one) that would

mimic the podium, and taking other steps to reproduce EOC arrangements at Pier 92. As

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is discussed below, movements set the stage for verbal directions which, when supported, served as signals for additional movements along the reproductive improvisation path.

Both temporary facilities that were established – the Police Academy library and Pier 92, which will be discussed below – constituted important steps in the process of reproduction. OEM and other lead city agencies secured the Police Academy to house a temporary EOC. On September 11, OEM staff and others within the ERON commenced the setting up of the EOC approximately one hour before activation and improvised resources – such as telephones, basic office supplies, and a paper system to track logistical requests – to provide a very rudimentary EOC framework. After activation, agency representatives reinforced the reproduction by rearranging the workspace in ways that mirrored the EOC – or at least as much as possible, given the limited space in the library. Other information dissemination and coordination systems that had operated through computer support systems at 7WTC were improvised using paper, easels, and other material that were more readily available.

Meanwhile, OEM, with the help of other agencies, was attempting a fuller reproduction of the EOC at the Pier 92 cruise-ship facility. That improvised EOC became operational three days after the attack. When I arrived inside the Pier 92 EOC on September 15, the resemblance to the 7WTC EOC was striking. Like 7WTC, desks in Pier 92 were divided into work pods, each pod representing the same functions they had at the original facility, such as fire, health and medical, transportation, and human services. Several televisions were set up at the internal entrance to the EOC space. A media briefing area was set aside toward the back of the pier in what became known by

staff in the EOC as the "martini lounge" because, according to one high-ranking OEM official, the area served as a lounge for cruise ship passengers during the facility's more routine operations. It was there that the Mayor conducted his regular press conferences during the disaster.

Although Pier 92 was not the technologically sophisticated and aesthetically pleasing space that had existed at 7WTC, its high ceilings and open floor spaces covering to almost two city blocks, it was larger and more accommodating than 7WTC, and it was a relatively comfortable area in which to work. OEM officials, cognizant of acoustic concerns, particularly in an environment that demands a great deal of inter-organizational communication, added carpet when setting up the site. In contrast, when the Federal Emergency Management Agency (FEMA) established its disaster field office (DFO) next door at Pier 90, carpet was not installed and as a result, the acoustics in the DFO were, according to many officials, less than ideal. OEM equipped Pier 92 with networked computers, fax machines, telephones, photocopiers, and supplies. OEM worked with private sector companies and city agencies such as the Department of Citywide Administrative Services (DCAS) to pull together resources and outfit the EOC. Some of the supplies were donated or newly purchased, while others were redirected from existing city sources. OEM established a primary meeting room in a sectioned-off waiting area of the pier in what could be described as a large foyer space. This elevated area was outside of the EOC room proper but inside the same facility and located. This space away from the activity of the EOC was shared by all organizations within the ERON.

Each organization within the ERON contributed to the collective determination that the EOC was an appropriate resource worth replicating. Organizations within the ERON reinforced one another's moves toward reproduction and made subsequent steps toward reproduction of the EOC. As is discussed at greater length below, the ERON improvised in a way to embody what Berliner, in his work on jazz improvisation, refers to as a "flexible treatment of preplanned material" (Berliner, 1994: 400). By envisioning the 7WTC EOC as the goal toward which to move, members of the ERON were flexible in their use of substitute resources and supported the improvisations of others when those steps contributed to the collective reproductive goals.

Considerations in the Process of Reproducing the EOC

The sections that follow discuss factors that contributed to the ERON's selection of reproductive improvisation as a strategy for coping with the situation in which it found itself following the evacuation and destruction of the EOC at 7WTC. As this discussion will show, reproductive improvisation was feasible in part because other elements of organizational response capability remained stable. Preference for and ability to maintain the status quo was another factor. Further, the resources needed to reproduce the EOC were available. Equally important, organizational members shared a collective vision that enabled them to restore EOC operations despite losses that would otherwise have crippled the ERON's ability to act.

The Importance of Stability of Other Organizational Elements for Reproductive Improvisation

Perhaps one of the most important facilitators of reproductive improvisation was the fact that other elements (structure, activities, and tasks) related to the EOC's mission, purpose, and mode of organization remained relatively stable. OEM, the lead facilitating organization in the ERON and the organization in charge of the EOC, did not lose personnel in the attack. This was in contrast to other local departments such as the Fire Department of New York, Port Authority of New York and New Jersey, and the New York Police Department, which suffered numerous casualties (343; 37 uniformed/ 47 civilian; and 23 respectively). As a consequence, the organization most familiar with the EOC resource was able to step in to reproduce what it had originally developed in 1999. Moreover, the roles of organizations that had suffered many casualties did not change. All of the organizations that had been active at 7WTC during smaller emergencies, that had participated in disaster drills, and that were assigned duties in emergency plans understood that they had similar roles to play in the EOC during this disaster (even though some of those roles would change later on.) The positions of various departments in the organizational hierarchy were sometimes contested in the field, particularly at Ground Zero, yet this did not alter the intended design and use of the EOC as a coordination site. Although organization personnel often engaged in emergent activities in the field, the EOC's basic roles – of response and recovery coordination, policy making, operation management, information gathering, public information, and hosting visitors – were not substantially altered in this disaster. The tasks representatives in the EOC performed in order to fulfill these roles also remained fairly stable. OEM would be

involved in a broad range of creative and adaptive improvisations, but given its relative

continuity with respect to structure, activities, and tasks, OEM sought to reproduce the

one feature of its response capacity that that had been completely lost: the EOC as a

critical resource. Because the EOC was designed as a resource that could support EOC

structures, activities, and tasks, and because the three other elements associated with the

EOC remained relatively stable, the ERON – primarily under the direction of OEM –

easily moved toward reproducing the EOC.

The Status Quo Bias

An organization that has a vested interest in maintaining authorities,

responsibility, tasks, and activities will also tend to encourage reproductive over adaptive

improvisation when that strategy is feasible. In the case of the EOC, both the ERON and

OEM, its lead agency, had such an interest.

On September 11 and the days that followed, the ERON was faced with a large

and complex disaster response. Hundreds of organizations were responding, and many

more were converging to New York City to offer assistance. Not only was the city facing

a large-scale and often dangerous set of challenges associated with debris removal,

firefighting, traffic control, emergency shelter, and a host of other activities, but an

intense and urgent search and rescue operation was also underway. Successful disaster

management and effective coordination were key to this response. Without an EOC, the

achievement of those goals could be critically compromised. To continue with a

concerted response of the type demanded by this disaster event while at the same time

considering completely new and improved ways to coordinate the activities of so many

organizational entities clearly was a luxury of time the ERON could not afford. Instead,

it chose to reproduce the EOC using 7WTC as a template and to make adjustments as

needs and time allowed.

A primary objective of OEM was clearly to provide the ERON with a functioning

EOC as a mechanism to improve response capabilities. It would be a mistake to

overlook, however, the positive impact the reproduction of the EOC had on OEM's

legitimacy as a coordinating agency, or rather, the negative impact *not* quickly

reproducing the EOC would have had on the organization. OEM is responsible for

ensuring that the EOC is activated. Its failure to secure a back-up facility as part of a

contingency plan and the choice in the late 1990s to locate the EOC so closely to a

primary terrorist target such as the Twin Towers – a structure that had been attacked in

the recent past – were decisions that were already generating criticism. In the immediate

aftermath of the attack, the overall sentiment in and around New York City was still one

of shock, grief, and willingness to support. However, an organization as closely linked to

the Mayor as OEM could not have been blind to the political ramifications of failing to

provide a resource that was critical for the management of response operations. OEM's

credibility was at stake at a time when its legitimacy as a coordinator could not have been

more important. Failure to act expeditiously would have directly affected the Mayor's

image as well. By reproducing the EOC at Pier 92 under such pressing time constraints,

OEM did ultimately withstand criticism. The lack of a suitable back-up facility and the

location of the EOC at 7WTC were still viewed by city residents and the emergency

management field as shortfalls, but the organization was also commended for its

accomplishments. Furthermore, reproducing the inter-organizational relationships reflected by the work pods and the podium reinforced OEM's role in the EOC as lead coordinator and facilitator of other organizations within the ERON.

At the Police Academy, in contrast, a simple chair had served as a podium. OEM officials would stand on the chair to call out requests to agency representatives. Besides making it very difficult to call attention to its requests in the crowded and noisy environment of the Police Academy EOC, the system also did not adequately support OEM's role or status. Anyone can stand on a chair. At the Pier 92 EOC, the podium was erected in such a way that it closely resembled what had been in place at 7WTC, overlooking the various work pods. Most OEM personnel worked on or adjacent to the podium. Following the same procedures that had been used at 7WTC, they would call organizations up to the podium using a microphone. Podium computers contained various databases and were linked to weather information available on the World Wide Web. A meeting area was set up behind the podium. Early on, staffers began to hang maps along the front rail of the podium. The physical arrangements of Pier 92 thus reflected the same inter-organizational arrangements that had been represented at 7WTC. OEM staff were again positioned above other organizations in the EOC both to aid in practical coordination of response operations and to symbolically reflect their oversight role in the facility.

By emphasizing the effectiveness of the original EOC and reproducing the site in such an expedited manner with available substitutes, OEM was able to maintain its credibility and ensure continuity of the overall emergency response structure. What

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Giddens (1976) refers to as the production of meaning – that the EOC was an appropriate resource and that the ERON, OEM, and ultimately the Mayor were coping and in control – was essentially achieved through the process of reproducing the EOC and the system itself.

Symbols were used to recreate the atmosphere that had existed prior to the September 11 attack. When a large OEM insignia – one that originally hung above the podium at 7WTC – was later recovered at Ground Zero during the debris removal process and brought to Pier 92, OEM officials and many other agency representatives were greatly encouraged. People smiled and seemed almost ready to cheer as it was carried in. On a practical level, OEM and other agencies constituting the ERON did not need any additional affirmation of the capabilities of EOC resources they had reconstituted. The reproduction was already achieved. The facility was impressive enough and was facilitating emergency operations. Still, the recovery of the insignia meant a great deal. Given that OEM personnel had taken almost nothing with them during the evacuation of 7WTC, the large metal seal served as virtually the only material bridge between the old EOC and the new, and its symbolic value was particularly important to OEM. At 7WTC, the insignia had designated the 'home' of the organization and also served as a declaration of OEM's presence and authority. Thus, although the facility was lost, the seal was the material representation that OEM's *place* was recovered. While OEM did not have a space above the podium to re-hang the damaged insignia, bringing it to Pier 92 served to christen the transition to the reproduced EOC and demonstrate that the reproductive improvisation was successful.

This legitimacy also worked to aid members of the ERON in their initial search

for an EOC after the evacuation of 7WTC. Because OEM is responsible for EOC

activation and coordination, the organization is tightly coupled with conceptions of the

EOC. OEM also borrowed legitimacy from the Mayor. Moreover, the Director of OEM,

along with other city commissioners and staff from the Mayor's office, accompanied the

Mayor as he evacuated north through Lower Manhattan. People looked for the Mayor

and when they found him, they found OEM. Representatives from the ERON (as well as

organizations that would eventually become part of an expanded emergent multi-

organizational network or EMON) initially followed the Mayor and his entourage to what

would become the temporary EOC at the Police Academy. As one OEM official

explained:

> People knew where we were and how they knew, I don't know. We were
> with the Mayor – gravity, you know. Power flows towards the Mayor.
> People gravitated toward him and they found us…by word of mouth.

By borrowing status from the Mayor, OEM was able to pull together the ERON,

essentially encouraging a re-emerging "walking EOC" around the Mayor until a stable

location could be identified.

Access to Suitable Substitutions

Access to resource alternatives is of course critical in an organization's ability to

engage in reproductive improvisation of an original resource. Clearly, if an organization

needs to substitute a resource like the EOC at 7WTC, it must have access to resources

that will aid in this process. Fortunately, resourcefulness is a major strength of a city as

large and diverse as New York City. Efforts to locate and mobilize alternative resources began as soon as OEM personnel recognized that they would have to abandon 7WTC.

Immediately after the evacuation, a segment of OEM personnel ran toward the city's deployed mobile command unit bus. As the bus slowly moved block by block out of harms way, more OEM staff and agency personnel gathered in and around the vehicle. The resource of the bus allowed members of the ERON to identify a mobile representation of the EOC that could serve as an area to coordinate, discuss subsequent moves, and share information with officials.

The mobile command unit bus drove to a firehouse on Houston Street, a location to which the Mayor had walked. Outside the firehouse, officials discussed where to go next but eventually decided to establish a temporary EOC in the library of a New York Police Department's training academy. The group that had congregated around the Mayor made this decision, and the presence of the Director of Emergency Management, OEM's First Deputy Director (both of whom had served previous appointments with the NYPD), and the Police Commissioner certainly played a role in the selection of the Police Academy as an alternative site. It was a logical choice for officials with links to the police department to think first of a facility closely linked to that organization. Furthermore, the facility allowed for the implementation of security measures, a concern that was foremost in the thoughts of officials whose city had just come under attack.

The "walking EOC," now consisting of the Mayor, key OEM personnel, and representatives from approximately thirty to forty other agencies, moved operations into the library shortly after noon on September 11 with activation at approximately 2pm, but

they quickly recognized the inadequacies of the facility. It was, as one person put it, a "place to park until a better facility was established."

Many of the supplies used at the Police Academy were commandeered from elsewhere within the building. Computers were not readily available, so much of the work was initially done on paper. On the night of September 11, approximately forty computers were set up at the Police Academy EOC. Many officials complained that because of the cramped quarters and lack of appropriate software, the computers were difficult to use. A great deal of time was spent stringing telephone lines from other offices in the Police Academy into the library. But still, many of the lines did not work. As one official who was present recalled:

> The phones were horrible, 'cause they were like pay phones [lines]. They strung all the phones into the room. But you know pay phones – you have to put a quarter in. So you would pick up a regular phone and you would dial the number and you'd get the, 'Please deposit 25 cents.' And then you [would] look for a place to deposit 25 cents [and] it was [a regular phone]!

But while the ERON was actively responding from the Police Academy, others were tapping informal and formal networks with private contractors, vendors, and city agencies to pull together the vast array of equipment and internal facility support needed to more fully reproduce the EOC that had been at 7WTC. Important in efforts to engage in the reproductive improvisation process was the ERON's performance as bricoleur, or "someone able to create order out of whatever materials [are] at hand" (Weick, 1993: 639). Instrumental in this process was the transformation of the ERON into an emergent multi-organizational network (EMON). That is, not only did the reestablishment of the EOC rely on organizations within the established network of New York City government

organizations with previous working relationships with OEM, but it also relied heavily on

the donations and services provided by a host of organizations new to the network. OEM

officials were able to pull together materials at hand to replicate the EOC at 7WTC.

Consider the management information systems component of the EOC as described in

OEM documentations of the disaster. OEM mobilized resources from the Department of

Information Technology and Telecommunications (DoITT), Computer Horizons

Corporations (CHC) and the New York City Human Resources Administration (HRA) to

develop the management information systems at Pier 92. Several technicians as well as

over one hundred fifty computers and printers were redirected from HRA to the emerging

EOC.   At the same time, HRA and DoITT acquired components for a Public Branch

Exchange, or phone switch in support of over two hundred fifty digital lines from

Verizon and Nortel telecommunications. These two companies, along with Nexteria and

Williams Communications, helped to make the phone switch operable and deploy over

two hundred telephone sets within thirty-six hours. The MITRE Corporation, contractors

to the Department of Defense and the U.S. intelligent establishment, provided satellite

phones. PolyCom and its distribution network established video teleconference

capabilities. Ricoh Corp provided several high-speed copiers, while Time Warner

Communications provided high-speed Internet access and cable services. Numerous

other agencies and companies played a role in reproducing the information technology

capability for the EOC. As the EMON continued to grow, so too did the resources

available to OEM and other agencies involved in the reproduction of the EOC. The more

resources at hand from which the organization could draw, the more capable the organization was in its reproduction efforts.

Even the building that would ultimately house the emerging EOC was an improvised resource. Ironically, OEM had scheduled a disaster exercise for September 12, 2001. The purpose of that drill was to bring together relevant city agencies to simulate a "point of dispensing" process to patients following a biological attack. The practice exercise was to include intake, triage, medical evaluation, and medication dispensing. Such exercises are relatively common across the county, with communities holding annual or biannual drills to test their response capability to potential disaster scenarios.[7] Pier 92 was the site OEM had previously arranged to use for the drill. On the morning of September 11, several OEM staff members were already at the facility setting up for the exercise. Not only were OEM staff members familiar with the site, but the organization had a short-term lease on the facility. That after the collapse of 7WTC, officials decided to extend the lease on the Pier facility.

As Weick (1998: 546) suggests, "improvisation does not materialize out of thin air. Instead, it materializes around a simple melody that provides the pretext for real-time composing." In the case of the reestablishing of the EOC, the original provided a guiding

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[7] In fact, a professor from DRC had observed another weapons-of-mass-destruction exercise in May, 2001 in New York City. The City had exercised a response to a plague episode on the east side of Manhattan (although participants were unaware of the agent at the start of the drill). Not all city agencies that had assigned seating at the EOC were actually represented in that exercise, although a sizeable contingent of organizations from the public health area did participate, as did the Mayor. Considerations such as whether to close bridges and tunnels into Manhattan, the school system, and the New York Stock Exchange were decisions the Mayor discussed during the exercise. There are numerous benefits to holding such exercises. In addition to testing plans and procedures, disaster drills foster a dialogue on emergency response issues even when more pressing daily concerns may occupy the minds of community officials. They also increase a familiarity among individuals and organizations that may have little interaction during routine times, but that will be expected to work together in disasters.

template, as did the OEM's earlier experience with Pier 92. The resources at hand made possible the process of improvisation. The shared vision of the EOC resource, discussed below, provided the template around which to garner those resources and model them after.

Persistence of a Share Vision through Virtual Role Systems

The multi-organizational network's ability to articulate a shared vision through virtual role systems was important to the ERON's reproduction of the 7WTC EOC and its effective response during the reproduction process. According to Weick (1993), virtual role systems allow members of a group to mentally maintain a conception of the systems of which they are part. Moreover, each group member is able to conceptualize his or her role, the roles of others, possible actions, and overarching goals despite system disruptions. The virtual role system operates in the minds of the participants long after the tangible system has ceased operating (Weick, 1993). Mallak (1998) interprets virtual role systems to mean that an organization can function when one or more of its members are absent. Weick and his colleagues (1993; 1999) use the concept virtual role systems in a way that highlights its importance for organizational resilience not only when a member is absent, but at all times. For them, the virtual role system enables all organization members to simultaneously develop a shared vision of emergent challenges and ranges of action, as well as allows each member to cognitively reproduce the organization. Virtual role systems are important in disaster responses when system disruption can reach extreme levels.

Through explicit strategies such as training, drills, and exercises as well as through implicit strategies of involvement in operational activities where organizational norms are absorbed, responders are able to develop, maintain, and act upon their shared vision of emergency needs, goals, and available resources (see Comfort, 1999). Loss of shared vision constitutes a management crisis that demands intervention (see, for example, Brenneman, 2000). Conflict does exist within organizations that hold a shared vision as dissenting groups offer alternative visions of appropriate courses of action. A shared vision does not imply absolute homogeneous thinking. It does, however, reflect overarching goals and procedures that influence the types of strategies (and types of improvisation) organizational members choose under crisis. The shared vision is not unlike the structure in Giddens' duality of structure theoretical approach, in which "social structures are both constituted by human agency, and yet at the same time are the very medium of this constitution" (1976: 121). The shared vision is both constructed by members of the organization through their participation in it and imposed on the members by policies, training, and the extent to which practices are crystallized prior to the time members join the organization. But just as the shared vision guides the actions of the organization's members, so too do the members have the opportunity to sustain or reject the vision. Organizations with a shared vision are guided by the overall structure while at the same time collectively constructing meaning from environmental cues and developing strategies to work toward that vision.

The initial tendency is for organizational actors to resist changing normal routines and practices. Weick's study (1993) of the Mann Gulch fire, for example, found that

during crises, emergency response organizations are likely to revert to original plans and practices even when the situation demands improvisation. In that study, firefighters killed in the wildfire rigidly adhered to an established course of action that was no longer appropriate given the newly emergent conditions. Sense-making that reflects the operation of virtual role systems did not emerge. While the group leader was able to envision a way to survive, others who did not have a shared vision were unable to come up with the same solution or even recognize that the solution was appropriate given the imminent threat of the fire, even when directed by their leader to respond differently.

In contrast, in the case of improvising the EOC, organizations were able to draw upon virtual role systems for their action repertoires after 7WTC was evacuated. The EOC at 7WTC was a resource used to coordinate and communicate multi-organizational emergency response activities. Evacuated organizations stationed at the EOC were able to use virtual role system of the EOC to envision the leadership, activities, and coordination procedures they needed to accomplish and improvise resources in their response repertoire as they reproduced 7WTC and also fulfilled their response roles. They improvised space, they improvised communication strategies – whether technology based, such as telecommunications equipment, or interpersonally-based, such as the physical arrangements of response-based workgroups – and they improvised the equipment and support material in the EOC that helped them carry out their responsibilities. The relative ease with which they were able to do so was facilitated by the fact that the improvisation was reproductive in nature, as opposed to adaptive or creative. Unlike the Mann Gulch firefighters, who were unable to envision a virtual role

system, where the planned for response of dropping their tools and running away was suddenly inappropriate, organizations in the EOC had what they considered an appropriate resource to use as a model and, in retrospect, their assessment of the resource as appropriate was a correct one. Because the organizations had an appropriate model to envision, their challenges lay in how best to reproduce that model rather than creatively envisioning and enacting a different system.

Although a multi-organizational network had immediately emerged at Ground Zero and other locations central to the response, it was members of the preexisting ERON who began the process of reestablishing the EOC. Unlike new members of the EMON, ERON members had prior experience with the EOC and consequently shared the same vision for it as a resource. Organizations with no prior involvement with the ERON (such as the Department of Design and Construction (DDC) and the construction companies at Ground Zero or family support organizations at the Family Assistance Center) were either more concentrated at other locations or became most active at the EOC after it was activated at Pier 92. Their influence on adaptations therefore became more pronounced only after the initial reproduction.

As discussed in Chapter 2, this and other discussions of improvisation involve ideal improvisation types. The reestablishment of the emergency operations center not only included adaptive and creative improvisation of other organizational elements, but the ERON soon began a process of adaptive improvisation within the EOC at Pier 92. For example, additional work pods, such as one focusing on debris removal, were added to Pier 92 given new response demands. Others, such as logistics, expanded as the roles

of the organizations in these work pods grew. The space was much larger than 7WTC and OEM eventually made use of much of that space, not restricting itself to the space allocations the original. A greater number of organizations with more representatives maintained desks at the new EOC, more than were allowed for or could have been accommodated at 7WTC. In fact, over twice as many workstations were ultimately in place at Pier 92 than at 7WTC. Organizations previously not assigned to the EOC, but that may have been included in additional workspace set aside at 7WTC for larger emergencies, were assigned to work pods. Security was tighter at Pier 92 than would have been in place at 7WTC, and the isolation of the new facility along the West Side Highway and Hudson River allowed for such security measures as more checkpoints and armed rooftop snipers. In Pier 92, the press did not have the same view of the inner workings of the EOC during press briefings. Instead, press briefings given by the Mayor were held in a curtained-off area at the end of the facility.

The original EOC had space for food tables. Such tables were introduced at Pier 92 but, due to the protracted response, they were quickly augmented by food and sleeping resources provided by the U.S.N.S. Comfort – the navel medical ship that was docked beside the pier, cot areas within the EOC, and what evolved into an elaborate dining area complete with catered food, round table-clothed tables, and commercial beverage refrigerators. Fresh flower arrangements were added later. A logistical tracking system called E-Team was introduced. E-Team had been scheduled for integration into 7WTC operations but was not yet in place on September 11. In response to a request by OEM,

the company sent representatives to New York City to aid in the expediting introduction of the system to the response efforts.

Creative elements were introduced within Pier 92 as well. For example, a mapping and data center staffed mainly by volunteers from Hunters College and a multi-agency mapping network was introduced into the new EOC and continuously grew as the demand for maps and data increased. The processes associated with these adaptive and creative improvisation episodes at Pier 92 are similar to those discussed in subsequent chapters. However, the overall motivation guiding improvisation at the EOC in the first days following the attacks was reproductive.

The shared vision of structures, activities, and tasks, along with staff members' mental maps of 7WTC itself, facilitated the reproduction of the EOC resource that organizations believed could best support their response. At the same time, the EOC resource, reestablished in a familiar, easily recognizable way with respect to physical facilities and arrangements, helped to maintain the shared vision important to organizational resilience. The ERON not only used the knowledge embedded in its response repertoires, but it also drew upon resources in order to improvisationally reproduce familiar operational patterns, as expressed in the spatial arrangement of their facility. When existing procedures were destabilized in the face of unexpected catastrophe, OEM staff and other members of the EOC organization created the physical operational context for restoring them. This was possible because, through training, frequent drills, and exercises that often involved the mayor, OEM and departmental representatives in the EOC organization had developed a capacity for flexible behavior

that was not dependent on either specific physical facilities or specific technological support systems.

It is worthwhile to remember that the EOC at 7WTC had been a relatively new facility. Many of OEM personnel who were with the organization on September 11 had played a part in designing and contributing to the improvement of the original EOC. The OEM Deputy Director responsible for overseeing the reestablishment effort at Pier 92 was the same person who had helped pull together resources in the design and development of the EOC at 7WTC. Another Deputy Director who contributed to this effort described the EOC, its constituent organizations, and interorganizational linkages as being "in [his] head." This official, like many we interviewed or whose actions we learned about, had a mental picture or template for the EOC as a coordination resource that continued to exist beyond the abandonment of 7WTC. That is to say, the abandonment of 7WTC signified the abandonment of the building housing the EOC, but not the collectively belief that the EOC was a valuable resource or the vision of what constituted that resource. The formal doctrines that supported its form and the experience of working at the facility reinforced the facility's merit in the minds of those reconstituting the EOC. Furthermore, the organization fostered a shared vision because the ERON had retained its institutional knowledge and also because OEM had not suffered large casualties within its ranks.

This vision of the EOC was shared by other organizations in the ERON in addition to OEM. Even as early in the reproductive improvisation process as the establishing of the temporary EOC at the Police Academy, representatives had begun

grouping themselves into work pods to replicate the networking function of the EOC.

They collectively organized themselves into work pods without external direction. As

this OEM official observed about the Police Academy work pods:

> We never formally told the agencies where to sit, but they all kind of
> grouped themselves together.

In part owing to their previous visits to 7WTC and in part owing to their recognition of

the types of activities that needed to be accomplished, organizations took it upon

themselves to arrange the limited number tables that were available based on the

arrangement of pods at the original EOC. OEM soon reinforced that reproduction by

posting pieces of paper identifying the work pods. The city's disaster planning process,

which had involved organizations within the ERON in drills and meetings, encouraged

the adoption of a shared vision of how the EOC resources was to look and function. The

designations used for work pods were in turn based on the emergency support functions

(ESFs) identified in the Federal Response Plan. This set of formal plans thus enabled the

ERON to replicate the EOC resource.

Within the first week following the attacks, much of the EOC had already been

reproduced. However, officials continued that reproduction over time. Small groups

seemed to avoid using the formal meeting area accessible through the foyer. At first, they

met around boxes of supplies toward the back end of the EOC. After about a week in the

pier facility, formal meeting spaces began to emerge in the under-utilized floor areas.

Tables soon appeared, to be followed by partitioning curtains. OEM personnel undertook

some of these movements toward reproduction, while representatives from other

organizations who noted deficiencies in the reproduction initiated others. Rather than

waiting for OEM to complete the reproduction, other organizations within the ERON stepped in when deficiencies interfered with their ability to work. One of the meeting areas was appropriated and turned into the Mayor's Conference Room. This space consisted of no more than a table, chairs, and solid partitions with a door. Less impressive than the Mayor's Conference Room at 7WTC, it was a reproduced resource that set aside specifically for the Mayor a private meeting area and provided another symbolic representation of his presence. Interestingly, many meetings involving the Mayor were still held in the larger more comfortable meeting area above the foyer.

In time, other reproductions took place. Not only had 7WTC been home to the EOC, but it also housed the offices of OEM staff. By the time of the November 12 plane crash into a residential area of Rockaway Beach, Queens, office and meeting space for OEM personnel, consisting of hard partitioned walls and doors, had been installed behind and adjacent to the podium.

The drills, planning, meetings, and training worked to instill a common vision in the minds of those who would make use of the EOC. One official recalled an agency representative telling him several months after the response that indeed, 7WTC was instrumental to the response even though it had collapsed, for it set the stage for the networks, relationships, and coordination that could only have resulted from the activities that had taken place there in previous years. The reproduction of the EOC at 7WTC was therefore not a new "shared vision," but the means of preserving through reproductive activity the vision that had guided the ERON's activities prior to September 11. As this official remarked regarding the EOC resource:

[We were] best prepared in the management structure. And that's from the EOC. We've done a lot of work figuring out how to figure out how to manage large-scale incidents. And this went from the EOC, we had done a bunch of EOC drills, we had an EOC protocol, we knew how we were going to manage the EOC into functional groups and how that flow of information would work. We had done a lot of thinking about that. So that's something that definitely worked and was there.

After the EOC was destroyed, it was the work done at the EOC prior to September 11 that had facilitated the shared vision and reproduction of the EOC resource. Planning for a disaster results in a process, not a product. According to this official who played an important role in the reestablishment of the EOC:

When you're in the planning process, it builds relationships with people and you learn about agencies and what they're capable of. And so no plan that you write it and no disaster [goes] according to the plan…So you know, building the relationships and understanding how the agencies operate and what some of the issues are between the interactions with agency - that's where your planning really pays off. Because that paper document as far as I'm concerned is useless. It's all of the things that you get, that you go through to get that paper document, that's the value that's- that's in planning, and so like knowing the players and understanding what the agencies are capable of and, you know, having them understand you and what your agency is capable of. That's where the value is.

The plans for the EOC resource, though vital, were not as important as the shared vision of that resource. Because the shared vision was still in place, the ERON could create a virtual EOC, making do with space and ad-hoc resources, while they worked toward reestablishing a better reproduction of the original. Although communities may come away with written documents that provide an undisputable contribution to disaster response, it is impossible to anticipate every specialized resource or action that a given disaster event may demand. The planning process, therefore, can contribute to the

capacity of the organization to improvise and integrate those improvisations system-wide (Drabek, 1985).

Conclusions

Reproductive improvisation occurs when the organization or collectivity of organizations determines that an original but unachievable structure, activity, resource, or tasks is appropriate in the crisis environment, and then employs novel substitutions under time-constraints to replicate the original. This analysis focuses on the City's reestablishment of the emergency operations center resource during the World Trade Center disaster response. Through a process of collective sense-making, the collectivity of organizations involved in the response defined their circumstances by looking at cues in the dynamic disaster environment and information from other organizations regarding the viability and appropriateness of the EOC at 7WTC. Facilitating improvisational processes was the stability of the coordination needs demanded of the EOC, even when other specific response activities or structures may have changed somewhat, the tremendous access to a wide range of resource substitutes, and a preference to maintaining existing systems of authority and network structure. By maintaining a shared vision of the resource and the structures, activities, and tasks it was supporting, the ERON was able to reproduce the EOC while carrying out response activities during a large-scale and protracted disaster. A virtual EOC persisted in the minds of those who had trained and worked in the facility despite the loss of 7WTC.

The EOC reestablishment example illustrates a successful instance of reproductive improvisation. Still, reproductive improvisation can have disadvantages.

The same factors that facilitate this type of improvisation can blind participants to cues pointing to alternative courses of action. Rigid adherence to an original model when no longer appropriate can result in increased response challenges. The time constraints of the World Trade Center response and demands to proactively respond to the disaster while improvising lost resources also encouraged the ERON to maintain the status quo and reconstitute a resource with which it was familiar rather than pursuing more radical adaptive or creative improvisations. Numerous adaptive improvisations did develop after the EOC was reconstituted and the ERON had to adjust to emergent needs. Even when a collectivity of organizations accurately determines that an element is ideal, this can contribute to a delay in recognizing that the element is in fact no longer viable or possible to implement.

That improvisation worked to reproduce the EOC rather than produce a new resource that was different from the original does not conflict with the concept of improvisation or improvisation processes that take place in other contexts. As Weick (1998: 551) states, "improvisation is a mixture of the pre-composed and the spontaneous." Improvisation must have something upon which it is based: "The connected themes of order and improvisation become even clearer when we look more closely at the object to which the improvisation is applied (Weick, 1998: 546). People "combine familiar and unfamiliar components in response to new situations. [In doing so, they follow] an underlying grammar and an evolving aesthetic" (Bateson, 1989: 3). Whether a group starts with one or more original melodies or scripts, looks to others for cues as they develop novel approaches, and gradually moves away from the original to

compose in real-time a performance that is quite different (adaptive improvisation);

whether the group has no melody or script to begin with but instead uses material in its

repertoires to create a new performance in new circumstances (creative improvisation); or

whether the group envisions the original melody or script as something to strive toward,

begins at a point quite different than the original, and employs novel approaches to

adhere to the original as closely as possible (reproductive improvisation), all three

process involve improvisation.

<center>**Chapter 5**</center>

<center>**ADAPTIVE IMPROVISATION AND THE WORLD TRADE CENTER
DISASTER: REARRANGING EMERGENY RESPONSE REPERTOIRES**</center>

Introduction

Adaptive improvisation involves the time-constrained and unplanned for

adjustments of an original or recently implemented organizational element consisting of a

structure, an activity, a resource, or a task. This chapter outlines conditions under which

adaptive improvisation occurs. Using changes in the credentialing system during the

response to the World Trade Center disaster as a reflection of the emerging and dynamic

organizational structures, I discuss how factors such as dissemination of information

regarding the adapted structure, resistance by those excluded from the new structure, and

adjustments to previous adaptive improvisations work to facilitate or impede this

improvisation form.

Adaptive Improvisation

When adaptive improvisation occurs in disaster response, the adjustments are

made to a recently implemented structure, activity, resource, or task that was in place

before the disaster, or that was in place due to reproductive, creative, or recent adaptive

improvisation (see Chapters 4 and 6 respectively for discussions of reproductive and

creative improvisation). This type of improvisation occurs when the intended or

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currently enacted model is defined by the organization as inappropriate given the newly emergent circumstances, regardless of whether or not the original model can be implemented. Stated another way, the organization may be able to follow the original model but chooses to instead implement structures, actions, resources, or tasks it deems as better suited to the response milieu; or alternatively, the original model may have been disrupted and, instead of working to reproduce the model using available substitutions, the organization opts to make adaptations. The norms and procedures that originally govern the response are still at work, influencing the actions of the organizations involved, but the organization or group of organizations work collectively to improvise changes, find meaning in their environment, and thereby respond to emerging needs that demand alternative solutions.

Collective definitions are critical to this process. As Giddens (1976: 79) observes, "The difference between the social and the natural world is that the latter does not constitute itself as 'meaningful.'…. Social life…is produced by its component actors precisely in terms of their active constitution and reconstitution of frames of meaning whereby they organize experience." In the social milieu that constituted the World Trade Center disaster response, organizations collectively came to characterize many aspects of the response as "ambiguous," "unexpected," "overwhelming," and "unimaginable." These organizations framed these particular aspects of the response environment in a way that called for a change in what was established and planned for. In doing so, the organizations borrowed from original models but improvised to reshape those models.

The use of the word adaptive to describe this type of improvisation does not signify any objective judgment as to whether or not the alternative to the original model was indeed the most appropriate given the circumstances, nor does it suggest that the original was objectively maladaptive. Rather, it is the collective determination of planned or current procedures as inappropriate that determines whether or not the original model is abandoned in favor of alternatives. Organizations collectively reflect on the original model to help determine their future course, engaging in what Weick terms "retrospective sense-making" (1998: 547). Meaning is created through a social process of looking back on what has occurred, assessing the structures, activities, resources, and tasks in place, and, as a group, *making sense* of the original as the best option or *making sense* that there is a need for something else. The process can be as explicit as organizations coming together in a joint meeting and expressing dissatisfaction with the original model, or as implicit as one organization taking steps toward adaptation with other organizations reinforcing those steps with their own adaptations, or, at the very least, not countering those steps.

The concept of adaptive improvisation is imbedded in the idea of adjustments made by an organization based on the interpretation of environmental cues that suggest the adjustments are necessary and where the organization supports that change. Organizations make adaptations during routine periods, not just during disasters. For example, a community may look at the response plans of another similar community and adopt the plan while making adjustments based on their own unique needs and the circumstances. Differences in community density, population demographics, budgetary

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constraints, organizational culture, and type of hazard exposure are just a few of the considerations that could persuade an organization or community to make adaptations to a response plan. Adaptive improvisation occurs, however, when those decisions are made under conditions of uncertainly and under tight time constraints, such as in the midst of an emergency response.

Improvisation is the basis for such action. Weick (1998: 546-547) notes, "Considered as a noun, an improvisation is a transformation of some original model. Considered as a verb, improvisation is composing in real time that begins with embellishments of a simple model, but increasingly feeds on these embellishments themselves to move farther from the original melody and closer to a new composition." As with other forms of improvisation, adaptive improvisation is a process as much as it is a product. Adaptive improvisation in disasters, a process by which organizations reshape a response after observing and reflecting cues, is consistent with improvisation in contexts such as jazz and theater. The script, the score, or the plan forms a point of departure for an ensemble; given the cues from fellow improvisers or from the environment, adaptations become appropriate. The riffs generated from the trombonist or the absence of a piano player may drive a percussionist to improvise the melody in a quite unanticipated direction and cause fellow musicians to adapt accordingly. The lack of humor generated by two improv actors in a skit or the unexpected responses from audience members may cause a third actor to pick up on a comment made and turn the skit toward a different but more humorous direction. In a disaster, the decisions made by some response organizations or the changes in safety conditions at a response site could

compel other response organizations to adapt response plans to better meet emerging response needs. In the cases of jazz or theatre, successful reading of cues can mean the difference between a successful and a poorly reviewed performance. In disaster response, however, it could mean the difference between a facilitated or impeded response, increased or reduced financial costs, or most importantly saved or lost lives.

Instances of adaptive improvisation abounded during the disaster response following the attacks on the Twin Towers. After the Mayor's Office of Emergency Management (OEM) reproduced the emergency operations center (EOC) at Pier 92, this organization as well as others collectively modified the facility to better accommodate emerging needs and the enormous scale that the response demanded. Respite locations for response workers at Ground Zero moved to various locations as more appropriate space became available, and these respite sites were run by different organizations as facilities changed. Debris removal operations changed over time as organizations identified shortcomings in implemented approaches. The regulations that governed debris removal also adjusted over time – such as whether or not to enforce the placing of tarps over debris removal vehicles when the debris was so hot it would burn through tarps. These are just a few of the many adaptations that organizations made under extreme time-constraints, drawing upon their preexisting response repertoires, rearranging them in new ways, and essentially improvising an alternative that the organization deemed more suitable given the emergent environment.

Thousands of organizations participated in the emergency response to the World Trade Center disaster. The development of the credentialing and identification system by

New York City agencies such as OEM allows for a close treatment of the concept of adaptive improvisation. At one level, the adjustments in the badges that were distributed to response personnel consist of changes in a key resource, but at another level it also signified a broader change in organizational structure. In order to determine who was awarded particular badges at specific points in time and for what areas, key decision-makers had to weigh legitimacy claims by a host of organizations and individuals, thereby reflecting changes in the response organizational structure while simultaneously contributing to its reshaping. This analysis examines the adaptive improvisation of the credentialing system during the response to the World Trade Center disaster as a reflection of the dynamic organizational structures constituting the broad range of emergency support functions.

Setting the Stage: Disaster Response Credentialing in New York City

The convergence of people and resources to key response locations typifies what happens when disaster strikes (Fritz & Mathewson, 1957; Neal, 1992; Kendra & Wachtendorf, 2003b). Residents and businesses returning to the area; family members searching for loved ones; emergent volunteers and formalized groups arriving to offer assistance; people – ranging from the general public to dignitaries and celebrities – wanting to see the destruction first hand; people gathering to demonstrate their support for response workers; in mass-casualty incidents, people gathering to mourn the loss of those who died; and an influx of resources – some needed, some a logistical burden: such convergence is an invariable part of the disaster landscape. This is particularly the case when a disaster event receives media attention. The world watched the drama of the

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attack on the Twin Towers, their eventual collapse, and the initial responses unfold. As a result, the convergence of people and resources came not only from near-by communities but also from around the world. The magnitude of this convergence was enormous. Although some city officials were experienced and sufficiently educated in the disaster literature to expect some degree of convergence, most were caught off guard by the sheer numbers of people who arrived and worked to become involved with the overall response effort.

New York City was no stranger to emergency response. Its organizations had responded to countless emergencies on a variety of scales and, in the months preceding the September 11, 2001 attack, had exercised a weapons of mass destruction disaster scenario. At the emergency operations center located at 7 World Trade Center (7WTC), OEM had relied upon individual agency badges to identify city, state, or federal employees. The space at 7WTC was relatively contained and therefore could only fit a limited number of agency representatives at individual work stations. Agencies were asked to assign an individual to staff their respective work stations at the EOC during an activation. Prior activations of the EOC, either for emergencies or for disaster drills, had not generated an influx of agency representatives beyond what was necessary for response coordination. As standard procedure, visitors to the EOC who did not have agency badges were given visitor badges while they were in the facility.

Essentially, the same system that was in place at the EOC during routine periods was used during emergency activations of the facility. Unlike the rudimentary system in place at 7WTC, New York City did not have a credentialing system in place to limit

access to a disaster impact site, beyond again relying on city agency badges. A recognized badge from a city, state, or federal agency was enough to allow access. The system in place for large-scale security events – a common-place occurrence in a city as large as New York – formed the model for emergency incidents. Prior to September 11, OEM was engaged in discussions with local businesses regarding the implementation of a corporate access system, in which a certain percentage of employees, considered essential to business operations, would have identification that would grant them access within certain restricted areas. OEM's human services group had also begun to meet with several volunteer and community agencies about how volunteer management could best be addressed. However, no plans were yet in place on the morning of September 11. As one OEM official stated, "[We] had never dreamed in our wildest dreams that this would be such a nightmare….So we had no [credentialing] plans at all." In fact, what the official describes as a "lack of plans" was actually a reliance on standard agency badges and routine event security procedures. Such measures were in no way sufficient to manage mass convergence.

Appropriateness of the Plan

The response to the World Trade Center disaster generated a convergence of people far beyond what New York City had experienced in other emergencies. Moreover, the emerging needs associated with the response called for skills and personnel not previously considered as integral to a disaster response, which meant that many who converged lacked even rudimentary credentials.

Consider as one example the dust suppression and lighting of "the pile" at Ground Zero. Companies and technicians that typically provide lighting and overhead rain rigs in movie shoots suddenly became integral to improving the environmental quality of the site by using water equipment to suppress the dust and increasing the safety for night-shift workers by providing huge overhead lighting rigs. Although lighting experts were not previously part of any response planning in the city, their inclusion in the response structure was paramount because of the new response demands.

Ground Zero was not the only location where new organizations and personnel were integrated into the response. At the Pier 92 Emergency Operations Center, a network of organizations developed a mapping emergency support function, which supported the debris removal, fire suppression, logistics, and emergency coordination functions among others. Private vendors such as ESRI, students with expertise in Geographic Information Systems (GIS) from local colleges, as well as experts from a mapping-focused network of government and non-government organizations played an unplanned-for but highly instrumental role in facilitating the response. Wildfire fighters from Alaska, Montana, and other states across the country came to New York to provide logistical assistance in supply warehouses. Emergency responders with experience in warehouse management, these newcomers to New York City became part of an emergency support function operation involving not only city agencies but other non-local organizations such as the State Emergency Management Organization (SEMO) and the National Guard. The emergency response saw countless other examples of the introduction of organizations to meet newly recognized needs.

In sociological terms, these problem-focused sets of organizations constitute emergent multi-organizational networks (EMON). An EMON is the "structure of relationships that form among organizations, or segments of organizations, that are focused on a specific [activities or response functions]" (Drabek, 1996: (21)11). These functions, (as outlined in Appendix A for the World Trade Center response), include debris removal, logistics, search and rescue, utility restoration, and numerous other activities. Emergent networks develop during the emergency period and exist for limited or more extensive time frames in order to address emerging needs. EMONs operate semi-autonomously but also often interact with each other. Because of the many unanticipated dimensions of the World Trade Center disaster, almost every function necessitated a multi-organizational network that differed from both routine networks and also, to varying degrees, from prior planning for interorganizational coordination during a disaster incident.

On a functional level, EMONs formed around such key response functions as debris removal, safety, and logistics following the September 11 disaster. For example, the Department of Design and Construction (DDC), an organization responsible for centralizing the city's capital construction program, would not normally be involved with debris removal. Yet this organization took the lead in overseeing this component of the response. Its very participation in the debris removal operation alone represents an adaptation to the organizational structure surrounding this particular function. Another EMON formed around the function of safety. The Department of Health and Mental Hygiene (DOHMH) took a primary role in the safety operations, along with organizations

such as DDC, the Department of Environmental Protection (DEP), the Environmental

Protection Agency (EPA), the Occupational Safety & Health Administration (OSHA),

and others. DOHMH's mandate is to promote the health of all city residents through an

assessment of the community's health status, formulating policies, implementing

programs, and ensuring access to services. The department enforces the health code, but

does not typically address issues that fall under the mandates of other organizations, such

as OSHA in the area of occupational safety. Still, according to one key decision-maker

in DOHMH, the agency did become involved in working on non-routine activities,

thereby assuming a role in an emergent structure:

> 99% of what I was doing at the landfill…and at Ground Zero was
> occupational health and safety issues. And you know why we were doing
> it? We were only doing it because we saw that nobody else was doing it.

On a geo-spatial level, EMONs formed around sites important to the response milieu.

The cadre of personnel working at Ground Zero, for example, were both representatives

of their respective organizations while at the same time forming a distinct Ground Zero

EMON for which membership in the organizational structure was not necessarily

transferable to other personnel within their respective departments or agencies.

Individuals who gained entrée to Ground Zero and by obtaining identifying credentials

that allowed them access to the site, were able to continue representing their

organizations within the Ground Zero EMON. Those individuals who had their

credentials revoked were less likely to continue their role in that site-specific network.

Site-related EMONS also formed around other locations such as the EOC.

Both types of EMONs are altered forms of the original emergency response (pre-disaster) organizational network (ERON). As discussed in Chapter 2, the ERON constitutes the meta-organization of individual organizations designated to come together and coordinate activities in an emergency response effort. They consist of participants from a broad range of organizations who, in accordance with pre-existing emergency management plans, are designated to work along side other community organizations in a systematic way, becoming a distinct decision-making organization. Often they communicate during routine periods such as planning meetings and disaster drills. While they do not interact daily, their structure is formalized through planning efforts. Even in disaster scenarios where the ERON comes together as planned, coordination is a constant challenge. Comfort (1999), for example, argues that in order to mount an effective response, the various organizations involved must self-organize into adaptive systems that can gather and comprehend data about the nature of an event and who is doing what to respond to it. As the ERON quickly encountered new response demands and an influx of different organizations after the attacks, it too took on emergent qualities.

Consequently, what developed over time were dynamic emergent multi-organizational networks surrounding a host of response functions and response locations. In some sense, these networks resemble high reliability organizations. In their discussion of High Reliability Organizations (HROs), Weick et al. (1993: 103) noted that "[w]hat is distinctive about HROs is that they loosen the designation of who is the important decision maker in order to allow decision making to migrate along with the problem." The structure of the response relaxed and adapted to developing needs and the officials

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within the ERON soon found that their system of credentialing, one that relied upon more routine protocol of familiar departments playing familiar roles, was suddenly inappropriate. This was the case because the numbers of both personnel and organizations involved were larger than anticipated; many organizations and personnel from outside the New York City became involved in the response; and organizations became involved in functions in which their involvement was not expected.

As the multi-organizational networks for each activity emerged and as organizations and individuals converged to the key response locations *en masse*, the ERON in New York City was introduced to a new concern: How does the response take into account and allow access for new members of the various EMONs while at the same time imposing much needed restrictions on organizations and individuals attempting to participate but who, for various reasons, the ERON (which was rapidly developing into its own EMON) wanted to restrict access?

The solution called for the development of a distinct EMON focused around credentialing. Those within this network interpreted cues in the response environment that pointed to the structure of the EMON for particular functions and then reflected that structure in the design and distribution of credentials. Moreover, the organizational structures of EMONs were enacted upon by the systems that credentialing decision-makers developed and the ways in which those systems were enforced. Each manifestation of the credentialing system attempted to reflect the organizational structure, and each manifestation in turn helped to socially construct the organizational structure.

The Process of Adapting the Emergent Multi-Organizational Network

The response necessitated at least two distinct but coupled forms of access credentialing: one, which became know as the Pier 92 badge primarily because this was its prime area of distribution, allowed access to key facilities associated with the response; the other allowed access to Ground Zero, the disaster impact zone, and became known as the contractor badge because, although used by a diverse group of people, many of its users were site contractors. More credentialing systems that governed the vast range of government, non-profit, and private facilities across the city also emerged, including distinct badges for the Federal Emergency Management Agency's (FEMA) Disaster Field Office (DFO) and the Family Assistance Center at Pier 94. This examination limits itself to the complex credentialing systems at Ground Zero and at the key response facilities under the oversight of OEM, although other credentialing systems are also discussed.

Both the Ground Zero (contractor badge) and the EOC (Pier 92 badge) credentialing programs had to consider several factors directly connected to the organization structure of various EMONs, particularly such functions as debris removal, search and rescue (which eventually evolved into remains recovery), building inspection, health and safety, transportation restoration, utility restoration, forensic investigation, and responder support services – although the emerging multi-organizational structure of almost all functions also played into the consideration of the credentialing operations.

Procedural and network adaptations were not unlike improvisational practices in music. In his instruction to jazz students, Baker (1989) outlines a broad range of

variation options to adapt original melodies or patterns, including but not limited to varying the scale type, the starting points for players, the rhythm, the dynamics, the accents, and the meter. Certainly, these examples are not transferable in emergency response adaptation, but each disaster improvisation includes various adaptive options. When considering the credentialing operation, officials implemented adaptations the credentialing process by adapting the acquisition criteria, distribution, enforcement, and appearance of badges to reflect and enact structural adaptations regarding who could participate in the EMON, where they could go, and what they could do.

Those charged with developing credentialing guidelines needed to consider such questions as who should have access to the site, whether or not specific individuals or organizations met access criteria, and what the badge entitled participants to do. From that information, the credentialing network determined the appearance of badges, their production, distribution, and inspection, the monitoring of forgeries, and the need for badge confiscation. As the EMON structure adapted, credentialing procedures needed to adjust. In a like manner, officials used adaptations in credentialing in attempt to enact changes on the structure of various EMONs. In line with Giddens' theory of structuration (1984), the agency and participation in the response was constrained by the structure imposed by the credentialing system, while at the same time claims organizations made to legitimate participation in the response and obtain credentials shape the EMON structure.

At first, access to the collapse site was both porous and inconsistent. Assistance came from across the city. Some individuals were unable to or had difficulty making

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their way through various checkpoints because they were unable to prove their association to key organizations or convince site security that they could make a needed contribution to the early response effort. Others were easily able to convince police at checkpoints that they had skills to contribute or were associated with an organization with a legitimate status that allowed them access. Of course, some individuals snuck into the area as well.

The search and rescue EMON was clearly given priority during the early days of the response. It was comprised of formalized organizations such as the Fire Department of New York (FDNY) and federal Urban Search and Rescue (USAR) teams, as well as an eclectic array of individuals and organizations simply wanting to help. It was supported by a host of other EMONs, also comprise of established groups and spontaneous convergers. The structure of these EMONs was unlike any previously planned response structure owing to the scale and emergent demands of the response milieu. Without virtually any prior planning, the participation of individuals at Ground Zero developed out of a series of collective interactions. Some took lead roles; others followed. Some assigned tasks to individuals close at hand, and as those individuals demonstrated their ability to accomplish these necessary tasks, they improvised one another's place within the overall structure while adapting the structure itself.

This process again resembles jazz improvisation. In jazz, the musicians may not have decided the order that people will play. Rather, they listen to what is going on around them and "develop a sense for time for the next person to play, and you watch for subtle signals that somebody is ready" (Peplowski, 1998: 561). While there may be a

leader in the group, that leader adopts a role more consistent with, as Peplowski (1998) illustrates, a traffic director, with leadership shifting as each person take a solo. Performers have the freedom to be creative within certain structures and can influence the leader to go into a different direction.

Although organizations within the city – such as the OEM, the New York Police Department (NYPD), FDNY, and the Mayor's Office itself – continued to exert control over the formal response structure, the informal response structure had a powerful influence on participation and decision-making. Particularly in the early hours and days of the response, organizations "simply showed up," as one official described it. As I will discuss, other organizations within the formal structure adopted new roles within the structure involving non-routine activities, sometimes, as was the case with DDC, in leadership roles. Using windows of opportunity, these organizations were able to nest themselves within the system and consequently adapt it. With new organizations and new activities, EMONs and the organizations comprising them needed to look to each other for cues, sometimes allowing new leadership to emerge while at other time adhering to the formal management structure.

The day after the attacks, an official at DDC and an official from OEM became largely responsible for steering the Ground Zero credentialing system. At this point, DDC was already beginning to assert a commanding operational presence at Ground Zero, despite the fact that such a leadership role was within the organization's regular scope of duties. DDC would eventually come to lead the debris removal operation along side FYNY. Not only was it negotiating its own role within the structure of the emerging

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debris removal EMON, it was now assuming responsibility, with the lead emergency coordination agency, of influencing the participants and structure of the debris removal EMON as well as other EMONs at the site.

Adaptations to both the Ground Zero and the EOC credentialing systems attempted to tighten control of response locations with consideration of the increasing influx of volunteers. Volunteers are typically outsiders to the ERON, yet they are outsiders with a halo of political significance, especially in the case of the World Trade Center response owing to their patriotic motivation. Much of the discussion about volunteers at response planning meetings reflected some fundamental tensions: recognition of the worthy intentions of volunteers, concern about extraneous people moving freely about a controlled area, and the need for "sensitivity" in getting volunteers to leave. Put bluntly, emergency managers recognized that outright rebuffs of volunteers constitute bad public relations. Some volunteers were offended that they were not allowed to assist. Yet at the same time, officials were not turning away volunteers out of disregard for the outpouring of generosity, or because they felt that the appearance of volunteers indicated some sort of failure of emergency planning. Rather, they appreciated the intentions of the volunteers and the community spirit that represented. Nevertheless, because the disaster was caused by a terrorist attack, there was great concern for identification and credentialing of all personnel working at the various locations. Within this context, volunteer personnel became another group that needed to be accounted for, and therefore potentially – though not inherently- a set of management challenges that outweighed their utility in some situations.

Some emergent jargon developed that reflected the challenges of uncontrolled donations and that also reflected a burgeoning oppositional relationship between emergency managers and donors. For example, the terms "rebel food" and "renegade supplies" were used to refer to food and other items that were brought into the impact area on an ad hoc, uncontrolled basis, sometimes by people who were known to recipients, but often not. Food items ranged from home-baked goods to hot meals, typically pasta. Soon after the attack, a well-known steakhouse chain set up a barbecue near the disaster site, an act that offended some of the firefighters who saw it as a "back-yard barbecue" but please others who appreciated the variation in diet. This episode typifies tensions between those who found the presence of some organizations as intrusions to the response while others advocated for their continued presence. This steakhouse was not unique in volunteering its goods and services. Restaurants and well-wishers came not only from across the city but from across the country to feed those involved in the rescue and recovery efforts. As they converged to the site, issues of access, health and safety, and security increased. Although people wishing to assist response and recovery efforts after the attack were directed to a central site, their numbers exceeded the identified needs and, because of security concerns, their access to particular sites had to be controlled.

Still, the credentialing EMON wanted to ensure that valuable volunteers new to the response system were able to remain. For example, we encountered a military reserve officer who volunteered his services (and was eventually issued official orders to do so) and became an invaluable assistant to a key response official. The officer took notes at

key planning meetings, coordinated transportation for operations staff, and spent time finding solutions for various operational exigencies; it was this officer who arranged for barges to be tied up alongside the Pier 94 EOC to prevent unauthorized vessels from gaining close access to the site. Other volunteers integrated into the emergency response were the GIS specialists from local colleges mentioned above who were instrumental in producing maps and images based on remote-sensing data. What is especially significant about their role as volunteers is that they had a particular skill or, as in the case of the military officer, set of capabilities or attributes that were congruent with the rapidly changing response needs, and that were simultaneously obvious to the emergency managers who were in a position to "hire" them. Consider the participation of several chiropractors who talked their way into the secured area adjacent to Ground Zero shortly after the collapse. One of the chiropractors attributed their initial success to his "gift of the gab" and knowledge of Lower Manhattan streets; however, he explained that they were able to stay because they were able to demonstrate a need for their services. This team performed adjustments on responders from a variety of agencies, who in turn supported their presence at the site and facilitated the chiropractors' efforts to obtain badges. They gained access into the EOC to perform adjustments by allying themselves with the American Red Cross, but again, they were able to offer a specific skill, which, even if not planned for in advance, seemed useful to those who already had access.

In order to both accommodate the EMONs and also reassert some control over them, an alternative credentialing system was developed. Although initially credentialing was quite rudimentary, it rapidly became more sophisticated.

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After the evacuation of the EOC at 7WTC, which, as discussed in Chapter 4, was destroyed due to its proximity to the Twin Towers, site security officials at the temporary EOC located at the Police Academy library permitted entry to people with official agency badges. One could also gain entrée to the facility by showing a photo-identification and providing a reasonable justification for access. The library was overwhelmed with personnel, although were it not for the limited publicity regarding the location of the site, officials could have seen much larger numbers of convergers.

After relocating a second time to Pier 92, officials did little to adapt their credentialing system; however, they were already defining the situation as one in which an adaptation needed to be made in order to reduce access to the facilities and to the various EMONs. Beginning on Saturday, September 15 and continuing over the course of the next few weeks, OEM developed a serious of badges. Officials transitioned through several phases, beginning with relatively a simplistic credentialing system where anyone given 'clearance' received a blue and yellow badge featuring the OEM insignia. This computer-printed badge was essentially a piece of paper placed in a name-tag holder that could be easily duplicated, and had no information identifying information. The letter "P" was added several days latter to denote access to the podium, a central decision-making area to the facility. Officials added the "P" because, according to interviews, the large numbers of people gathering in that area were causing too much disruption. Put another way, their place in the organizational structure was not in tied to the coordination role of the podium but instead to the various functional based EMONs, and therefore they should not have unrestricted access to the emergency coordination

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podium. A third badge was added with a "92" to denoted Pier 92 and distinguish it from

badges distributed at Pier 90 (the Federal Emergency Management Agency's DFO) and

Pier 94 (the Family Assistance Center). Eventually a plastic white badge was produced

with a white background, the title "WTC 2001," a digital color image of the individual,

the person's title and organizational affiliation, and a variety of codes indicating

particular areas to which the person could have access.

Each badge worked to better gain control over access to the EOC. Several weeks

into the response, for example, a representative from a human services organization was

told officials would not allow in another member of this agency because several were

already working in the EOC. The final badge specifically outlined facility access. For

example, the codes denoted access to Ground Zero ("Z"), access to the EOC at Pier 92

("E") as well as podium access ("P"), and access to the Family Assistance Center at Pier

94 ("F"). At this time, the FEMA DFO had already established its own distinct

credentialing system.

Yet even with the final badge, the individual and organization still had agency

with respect to the structure through the credentialing system. In the early phases of the

transition, staff issuing the credential would ask the individual to which locations they

wanted access, and negotiation would follow. Although officials had intended to have

lead agency representative designate location access, credentialing staff initially attached

access credentials as requested by the individual. Essentially, security granted access to

the structure by allowing the individual to obtain a badge, however, the individual helped

to determine his or her place in the structure by stating to which response-related areas he or she wanted access.

For the Ground Zero credentialing system, OEM began by publishing a security policy that outlined certain city/state/fed agencies that did not need to go through the credentials. Instead, agency-distributed credentials would suffice. All other personnel were to go through the credentialing centers and provide information such as their social security number, a form of work identification, and photo identification.

Credentialing presented a formidable activity. A high-ranking city official estimated that at one point in the response, approximately 10,000 badges per day were in circulation, including those issued to the four prime contractors assigned to work at Ground Zero –AMEC, Bovis Lend Lease, Turner Construction, and Tully Construction – as well as the thousands of other people who were subcontracted under their direction. The credentialing group decided it would give the prime contractors a set number of badges and charge them with distributing the badges to their subcontractors. Credentialing stations were established at hubs such as at Pennsylvania Station in Midtown Manhattan and at IS 89 in order to allow responders to obtain badges before attempting to cross perimeters as far north as Fourteenth Street.

Badges took on a number of forms over the course of the response. The first identification badges distributed specifically for work at Ground Zero were red paper badges. Every credential had a unique number, but it was impossible to tell an original from a quality photocopy. After one to two weeks, contractor badges were switched to white as the credentialing group determined they needed to "clean up the site." In other

words, they had decided that organizational structure of the EMONs with access to the

site needed to be tightened. The reasons for placing greater controls on site access

included ensuring that only skilled personnel were working at the site, increasing safety

protections in a dangerous and highly volatile environment whose barriers were

continuously shrinking to allow for greater city access, a greater emphasis on recording

hours for payment and reimbursement, and taking into account high turnover at the site in

the initial weeks. The system also needed consistent enforcement. As these contractors

active the duration of the response effort explained:

> What got me into the site day one was that I had a letter in my pocket that
> had Bovis [one of the four lead contractors at the site] letterhead on it and
> I showed that to the National Guard and said I work for these guys. They
> called me down. Let me in….They knew ahead and called in advance that
> BOVIS had a team of assessment guys coming down there and had guys
> coming down…. The laborers and people that didn't have an assignment
> they just wanted to be volunteers were stopped. They wouldn't let you in
> unless you had somebody come and meet you at the right zone and walk
> you in. They wanted to make sure they didn't have any nut-jobs showing
> up down there in the middle of all this.

> I know at first there was no credentialing and I remember one night in
> particular, I think walked out seven or eight operators and I don't know
> where on West Street, they had like a like-a with the boundary line or
> perimeter set up and I had eight people. It was basically me walking eight
> out, bringing eight in and these guys had been working for thirty some
> hours alright, and I crossed the perimeter line and I turned around and I
> couldn't get back there. Now I had sixteen operators, I had eight
> machines down, and I could not get back to the cops wouldn't let me back
> in and I was looking – you know everybody was emotional, we knew- I
> think I'm surprised I didn't get arrested that night. So, basically I said,
> 'Look, we're trying to find your brothers here and these are the guys that
> are going do it' and they wouldn't have it – they wouldn't have anyone to
> listen to, but that was before there was any kind of credentialing.

> The first two days you can understand volunteers are coming in and
> getting through all the nooks and crannies of the job site to try to help
> because everybody wanted to help. When the National Guard put their

> fence around the area with their men, that was when who was in there
> stayed in there, because if you left you weren't coming back in without
> being assigned by your union or with the proper credentialing….I had to
> leave the site, go back out, produce a driver's license, produce whatever
> identification they asked for and I was given a pass.

A number of the early responders remained within the secured zone for the first few days

if not the first week. They therefore did not need a badge to reenter the site because they

never left it, choosing instead to sleep and eat in the makeshift respite areas surrounding

the site. Credentialing personnel became aware of this and began encouraging site

security to also direct people working within the secured perimeter to credentialing

stations. Each change in badge represented a change in or an attempt to adapt the

organizational structure. In turn, stricter credentials encouraged some of these early

participants to connect with officials in an effort to officially become part of the debris

removal EMON by obtaining a badge. This contractor related his experience with a non-

credentialed volunteer:

> I dealt with guys that were sleeping in their cars, they drove up here from
> Tennessee and they said that they were welders. Eventually people came
> around…and I had a lot of people come up and introduce themselves to
> me, 'Are you Charlie?' I'd say, 'Yeah who are you?' 'I'm Tom.' 'How
> you doing, Tom?' 'Listen, I'm an ironworker. My father built this site.'
> He'd have a story but number one he didn't belong to any of the unions.
> And I'd say, 'Well how long have you been here?' He'd say 'Well I've
> been here six weeks.' And I'd say 'Have you left?' and he'd say 'No,
> because if I leave they're not going to let me back in.' I'd say, 'Who are
> you working for?' and he'd say, 'Well that's my problem, that's why I'm
> talking to you, to help me out.' So I made a phone call and I got him
> hooked up. The guy went [to talk with the] union. He ended up being a
> great [welder]. The guy knew his stuff, and he's still in New York now,
> this kid. I got a letter from him, a thank you, with his picture. And here's
> a guy who was sleeping in his car, and they finally towed his car. They
> towed this kid's car. One night he came back and he says, 'My car's
> gone.' And he was sleeping in the AMEX building behind the blown out
> theatre. He found a nice little place. These were the type of people that

were down there. It didn't happen that often, but it happened very quickly
that you could identify groups of guys that belonged together. It was very
easy. Ironworkers stuck with iron workers. It's a very small business in
New York City. People know each other, and you're not going to have a
guy pass himself off as a Local 40 ironworker and then introduce him to
the ironworker foreman. They don't know each other, there's a problem,
and the guy is quickly removed from the job and he's gone

Determining What is Appropriate

Although an organization may be able to determine that the existing structure is

not appropriate, it may not yet be able to determine what organizational structure should

replace it. In the early days of the response, the credentialing group was often pressured

to give out additional badges, as individuals and organizations vied for a greater presence

at the site. As this official explained:

> [People came up and said,] "Give me a hundred. We need a hundred over
> here." And in the early stages we were much more apt to go ahead and
> comply with those sort of requests. The idea was that people might still be
> alive [in the debris pile and awaiting rescue.] While we [were] still a
> rescue operation, [we didn't want to] have someone standing in line for a
> badge [who] might be [person] lifting [the] gerter off the person who
> [was] trapped – who might be making the difference. [The idea was to]
> get people down there, let them in, and so on."

Consequently, the credentialing group along, with site security, had a more challenging

time tightening the structure of the EMONs at Ground Zero than if they had been able to

implement a clearer structure from the beginning. However, because officials had to

improvise in a response environment fraught with ambiguity and there was a chance that

additional victims could still be rescued, they decided to err on the side of having too

porous an organizational structure, rather than one that was too constrained. This was

likely the better decision despite the challenges associated with additional adaptations

that followed.

As the response continued, some contractors expressed frustration over

credentialing processes, while others thought the system imposed reasonable demands:

> Credentialing to me was- it killed me cause it took about an hour to get
> someone new in and I had upwards of, you know 400-500 people doing
> that job…. That was an hour of good work time because you had to leave,
> come up to the badging center, which was up at IS 89, get that person,
> bring them in, go through all the computers, get him badged and then get
> him to his place of work. So that was, that hurt me as far as time wise you
> know, 'cause I mean if you get the amount of people that-that were
> coming here, if it was five or six people, that was five or six hours just to
> get them in place. And we're begging, I said look, give me a way even if
> it's a temporary badge at least I can get this poor guy that been on the
> machine for 24 hours off. Get this guy in and then I- I can read his
> paperwork but there was no real, there was no way to get that done, that
> you know, that doesn't bureaucracy you know, with it, that was a real
> problem for me.
>
> It was very confusing to a lot of people but everybody got through it.
> When they told you that Monday you better have that tan badge because it
> replaces the white one, sure a lot of guys didn't take it seriously, and then
> there would be hassles that morning. 'Well why wasn't I told?' Well they
> were all told. Everybody was informed. You just had a bunch of guys
> that didn't want to conform or didn't think it was going to be taken
> seriously. But when they realized they weren't getting paid and we would
> replace them with somebody who would conform, obviously they went
> and got their new badge. Trade in your old one you get the new one. If
> the guy didn't go do that and showed up on Monday with the old one then
> he didn't get in. We put written notification out, we tacked it up on all of
> the [boards] of all the sub-contractors, we gave it to the foremen at the
> meetings, they all let their men know about it, but you know how
> construction workers are. A lot of these guys just [thought they were] not
> going to do it. They did it. It took a little while.

It is unlikely that a multi-organizational network as large as that in place during the

World Trade Center disaster response would reach complete consensus on appropriate

improvisation strategies. Ultimately, the organizations collectively reinforced many of the improvisations implemented by following them and requiring others to d so.

Elements of improvisation are present in many fields of study. Keeney (1990), for example, points to the similarities between improvisation and therapy, noting that a psychiatrist never knows what a patient will say or where the therapy will turn. The psychiatrist is therefore unable to fully anticipate his or her own responses, which will in turn influence the course of the therapy. Only by listening carefully and picking up on non-verbal cues, including reactions to his or her questions, can the psychiatrist best improvise the course of a therapy session. Clearly, the psychiatrist builds upon his or her training and experience in the session, but it is unlikely that any session will proceed in 'text-book' fashion. Similarly in jazz, it is imperative that performing musicians listen to each other for the improvisation to be successful in creating music (Peplowski, 1998). The same is true of improvisation in organizations. Organizations must be aware of their environments and the performances of other groups in order to properly assess whether or not a course of action is appropriate. In the World Trade Center response, determining appropriateness involved collectively determining if adaptive improvisation was necessary and if so, what that improvisation might be. Without a plan or previous experience regarding how or when to limit access to certain response locations, the credentialing EMON had to keep looking back to the steps it had taken and where those steps had now positioned it to yet again determine if additional adaptive improvisations were necessary and how they might be reworked, given the outcomes of the previous improvisation.

Dissemination of Information Regarding the Adapted Structures

One strategy employed to ease the adaptation process was using multiple methods to communicate and enforce changes in structure. Credentialing officials relied upon lead contractors to encourage their workers to obtain new badges. Delays in obtaining new badges would prohibit contractor employees from worker, and therefore lead contractors had a vested interest in seeing that their workers complied with new regulations. Officials also distributed written memos outlining new policies and describing which badges should be accepted. Officials at both Ground Zero checkpoints and the EOC allowed for a grace period in obtaining new credentials. Personnel needing access to the site typically had at least several days following initial notification to obtain new credentials. This grace period allowed personnel who had not yet learned of the changes time to acquire new badges to renegotiate their places in the adapted structure.

Officials also attempted to pair National Guard and NYPD personnel at checkpoints because, as one OEM official explained, each brought different skills to the task. "Putting National Guard and cops together [was] a nice fit. Cops are the negotiators. Guards are cut-and-dried." According to this official, National Guard personnel were better suited to enforcing the credentialing guidelines while NYPD personnel, who were more familiar with the working of the city, were better suited to applying the flexibility demanded by an improvised organizational structure and credentialing system.

As the EMON structures gradually tightened and the credentialing procedures changed, credentialing officials were challenged in efforts to communicate those changes

to NYPD and National Guard personnel who were staffing perimeter checkpoints. As Ground Zero checkpoint security rotated their details, enforcement became somewhat uneven, particularly over the periods of badge changes. As one high-ranking official described, "You could get in one day with something and not the next." This complaint was reiterated during interviews with contractors, personnel from a variety of city departments, and was witnessed by DRC researchers.

This was true for city agency badges, contractor badges, and Pier 92 distributed badges. For example, at one point several weeks into the response, the credentialing group replaced the white contractor badges with a badge of a different color, and checkpoint personnel received memo notification of this change. However, we witnessed security personnel at Ground Zero perimeter checkpoints delay entry to people who had the WTC white plastic photo identification on several occasions because they were instructed "to no longer accept the white badges." We were with high-ranking OEM personnel who experienced small delays in crossing checkpoints, sometimes showing their badges to two or three different guards, before being allowed entry, while others with less responsibility in response efforts experienced no delay at the same checkpoints. We also observe a group of out-of-state police officers from who were assigned to guard access to a supply warehouse but were not fully aware for which badges would authorize entry.

The structures of the various EMONs were too large, complex, and dynamic to easily communicate to those enforcing secured border areas. Instead of communicating changes in the organizational structure, credentialing officials communicated changes in

the badge system that symbolized that structure. Because different types of badges were in distribution, there was confusion regarding which badges were still in circulation and which had expired. Because personnel rotated posts, they were not always informed of the latest badge changes. Because not all personnel enforcing credentials were from New York City, many of these out-of-towners were unaware of the more routine structures and the organizations that comprised them upon which the adapted structures were based.

The contractor badges and Pier 92 badges allowed for access to Ground Zero; however, it also allowed for access though other checkpoints throughout the city. As one official explained:

> So they became a very hot commodity. Everyone wanted credentials because it got you through all the checkpoints in the city. A cop saw the credential and they let you through. EOC credentials became very hot for that same reason. People began applying for credentials to get on the site that had no business being on the site, but they were adjacent to the site. They were contractors to do cleaning, [for example].

The credentialing system did not even distinguish access between "hot and cold zones" of the secured area, or in other words, those sections posing the most danger to workers and where human remains and forensic evidences were located and those sections that were adjacent to Ground Zero but either within the restricted area to provide a physical buffer or closed for open access for other less pressing reasons.

Again, the extremely complex structures of the World Trade Center response could not adequately be captured by the simplistic representation of the evolving badges system, especially at first. The badges produced, particularly at beginning of the response, were not sophisticated enough to fully represent the position of the holder within the organizational structure. Instead the badges merely indicated whether or not

the holder was somehow part of that response structure. As time passed, the Pier 92 badges included a photograph of the individual, a listing of access areas, the organization for which the individual worked, and title of the individual's position within that organization. Contractor badges also evolved in the later stages of the response, months after the initial attacks, to display similar information and even contain a bar code for identification and payroll purposes. Less than optimal communication regarding the badges (that symbolized the structure) created challenges to adequately adapting the structure.

Resistance to Adaptation by Those Excluded From the New Structure

One of the barriers to adaptive improvisation occurs when participants within the structure resist those changes. In other words, as the organizational structure is signaled in various ways to its members, the members in turn react to those signals, shaping the way the structure operates, sometimes in ways that make the structure operationally different than what has been proposed. Regarding the enforcement of the credentialing system imposed at Ground Zero, one official complained, "Our own guys didn't help us out." In his statement, this official was referring to workers at the site taking items – including food, supplies, mementoes, and cigarettes – who, according to credentialing and site security guidelines, were not permitted to gain access to the site. In order to gain access, these "rogue volunteers" – as they were sometimes termed – both convinced site security to allow them into the area and persuaded workers to accept their goods.

As discussed above, early in the response, countless people and organizations arrived near the site to supply food to response workers. Many were from businesses

located within the secured zones that could not open to customers because of public access restrictions but that wanted to contribute to the response. Others came from outside of the secured zone and from outside the city. Over time, emergency coordinators determined they needed to gain more control over the provision of food at the site. From a site management perspective, officials wanted to adapt the at first loose responder support services structure to a more tightened structure comprised of "legitimate" organizations such as the American Red Cross and the Salvation Army – organizations with disaster response experience and that are included in more formal emergency food provision plans.

By not allowing outside ad hoc venders to be credentialed, officials were hoping to ensure balanced nutrition for workers, reduce the potential contaminates brought from the debris pile, and prevent food products from finding their way to the pile, where the food waste could attract pests and compromise the remains recover operation. Moreover, ridding the site of ad hoc vendors, or at least encouraging them to volunteer with groups such as the American Red Cross and Salvation Army, reinforced the legitimacy of those established relief organizations that extend their own organizational structures during disasters. Officials had improvised the initial food service by allowing ad hoc food providers to set up near staging areas, adapting because the availability of food did not meet the demand and because the many of the initial ad hoc food providers were able to mobilize quickly to the site. Now that officials wanted to adapt the structure again, this improvisation faced some challenges from vendors.

For example, another organization that obtained some degree of legitimacy within the primary secured zone was a food trailer supplying gumbo and other Cajun cuisine. DOHMH and OEM officials, among others, attempted to expel this unauthorized food supplier from the staging area near Ground Zero. The concern was not only for the safety considerations for non-essential personnel near the area because the trailer was without a New York City vending permit, but also that it undermined the streamlined respite structure in place at the site. Still, at a health and safety meeting held at the EOC, a high-ranking official who was pointing to the security breach of allowing the trailer also admitted that for the time being, the trailer was granted permission to stay out of consideration for response workers' requests. The food trailer had negotiated itself into the responder support services EMON by obtaining permission to continue its services, at least for a short time period. It established its legitimacy by gaining the support of those it was serving. This example points to how difficult it was for the credentialing system to enforce the adapted structure at the site and to the negotiated nature of EMON ties.

Others within the EMONs took steps to set aside the credentialing procedures when the system was inconsistent with more familiar organizational structures or with the structures they thought should be in place. One official described the problems that arose from site security personnel setting aside credentialing procedures:

> Another thing is the issue of rank. It was a difficult issue to deal with. You would have a police officer at a checkpoint, and you would have [a higher rank] showing up with whomever they wanted and getting in, no credentials. And that was Port Authority, it was Police, and to some degree they wouldn't stop Fire either. And so you had a lot of the uniformed services letting people in all over the place. And a good amount of them stopped when we built the VIP stage, the family stage at Liberty and West.

In this case, in another improvised move, officials responded to the issue of "Ground Zero tours" (along with requests from family members of the victims) with the construction of a viewing platform.

The process involved in obtaining badges was at times very time-consuming for some individuals. Although it was important for the city to restrict the number of people with access, there was a real and legitimate need to move along with critical assessment and recovery tasks, including the inspection and repair of many surrounding buildings. Some of the contracted workers involved in the inspection and repair function of the response also circumvented the improvised system in order to complete tasks at hand.

Supervisors of construction workers were only allowed a certain number of contractor badges, a restriction put in place for safety and security purposes. At the same time, demands were placed on the supervisors to carry out their responsibilities rapidly. The number of badges allocated to them did not always match the number needed to undertake or promptly complete their tasks. The supervisor would then contend with a certain competing tensions that needed to be resolved. On the one hand, the contract workers needed to do a task and on the other hand they did not have the resources – access badges – that would allow them to complete the task. One supervisor of contract workers recounted that he received approximately twenty badges for access to complete the inspection or repair of a building. More workers were needed to quickly complete this task. As a solution, twenty workers would enter the building, one worker would take their badges, and then this worker would leave to give a separate group of 19 workers the same badges for access to the building. Supervisors were able to retained control over

the badges because a contract worker could not enter or exit that building or area without a badge. Another contractor described a similar strategy he used:

> Oh, it was always a problem….You'd spend and hour to two hours just to get [an equipment operator] through the system and mean while that machine's sitting there….If for instance, I had somebody that just couldn't take it emotionally and [say] 'I just can't work here,' [I would say, 'I understand go ahead.' I'd take his badge. So when I was really jammed up, I would just go out with that badge under my shirt, get this person, get him on the machine, and then deal with getting him legally in soon after his shift.

When confronting issues of rank, the adapted organizational structure of not restricting access was inconsistent with more routine structures of following orders from higher ranks. In the case of the contractors, the equipment operator described a scenario where he felt that the improvised credentialing system poorly reflected the needs of the debris removal EMON. He therefore took steps to circumvent the system, enacting upon it by working against components of it.

Adaptive Improvisation Begetting Further Adaptive Improvisation

Along with improvisation comes the possibility of error. In jazz or theatre improvisation, a skilled performer can work with these mistakes and improvise into a stronger outcome, essentially correcting the mistake (Crossan, 1998). In disaster response improvisation, the consequences of mistakes can be fatal. Certainly it is better when contingencies can be anticipated, taken into account, and incorporated into planning. But when the plans are inadequate, organizations must have a culture that encourages the rearrangement of plans, the improvisation of what is most appropriate given the emerging environment. Hopefully the mistakes will be small but the larger

organization must be willing to assume some error along the process of working toward a new way of operating.

As Weick (1998) explains, what will actually in a happen as a consequence of improvised action cannot always be anticipated. Instead, the improviser must look back retrospectively to make sense of the direction the improvisation took. In jazz or theater, this may involve recognizing an improvisation that in hindsight was not ideal and working from that departure point to rework the direction of the performance with additional adaptations in an effort to move toward a more appropriate direction. In a like manner, decisions in emergency response made may not have been the best decisions when viewed in hindsight, but the organization can look back to *make sense* of those choices and move the response in a new direction while taking those improvisations into account. Credentialing and its associated EMON structures reinvented themselves into new forms based on the successes and shortcomings of what happened in previous adaptations as well as the dynamic environment.

Improvisation can be thought of as a collective reframing process. "Learning from the environment often requires that individuals break out of their traditional frames of reference to see the environment in its full richness and complexity" (Crossan, 1998). Crossan (1998) cites an example of lifeguards who, while attempting to rescue a woman whose foot was caught in a drain at the bottom of a pool, relied on the "rescue mindset" of bringing the victim to safety – in this case, an air source – instead of bringing safety to the victim. Tragically, because they could not free the woman's foot, she drowned because they were unable to shift their thinking patterns to instead realize an alternative

option would have been to bring air to the woman while she remained under water. Certainly, we can apply the same logic to organizations responding to large-scale disasters.

In all three forms of improvised actions can be immediate, the consequences can be irreversible, the improvising organization must extend or expand on what was previously done (drawn from Weick's 1998 discussion of jazz), and the organization must "juggle short-and intermediate-range goals simultaneously" (Berliner, 1994: 200). In this case, as officials made credentialing decisions, they balanced short-term goals such as maximizing the safety of those working at Ground Zero and accommodating the recovery of human remains with long-term goals such as reopening businesses, residences, and thoroughfares in Lower Manhattan. They balanced ensuring the continued participation of personnel and organizations making important contributions to the response effort with limiting the access of personnel and organizations in the interests of safety, security, and operational effectiveness.

As adaptive improvisation strategies were employed to contend with these issues, additional adaptations often became necessary to correct for mistakes in judgment or to incorporate new directions in which the course of the response was heading as a result of previous improvisations. According to one lead credentialing official:

> To be honest, we didn't [set up the credentialing system] that well. We learned from our mistakes and we made it better. We sent it up to begin with but we tried to improve it. Maybe it was a couple of weeks in, we spent about a week in the new space, and the [first deputy director] called us in and said, "You see these maps on the on the way. We got to take time. We've been too caught on the details. We got to step back and take a look at these maps and start to think about what is going to happen and

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think ahead of ourselves and think more strategically." I know I took that
to heart.

In another example, the almost open-access of Ground Zero to Fire Department of New

York (FDNY) personnel during the early weeks of the response (understandable in many

ways due to the initial search and rescue operation and the high loss of life to the

department) led to a heightened expectation for access by these responders. Efforts to

minimize the number of uniformed personnel working "on the pile" generated frustration

and anger on the part of many from FDNY who previously had access. As a result,

credentialing organizations responded with additional adaptations by increasing the

numbers of FDNY permitted on the site at one time slightly upwards from the reduced

number. Cues were taken and organizations collectively *made sense* of the conflict,

determining that additional adaptations were appropriate – either because the

credentialing EMON's sense-making identified an overlooked operational need for

greater numbers of FDNY personnel or because it identified a political need to reach a

compromise and move on with operations. Officials initially allowed a large number of

organizations in to ensure needs were being met. They had to accommodate this decision

by developing credential systems to then restrict these organizations. Officials at Pier 92

needed to quickly implement a badge system, but because they adapted under time

constraints, they did not include important information on the badges. This led to

subsequent adaptive improvisations, each taking time from active responders to become

re-credentialed and demanding corresponding policies to ensure proper site security

enforcement. Just as it was important for the lifeguards in Crossan's (1998) example to

break away from routine patterns of response and take into account environmental cues

pointed to more appropriate courses of action, adaptive improvisation involves an ability to make sense of what is not working and enact upon the structure improvised alternatives.

Conclusions

Adaptive improvisation occurs when the organization or collective of organizations determines that the planned for or current structure, activity, resource, or tasks is inappropriate and then makes unplanned for adjustments under time constraints, irrespective of whether or not the original model might have worked. This analysis focused on the credentialing system as a complex instance of adaptive improvisation. Through a process of collective sense-making, the group of organizations define their circumstances by looking at cues of emerging needs and responses from organizations within and outside the collective network.   The improvisation in which responders engage can be likened to a conversation (Weick, 1998). Rather than constituting an individual choice, participants collectively engage in a process of defining their environment and enacting upon it, constituting a new structure through their interactions whose foundation follows from the original structure.

In complex disasters such as the World Trade Center response, adaptive improvisation can occur repeatedly within the same structure, activity, resource, or task, because organizations must rapidly respond to meet sometimes life-threatening demands. In an unfamiliar, dynamic environment, organizations can expect to make some degree of error. "To improve improvisation is to improve memory" (Weick, 1998: 547), and as

organizations process more cues and signals they respond by engaging in additional adaptive improvisations as the disaster progresses.

The need to employ adaptive improvisation in a response should not be viewed as an indication that response activities are not effective. Indeed, because it is impossible to account for every disaster scenario, some level of adaptive improvisation will always be necessary. Being able to interpret and adapt to a changing environment increases the capacity to spontaneously respond (Crossan, 1998). One practical implication of this insight is that in addition to bolstering disaster plans, organizations should foster strategies that improve the ability to improvise, including increasing sensitivity to organizational and environmental cues, building diverse response repertoires, gaining experience adapting those repertoires under real time constraints, and fostering organizational flexibility in moving forward in new directions when the need arises.

Chapter 6

CREATIVE IMPROVISATION AND THE WORLD TRADE CENTER
DISASTER: THE RECOVERY OPERATION AT FRESH KILL LANDFILL

Introduction

Creative improvisation involves the time-constrained and unplanned-for

development of a new structure, activity, resource, or task when no pre-established plan

exists. This chapter outlines conditions under which creative improvisation occurs.

Creative improvisation is examined within the context of the activities surrounding the

complex remains recovery and debris processing activity that emerged at the Staten

Island Fresh Kills Landfill site. Using this event, I discuss factors that facilitate creative

improvisation, such as drawing upon repertoires of individual and shared knowledge to

produce novel arrangements; the ability to sense-make; a relaxation of or lack of norms

that could impede creativity; and the development of a shared vision facilitate creative

improvisation.

Creative Improvisation

In disasters, systems are disrupted, and unanticipated needs emerge. Typically,

the collectivity of organizations responding in crises recognizes that need. Although

plans may be in place to cope with demands imposed by the disaster, in certain cases, no

plan exists to contend with the unanticipated emergent need as collectively identified by

those involved. As a result, an organization or group of organizations is compelled to improvise to establish new courses of action consisting of structures, activities, resources, or tasks. I use the term creative improvisation to describe such courses of action.

Creative improvisation is not influenced by an original model and is less influenced by the pre-disaster environment than reproductive or adaptive improvisation (see Chapters 4 and 5 respectively for a discussion of reproductive and adaptive improvisation). Creative improvisation departs more from prior organization and planning processes that the other two types of improvisation. As Weick (1998: 546-547) observes, "[Considered] as a noun, an improvisation is a transformation of some original model. Considered as a verb, improvisation is composing in real time that begins with embellishments of a simple model, but increasingly feeds on these embellishments themselves to move farther from the original melody and closer to a new composition." In creative improvisation, the organization, or in some cases group of organizations, find meaning in the environment and look to each other to collectively determine that a need exists. Each organization has its own skill sets, knowledge, and experience – its own repertoire – from which to draw, and each movement toward developing a new but original course of action helps other organizations collectively define what needs to be done. In turn, the movements of each organization influence the process experienced by other responding organizations. Creative improvisation on an organizational level therefore consists of a responsive flow in which new patterns are created as a result of organizations collectively making sense of their turbulent environments, moving forward without a predetermined end. The collective action that results is an indeterminate

outcome generated from the creative improvisation process, rather than one that strives toward or way from particular outcomes.

As with adaptive and reproductive improvisation, the collective determination that an unanticipated need exists for a given structure, resource, activity, or task is a social process. Even when creative improvisation takes place, it does not necessarily indicate that no plan is in place or that a need is apparent. For example, a plan could be in place of which an organization is unaware. Alternatively, one organization may collectively define the situation as one that does not fit within the scope of outlined plans, while another organization may determine that existing plans do indeed take into account the needs generated by the situation. Finally, organizations may not even consider creative improvisation necessary, if, as a result of their collective sense-making, they have not defined that a need exists. To illustrate this point, consider the evacuation of a college football stadium on game day as a result of a damaging earthquake. While those involved in overseeing the overall operations of the stadium may be aware that an evacuation plan is in place, those involved in onsite security, announcements, ticketing, and concessions may be unaware of the evacuation plan and therefore determine that creative improvisation is necessary in order to evacuate the stadium. Alternatively, a fire evacuation plan may be in place that some believe can be adapted to facilitate a post-earthquake evacuation. Organizations on site could collectively make sense of the situation in such a way that they define the earthquake evacuation as an unanticipated need that demands creative improvisation. Finally, while some organizations may determine that evacuation of the stadium is necessary after an earthquake, those involved

onsite could be unaware of the potential structural damage the earthquake could have caused to the stadium and determine that immediate evacuation is unnecessary – that is, that there is in fact no emergent and unanticipated need. In short, such a situation is subject to multiple organizational interpretations, suggesting varying courses of collective action.

Under such conditions, organizations collectively reflect on the emergent environment and take cues from various sources to determine their future course while simultaneously acting upon the environment as they respond, engaging in what Weick terms "retrospective sense-making" (1998: 547). Meaning is created through a social process of looking back on what has occurred, assessing the structures, activities, resources, and tasks in place, and collectively *making sense* of what needs exist and what plans are in place. In the case of creative improvisation, the process can be as explicit as organizations coming together in a meeting and stating that something needs to be done, or as subtle as one organization taking steps toward creating a new course of action with other organizations reinforcing those steps with their own novel improvisations or, at the very least, not working against the creative improvisations in which others are engaged.

Organizations create and innovate during routine periods, not just during disasters. For example, a small community may have never felt the need to have an evacuation plan, but decides it needs to develop one (without necessarily using the plans of other communities as templates) after a new hazardous chemical facility is built in the area. Out of concern for the threat of emergent diseases, a vendor may develop new detection equipment that can be installed at airports. A town with an increasing migrant

worker population may develop a new outreach organization (and corresponding organizational structure) to contend with the unique needs of this segment of the community. In response to increased concerns about terrorism, immigration officials may adapt their immigration-processing activity by creating new tasks for personnel such, as scanning fingerprints and collecting other biometric information from non-citizens. While an organization may borrow features from models used in different circumstances, the absence of models that have direct applicability in specific situations is a central component of creativity. *Creative improvisation* occurs when decisions to enact new elements are made under conditions of uncertainty and under tight time constraints – for example, in the midst of an emergency response. Under such conditions, the organization has less time to strategize its options. As Weick (1993) notes, decision-making, unlike sense-making, involves strategic rationality. That is not to say that sense-making does not lead to decisions, but that sense-making leading to improvised action occurs when the time constraints are such that strategizing and lengthy considerations of alternatives and consequences is a luxury the participants cannot afford. In the turbulent environment of a disaster, the organization must make sense of its environment and develop new structure, activities, resources, or tasks while simultaneously moving forward in its improvisation strategies. Creative action in routine periods allows for the consideration of the viability and appropriateness of new procedures before the decision to carry them out is made. Creative improvisation in turbulent environments involves the consideration of those questions in a dynamic and sometimes ambiguous environment while the organization must simultaneously engage

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in the improvised collective action demanded by the response. Using jazz as a metaphor, the process resembles that of musicians improvising in a jam session without having discussed the direction the performance would take. This contrasts with the less time-constrained process of sitting down to compose a new musical score over a period of weeks or months, as well as with improvised performances discussed beforehand and with improvise action undertaken in other contexts.

In creative improvisation, multiple but related elements are often improvised at the same time, adding to the complexity of this improvisation form. When no plan exists for a given activity, it is likely that few planned-for structures, resources, or tasks exist. In other words, if organizations have not anticipated a scenario that would demand for a certain response activity, they will generally also lack an organizational structure to implement that activity. If creative improvisation of the structure were seen as unnecessary, adaptive improvisation would likely occur with an existing structure to accommodate the new activity. One might also expect the creative use of resources and emergence of creative tasks. Although this is not always the case, creative improvisation of one element, such as an activity, is more likely to be accompanied by creative improvisation of other elements, such as structures, resources, and tasks. When this occurs, the process in which the organization determines action becomes increasingly complex, as the number and variation of evolving social and environmental cues increases. The more complex and time constrained the environment, the more likely the emergence of creative improvisational strategies. For this reason, catastrophic or near-

catastrophic disasters are more likely than les severe events to be accompanied by creative improvisational action on a large scale.

When organizations creatively improvise an activity, structure, resource, or task, the steps they take are both new and evolving. Although all three improvisation forms are processes, not simply outcomes, creative improvisation is perhaps the most fluid of the three. With no preexisting plan in place, impositions on the organizations come more from the continually emerging environment than from guidelines of pre-established arrangements.

In Chapter 4's comparison of reproductive improvisation in disasters and non-disasters, I discussed how the plan forms the shared vision toward which the ensemble moves; however, the ensemble comes to recognize that limitations demand that substitutions be employed. One non-disaster example used was when the absence of a critical prop item during a theatrical performance may force actors on stage to substitute the missing item with another, changing lines and movements accordingly to suit the substituted item until they move on and can gradually return to the original script. The improvisers must continue to act while simultaneously seeking and implementing a substitution that will eventually bring them to a close reproduction of action encompassed by the original script.

In Chapter 5's discussion of adaptive improvisation, I illustrated how a plan forms a point of departure for an ensemble when, given the cues from fellow improvisers or from the environment, adaptations become appropriate. One non-disaster example provided was when the lack of humor generated by two improv actors in a skit or the

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unexpected responses from audience members causes a third actor to pick up on a comment made and turn the skit toward a different but more humorous direction.

The processes of creative improvisation during disasters are also consistent with improvisation in contexts such as jazz and theatre. Unlike reproductive and adaptive improvisation, however, the score, script, or plan does not serve as a model to which the ensemble returns, nor does it serve as a point of departure. Rather, no score, script, or plan exists. Instead, the ensemble must draw upon shared knowledge, experiences in other circumstances, resources at hand, or a reading of social and environmental cues to compose in real time an entirely new course of action. Imagine that jazz musicians from different cities who have never before played together come together in jam session. They begin to play without any prior discussion of what will be played, improvising to create an original score, taking cues from one another as they play. Alternatively, consider improv actors in a festival who take the stage and, after receiving no instructions, are given the cue to begin a sketch. Immediately, the actors must look to each other to develop an entirely new sketch worthy of the audience's attention and interest. Or, consider local citizens who respond to a major earthquake that has isolated them from emergency response personnel. These emergent citizen groups must form a temporary organizational structure, and members must assign tasks to one another in an effort to rescue victims trapped in collapsed buildings. In each case, the improvisers must continue to perform, act, or respond while simultaneously developing a new score, script, or plan.

In the response to the World Trade Center disaster, many instances of creative improvisation took place: the improvised organizational structure of the bucket brigades formed at Ground Zero in the early hours of the search and rescue operation; the improvised evacuation of hundreds of thousands of people by converging harbor vessels from Lower Manhattan; and the improvised wash-down procedures and stations set up for vehicles transporting debris from the pile. These improvisations at and near Ground Zero were important to the response and received considerable attention. In contrast, little attention has been given to another equally vital component in the response: the operation the developed at the Fresh Kills landfill site in Staten Island. The analysis in this chapter examines creative improvisation, as exemplified by the debris processing and remains recovery operation, by tracing the process of its emergence.

Setting the Stage: The Fresh Kills Landfill Site

Organizations across the expansive multi-organizational network that responded to the World Trade Center disaster became involved in a broad range of functional activities. Although not as prominent as the search and rescue operation, fire suppression activities, or debris removal operation at Ground Zero, the debris processing and remains recovery operation at the Fresh Kills Landfill Site in the Staten Island borough of New York City played an important role in the response effort. Unlike other activities that were at least incorporated into prior planning efforts to some degree, the debris processing and remains recovery operation at Fresh Kills was a creatively improvised activity, not envisioned at all in prior planning that was implemented in response to emergent needs.

The Fresh Kills landfill site had closed in March, 2001. Equipment and office

space consisting primarily of trailers were still onsite at the time of the attacks to

facilitate the "closing work" being conducted by the Department of Sanitation (DOS),

which had routine jurisdiction over the site. DOS personnel were conducting grading and

maintenance work, and therefore all of the equipment at Fresh Kills was still operational.

As one official explained:

> The top [of the landfill] we had just finished grading off, so that it was
> relatively level. You want a bit of a pitch for runoffs, so it was literally
> made to order. [Had the disaster] happened three months before it might
> have been a problem because [we] hadn't had it all graded off at that
> point. And if it had happened six months afterwards [conditions would
> also not have been ideal]. [The conditions at Fresh Kills were] just made
> to order.

Debris from the World Trade Center began to arrive at the landfill on the night of

September 12. According to material from the New York State Museum's traveling

exhibit on the operation, over the course of the eleven-month operation, over 1.8 million

tons of material was transported to the landfill, searched for human remains, personal

property, and forensic evidence; and buried. At the site, approximately 100 New York

Police Department (NYPD) officers, 20 to 30 Federal Bureau of Investigation (FBI)

agents, many DOS personnel, along with approximately 35 city, state and federal

agencies, non-governmental organizations (NGOs) such as Salvation Army, and

approximately fourteen private contractors worked to develop the unplanned for activity.

These same materials state that 4257 human remains were found at Fresh Kills, resulting

in the identification of over 300 individuals. $78, 318.47 in domestic and foreign

currency, 54,000 personal items, 1358 vehicles including 102 fire apparatus and 61

Police Department vehicles, and approximately 4000 personal photographs were also recovered. Officials estimate that during the peak of its operation, 7,000 tons of materials were processed each day (New York State Museum, 2003).

Existence of a Plan

As outlined in the improvisation decision-tree (see Figure 1), organizations acting under time constraints must first determine whether or not a plan for a particular organizational element (structure, resource, activity, or task) is in place to respond to whatever scenario is presented. New York City had not planned for a disaster event that would generate the amount of concentrated debris, number of fatalities, and condition of human remains that resulted from of the World Trade Center disaster. According to one official at the Office of the Chief Medical Examiner (OCME), the organization's disaster contingency plans for morgue overflow was developed in preparation for incidents involving approximately one thousand fatalities. While some thought this number somewhat high prior to September 11, the World Trade Center incident resulted in almost three times that number of fatalities. In the early days of the response and before a more accurate count of missing persons was developed, responding organizations anticipated that the number of fatalities would be closer to six thousand to ten thousand, or six to ten times the number outlined in contingency plans. Organizations such as the Mayor's Office of Emergency Management (OEM) had previously considered the Staten Island landfill as a possible site for debris disposal in the event of a destructive earthquake or hurricane. As this official stated:

Well, we had to go somewhere and we always knew that in a big – One of the things that we had done a lot of planning on was debris planning and we had always talked with Sanitation about if we had a big disaster, well what would we do with all the debris. And, you know, ultimately we were going to have to put it at the landfill. So we always kind of knew that and so that's why it wasn't troublesome to me, that the situation, cause that's something that we had always said, well we're just going to use the landfill.

Even so, plans were not laid out for an event like the World Trade Center attack, and there were no plans or locations identified for the processing operation that would eventually emerge. This event was different from the type of debris removal operations that had occurred elsewhere following natural disasters such as hurricanes. The combination of items to be searched for demanded creativity on the part of the organizations involved in the operation would demand high levels of creativity. The Fire Department of New York (FDNY) along with other organizations that had lost uniformed officers to the disaster adamantly expressed the priority in finding the remains of fallen comrades. Other family members of the disaster victims were equally assertive in their expressed need for investigators to find and identify human remains. Intelligence agencies searched for sensitive material. U.S. Customs searched for confiscated drugs, weapons, and currency. Not only was this a remains recovery operation, it was a crime scene where investigators needed to search for forensic evidence. Processing could not occur at the site of the disaster because of immense pressures to reopen the city, the hazardous conditions at the collapse site, and the need to dispose of the material. This combination of complex needs far beyond more commonly observed debris operations demanded creative improvisation in the debris processing and remains recovery operation.

If organizations are at the stage of asking whether or not a plan exists to contend with a given scenario, members of those organizations have already collectively identified that a need exists. There is a movement, a fluidity of information exchange and action, which connects, for example, the recognition that a tremendous amount of debris scattered with human remains and forensic evidence is located in Lower Manhattan with the decision that a complex multi-step debris processing and remains recovery operation like the one that emerged at Fresh Kills needs to be developed.

Confronted with the presence of debris at Ground Zero, organizations quickly came to the realization that the debris would need to be disposed of and that the disposal should be expeditious. Yet a number of considerations, expressed through the discussions at various response locations and meetings, helped to define the need and to shape creatively improvised activity that ultimately emerged. Included in these considerations was the need to provide access to the site for search and rescue operations as well as an interest in reopening Lower Manhattan to businesses and residents. The later was in some ways imposed upon organizations because of pressures from residents and businesses; however, only when response organizations accommodated those pressures did they have an imposing effect. Though the city's density was constraining, it had a seemingly endless supply of available resources and expertise. Moreover, what was not already present in New York City was quickly converging from around the country and around the world.

At the same time, other organizations – such as the Fire Department of New York, which suffered high casualty rates among its employees, owners of valuable property

owned entangled in the debris, and organizations like the FBI, which were searching for forensic evidence – were concerned that the rush to clean up the areas surrounding Ground Zero would hamper attempts to locate human remains, valuable property, and evidence mixed in with the debris. Immediately following the disaster, a common and primary concern emerged within the city that guided almost every aspect of the response and recovery operation: to do right by the families of the victims. At times organizations and individuals differed regarding how to best fulfill that obligation in light of other competing concerns. However, since the community had defined that obligation as of the utmost importance, that priority influenced how organizations made sense of the operation. These are a but a few of the cues and influences in the emerging environment that led to the movement to not only develop an offsite debris disposal activity but also to merge that activity with a remains, property, and forensic evidence recovery operation.

Response and recovery organizations defined the need by *making sense* that this activity was important to undertake. Consistent with Weick's (1993) discussion of sense-making, this need was not imposed upon those organizations; rather, they were active participants in creating that guiding framework. On the one hand organizations and individuals create meaning, socially constructing their environments through their collective interactions and interpretations. On the other hand, meaning is imposed. The framework of roles, regulations, delimited activities, and structured relationships constrain social constructions, but at the same time that framework reflects what was constructed. Or as Morgan, Frost, and Pondy (1983: 24) put it, "Individuals are not seen as living in, and acting out their lives in relation to a wider reality, so much as creating

and sustaining images of a wider reality, in part to rationalize what they are doing. They realize their reality, by reading into their situation patterns of significant meaning."

The Process of Creatively Improvising the Fresh Kills Operation

Sense-making goes well beyond the identification of a need, continuing throughout the implementation of the improvised activity. After the need for a debris removal and remains recovery activity was identified, and after it became evident that there were in fact no plans to address that need, organizations came together to make sense of what that activity would entail. Indeed, the sense-making proceeded even as organizations were simultaneously responding to the need. A full description of this impressive process merits more detailed attention than can be given here. The brief summary of that process which follows is intended to set the stage for its discussion within the context of creative improvisation.

On the day of the attacks, September 11, a number of discussions took place between key organizations involved in the emergency response and criminal investigation – including such as the OEM, DOS, NYPD, FBI, the Port Authority of New York (NYPA), and the Department of Environmental Conservation (DEC) – regarding what should be done with the debris. The outcome of those discussions was the decision to send the debris to the Staten Island landfill. On September 12, the debris began to arrive at Fresh Kills.

In the first two weeks following September 11, nearly all debris that was transported was trucked out to Fresh Kills, including the steel that would rapidly pose a problem to debris processing at the landfill. The site had approximately one hundred

sixty-five acres that were considered suitable for searching, stockpiling, and finally burial

of the debris material. One of DOS's first tasks was to set up the infrastructure for

handling the material coming in to Fresh Kills. Although new equipment was later

purchased for the World Trade Center operation, DOS had to get started with what was

on hand at the time. The process at the beginning was very "ad hoc" as one DOS official

described. Debris was coming in so fast that DOS, NYPD, and FBI officials needed to

start processing and arranging it before the equipment DOS had requested had arrived.

This illustrates the sense-making involved in the entire operation: under severe time

pressures, the emergent multi-organizational network (EMON) had to respond while at

the same time developing a system within which to respond. Its responses influenced

operations in such a way that subsequent improvisations were necessarily shaped by what

had been improvised earlier.

The EMON centering on the debris removal and recovery divided up operations at

Fresh Kills. The "crime scene" was headed up by NYPD. The FBI supported NYPD and

ran the areas of the landfill where forensic recovery took place. DOS ran the landfill

itself. In early October, the Army Corps of Engineers and its contractor, Phillips &

Jordan, became involved. While NYPD still headed up the debris and remains recovery

operation at the landfill, the Army Corps and Phillips & Jordan provided site-specific

management, administration, equipment, and inventory support, health and safety

planning, enforcement, and quality assurance oversight. When the Army Corps took over

management of the landfill, OEM was able to focus on Ground Zero where issues were

more "delicate." At Ground Zero, OEM served as a facilitator between organizations

regarding what were sometimes sensitive and at other times contentious issues, including

the speed the operation, access to the site, and safety considerations. OEM, however, still

made frequent visits to the landfill in support of the operation. Both the central

Intelligence Agency (CIA) and the Secret Service also had a presence at the landfill.

Both agencies had offices located at 7 World Trade Center (7WTC), and both were active

in searching the debris recovered from 7WTC for the contents of those offices.

Indicative of its sensitivity, debris from 7WTC was stockpiled and searched in a separate

area from the other World Trade Center debris. A host of other contractors and public

and non-governmental organizations also played a role throughout the recovery and

debris-processing operation at the site.

DOS transported the debris from Ground Zero by truck until the barge component

of the removal operation was established. The barge operation initially involved DOS

marine transfer stations. However, piers closer to Ground Zero were soon dredged to

facilitate the speed with which debris could be transferred and to decrease the impact on

city traffic. If the debris came to the Fresh Kills site by barge, it was unloaded from the

barge onto the ground and then loaded on to a truck. Responders could not directly load

debris from the barge onto trucks because weight had to be evenly balanced to prevent

vehicles from tipping over. All trucks would drive the debris to the top of a specific hill

for unloading.

The site where the structural steel from the destroyed towers and other buildings

was placed was, according to one estimate, forty feet high by a thousand feet long within

two weeks. One official observed, "It was just incredible how fast the steel was coming

in." DOS personnel determined that because the steel was twisted, the standard cherry

pickers and cranes that they would normally use for such recovery operations would not

work. They decided instead to order grapplers, and the equipment arrived the next

afternoon. The request was put in through OEM; however, DOS knew that none of the

outsourcing agencies would have the particular type of equipment that was needed.

Instead, DOS located a source at one of its debris-removal meetings and told the source

to expect a request. Within an hour, OEM approved the request, and DOS went back to

that source. DOS notified the Department of Design and Construction (DDC) that it

would need to execute a contract with a recycler to take the steel directly from Ground

Zero to the recycler instead of to Fresh Kills. DDC instructed DOS to add this provision

to the existing contract the facility already had with a contractor.

Although the typology of improvisation developed here is a useful heuristic

device, it is important to note that these improvisational forms are not mutually exclusive.

Different forms of improvisation occur in concert with each other. In this case, adaptive

improvisations with respect to the debris processing operation itself occurred along side

the creation of that operation. For example, one official was concerned with the working

environment for the personnel inspecting the piles of debris. As he explained:

> The older guys, [I] knew they were going to start getting heart attacks and
> we were going to start having some problems with this.

As a solution, the official requested "driving dumps," in which vehicles would dump the

debris while moving forward, creating a more manageable debris field to search, rather

that a large 12-foot-high pile.

The search fields were continuously replenished with topsoil, as the front-end loaders would scrape into the eighteen-inch topsoil covering the landfill waste and generate unpleasant odors for the workers. After the adjustment was made to contend with the tangled steel, the top pile of debris would stand ten to twelve feet high. The inspectors would work though the pile, pulling debris off and sifting through the material. Over the eleven-month operation at Fresh Kills, the inspectors searched for three types of items in order of priority: human remains, personal property, and evidence.

In the search operation, the heavy metal was first manually removed and placed across the field. All heavy metals were scraped off and then spread out on what one official referred to as "picking fields." Inspectors from NYPD and FBI would walk the field looking for the three priority items. Large tents were set up to keep inspectors and the debris out of the elements. Later, a shaker system was introduced. Bulldozers would push debris to specific piles. The same search process would take place for the heavy metal; however, the finer material was loaded into shakers. Workers would then use equipment to place the rest of the debris on the shaker boxes. One of the shaker boxes had a conveyer belt that went up on an angle. To make the processing somewhat less labor-intensive for the detectives, inspectors would stand at the shaker belt and watch the debris fall off. If they to noticed a possible priority item, they could turn a switch that would shut the system off. All the while, heavy machinery was operating around personnel. One official stated that he was amazed that there was only one major injury during the process – a construction worker whose hand was crushed while cutting piping.

In late September or early October, 2001, the EMON acquired additional shaker boxes that would make the search process more rigorous. A backhoe machine would lift the debris from the piles into a hopper and shaker machine that would separate the debris into three sets: debris that was two to eight inches in size; material one-quarter to two inches in size; and debris less that one-quarter inch in size, which was not examined. As one participant described this process:

> The debris to be examined would come out of the shakers on a conveyer belt ramp at a quarter of an inch size. Detectives were stationed in what was referred to as the 'green houses,' or covered tents. Here, they examine the two different sets of debris particles that would pass by them on conveyer belts: one conveyer belt for each size of debris. Detectives would observe the debris as it passed by them on the conveyer belt and would select out pieces that required further examination. All the debris that was searched prior to the introduction of the more rigorous process was excavated and processed a second time before the operation shut down.

The officials at the site later thought to position three conveyers so they were at waist height for the police processors, enabling the inspectors to examine the debris as it passed by. Those working at the site expressed amazement that they were able to identify small personal items when so much was destroyed and seemed unidentifiable because of its condition. Later in the process, a spinning machine was introduced that would remove dirt, allowing for a better look at the debris. Eventually, the EMON added stools for inspectors charged with observing the conveyor belts and inspectors were given earplugs. Just before Thanksgiving 2001, the Fresh Kills processing operation finally caught up to the debris removal operation from Ground Zero.

The Office of the Chief Medical Examiner began with having a representative working at the site around the clock. Much later into the response, OCME found that was

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no longer necessary and changed procedures to transport remains once a day. Agencies

at the landfill also had a direct phone number to OCME, and the latter authorized an

immediate pick-up if a large body part was found.

Conditions at the landfill during the first few days were not ideal. The Fresh Kills

EMON was struggling to acquire equipment and supporting, a strong odor persisted,[8] and

the ground was extremely muddy. From the beginning, the operation started planning for

winter processing. Even though New York City was fortunate to experience a mild

winter, those working at the landfill had tents and warming sheds set up where the police

officers could go during the twenty-four-hour a day operation. Supply tents were also

constructed, and a mess tent referred to as the "Hill Top Café" allowed workers to take

breaks relatively near the processing operation. Air quality tests were regularly

conducted at the site, and the results were posted.

The entire activity at Fresh Kills was a result of creative improvisation. Many

other tasks were creatively improvised as needs surrounding the debris processing

emerged. For example, inspectors improvised their own property processing system that

is now being integrated into NYPD operations. In another example, after hearing falcons

chase away seagulls, officials unsuccessfully tried this approach to keep the gulls away

from the remains recovery operation. The falcon did not deter the birds. In the end, the

use of fireworks proved to be a more successful strategy. In another creative approach,

inspectors digitally photographed all property that was sent to the property clerk's office.

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[8] Not only were the strong odors from garbage disposed of at the landfill prior to September 11th difficult
for personnel not used to working in such environments to cope with, but the odors also had somewhat
demoralizing effect on personnel given the massive death toll and that inspectors were processing human
remains from the World Trade Center site.

They also built an area to enclose dogs involved in the searching. As one official

explained:

> First of all the dogs were going crazy. Because this is a landfill, you get
> so many different scents coming out, the dogs must have been drove
> crazy. That's primarily why they didn't last here. There were some odd
> things in the beginning, but again, it was just such an [outpouring] from
> the country that we said, 'Okay, we'll look at it and then we'll move it
> along if it doesn't fit.' After a while you got down to what was needed
> and what was not needed.

Another example, one that illustrates the impact concern for the victim's families had on

the development of the operation, involved the cleaning of personal property. According

to officials, the personal property items that were recovered were invariably dirty, and

they also emitted a foul odor. Inspectors did not want to return the items in that

condition, so personnel did research into different cleansing mechanism that would rid

the items of that smell. This improvised task is consistent with others the emerged at

Fresh Kills. One official described an extraordinary effort that was undertaken to recover

photographs:

> We even saved the photos that we were coming up with. Like photos of
> your kids on your desk or whatever the case may be. We even saved that,
> and [a private sector company working on another project with the NYPD]
> restored them and then they put that to a disk. And they did it pro-bono.
> Then they put it to a disk, so this way you could get the picture back that
> you had on your desk of your kids, or of whoever it was.

The sentiment that victims' families were overwhelmingly important served as a social

cue that shaped both specific tasks and the overall activity of processing debris. Those

working at the site spoke of how they knew that for many, the remains of loved ones

would never be found or identified, leaving an incredible void in the lives of family

members. The official explained:

> What we were looking to do with that was, even though a lot of people were victimized and died, there were also a lot of people who worked there, [and] we [wanted] to try and get whatever we could back to them. And we, you know, a lot of people that you talked to were very, very thankful.

This official went on to tell a touching story of how a woman who had lost her husband in the attacks had thanked inspectors. While the inspectors had recovered some of his remains, she wanted to express her appreciation for them finding his credit card at Fresh Kills:

> And she says, 'I want to thank you, you recovered my husband's… credit card.' She says, 'And naturally, I cannot have an open coffin, and naturally I shielded my children from what was remaining of their father,' she says, 'but the credit card was something they could hold. It was something [that] brought them some connection to their father.' So really we felt kind of nice about that.

As the recovery operation proceeded, the inspectors began to regard the returning of personal items to relatives and loved ones as an integral part of their recovery process, perhaps to in a way and to an extent they would never have recognized in any other disaster event.

Throughout the implementation process, those organizations that had a presence at Fresh Kills shaped this what the debris processing and remains recovery operation became. The method devised to ship the debris, where and how to unload it, how to search for remains and forensic evidence, and what type of support operation was necessary were just a few of the elements of the operation that were determined by organizations as they collectively made sense of what needed to be done. The creative improvisation of this activity and its related structure, resources, and tasks were a product of those interactions.

Factors Contributing to Creative Improvisation

The sections that follow discuss the factors that contributed to creative improvisation in the Fresh Kills operation. This discussion will show that creative improvisation was feasible in this case in part because of the ex tent to which members of the organization were able to draw upon repertoires of individual and shared knowledge to produce novel arrangements. Equally important, the EMON that developed was relatively skilled in sense0making and in accurately reading and integrating cues. A relaxation and in some cases complete lack of norms that would have stifled creativity was another factor contributing the improvisation process at Fresh Kills. A final contributor was the development of a shared vision provided a guiding framework where no model or template existed.

Repertoires of Individual and Shared Knowledge

The ability of various members of the organization to draw upon their individual and shared repertoires is essential for effective creative improvisation. While a plan or model does not guide the action of the organization in this form of improvisation, what facing uncertainty, the organization must nevertheless draw upon past experience, education, skill sets, and knowledge from other circumstances and different situations to inform, develop, and implement novel approaches. These repertoires ideally consist of shared knowledge and expertise that will overlap among all members of an organization or network, along with individual knowledge and expertise that will increase the overall diversity of organizational repertoires, which together enhances its agility to respond to new circumstances under time constraints.

Although members of the EMON at Fresh Kills were instrumental in shaping the activity through the process of sense-making, they were still constrained by elements of the overall response structure. At the same time, more so than in cases involving adaptive and reproductive improvisation, creative improvisation allowed for greater organizational agency in shaping the response system in which responders acted.

In analyzing the actions of organizations and networks that were active at the Fresh Kills site, it is useful to recall Giddens' (1984) theory of structuration, in which both structure – the rules and resources that govern social systems – and agency – the power of human action to enact on the system – are at play in the constitution of social relations, with neither accorded primacy. It is the duality of structure and agency, by which structure both constrains and enables agency, and by which agency both is constrained by and enacts upon the overall structure, that forms social systems.

Even in creative improvisation, structure still exerts a significant influence. Organizations are guided by their own cultures and rules of conduct in addition to those in place within the large community in which they act. As an organization or group of organizations makes sense of even the most novel situation, their interpretations will still be informed by prior institutional cultures and practices. Giddens (1976: 104) uses language as an example to explore the duality of structure, where language involves "interpretive schemes to make sense not only of what others say, but of what they mean," essentially sense-making through the use of contextual cues as well as mutual understanding through interaction. Moreover, language provides a structure or abstract

set of rules that guides the language, even if it does so in ways that are relatively abstract and not easily explainable (or even perceived) by those it guides.

Using conversation and language as a metaphor with which to explore creative improvisation in disaster is helpful. Consider two people, strangers, engaging in a conversation while waiting for a bus. To add complexity, assume that both individuals share some small knowledge of English, but that each has a different native tongue. Each person will draw upon a knowledge of English as well as his or her own native language in shaping the conversation, yet each will have to take into account the other's knowledge for the conversation to continue. Each person will draw upon a own knowledge of various topics, offering them up for consideration to keep the conversation going, while never entirely sure how the other will respond. Finally, each party knows that in order for the interaction to be a conversation, both have to contribute. In creating a dialogue, the two strangers are constrained by the structures of language, the formalities and courtesies of conversations, and their own knowledge base. However, their interaction shapes the conversation, steadily moving them toward exchanges that were not planned. With no script in place to guide what they must discuss, the two parties have considerable influence on how the conversation will take shape despite the impositions the structure of their languages imposes. Indeed, they will likely find other ways of communicating – through pointing or gesturing – in order to convey meaning and, as result, enact in real time on the language of their own conversation.

Along these lines, Sawyer (2003: 5) argues that the study of improvisation study contributes to a better understanding of conversations., or the "process whereby

participants in a conversation collaborate to create their interactional context, or *frame* [what Sawyer terms *collaborative emergence*]….and participants are constrained and enabled by the interactional frame that emerges from their dialogue [what Sawyer terms *downward causation*]. Sawyer (2001: 1) points to a tension between script and improvisation in conversation development, in which "even though our conversations are improvised, we still use small bits of structure that seem almost scripted." In other words, when we are at a loss for what to say, we may offer questions or topics of conversation that have led to successful dialogues in the past, even though the direction of the conversation could very well move in a direction that differs from than when the question or topic was last used, because the current situation is different.

At Fresh Kills, just as the strangers discussed above each drew upon rules of language from their own native tongues, the cultures of the various organizations that made up the EMON certainly had an influence on the overall operation. Although the Fresh Kills operation became EMON with its own regular routines, personnel from NYPD, FBI, DOS, DEC, OCME, Phillips & Jordan, Salvation Army, and other organizations were still accountable to their departments, agencies, and companies. Just as the two strangers engaged in a conversation shared some knowledge of English, along with some knowledge of specific topics, the organizations at Fresh Kills shared some knowledge of the disaster, the workings of the city of New York, the emerging procedures of the response, and the laws governing the city. That notwithstanding, each could also offer its own individual contributions. Just as one party in a conversation offers his or her own individual knowledge on a given topic during the conversation,

adding to the repertoire upon which the other participant can draw, contributing unique

knowledge or skills to the debris processing and remains recovery operation provided a

synergy upon which other responders could build using knowledge from their own

repertoires.

According to Weick (1993), those who more routinely work in non-routine

environments and who are used to creating order out of disorder by drawing upon the

resources and knowledge of what is at hand are better able to work with others to rework

their experiences into novel combinations. Many of those working in the World Trade

Center response environment had experience operating in non-routine environments,

even though the present conditions differed from those experiences. For example, some

FBI investigators had responded to the 1998 U.S. embassy bombings in Africa, while

other officials had experience working in the post-disaster environment of natural

disasters or airplane crashes.

Good jazz improvisation involves more than playing from the heart while

completely ignoring patterns and previously used formulae. As Baker paraphrases the

great trombonist, Slide Hampton, "Man, you show me a dude who plays with his heart,

and I'll show you an incoherent dude" (1989: 1). Just as important as the emotional

involvement in the performance of jazz music are the fundamental skills that constitute

the shared language of jazz musicians. For emergency responders, the same holds true.

Some individuals may have a greater aptitude than others for responding to unexpected

circumstances during a disaster. However, a solid grasp of the shared knowledge that is

drawn upon within that response, as well as practice in generalizing from patterns of

response used in other situations and rearranging them in novel ways in concert with others in the response, is essential.

When improvisation takes place, even when not guided by an overall model, each ensemble, through its members, has repertoires from which to draw. In the case of jazz, the musicians have their own riffs and are guided by a shared knowledge of music, genre, harmony, and rhythm. For improv actors, there is a shared knowledge of various games and rules regarding status and what is permissible. Similarly, actors have their own humorous lines that they have developed in other sketches. Disaster responders, whether laypersons or emergency management professionals, also have their own skills and experiences from daily routines and possibly previous disaster responses, as well as shared knowledge, which could include knowledge of resources and procedures in the local community or government.

When asked about improvisation, many people describe their actions as guided by common sense. But as we learn from more in-depth discussion, responders use the term "common sense" to reflect what in fact is a shared knowledge from which decisions can be made that others will support, even if others would not necessarily have thought of those same strategies themselves. As one official explained:

> You have to have some type of working knowledge of what we do. You
> have to have a basic working knowledge of working with other people,
> especially working with other people in respect to what they do, and then
> taking that and putting it together, and I think that's what I mean by the
> common sense approach. I know what my job duties and my experience
> has been and what works and what doesn't work in disasters. I know what
> doesn't work in disasters is a million reasons that you're giving me why
> you can't do something, and only one [reason why] yes, [something can be
> done]. You give me a million reasons why this isn't going to work –just
> let's make it work, together us as a group [we] can make anything work,

and we proved that at 9/11. I proved that at other disasters. And I think in this situation you definitely need some experience. You can't just go in there with just a common sense approach [and wing it]. You have to know there's a landfill, you have to know that there's a closure on it, you have to know that it has the capacity to hold this material…So yes, you need a basic working knowledge and some experience.

Baker (1989) observes that highly knowledgeable jazz musicians are better able to be creative jam sessions because they possess a greater repository of material upon which to draw. The greater and more diverse the repertoires, the freer the performer will be to engage in creative thinking. If we apply that model to emergency response, the better prepared and more experienced the responder, in terms of having faced and coped with a range of response challenges, the better able he or she will be to creatively improvise when face with the unexpected. Experience is important, but education and training can also help build us a stock of knowledge upon which to draw, making for a diverse and expanded repertoire from which appropriate actions can be selected.

This shared knowledge provides a base from which organizations can move, even when no plan is in place. In the case of the World Trade Center disaster, none of the responders had ever experienced an operation so complex, novel, and demanding. The disaster challenged even investigators from the FBI who had experience in recovery work following the embassy bombings in Kenya and Nairobi. They had never worked in an operation as complex as the September 11 disaster. In contrast to the 1998 bombings in Africa, New York City had the resources and the will to develop a complex operation. Moreover, following the World Trade Center disaster, there was such prolonged attention to the recovery of any remains at Fresh Kills. So much creative improvisation took place

in part because there were individual organizational repertoires that were played out in addition to the shared repertoires – all of which worked to facilitate novel approaches to the remains recovery.

The variety of organization involved at Fresh Kills further expanded the diversity of the response repertoires. Organizations such as the Army Corps of Engineers and Phillips & Jordan were brought into the EMON fold because of their skills and potential contributions. One official interviewed for this study pointed to the ways in which the Army Corps could step into the activity and shape it in ways that would enhance the overall operation:

> I knew that the Army Corps was really good at contract management, so they would be really good at managing the contracts [and payroll] and that would let like the Police Department and Sanitation worry about the operational issues. Because when I went up there that's all they kept talking about were all of these vendors that wanted to get paid, and they didn't know what to do, and they were like, 'Well we have to sort the debris.' And so they were just very overwhelmed.

According to one official at Phillips & Jordan, when the company first arrived at Fresh Kills, officials from NYPD told the company that they were overwhelmed with contractors coming in and pitching solutions for debris management issues. Phillips & Jordan were tasked with playing interference so the debris inspectors could do their jobs. This same official explained, "We had to do our job in such a fashion to win their trust. There was not blueprint for this, so we just made it up as we went along" (Phillips & Jordan, 2004). In completing its tasks, the company took its cues in from those organizations it was hired to assist. Successful sense-making regarding what "doing their job" meant earned this non-local organization the trust of organizations that had been

involved with the operation since the beginning. In turn, Phillips & Jordan's actions shaped the overall activity and the expectations of the EMON. Trust essential to any improvisation process, but especially so in creative improvisation. If others within the group, as this other official states, "trust your opinion, they trust your common sense, [and] they trust your working knowledge to make things happen," they will also have better confidence in the process. When there is skepticism, there is a delay in decision-making, which can hamper the response.

Compared to the waterborne evacuation of Lower Manhattan, in which creative improvisation also abounded (Kendra, Wachtendorf, & Quarantelli, 2003) but which lasted only a short time, the Fresh Kills operation took place over a longer time period. Even so, the fast-paced, complex, and turbulent environment during the initial weeks when the operation initially evolved necessitated simultaneous action and reaction. Thousands of tons of debris per day began to arrive at the site starting on the night of the 12. Those involved in the operation had to accept and process debris while at the same time making sense of how that entire process should be managed.

Although the process provided more time to contemplate decisions than, for example, the evacuation of Lower Manhattan or of the Twin Towers themselves, the sheer volume and complexity of those decisions did not allow time for decision-making before moving forward with subsequent steps. For this reason, the literature on expediting decision-making is useful to our understanding of how to speed the process of sense-making.

According to research on fast-paced industries in which decision-making occurs under tight time constraints (although not as constrained as the demands placed in the turbulent environment of a disaster), decision speed affects firm performance (Eisenhardt & Bourgeois, 1988). That is, firms that are less able to make quick decision are more likely to miss fleeting opportunities and tend to not perform as well as firms that are able to make decisions under similar time pressures.

Eisenhardt (1999) suggests that fast decision-makers working in the context of an organization use more, not less, information than slow decision-makers and develop more, not few alternatives. She also finds that conflict is not necessarily detrimental to decision speed; however, conflict resolution is critical. As decisions are integrated with other decisions and with plans, decision-makers become more comfortable with the risks associated with their decisions, and as a result those decisions are made more quickly. The use of real-time information may quicken the pace of strategic decision-making in organizations because it: allows decision-makers to more readily identify problems and opportunities; provides the opportunity to establish patterns from which begin to work from as the environment changes; and helps develop social routines people need to respond rapidly in crisis (Dutton & Jackson, 1988; Eisenhardt, 1999; Hayes, 1981; Simon, 1987). What helps speed decision-making? According to Eisenhardt (1999), executives who made quicker decisions had a firm grasp on the workings of their organizations. They also examined several alternatives at once and focused their attention on advice from the most experienced executives. Finally, they integrated key decisions and tactical planning within the decision process.

How do those findings apply to the turbulent environment of the World Trade

Center disaster? Certainly, the time constraints face by those involved in the Fresh Kills

operation affected their ability to improvise. As the official explained:

> You can't do everything, and so just trying to prioritize what's the most
> important thing at this particular moment in time and then do that, move
> on to the next thing, so it's a very humbling experience, you know you
> can't manage everything.

When participants have large and diverse repertoires from which to draw and work with

others whose repertoires overlap but also include alternative repertoires, the speed with

which they are able to respond to social and environmental cues increases. One official

described the importance of knowing the expertise of those personnel with whom he

worked in facilitating the improvisation process:

> So, it was knowing your staff and their capabilities and their experience.
> You have to know that off the top of your head (snaps his fingers). You
> can't say like, "What is he capable of?" You have to know that to make
> things work.

As organizations interact with and make sense of on another's actions, and develop a

sense of trust, as well as make sense of what is going on around them, they begin to

develop patterns that will increase the speed at which they are able to take in information

from on another and react to a rapidly changing environment.

What is perhaps most important about the Fresh Kills operation is that it evolved

out of a continuous process of interaction and sense-making over the two-to- three-week

period that followed the attacks. As this official observed:

> The process evolved, but I would say that there were no real modifications
> to the process after the beginning of October. We had everything we
> basically wanted, either if not in place, on the way there.

In developing the process, some organizations would come together and identify needs. Others would step in to offer a temporary solution that in time would evolve into something in response to changing conditions. Organizational members formed structures by members reading cues that it was appropriate they should step in. By doing so they would define a role for themselves that was maintained through subsequent months the operation continued. Moreover, when organizations stepped in, their participation would shape the activity itself. As one official said:

> Some of it was people that just said, 'Oh well, I could do that.' Or, you know, they started doing it and then they were stuck doing it the entire time, so it was little bit of everything.

Another official reinforced this statement:

> You're talking about improvising: we would at role call [to ask], 'Who's a carpenter? Cops, you raise your hand. Okay, over there.' Cause we had build loading docks, we had to build ramps, we had build ease-ways [so] that the guys wouldn't get rained on. We wanted to shield certain things.

One official marveled at how easily law enforcement officers moved to perform entirely new duties and take on very different roles, essentially finding a place in the emergent organizational structure to support the overall objectives of the debris processing and remains recovery activity:

> That's the beauty of New York City cops. You give them a job, and they do it. That's the beauty. You gotta love the guys, 'cause no matter what it was, how far out of the box was this – You know, two weeks before [one officer was] locking up bad guys, and now he, the guys used to say jokingly, call him the Boot Nazi. You know, cause you went to supplies and what have you, like the soup nazi from Seinfeld. They used to call him the Boot Nazi.

Each individual and organization had resources and skills above and beyond those that were required during routine periods. These latent skills and resources helped determine

the tasks that were undertaken and allowed for improvisation of an activity that was new to all those working on the site.

Ability to Make Sense in Ambiguous Circumstances

Although individuals in an ensemble may have a large array of resources and skills in their repertoires, equally important is their ability to read cues offered by others. More so than adaptive and reproductive improvisation, in which the adherence to and deviation from models or plans provide a guiding framework, creative improvisation relies on the cues offered by other participants as the framework from which the appropriate course of action is defined. The framework developed from these cues is at least as dynamic as the disaster environment, and therefore making sense remains an ongoing endeavor.

The statement of one official reflects how many described the Fresh Kills operation: "They made it up as they went along." The remark is exemplifies what creative improvisation is, yet it elides the effort that goes into making what organizations "make up" actually work. Creative improvisation is rooted in training and experience. As jazz scholar David Baker (1989) notes, the jazz idea that "you either got it or you ain't" is a misconception that generates myth around the genre that jazz can't be taught. Similarly, in emergency management the notion that some people simply improvise well in an emergency while others do not – the idea that raw talent is all that counts – detracts from preparatory work involved. As this official who was active in the development of the Fresh Kills landfill operation stated:

> The worst crisis you can give me the better I react. The worse the crisis is, the better I'm at handling it because I can just rattle things off. That's just my nature.

But clearly there is more involved here than that it is simply in the responder's nature to improvise well. What this official alluded to in later discussions was that he had significant disaster experience and was therefore accustomed to working in turbulent environments under time constraints. He had honed these skills over time and was open to new suggestions and approaches to get tasks done that others said could not be done. In other words, he was skilled at sense-making. He elaborated this way on his thoughts of the operation:

> And my attitude was, "This makes sense." This is a landfill that's under a closure order but it's still not closed…It makes sense for us to take the debris there, even if it's temporary, to sift through it to look for the black box which they were concerned about, [to] look for material. It was a snap decision, I think was a very good decision and I stand by it today.

Likewise, in jazz, while some musicians more so than others may demonstrate an aptitude for improvisation, the ability to read the cues of others within the group, to rework knowledge in ways that complement the improvisation of other musicians, and to produce music that is agreed upon by others as "good" through the process of real-time composing, is a skill that is practiced and learned.

Disasters can present challenges that are entirely novel for those involved. Weick (1993) uses the term "cosmology episode" for such situations. Cosmology episodes are the opposite of déjà vu, in that they are completely unfamiliar and outside both the normal experiences and other crisis situations of the participants. Weick describes the Mann Gulch disaster, in which thirteen smokejumpers were killed fighting a fire in

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August, 1949, as an episode in which sense-making and organizational structure

collapsed for the group as they confronted an out of control fire rush. Because the

firefighters had not been in a similar circumstance, they did not have well rehearsed

repertoires to guide their actions. Improvisation was necessary. As Weick explains, the

lethal temperatures and dense smoke in the Mann Gulch disaster challenged, if not made

impossible, the smokejumpers' ability validate impressions with others and or interpret

confusing directions. In other words, the smokejumpers could not make sense of the

situation.

The conditions involved in improvising the activity at Fresh Kills were not as

deadly or as challenging as those the smokejumpers at Mann Gulch faced. The

organizations at Fresh Kills were much better able to read one another's cues in

improvising the process. They could provide feedback, interact, and negotiate conflict.

Although the time constraints were tighter at Mann Gulch than at Fresh Kills, the real

challenge in improvising through the cosmology episode at Mann Gulch was related to

the firefighters' inability to engage in the sense-making process, not necessarily to the

time-constraints involved. In contrast, sense-making was possible among the

organizations whose work centered on the landfill.

When individuals lack the skill to engage in the collective sense-making process,

or when the turbulent environment of the disaster inhibits their ability to read cues, the

ability to creatively improvise can be hampered. On responder explained what guided his

actions:

> Well, a lot of what we did was flying by the seat of your pants. And if
> something didn't make sense, we didn't do it.

Certainly, we can imagine scenarios in which because of an inability to read social and environmental cues, situations do not make sense and responders fail to engage in necessary creative improvisations or employ inappropriate novel actions. For example, the lack of radio and cell phone interoperability prior to the collapse of the Twin Towers likely hampered the ability of firefighters in the stairwells to make sense of the imminent threat to the integrity of the structure. Heavy smoke and an inability to see clear passage deterred some office workers trapped in one of the towers from continuing down a stairwell to safety. Or consider a group of people who don't speak the same language who face an immanent threat. While together they may have the expertise to creatively improvise out of a dangerous situation, language barriers could prevent members of the group from accurately reading the cues of others in time to prevent negative consequences.

The entry of Phillips & Jordan in the crisis milieu, described earlier, facilitated the NYPD, FBI, and DOS's ability to make sense of debris processing and remains recovery. As described in the previous section, inquiries by vendors and administrative burden were creating what two officials described as "noise" for the Fresh Kills EMON. Personnel were becoming so distracted that they were impeded in their ability to carry out essential tasks. By stepping in to deal with administrative and vendor management issues, Phillips & Jordan's attempts at "reduced noise" and contributed to an environment in which other organizations could better make sense of what needed to be done.

The process of creative improvisation is not easy to negotiate. The organization must reduce distracting cues in the environment in order to pay better attention to those

cues that will work to best influence improvisation strategies. Yet, the organization must also take care to not ignore or miss cues that have consequence even though their impact is not readily apparent. Just as actors and musicians skilled at improvisation are able to read the crowd while not becoming distracted by other audience behavior such as talking or coughing, just as they are able to build upon novel riffs or lines offered by others in the ensemble while compensating for or ignoring the poorly-chosen improvisations of these same fellow performers, emergency responders skilled at improvisation are able to read emergent cues in a turbulent environment while separating out the "noise" that impedes the sense-making process. And just as actors and musicians learn and practice the art of improvisation and get better over time, so too can emergency responders engage in sense-making as a developed artistry that doesn't simply come from the heart.

Relaxation or Lack of Norms That Impede Creativity

Creative improvisation is of high consequence. As in any attempt at something new, the risk of error looms as a real possibility. Yet unlike reproductive improvisation, in which the objective involves striving toward duplication of the original, or adaptive improvisation, where there is at least a model to move away from, no precise template exists on which to model the creative improvisation, from which to deviate. This lack of a template provides some degree of freedom for those engaged in the creative improvisation process. Although likely aware of the scrutiny their decisions will face in the post-disaster environment, the improvisers enjoy the freedom to innovate under time constraints and essentially try something new "because [they have] to do something." In the case of the Fresh Kills operation, the lack of any preexisting plan for managing the

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debris processing and remains recovery activity necessitated the development of an improvised operation and allowed for the emergence of an activity that could conceivably have taken a different form had that freedom not existed.

As discussed earlier, creative improvisation of one response system element (improvised activity, structure, resources, or tasks) is often accompanied by creative improvisation of other elements. As organizations made sense of how to develop the debris processing and remains recovery activity, they simultaneously made sense of how to develop and implement various improvised structures, resources and tasks. One of the many tasks that comprised the overall activity, the one quarter of an inch standard set for searching the debris for remains, illustrates how the collectivity of organizations looked one another to create a standard of social acceptability. Why would investigators search the debris for remains to one quarter of an inch in size? Certainly, the resources available to them influenced their choice. The tools that were pulled into their response repertoires bounded their abilities. But the EMON could have determined that such rigor was superfluous and that the time and effort expended by their investigators was better invested elsewhere. Alternatively, the EMON could have continued to seek out ways to add rigor beyond the one-quarter-inch standard or expressed dissatisfaction that not enough was being done. However, the Fresh Kills EMON collectively made sense that one quarter of an inch was as small as it could reasonable search and still be able to say with confidence to the families of the dead that the operation had held the search to a high standard. The organizations reached a consensus based on what was available to them as well as through their collective sense-making that this standard would hold them

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accountable and still be feasible in the operation. Because there was no set standard to
which to compare regarding how small a bone or a tissue fragment the investigators
should look for, they had a degree of freedom in which to improvise that standard
themselves.

It is important to note that the Staten Island landfill was extremely isolated
compared to many other response locations related to this disaster. Unlike Ground Zero,
staging areas, the emergency operations center, and incident command posts, the landfill
was only accessible by car and at some distance. The site was therefore under less
scrutiny than other locations, particularly when compared with to the activities underway
at Ground Zero. As one official notes, "People were very fixated on the World Trade
Center and nobody was really paying attention to landfill." While sense-making was
ongoing, it was a process mainly informed by those working within the operation.
Outside scrutiny was less frequent and intense than what those working at the pile dealt
with on a daily basis.

Not only was there an absence of plans for the debris processing and remains
recovery activity, but the city also lacked an organizational structure to immediately
assume responsibility for such an operation. There was no pre-established emergency
response organizational network (ERON) for this activity. As a consequence, an
emergent multi-organizational network (EMON) was creatively improvised over the
course of the improvisation of the activity itself.

An organization is a "series of interlocking routines, habituated action patterns
that bring the same people together around the same activities in the same place and

time" (Westley, 1990: 339). Following the World Trade Center disaster, organizations came together in new ways to contend with newly emerging demands. These organizations formed new organizational networks as well as functional and response-based organizations in their own right. At the Fresh Kills landfill site, these creatively improvised organizational structures fostered the process of creatively improvising the debris process activity. The new activity generated new roles that did not have to compete with previously designated roles. Both the structure and the activity went through a negotiation process.

Chapter 5 examined how the planned-for emergency response organizational networks in some functional areas such as debris removal and health and safety evolved into emergent multi-organizational networks when the ERON did not adequately contend with response needs. EMONS also developed at site-specific locations important to the response milieu, such as the two EMONs including agency representatives at Ground Zero and the emergency operations center. In other words, the structures adapted.

Other EMONs were not adapted from ERONs, but instead emerged in response to demands that were not previously planned for. At the Staten Island Fresh Kills landfill site, organizations such as the NYPD, DOS, and FBI, in addition to a host of others, came together to form not only an emergent network of organizations but actually a new response-driven organization separate from their agency or departmental membership. These organizations were not only connected through their interactions, but responders at Fresh Kills also formed their own unique sets of patterns, activities, and structures.

While the focus of this chapter is on creative activities rather than creative structures, the emergent organizational structures improvised at Fresh Kills clearly affected the creative improvisation of the debris processing and remains recovery activity. Moreover, the lack of a preexisting structure for such an activity fostered an environment in which improvisation was not only acceptable but also encouraged. In other circumstances, the temporary relaxation of a pre-existing structure could also facilitate creative action.

Structural support is not always present for those who choose to creatively improvise. We talked with at least one official that was reprimanded for participating in the Fresh Kills operation. According to this official, higher officials within the agency were upset that routine decision-making processes were not followed on site. It never crossed his mind that the agency would not stand behind those decisions. He explained how he was asked for reports when time did not permit their production. He encountered organizations that would hesitate fulfilling requests unless a paper trail could be tied back to him. These instances point to discrepancies in the ways different people within the same organization made sense of the disaster environment. While organizations he was working with in the field had arrived at similar definitions of what needed to be done, organizational representatives working at locations outside of the city still saw routine plans as adequately accounting for needs and therefore believed those regulations should be followed. For this official, agency norms lacked flexibility and responsiveness. As a consequence to the reprimands facing this responder, one could anticipate that departmental creative improvisation in future disasters will be stifled.

Like Sawyer's (2003) descriptions of jazz and improv theater, creative improvisation in disasters are collaborations in which individuals within the ensemble have a degree of creative freedom, but at the same time are influenced by the situation and by the actions of others within the group. Although the sense-making process allows for freedom to employ novel strategies, when applied on an organizational level those strategies are only successful to the extent that others support and build upon them.

The relaxation of norms during the World Trade Center response, whether through official waivers based on the Governor's disaster declaration or through the informal suspension of routine norms, facilitated the creative improvisation process. Moreover, because the Fresh Kills operation was entirely new and without a prescribed plan, responders had a degree of freedom to implement novel strategies. Bruner (1983: 183) describes creativity as "figuring out how to use what you already know in order to go beyond what you currently think." The freedom enjoyed by the Fresh Kills operation allowed organizations at the site to explore what was possible and establish their own course of action. While hindsight could be used to critique the decisions made, the operation also played a role in defining what was necessary and the criteria for evaluation. Without an established plan against which to judge the operation, the freedom enjoyed by responding organizations facilitated the introduction of novel strategies.

Development of a Share Vision

One of the primary requirements for an effective response to disasters and other complex crises is the ability of all the participants in the response to develop, maintain,

and act upon a "shared vision" of emergency needs, goals, and available resources (see

Comfort, 1999). Typically, within a single organization, the shared vision is developed

both explicitly, through training, drills, and exercises, and implicitly, through steady

immersion in operational activities and organizational culture so that norms are learned

over time. The process is, of course, an imperfect one; dissident groups and resistors

exist in any organization, and distinct subcultures exist alongside those preferred by

corporate leaders. While no organization functions according to its formally-delineated

structure, sufficient congruence exists by consent or through formal and informal

sanctions to ensure some degree of consistency and regularity in performance. Loss of

shared vision, in contrast, constitutes a management crisis that demands intervention (see,

for example, Brenneman, 2000).

When activities and organizational structures are improvised during a disaster,

organizations must collectively make sense of their shared vision while simultaneously

engaging in response activities. Sense-making and response occurs at the same time. As

pointed out earlier, the expeditious removal of debris from Lower Manhattan and concern

for the families of the victims became the *modus operandi* for the Fresh Kills operation –

the shared vision of outcome the EMON needed to achieve. But this took time to

develop. Moreover, that vision in and of itself could conceivable lead to different

manifestations of the debris processing and remains recovery operation. Response

organizations needed to act before they had an opportunity to envision a complete and

shared understanding of what they needed to do and how they should achieve it. Once

response organizations had made sense of what they needed to achieve – the *modus*

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operandi – they were able to use that as a shared vision to further make sense of how they could best meet the needs of the victims' family members and the need to quickly remove debris from the collapse site.

While the ultimate decision to bring the debris to Fresh Kills was likely made by an official at OEM in conjunction with discussions with DOS officials, a variety of people from a number of different organizations claimed credit for the idea. One could argue that some of these claims were a product of people taking credit for decisions they did not make; however, it should be noted that at least one official was received reprimands because of his involvement and perhaps would have been better off to suggest that it was someone else's decision. What is most likely, based on observations and interviews, is that a number of key decision-makers came to the same conclusions based on the information available to them. All were engaged in activities that involved the debris at Ground Zero. All knew that the landfill had been shut down below capacity and were somewhat familiar with the operations at the location. All saw that DOS would have an important role to play. All knew Fresh Kills was a marine unloading facility, which could handle barge unloading. All knew it would be convenient to search the material where it could be disposed of onsite. Therefore, early on in the disaster response, a shared vision was already forming among organizations regarding where the operation needed to be set up. When various officials encountered others who thought that the landfill was the most appropriate location for the debris processing operation, they believed that others recognized their suggestion of Fresh Kills instead of

understanding that each had individually come to hold shared vision based on sense-making of similar cues.

As part of the sense-making process, guiding frameworks began to develop. Eventually, some of these frameworks would become part of the shared vision of the EMON, including the priority placed on keeping pace with the transport of debris from Ground Zero, an emphasis on safety, and perhaps more importantly, a shared vision for finding every human remain that could be recovered and returned to loved ones. As one official recalled:

> Family members would come up and they would say to us, you know, 'Please, please, please.' And we used to tell them…'Listen, I'm not telling you we're going to find them, but I promise you I will look through everything to get it.' And they were very satisfied with that, so what we did at the end was we dug up the whole hill…I told you there was the base line of garbage that we know we didn't put there. So we went down to the base line of garbage and processed the whole hill, in case we dropped something, to put it through. Just to keep true to the promise that we made to the families.

Wenger and his associates (Wenger, Giuliano, & Hertel, 1985; Wenger, Erber, & Raymond, 1991) posit that shared vision formulates around collective memory, where each participant in the organization contributes different pieces of the memory puzzle and relies on each other to form single transactive memory system. Others, like Sandelands & Stablein (1987) who have done work in the area of artificial intelligence argue that organizations are like minds. As the operation Fresh Kills developed, so too did virtual role systems in which participants could envision their and other's roles and responsibilities within the activity. The advantage in developing such an understanding of one's role in relation to others is that an individual responder can align his or her

improvisations with the shared roles of the group even when working in isolation (Weick & Roberts, 1993).

Deviations from the shared vision were noted and sanction. For example, officials pointed to some individuals who lied and others who suggested ideas that were deemed inconsistent with the shared vision of EMON. These individuals were not tolerated as part of the EMON and were removed from the site. More often than not, it seemed that the way in which conflicting ideas were offered, rather than the fact that conflict emerged, determined the extent to which participants were excluded from the operation. Officials at the Fresh Kills site claimed to distinguish between differences of opinion and conflict by determining whether or not the party involved had a vision of the response consistent with the EMON's shared vision and had the trust (or at least had not lost the trust) of the EMON. A spirit of cooperation was key, according to this official:

> Sometimes you know, being a cop, you can become a little overbearing. It's your way, you're used to doing things your way. When we were up there we had quite a bit of like, you know, Type A personalities up there. And it amazed me how everyone worked together. We didn't have any fights. We didn't. Everything was handled [in] the spirit of cooperation, which I think maybe [was a result of] the circumstances of the attack itself. It was really a team effort; the entire thing up there was a team…I did not make decisions without letting other people know what I was doing and they did not make decisions without letting me know what they were doing and why…When Phillips & Jordan came up there, we did not like them, we did not need them, we did not want them. [We wanted them to do] one specific thing for us, and that was it. And they became a very trusted partner up there…They didn't gouge. They were very honorable people. Not once did they try and propose something [that] we felt would've been [a] waste…Every now and then you would have a jerk. And it was usually somebody who [would] come in for just a short period of time, and the universal opinion was, "That person's a jerk," and we shut down [that] person.

Officials who worked at the Fresh Kills site believed that people from the different constituencies got to know one another well because they had to work in such close proximity to one another and even eat together. Unlike other response locations where workers could eventually go off-site or to areas onsite with friends or colleagues from the same department to eat or rest, the isolated and closed quarters of the Fresh Kills operation encouraged people to get along. This likely contributed to the sense-making environment that developed.

Teamwork is important to successful improvisation. As in theatre or jazz, it is not enough to simply get by in a scene or performance (Crossan, 1998; Peplowski, 1998). Individuals must think of how to best work with the group and to facilitate participation. Just as it is important for the individuals to have a common goal in these improvisation sessions (Crossan, 1998), so to is it critical for organizations to work together toward a common goal in their emergency response, not just by contributing with minimal effort but instead by responding in ways that will bolster the improvised response of others.

Conclusions

Creative improvisation occurs when the organization or collectivity of organizations determines that system element consisting of a structure, activity, resource, or tasks is needed where no prior plan or model exists and novel strategies are employed under time-constraints to produce that element. This analysis focuses on the emergence of the debris processing and remains recovery activity established at the Fresh Kills landfill site in Staten Island during the World Trade Center disaster response. Through a process of collective sense-making, the collectivity of organizations involved in the

response defined their circumstances by taking at cues from the dynamic disaster environment and from other organizations regarding need to contend with the debris generated as a result of the collapse of the Twin Towers. Sense-making was instrumental in both the determination that a novel activity was necessary and the implementation process itself. Improvisation was facilitated because members of the organization were able to draw upon repertoires of individual and shared knowledge to produce novel arrangements. The EMON was able to accurately read and integrate the cues of its participating organizations. A relaxation of or, in some cases, a lack of norms that would normally work to impede creativity fostered the improvisation process. Finally, the development of a shared vision provided a guiding framework where no model or template existed.

The debris processing and remains recovery operation example illustrates a successful instance of creative improvisation. It should be noted, however, that many of the same factors that facilitate this type of improvisation can encourage improvisation where plans exist that would adequately address emerging needs. While crucial in many circumstances, creative improvisation can also have its drawbacks. Engaging in creative improvisation in situations in which organizational continuity, reproductive improvisation, or adaptive improvisation would prove more appropriate might delay a response and also generate serious unintended consequences. Even when sense-making appears satisfactory to the organizations involved, creative improvisation could prove the wrong path to follow if the organizations have in fact misread environmental cues.

Chapter 7
SUMMARY AND CONCLUSIONS

This dissertation began with a quote from E. B. White (1949) calling attention to New York City's vulnerability to disasters. Over half a century later, the World Trade Center disaster demonstrated just how vulnerable the city really was. Despite the experience and knowledge of city officials as well as the investments in its response efforts, New York City was still not prepared for a disaster of the magnitude and complexity that occurred on September 11, 2001. Yet the World Trade Center disaster also showed that while the built environment and social structure were indeed vulnerable to extreme events, the emergency response organizational network (ERON) was well equipped to exercise flexibility, resourcefulness, and coordinated collective action to improvise an effective and resilient response.

Clearly, it is imperative that organizations learn from mistakes that lead to increased vulnerability and integrate those lessons into future planning efforts. New York City was not as well prepared as it could have been, and this was one reason why so many response activities had to be improvised. At the same time, it is important to remember that the presence of high levels of improvised action in and of itself does not necessarily imply that New York City was deficient in its response. Organizational studies often consider improvisation as something that occurs when there is an

organizational failure (Lewin, 1998). However, improvised action does not alone signify that a system has failed. To hold this incorrect assumption ignores the fact that organizations function in a dynamic and changing environment in which the unexpected happens with considerable frequency. It also disregards the fact that in some cases such extreme changes can occur at that operational plans become 'fantasy documents.' That is, while written documents may serve the symbolic function of legitimating claims that the organization is prepared, the plan itself is unlikely to adequately meet the extreme demands imposed by a catastrophic disaster (Clarke, 1999). Finally, the assumption does not account for agency, or the extent to which the actions of individuals, groups, organizations, and networks enact change on the environment, thereby helping to create an altered environment to which they must respond.

Planning is critical. Not only do good plans save lives when disasters strike, but formal planning processes and widely-held normative expectations regarding action can also protect property, mitigate post-disaster disruption, and speed recovery. However, in turbulent environments – particularly those characterizing catastrophic or near-catastrophic events – improvisation is essential. Organizational improvisation is not rare in disasters, as the very definition of disaster implies that a situation has moved beyond the ability of affected organizations and communities to cope. Moreover, improvisation takes place during non-disaster periods when the social or physical environment changes significantly or when needs shift. Indeed, organizations are more resilient when they can anticipant shifting environments, develop planned courses of action, and demonstrate

flexibility and the ability improvise under time constraints when unanticipated situations emerge.

Efforts to prevent or mitigate the consequences of disaster must be encouraged; however, it is the purpose of this work to explore what happens when such efforts prove insufficient in the face of unexpected events. In this dissertation, I draw upon the classical literature in disaster sociology and collective behavior, organizational theory, structuration theory, and jazz and dramatic improvisation models to study improvised collective action and sense-making at the multi-organizational level in highly demanding, ambiguous, and turbulent environments. I explore the different motivations and outcomes of improvised responses that develop under crisis. In doing so, I provide an analysis of the improvisation process as well as a typology of improvisation forms.

The use of jazz and improv theatre metaphors to explore the World Trade Center response is not meant to simplify the very complex operations of a disaster response of this scale. The metaphors offer a framework in which to think about improvisation as more than a response to an unexpected stimulus. Instead, improvisation is a process through which organizations come together to define, shape, and work in concert with one another, to draw upon response repertoires in novel ways, and to act reflexively and retrospectively upon the turbulent environment in which they find themselves.

As Weick (1998: 551) observes, "the newfound urgency in organizational studies to understand improvisation and learning is symptomatic of growing societal concerns about how to cope with discontinuity, multiple commitments, interruptions, and transient purposes that dissolve without warning." What this dissertation demonstrates is that

improvisation is more than a binary opposite to organizational continuity. Although the sociological literature often uses the concept of improvisation to describe unplanned-for novel action, a closer examination of improvisational processes themselves reveals complex forms and variations in both improvisational objectives and outcomes. Taking these differences into account, the research has identified three forms of improvisation: reproductive, adaptive, and creative improvisation.

A close examination of the reestablishment of the Emergency Operations Center (EOC) after this original resource at 7 World Trade Center (7WTC) was completely destroyed offers insight into the reproductive improvisation process. Reproductive improvisation occurs when an organization or collectivity of organizations determines that an original but unachievable structure, activity, resource, or task is still appropriate and employs novel substitutions under time constraints to replicate the original. Facilitating reproductive improvisations in this case were: 1) the stability of the coordination needs demanded of the EOC by responding organizations, even when other specific response activities or structures may have changed somewhat; 2) the tremendous access the City of New York had to a wide range of resource substitutes; 3) a preference for maintaining the existing systems of authority and structure; and 4) the maintenance of a shared vision of the resource and the structures, activities, and tasks the emergency response network was supporting.

Adaptive improvisation is illustrated by an examination of the credentialing and badge identification system that developed in the aftermath of the Trade Center attack as it reflected the dynamic organizational structures constituting the broad range of

emergency support functions. Adaptive improvisation occurs when an organization or collectivity of organizations determines that the original structure, activity, resource, or task is inappropriate and makes unplanned-for adjustments under time constraints, regardless of whether or not enacting the original model is possible. Adaptive improvisation often brings about the need for additional adaptive improvisations. Inappropriate planned-for strategies may be revised to temporarily contend with emergent needs; however, when these strategies themselves are perceived as lacking, such approaches may generate new needs to be contended with, demanding additional adaptive improvisations. Throughout the process, the organizations involved must work to communicate the adaptations to other organizations and negotiate with those that oppose the changes.

Creative improvisation is discussed within the context of the complex debris processing and remains recovery operation that emerged at the Staten Island Fresh Kills Landfill site. Creative improvisation occurs when an organization or collectivity of organizations, determines that a structure, activity, resource, or task element is needed in order to respond to an event, but where no prior plan or model exists, resulting in the enactment of novel strategies under time constraints to produce that element. Creative improvisation was possible because the EMON was able to accurately read and integrate the cues of constituent organizations and members were able to draw upon repertoires of both specialized and shared knowledge to produce novel arrangements. A relaxation or lack of norms that would normally work to impede creativity fostered the improvisation

process. Finally, the development of a shared vision provided a guiding framework where no prior model or template for collective action existed.

Implications for Disaster Policy

The findings from this study have applicability for the field of disaster management and policy. Pre-planning enhances the capabilities of organizations (Dynes & Drabek, 1994). However, emergency planners should also understand the coupled relationship that exists between planning and improvisation in the disaster response context. Planning improves response capabilities, but when the unexpected happens or when events exceed a system's ability to cope, improvisation plays a central role in increasing the effectiveness of response efforts. This study also demonstrates that emergency managers must not only ask themselves, as Shibutani (1986) states, whether normative frameworks are still adequate – that is *if* improvisation is necessary – but they must also consider what *type* of improvisation should be employed. The organizational structures, the activities in which organizations engage, the tasks that comprise those activities, and the resources used in their implementation are all elements of the response system. For each element in each circumstance, it is possible for responders to collectively determine that continuity, contingency, or one of three improvisational forms is appropriate.

The consequence of that sense-making endeavor – deciding whether to engage in normative behavior consistent with the continuity of established or contingency plans or instead engage in emergent behavior of various forms, be they reproductive, adaptive, or creative – can lead to both appropriate or inappropriate paths of action. Adherence to

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plans that are no longer appropriate can produce negative outcomes, but so can improvisation when adequate plans are in place, or alternatively, improvising in one way when another is more suitable to emerging demands. For this reason, education and training efforts should emphasize strategies that will improve the ability of responders to make sense of social and environmental cues despite the often stressful and ambiguous context of a disaster.

Disaster planning may stifle improvisation, but it can also anticipate and incorporate improvisation (Quarantelli, 1996). Not only does planning increase the repertoires of those in the ensemble of response organizations, but it also allows time to focus on sense-making in some critical areas by eliminating the need for extensive reassessment in others. Clearly, the more complex and unexpected the disaster, the more collective sense-making needs to occur. To the extent that plans, or rather the planning process, has already made sense of a range of appropriate responses, organizations will be able to concentrate their efforts on the truly unexpected and surprising aspects of disaster events.

Disaster planning also needs to consider ways of helping to create an environment that encourages improvisation when appropriate. The comparisons drawn between the improvisations of disaster responders and those of jazz musicians and improv actors are telling. Improvisation in disasters has an artistic quality. Inspired by features in the surrounding environment, improvisers are able to produce a vision of a novel strategy – a previously unthought-of-way of organizing (Kendra & Wachtendorf, 2003a) – to recreate, reshape, or create a response element. But even great artists hone their skills

through practice, training, and education. There are those with aptitudes for responding under time constraints, but just as improvising jazz music well while playing in an ensemble involves more that playing from the heart, disaster responders, whether laypeople or professionals, require more than intuition and common sense to improvise well in crisis situations. Even more complex is the improvisation that takes place on a multi-organizational level, in which responders represent not only themselves as discrete individuals, but also organizational entities interacting with others within an elaborate network. Effective disaster planning must, therefore, take into account ways to facilitate sense-making, encourage flexibility when the circumstances demand, and reinforce the established structure when that path is most appropriate.

Plans are like theatre scripts. They guide action, just as organizational strategy and planning guide organizational management (Crossan, 1998). Improvisations in acting and disaster response have common features. In a theatrical context, improvisation workshops bridge the theory of improvisational acting with its practice (Crossan, 1998). So too can disaster drills bridge the scripts of response planning, the theory behind improvisational emergency response, and their application. This can only occur when drills and improvisation exercises truly aim at enhancing the skills of responders, rather than enhancing an organization's image – for example, to demonstrate legitimacy by touting the organization's preparedness. For this reason, disaster drills that play the same scenarios over and over until the participants "get it right" are only useful to the extent that participants experience that exact scenario in some future event. More important are drills that train participants on sense-making strategies, how to work toward a shared

vision, how to interpret cues in ambiguous and changing environments, and how to communicate that information to others.

Implications for Sociology and Future Directions

The development of the improvisation typology presented in this study has implications for organizational studies, collective behavior, and other sub-fields in Sociology.

This analysis has combined the theoretical work of Giddens (1976) with that of organizational scholars such as Weick (1993), to show how sense-making and organizational improvisation is consistent with Giddens' structuration approach. It has highlighted the symbiotic relationship that exists between planned and improvised action, providing an example of how emergent and normative action work in concert with each other and how new patterns of behavior develop through organizational interaction.

The study considers as its unit level of analysis the multi-organizational network or collectivity of organizations that response to a disaster. Organizational networks are more than simply the sum of their parts, but instead include actors that represent organizational cultures, organizational sense-making processes (as distinct from network sense-making processes), and organizational repertoires. The typology is applicable for studies of multi-organizational improvisation episodes in non-disaster environments, as well as studies focused on organizing at the individual, family, small group, or single organizational level. Future research should examine sense-making strategies and improvisation approaches in these contexts and explore the differences and similarities between these processes at different levels and in different contexts. For example, how

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do families improvise in turbulent environments? Are some groups, organizations, or networks better suited to developing or maintaining a shared vision than others? Are the strategies used by informal organizations, formal organizations, formal networks, and loosely-bonded informal networks similar or different? Do some of these groups tend toward certain types of improvisation processes more so than others and, if so, why? The use of this typology and the findings from this research would be useful in answering these questions.

The use of musical and dramatic metaphor to consider improvisation sheds light on the social nature of the concept. Improvisation is sometimes linked to psychological processes, such as the layperson's description of using common sense or intuition. Perhaps this is because we often conceive of improvisation primarily at the individual level. Because this study places its emphasis on improvisation at the multi-organizational level, it points to how improvisation is a social process, rather than individual action. These processes are linked to both agency and structural influences that exists independent of both individuals and organizations.

This study makes a substantial but first step in conceptualizing and analyzing different improvisation forms. More extensive research is needed to better understand these improvisational forms and the factors that influence their emergence. Useful approaches to such investigations would include in-depth case studies of each improvisation type, additional research on improvisation types across response elements, and meta-analyses of improvisation in different crisis and non-crisis environments. If improvisation describes different processes with different goals and outcomes, what

about other commonly used concepts? This phase of the study has not yet fully examined organizational continuity and contingency. Creativity, intelligence, and leadership are other examples of concepts that may describe multiple processes and merit future research.

Findings from this work also have implications for the study of collective behavior. This research supports assertions that new forms of action are connected to previously existing norms and structures while at the same time transcending, opposing, or modifying them (Killian, 1994). This work offers a framework to distinguish among different forms of improvised collective action. By developing a broader understanding of organizational processes in turbulent environments, this research shows that collective action under conditions of uncertainty and urgency is more nuanced than previously thought. The concept of improvisation has wide use in the sociological literature on collective behavior and organizational studies. Understanding that this concept in fact describes different types of collective action will better enable scholars in the collective behavior field to explain the development of emergent norms and sense-making in formalized and loosely-coupled groups, organizations, and networks. Indeed, how organizations make sense of their environment leads to different processes of social behavior and expectations. The sense-making of the collectivity – whether it works to reproduce or adapt planned-for action or create novel courses of action entirely – influence organizational action. At the same time, those interpretations are outcomes of the collective definition of emerging needs. Moreover, these processes occur in the context of four distinct response elements: structures, activities, resources, and tasks.

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The typology provides a new framework to reexamine what we know about emergent action in organizations and better understand the role agency and structure play influencing emergent collective behavior. For example, future research should explore the extent to which the analytic tools developed to study improvisation by Kreps and Bosworth (1993; 1994), and expanded upon by Webb (1998) could be used in conjunction with this typology, adding another dimension to the study of improvised action during disasters. Reconsidering earlier indices used to measure improvisation in light of the improvisation typology developed here can also generate new insights into such sociological concepts as role-enactment.

The improvisation typology and this study of sense-making can also lead to a better understanding of the social construction of contentious actions that emerge under time constraints. Almost thirty months after the attacks on the World Trade Center, the New York Times (Lichtblau, 2004) ran an article reporting how Federal Bureau of Investigation (FBI) agents were under criticism for taking from the Fresh Kill landfill mementos such as chunks of concrete, bags of dust, pieces of metal, an American flag, and a Tiffany globe paperweight. The article stated that no written policy was in place during the Fresh Kills operation that prohibited memento taking, yet an FBI official concurred with the thoughts of some family members that the actions were inappropriate:

> We didn't have a written policy relative to this type of activity, and that's one of the problems here. Obviously we don't encourage this type of thing, and while it was inappropriate, there wasn't a policy we could say they violated (Lichtblau, 2004).

The article suggested that those agents who took mementos did so in order to have reminders of the months of difficult work they conducted at the site, and that such actions

were consistent with memento gathering by responders at Ground Zero as well as by family members.[9] Thus far, we have not learned of any mementos that consisted of personal property that should have been returned to families or that would have been considered part of the forensic or structural collapse investigation. Seemingly, these were items that would have been buried as landfill. Admittedly, some agents may have had less-than innocent motives for removing items from the site. But for the most part, this was a situation in which those agents at the landfill made sense that memento taking was an appropriate or at the very least excusable action, given their investment in working at the site. At the same time, other communities – such as family members of the victims and the FBI organization separated from the FBI component that had become part of the Fresh Kills emergent multi-organizational network – have come to define those same actions as "inappropriate." Rather than criticizing the agents' actions or focusing on *why* they took the items, exploring the process through which the agents came to define those actions as appropriate during the post-disaster period would provide a better understanding of *how* collective definitions developed in ambiguous circumstances.

Another example shows how the typology is useful in examining how organizations come to engage in different forms of improvisation and with what result. Consider the waterborne evacuation of Lower Manhattan. Overall, this was clearly a successful creatively improvised activity. No plan was in place before September 11 to conduct such an evacuation; however, harbor vessels converged and formed a loosely

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[9] Although there was a strict policy that no one was to remove any items from Ground Zero except as part of the official debris removal operation, we saw and heard from many officials from a broad range of organizations who took small blocks of concrete or pieces of metal from the site. After the October family memorial held at Ground Zero, firefighters and construction workers placed small pieces of concrete on a barrier for family members to take.

organized network that successfully evacuated approximately five hundred thousand people with no casualties and relatively few injuries. If we consider one adaptive improvised task within this activity – the improvisation by some vessel operators regarding the number of passengers allowed aboard a vessel – this sense-making and improvisation framework provides insight into the improvisational strategies adopted.

Although regulations are in place governing how many passengers are allowed to board a vessel, many of those involved in the response defined the environment as one in which it was imperative to evacuate people from Lower Manhattan as quickly as possible. The sense-making that took place on boats and along the shore – through interpreting environmental conditions, the ambiguous threat environment, and cues from one another – fostered the sense that a very quick evacuation was imperative. As a result, at least some vessel operators allowed more passengers on their vessel than would have been permitted by the regulations – and more passengers that there were life jackets. Vessel operators made sense that these regulations on capacity were not longer appropriate, and that adaptive improvisation regarding safe capacity numbers was necessary. Operators "eye-balled" what was safe, drawing on their experience repertoires as captains. In hindsight, one could argue that although the evacuees were upset, uncomfortable, and some suffered minor injuries after the collapse, they were for the most part not in any imminent danger if they did not leave the island immediately. Many boats had queued to transport the evacuees from Manhattan and, with the atypical harbor traffic patterns underway, it was fortunate that a major collision did not occur that would have left passengers without life jackets and vulnerable to additional injury.

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It could also be argued that this was a case where adaptive improvisation was not an appropriate course of action and that operators at the very least should have adhered to capacity guidelines. Yet it was the way those vessel operators made sense of the September 11 environment that led them to determine adaptive improvisation was appropriate. Evacuees were anxious and wanted to leave quickly, the physical environment was imposing and fraught with confusion, and neither vessel captains nor those on shore had any way of knowing if additional terrorist attacks were imminent. In this case, understanding the sense-making and improvisation process leads to a better understanding of why particular collective actions emerge even when outside observers or those looking back on those actions with more information may now read that environment differently.

These examples draw from improvisation episodes during the World Trade Center disaster, yet their implications have applicability for studies of other turbulent, fast-paced, and ambiguous environments. Study findings can help address how do different constituencies of organizations make sense of their social environments under time constraints and how such constituencies may choose particular improvisation strategies that differ from one another or from strategies deemed appropriate by those not working under those same kinds of constraints.

The scale, magnitude, and complexities associated with the response make the World Trade Center disaster provide an ideal context in which to explore the concept of improvised collective action. However, organizational improvisation occurs in less serious events as well. Indeed, to a greater or lesser extent, improvisation is a process

that characterizes all efforts to respond to the unexpected. In an activity related to the September 11 attacks, air traffic controllers across the United States improvised in an unprecedented move to ground or reroute all aircraft within the country. During the 1997 flood of the Red River of the North, a multi-organizational response developed in Manitoba, Canada after a weakness was discovered in the flood control measures protecting the city of Winnipeg. A huge makeshift dike that would normally have taken months to complete was constructed in a matter of eight days, with the bulk of the construction taking place in three days. During recent earthquakes in Iran and India, community members came together to search for victims trapped beneath the rubble of buildings before more formalize rescue teams could arrive. The typology presented here will be useful in comparatively studying the processes involved in improvising across such events.

Understanding improvisation at the multi-organizational level is particularly useful given the increasingly regional and even global relationships organizations have with one another. Improvisation frequently occurs among organizations with ties to broader social networks, not simply discrete actors that are confined geo-spatially. The multi-organizational response to the World Trade Center attacks provides a glimpse into the complexity we might expect from more diffuse regional, national, and global disaster threats. Such episodes could be related to ambiguous terrorist threats, computer network failures, regional power blackouts, or the spread of contagious diseases, as was seen in the 2003 cross-national, trans-pacific spread of Severe Acute Respiratory Syndrome (SARS). Moreover, researchers who study other turbulent environments, such as

complex humanitarian disasters, war maneuvers during combat, or the turbulent environment that characterizes financial crises, may be able to draw insight from this typology. Indeed, future research should explore the extent to which this typology is useful in understanding larger transformative social changes in turbulent environments. While the context of improvising a disaster response is quite different from improvising nation-building, the sense-making, artistry, and reliance on action repertoires, as well as the application of structuration theory in the same way as used in this study, could prove insightful for those scholars interested in better understanding improvisation in, for example, the turbulent environment of the 'post-war-yet-ongoing-conflict' of Iraq in 2003 and 2004. Such studies, by further examining the differentiation between war-time strategic decision-making by commanders at headquarters distant from actual sense-making in battle and from 'peace-keeping' field operations, could lead to a greater understanding of higher-level decision-making and organizational sense-making in the disaster context.

The concept of sense-making is central to research on improvisation. This study discussed the challenges that arise when different organizations, each with its own organizational culture and structure, come together to collectively define and respond to a rapidly changing social environment under time constraints. Yet, as organizations become increasingly linked on a global level, multi-organizational sense-making could confront different challenges than seen on a regional level. Does sense-making involve like or different processes when compared cross-culturally or when "scaled-up" to global organizational networks? If the processes are different, how will this impact

sense-making on a multi-organizational level during transnational disasters and other crises, such as the spread and attempted containment of highly contagious diseases, or responses to global financial crises?

As discussed here, reproductive, adaptive and creative actions occur both during disasters and during periods of relative calm. Such actions are characterized as improvisational when they take place under time constraints. Organizations engage in actions while simultaneously sense-making, thereby both enacting and altering the environment of which they then retrospectively make sense. Improvisation at the individual level often takes place over a period of a few seconds or minutes, perhaps somewhat longer if the action is relatively complex. However, the World Trade Center response points to the ambiguity of the notion of "time constraints" when considered at the multi-organizational level and in the context of a protracted crisis event. The processes of improvisation in this case lasted hours, days, and even weeks. When does improvisation begin and end? How can we determine when improvisation becomes routine? Is this related to the concept of "the new normal" – a term that has been used again and again in connection with the events of September 11? What differences exists, if any, in how reproductive, adaptive, and creative improvisation and action take place at the multi-organizational level? Would the improvisation typology and decision-tree help shed light on the multi-organizational sense-making and risk management strategies engaged in by top advisors in the White House, the Central Intelligence Agency, the Federal Bureau on Investigation and other agencies in the nine month leading up to the September 11, 2001 attacks? What about organizational sense-making and improvisation

in businesses and institutions? In a recent article in the Chronicle of Higher Education,

Stanley Fish (2004) posited that incremental steps have a greater impact on institutional

change than long-term strategic plans. He pointed to adaptability and flexibility as

necessary for institutions, arguing that "planning alone cannot carry the day" as strategies

are developed in institutions of higher learning. Private sector organizations and

organizational networks also enact change in response to dynamic market conditions.

Social problems that emerge over a relatively long period of time, such as the slow but

evolving initial multi-organizational response in the United States to the spread

HIV/AIDS, may also involve sense-making and reproductive, adaptive, or creative

actions, but are these improvisations? Worthy of further research is the extent to which

sense-making and improvisation occur over more protracted episodes and the similarities

and differences between these episodes and those with more urgent and shorter time

frames.

Sociology is fundamentally concerned with identifying and explaining patterns in

social life. Sociologists use systematic approaches and methods in order to understand

human and group behavior within the context of larger institutions and ways of

organizing. Disaster sociologists have long been interested in the maintenance and

transformation of the social structure; indeed, this theme has been a focus for disaster

research since its inception. Much of this theoretically and methodologically grounded

work, carried out by organizations such as the Disaster Research Center, has made

important contributions to the broader discipline of sociology as well as to specialty areas

such as the field of collective behavior. At the same time, this body of research has

contributed to the understanding of disasters on a practical level, highlighting

implications for policies and practice. Frequently, although by no means always,

practitioners and decision-makers learn about and apply these findings. In many ways,

this is what we as sociologists strive toward: using sociological perspectives to develop

better ways of understanding social life, and then demonstrating how those perspectives

can be used to address social problems and pursue other socially-desirable goals. In the

disaster research tradition, this research has sought to better understand the relationships

that exist between plans and performance, organizational routines and emergent

organizational behavior. Focusing on organizational structures, activities, resources, I

have shown how each of these response elements can become a locus for organizational

improvisational actions under crisis conditions. I have taken a new approach to defining

and operationalizing improvisation, showing how improvisation differs not only from

planned activity but also from contingent or Plan B" crisis response. Further, I have

shown that improvisation takes different forms – reproductive, adaptive, and creative –

and that the adoption of different improvisational strategies by multi-organizational

networks can be traced back to specific sets of facilitating and constraining conditions.

Finally, I have suggested that effective crisis management is based upon the ability not

only to plan well and execute those plans, but also to foster within organizations and

networks the capacity to recognize when improvisation is required and to select prudently

among alternative improvisational repertoires.

APPENDIX A

World Trade Center Coding Categories

BUILDING INSPECTION/REPAIR
This category refers to building inspections for the purposes of classifying damage ("red tagging" or condemned; ok to enter) and suitability for eventual reentry. The focus is on individual buildings. Organizations or contractors who assess whether or not a building is safe; the extent to which it is damaged, specifically related to the reoccupancy of the building; when it can be entered/reentered; and the process of repairing, stabilizing, and putting the building back into service. Includes the damaged or impacted buildings surrounding the collapsed buildings.

BUSINESS RECOVERY
This category excludes mere mentions of damage to individual firms. It does include businesses when they employ strategies of recovery such as improvising new facilities, equipment, methods for carrying on their business. It also includes business that assisted in recovery efforts of other businesses. (e.g. lending facilities). It also includes organizations that assist businesses with recovery efforts (e.g. financial assistance or other aid). If a donation was made from one business to another, it should be coded as both "business recovery" and "donations."

CABLE RESTORATION
References to cable television service and high-speed digital Internet access. This includes both the impact to those infrastructures (e.g. loss of service to specific areas of the city) as well as the restoration of service.

COUNSELING
This includes the provision of mental health care to victims and responders. In each case the category of responder support services or victim support services will accompany the counseling category. It includes counseling provided by mental health professionals, volunteers, clergy, and intraorganizational counseling provided by peers or designated mental health workers. In cases of mentions of individual volunteers or mental health professionals, include the name of the individual in the contact information cell and the organizational affiliation (Red Cross, Salvation Army, church, name of private practice, name of hospital) in the organizational affiliation cell. Write "unknown" if you cannot determine the affiliation. Responders include: uniformed personnel who converge to the

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site upon first impact and those who participate in the recovery operations in the subsequent weeks; personnel who engaged in response or response support activities at other sites (such as hospitals, family center, EOC, checkpoints); lay people who evacuated the building but stayed to assist in response efforts; lay people and volunteers who engaged in response or response-support activities. Victims include: lay people who evacuated the buildings; family members and friends of those who died or who evacuated; other people impacted in the city (loss of jobs); family members of responders. [Make notation that it is a family member of responder]. Do not include as an interaction the provision of counseling from someone in one organization to someone in another. For example, a Salvation Army volunteers counseling a firefighter is not an interorganizational interaction, but should only be coded as organization: Salvation Army, category: counseling, responder support services. However, formal requests by an organization to another organization does count as an interaction.

CREDENTIALING
The process of identifying personnel authorized to access secured locations, issuing documentation such as badges to prove authorization, acquiring the documentation, and disseminating information about valid credentials. The process of credentialing ends at the checkpoint. When a guard or officer inspects credentials prior to allowing access to secured sites the activity would be coded as "site security."

FORENSIC INVESTIGATION
Forensic investigations related to debris at crash site and/or debris brought to Fresh Kills landfill or Staten Island. Other related investigations should be coded under "law enforcement."

DAMAGE AND SITUATION ASSESSMENT
Includes general visual assessments and assessments related to damage as it impacts the work site. The exact geographical location of these sites will vary (and shrink) over time; however, this category is specifically related to the work site and assessments needed for site stabilization (such as netting for buildings, assessing need to tear broken glass from windows, assessing the stability of external damage to surrounding buildings that could make the work site unstable, need for fire suppression, assessments of the "bathtub", etc). This includes damage assessment of the collapsed or near-collapsed buildings (World Trade Centers 1-7 and the Marriott Financial Hotel) as well as the immediately surrounding areas. Includes the retaining wall ("bathtub"); does not include the assessment of damage in surrounding buildings which will be categorized under the "building inspection" category. Does not include environmental quality and does not include occupational-safety related hazards. Does include remote sensing surveys, assessments of the debris spread, prevalence of fires, conventional surveying activities. When these assessments are mapped, they will be categorized as both "situation assessment" and "mapping." Damaged roads, bridges, etc. will be coded under "infrastructure". In addition, damage to lifelines such as telephone, electricity, water, gas, steam will be coded under their respective categories).

DEBRIS MANAGEMENT
This includes management of debris (excluding remains) at sites away from Ground Zero, such as Staten Island and Fresh Kills Landfill. It also includes the eventual disposal, sale, or recycling of any of the debris. It excludes the forensic component of debris management, which should instead be coded as "crime investigation."

DEBRIS REMOVAL
This includes the removal of debris (excluding remains) from the site. Organizations involved in cutting down larger pieces at the site into smaller pieces for removal, loading of debris at the site, and transporting debris from Ground Zero to other sites for further management are included in this category. Management of that debris at alternate sites should not be classified in this category but instead under "debris management."

DONATIONS
This includes financial and material donations. It includes mentions of organizations (including businesses and community-based groups) who donate to the response effort, to recovery efforts, businesses, or to victims, as well as the organizations that receive and distribute the donations. If a donation was made from one business to another, it should be coded as both "business recovery" and "donations." If the donation was made specifically to victims or to responders, it should be coded as both "donations" and "victims support" or "responder support" respectively. If an individual who is not in any way associated with an organization, such as a random person donating cookies or money to another person, it is not included. But we are interested if that person is part of a group, however informal. If that person donates to an organization, such as the Red Cross or Uniformed Widows Fund, the organization that receives the donation should be what is coded with "donations," not the individual who made the donation.

ELECTRICITY RESTORATION
This includes the loss or restoration of electric power.

EMERGENCY COORDINATION
Distributing information to other agencies involved in the response; instructions to other agencies to do certain tasks (SITREPs); directives on what to do next; contact information; producing organizational chart; distributing of Incident Action Plan; general liaison (whom to talk to). Emergency coordination involves the compiling and distribution of information about a variety of current or changing activities and conditions (these activities and conditions will be reflected in other categories). For example, a number of debris management, security, and infrastructure activities could be listed in a SITREP. Producing the SITREP is an "emergency coordination" activity; performing the task is a "debris management," "security," or "infrastructure" activity, respectively.

ENVIRONMENTAL QUALITY
This includes monitoring of air quality, toxics and other hazardous or infectious (distinguished from remains but includes concerns about blood-borne pathogens) materials, the extent of the ash cloud, freon, and water quality (it's possible there are others). It also includes the mitigation actions taken to reduce the hazards associated with these concerns, such as dust suppression measures. It does not include activities that are taken by responders to prevent the harm that these hazards may cause to them and others (such as wearing masks and respirators). In these cases, the activity would instead be coded as "occupational safety."

EVACUATION
Organizations involved in evacuating residents and businesses from the Ground Zero area or other areas of Manhattan. If a business or an individual from an organization (e.g. a lone police officer) is evacuated by another organization, do not include this as an interaction. However, include as an interaction cooperative or collaborative efforts among organizations to facilitate evacuation (e.g. US Coast Guard and NYPD or a private boat company) during the waterborne evacuation of lower Manhattan.

FINANCIAL ASSISTANCE
This does not include donations. It does, however, include financial assistance provided by FEMA, the state, the city, and companies providing assistance to employees or the families of employees.

FIRE SUPRESSION
Includes efforts to suppress the fire at the site. It does not include other fires around the city. Activities involved in assessing or mapping the fire (again, not suppression per se) should be coded as "damage and situation assessment."

FOOD PROVISION
This includes the provision of food to victims, victim's families, and responders. This activity should be codes as both "food" and the appropriate category of "victim support services" or "responder support services." Organizations that provide the food should be mentioned. Intervening organizations that facilitate or permit (if that can be determined) should be mentioned as an interaction. If a member of an organization utilizes these food services provided by another organization, it should be coded as an interaction.

GAS RESTORATION
This includes the loss or restoration of natural gas service.

HOUSING / SHELTER PROVISION
The provision of accommodations by an organization (e.g. Salvation Army, Red Cross, government entity, USNS Comfort (coded as US Navy)) to victims, responders, volunteers, and evacuees. Does not include individuals' allowing friends, family to stay at their home. This should be coded with "victim support services" or "responder support

services" as appropriate. Organizations that provide the housing should be mentioned. Intervening organizations that facilitate or permit (if that can be determined) should be mentioned as an interaction. If a member of an organization utilizes these housing services provided by another organization, it should be coded as an interaction.

TRANSPORTATION INFRASTRUCTURE RESTORATION
Includes the loss, inspection, or restoration of the use of roads, bridges, tunnels, train and subway service. The closure of roads or rerouting bus service should be coded as "infrastructure." The distribution of information about that closure should be coded as "emergency coordination."

INJURY TREATMENT
Provision of medical care to victims, responders, volunteers, or animals.

LAW ENFORCEMENT
The investigation of suspected WTC-related crimes within New York City and pertaining to the elements of response, relief, and recovery, arrest and prosecution of suspects, including anthrax incidents and bomb scares (coded also as a "response to continuing threat") fraud, fines and arrests due to breaching of site security (coded also as "site security") or violations of safety regulations (coded also as "occupational safety" or "environmental quality" as appropriate).

LEGAL ISSUES
Refers to filing of death certificates and related paperwork; lawsuits threatened or ongoing; building tenants and leases; counseling to organizations on ramifications of response actions.

LOGISTICS
The ordering, purchasing, transportation, storage, and delivery of personnel and material resources related to the response efforts. Interaction includes both the requesting organization, the providing organization, and any organization that facilitates the transaction.

MAPPING
The production of maps: includes the development of new GIS capability at the new EOC; the distribution of maps; the process of turning situation assessments into maps; new uses of maps or development of new kinds of maps (e.g. charting the ash cloud). Specific requests for particular kinds of maps to meet particular response needs.

OCCUPATIONAL SAFETY
Refers to organizations overseeing the safety of response workers (use of protective equipment, hard-hats, respirators) and implementing strategies for ensuring adherence to safety regulations. This can include organizations that are impacted by those strategies (e.g., contractors can suggest what should be done; they can point to problems with

regulations; or interact with oversight organizations when workers or others fail to abide by regulations).

PUBLIC INFORMATION/RELATIONS
The dissemination of information to the public. This is distinct from the categories under which the activity itself occurs. For example, an organization may be involved in monitoring environmental quality. That same organization or a different organization may be involved in communicating the information to the public, which should be coded as a separate activity.

REMAINS IDENTIFICATION
Organizations involved in identifying victim remains, either through DNA analysis (includes the process of collecting samples from relatives) or through personal effects, dental records, etc.

REMAINS RECOVERY
Organizations involved in recovery of remains at Ground Zero and the transport of those remains to morgues.

RESPONDER SUPPORT SERVICES
Organizations providing support services to responders such as feeding, housing, counseling (also coded as "food," "housing," and "counseling," respectively). Also includes massage and chiropractic care, veterinary care, information about New York City, and any other service devoted to assisting or comforting the responders.

RESPONSE TO NEW THREATS
This category is restricted to anthrax episodes, either confirmed or feared, in New York City and bomb scares in New York City. This should be coded with other appropriate categories (e.g. evacuation if residents are told to leave a building). This does not include incidents at airports, or anthrax episodes elsewhere in the US.

SEARCH AND RESCUE
Organizations involved in searching for, locating, and intending to free or actually freeing live victims from collapsed buildings. Does not include transport of the victims to hospitals, which should be coded as "victim transport." Also does not include the recovery of remains (which should be coded as "remains recovery"); however, search and rescue and remains recovery were often taking place simultaneously and by the same organizations. If an organization is mentioned twice in the same article (e.g. SAR and remains recovery), fill out two code sheets for that organization for that article. Organizations that provide information about where victims may be are considered to be participating in SAR activities as are organizations who provide technical support for SAR (thermal cameras, SAR robots). Finding a firefighter in the rubble does not constitute an interorganizational interaction.

SITE AND FACILITY SECURITY

Organizations involved in prohibiting unauthorized access to facilities. This includes organizations monitoring checkpoints, entrances to buildings, and people within a facility or secured area. Does not include organizations that pass through checkpoints, unless that organization is involved in pointing out flaws in security measures or in suggesting alternative strategies. Also includes those organizations establishing secured perimeters and designating facilities as restricted access.

SITE STABILIZATION

Site stabilization relates to organizations involved in stabilizing the ground zero work site. This includes stabilizing or minimizing overhead hazards, unstable surfaces, stabilizing the retaining wall ("bathtub"), stabilizing the sub-surface structures. Organization involved in the stabilization of collapsed or near-collapsed buildings, debris piles, the "bathtub," ground surfaces whose stability impacts the ability to use heavy machinery; and netting windows to prevent falling glass.

SPACE PPROVISION

Provision of space for response related activities.

SUPPORT TO VICTIMS AND VICTIMS' FAMILIES

Organizations providing support services to victims and their families such as feeding, housing, counseling (also coded as "food," "housing," and "counseling," respectively). Facilitating paperwork and bureaucratic processes, providing information about New York City, access to free telephone and email, meeting space, and any other service devoted to assisting or comforting the victims and their families.

TECHNICAL SUPPORT SERVICES

Organizations that provide support related to activities dealing with technology, including expertise, consulting, set-up and repair. Examples include networking computers, helping with software—including E-Team--computer troubleshooting, provision and ongoing support related to portable radios, walkie-talkies, and other technologies that facilitate communication between responders; troubleshooting and networking telephone systems, fax systems, copy machines). Technical support involving mapping or GIS should be coded as "mapping." To clarify, if an organization uses remote-sensing technology for damage assessment, that should be coded as "damage assessment;" if a different organization provides the technology (or guidance on its use and application) to the organization conducting the damage assessment, but does not itself directly use the technology, that organization's category should be coded as "technical support."

TELECOMMUNICATIONS RESTORATION

Refers to the loss or restoration of telecommunications.

VICTIM TRANSPORT
Organizations involved in transporting victims to hospitals and other medical care facilities.

VOLUNTEER COORDINATION
Organizations involved in the coordination, management, marshalling, registration, assigning of volunteers.

WATER RESTORATION
Refers to the loss or restoration of water service.

WIRELESS TELECOMMUNICATIONS RESTORATION / PROVISION
Refers to the loss or restoration of wireless telecommunications.

APPENDIX B

Newspaper and Document Data Coding Project Instructions

Go through documents and the NY Times and Wall Street Journal articles we have saved electronically. Record the mention of any organization mentioned in connection with the response or early recovery in New York City only. Search and rescue activities, response to the site, assistance to families and relief workers, business recovery strategies, donations, volunteer efforts, debris removal, utility restoration, injury treatment, anthrax issues in NYC, and bomb scares immediately after are example of response and early recovery activities. Memorial plans, airport security, the Queens plane crash in November, the military strikes overseas, personal stories of loss that do not involve organizational assistance or response, and the disasters in Pennsylvania and Washington are examples of activities we will not consider. Remember, you are looking for organizations and their involvement. This could be a city department, an out of town agency, a state agency, and federal agency, a business, a school, a gallery or association, a research center, a media organization, a non-profit group, donation or foundation group, a task force, a consulting company, an informal or emergent group like a victim support group or issue driven group. Think broadly. You should skim articles for mention of any organization mentioned in connection with the response or early the recovery. ALL mentions should be recorded. The underlying purpose of this is to ultimately develop a network map of inter-organizational interaction around certain functions of the response and recovery effort. If three organizations are mentioned in an article, you will fill out three separate code sheets. If an organization is mentioned twice, both time for the same function (e.g. logistics), only fill out one code sheet for that organization that article. If an organization is mentioned twice in the same article but for different functions (e.g. logistics and debris management), fill out two code sheets for that organization for that article. Enter this information on the code sheets provided. This information will then be entered into a database. If you discard an article as not relevant, make sure you make a note of it on the discarded article checklist.

APPENDIX C

Coding Sheet

Coder's Name:
Organization's Name:
Facility:
Contact Name:
Contact Information:
Response Function:

Organization Type:
Private: for profit   non-profit
Public: local   state   regional   federal
Organization's structure: pre-existing   emergent
Organization's task: planned   improvised

Action described as: Positive Negative

Interaction with another agency: Yes No
(If yes) Name of agency:
Facility:

Source:
Size of contingency: Small   Medium   Large
Time period: 1-3 days   4-12 days   13-30 days   30-60 days   more than 60
days
Comments:

APPENDIX D

World Trade Center Disaster Response
Key Informant Interview[10]

As you know, we are carrying out a study that focuses on how organizations responded following the attacks on the World Trade Center, how response-related tasks were carried out, how the organizations involved worked together on those tasks, and what lessons were learned in the course of those response activities.

I want to start with a few questions about you and your involvement in the emergency response following the World Trade Center attack.

1.   Where were you and what were you doing on September 11 when the first plane struck?

        (Probe: At work, on the way to work, off duty?   Doing what he/she would normally do?)

2.   When did you become involved in responding to the attacks?

        (Probe: Did the interviewee become involved spontaneously, by plan, or by a directive given by a superior?)

3.   What was the nature of your involvement?

4.   How long were you involved?

5.   What are your normal duties within _____ (name of organization), and are those duties the same as or different from those you performed during the World Trade Center emergency?

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[10] Interview questions were open ended. The many follow-up questions and additional probe are not listed here.

I want to turn next to talking about your organization and its activities during the emergency response period. But first I have one or two questions about how the organization operates during normal times.

6. Can you tell me about the main responsibilities of your organization during non-disaster times?

    (Probe: Ask interviewee if there is an organizational chart and if you can have a copy)

7. How large is the staff?

    (Probe: Do staff work in 24-hour shifts, or only during the day?)

8. To what extent was _____ (name of organization) involved in disaster planning for New York City prior to September 11?

    (Probe: For example, was the organization given a role in citywide disaster operations—for example, in a formal disaster plan? Had the organization taken part in any disaster drills and exercises with other agencies in the year or two prior to the 9-11 attacks?

9. Did your organization have a formal disaster plan prior to 9-11? If so, can you describe what activities the plan covered?

    (Probe: If possible, I would like to obtain a copy of the plan as it existed at the time of the Trade Center attack.)

10. Did your organization have a representative at the City's emergency operations center or at command posts that were set up to manage the response to the Trade Center attack?

    (Probe: If there was a representative: At which location? When was the representative first sent? How did the organization know where to send someone?

(Hand "Emergency Response Activities" list to interviewee.)

Here is a list of several key emergency response activities that different organizations were involved in following the 9-11 attacks. Can you please look over the list and indicate which activities your organization was involved with? The timeframe in which we are interested extends from the time of the attacks on 9-11 until approximately two months later, around November 12 when the passenger jet crashed in Queens.

(Determine disaster-related tasks in which the organization was involved.)

I'm going to ask you a series of questions about each of the response activities in which your organization was involved. We will take those activities one at a time. First, with respect to _____ (name of task): (Note: Write on separate paper)

11.   When did _____ (name of organization) first become involved in _____ (name of task)?

        (Probe: First three days? Days four through twelve? Thirteen through thirty? Thirty through sixty? When specifically did involvement begin?)

12.   What part did your organization play in _____ (name of task)?

13.   How long did your organization's involvement last?

        (Probe: Use standard timeframes: first three days, etc.)

14.   Was this involvement planned beforehand—for example, were the organization's duties specified in a formal plan or other agreement, such as a memorandum of understanding?

15.   Were the specific duties or activities your organization carried out in connection with _____ (name of task) planned in advance, or were they new activities for which there had been no prior planning?

        (Probe: If not planned, how were decisions made about your organization's involvement in those activities?)

16.   What sorts of equipment and technologies does your organization normally use during daily operations?

17.   Were these same kinds of equipment and technologies used in (name of task), and were any new kinds of equipment or technology added?

        (Probe: If new equipment or technologies were added, what was new? Was there a need to substitute for technologies that failed to function or that were inadequate?)

18.   What about the facilities or space your organization used for this task?

        (Probe: Where are the organization's normal work sites, were these also used following 9-11, and were new facilities used during the emergency response)?

19.   What about the personnel that were used in this task?

        (Probe: Were regular employees of the organization used, and were new
        personnel added? Were new personnel employees of other organizations,or were
        they volunteers?)

20.   With what other organizations did your organizations work in carrying out
        _____ (name of task)?

        (Probe: Be sure to get complete account of other organizations with which
        interviewee's organization worked.)

21.   How were those organizational arrangements managed and coordinated?

        (Probe: Which organization had authority for carrying out the task? What kind of
        division of labor developed? Ask interviewee whether he/she has an
        organizational chart of those activities or can draw one.)

22.   During the course of carrying out _____ (name of activity),
        what worked well? In what ways would you judge the response to be effective?

        (Probes: Did organizations collaborate successfully? Were losses avoided or
        contained? Was the task completed on time or perhaps even early?   Were
        organizations recognized publicly for the good job they did? Were there tangible
        benefits to victims or to the general public?)

23.   During the course of carrying out _____ (name of activity),
        what didn't work well?

        (Probe: Were there areas in which the response wasn't as effective? Were there
        barriers that stood in the way of effective organizational performance? Conflicts
        or occurrences that harmed the organization's image? Was additional harm done
        due to poor performance or lack of collaboration?)

24.   What were the major lessons your organization learned with respect to the
        performance of this specific task and set of activities? In your view, what would
        the organization do differently on this particular task as a result of its experiences
        following 9-11?

(If interviewee names more than one task)

Now I would like to go over the same series of questions for _____
(name of next task).

(Continue on with questions for all activities identified).

(At end of interview, ask the following questions):

25.   Is there anything more that you would like to add to anything that has been said—
        Anything more we need to know about how the response to 9-11 was carried out
        and managed?

26.   Who else would you recommend that we speak with for this study—either in your
        own organization or in other City organizations that were involved in a major way
        in the response to the 9-11 attacks?

        (Get names and contact details.)

(After terminating the interview, ask for any and all relevant documents, including any
general descriptive material on interviewee's organization, disaster plans, after action
reports, etc.)

World Trade Center Response Activities Handout

Please check the activities your organization was involved with following the 2001 terrorist
attacks on the World Trade Center. Please ask the interviewer if you are unsure of what tasks that
would be considered under a specific activity listing.

BUILDING INSPECTION/REPAIR
BUSINESS RECOVERY
CABLE RESTORATION
COUNSELING
CREDENTIALING
FORENSIC INVESTIGATION
DAMAGE AND SITUATION ASSESSMENT
DEBRIS MANAGEMENT
DEBRIS REMOVAL
DONATIONS
ELECTRICITY RESTORATION
EMERGENCY COORDINATION
ENVIRONMENTAL QUALITY
EVACUATION
FINANCIAL ASSISTANCE
FIRE SUPRESSION
FOOD PROVISION
GAS RESTORATION
HOUSING / SHELTER PROVISION
TRANSPORTATION INFRASTRUCTURE RESTORATION

INJURY TREATMENT
LAW ENFORCEMENT
LEGAL ISSUES
LOGISTICS
MAPPING
OCCUPATIONAL SAFETY
PROVIDE SPACE
PUBLIC INFORMATION/RELATIONS
REMAINS IDENTIFICATION
REMAINS RECOVERY
RESPONDER SUPPORT SERVICES
RESPONSE TO NEW THREATS
SEARCH AND RESCUE
SITE AND FACILITY SECURITY
SITE STABILIZATION
SUPPORT TO VICTIMS AND VICTIMS' FAMILIES
TECHNICAL SUPPORT SERVICES
TELECOMMUNICATIONS RESTORATION
VICTIM TRANSPORT
VOLUNTEER COORDINATION
WATER RESTORATION
WIRELESS TELECOMMUNICATIONS RESTORATION

APPENDIX E

Copy of Informed Consent Form

STATEMENT OF INFORMED CONSENT

I agree to participate in an interview that focuses on the activities of my organization during the emergency period following the September 11 attack on the World Trade Center. The interview is being conducted as part of a study that is being carried out by the Disaster Research Center at the University of Delaware. I understand that the purpose of this study is to gain information on my understanding and perceptions of my organization's involvement in the performance of emergency response tasks following the 9-11 attacks. A member of the Disaster Research Center staff has explained to me that approximately 100 interviewees have been or will be contacted as part of this study.

I understand that the Disaster Research Center has obtained a Confidentiality Certificate from the Department of Health and Human Services. With this Certificate, DRC researchers cannot be forced (for example, by court subpoena) to disclose information that may identify me in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. The Disaster Research Center will do everything possible to keep others from learning about my participation in this research. Disclosure will be necessary, however, upon request of DHHS for the purpose of audit or evaluation.

I understand that a Confidentiality Certificate does not prevent me or a member of my family from voluntarily releasing information about myself or my involvement in this research. I am aware, however, that if an employer, insurer, or other party learns about my participation and obtains my consent to receive information provided for this research, then the Disaster Research Center may not use the Confidentiality Certificate to withhold that information. This means that I must do all I can to protect my own privacy.

I understand that the interview will last from one to two hours. This interview will be tape-recorded. The tapes and transcripts from this interview will be archived by the Disaster Research Center, and may be used for legitimate research purposes in the future with the approval of the Center's Director. The identities of all study participants will be kept confidential at all times, and any information that could lead to the identification of individual interviewees will be removed from all archived data.

I understand that my participation in this study is voluntary and without compensation and that I may refuse to answer any specific question raised during the interview. If I wish to withdraw from the study, I may do so at any time without giving any reason or explanation. If I do choose to withdraw from the study, I understand that this will have no effect on my relationship with the Disaster Research Center and that any information I may have provided prior to withdrawing will be destroyed. I understand that any reports based on interviews conducted for this study will not identify specific individuals.

The Disaster Research Center has answered any questions I had about the study and what is expected of me. I have been told that if I have questions about this research project, I can contact the study's director, Dr. Kathleen Tierney, at (302) 831-6618. It has also been explained that if I have questions about my rights as a participant in this research project, I should contact the University of Delaware's Vice Provost for Research, Dr. T. W. Fraser Russell, at (302) 831-4007.

I have read and understood this information, and I have received a copy of this form.

_____   _____

Signature   Date

APPENDIX F

**Copy of Approval Form University of Delaware Internal Review Board Governing
the Protection of Human Subjects**

REFERENCES

Aguirre, B.E. 1994. "Collective Behavior and Social Movement Theory." Pp. 257-272 in *Disasters, Collective Behavior, and Social Organization*, edited by R.R. Dynes and K.J. Tierney. Newark, DE: University of Delaware Press.

Aguirre, B.E., J.M. Kendra, and R. Connell. 2003. "Emergencies, Crisis, and Disasters in Hospitals." Preliminary paper. Newark, DE: Disaster Research Center, University of Delaware.

Auf der Heide, E. 1989. *Disaster Response: Principles of Preparation and Coordination.* St. Louis, MO: The C.V. Mosby Company.

Baker, D. 1989. *David Baker's Jazz Pedagogy: A Comprehensive Method of Jazz Education for Teacher and Student.* Van Nuys, CA: Alfred Publishing Company.

Balan, J., H.L. Browning, and E. Jelin. 1973. *Men in a Developing Society: Geographic and Social Mobility in Monterry, Mexico.* Austin, TX: University of Texas Press.

Bateson, M.C. 1989. "Composing a Life." *Atlantic Monthly.*

Berliner, P.F. 1994. *Thinking in Jazz: The Infinite Art of Improvisation.* Chicago, IL: University of Chicago.

Blumer, H.G. 1939. "Collective Behavior." Pp. 219-288 in *Principles of Sociology*, editor R.E. Park. New York, NY: Barnes & Noble.

Brenneman, G. 2000. "Right Away and All at Once: How We Saved Continental." In *Harvard Business Review on Crisis Management.* Boston, MA: Harvard Business School Press.

Brouillettee, J.R. and E.L. Quarantelli. 1971. "Types of Patterned Variation in Bureaucratic Adaptations to Organizational Stress," *Sociological Inquiry* 41: 39-46.

Bruner, J. 1983. *In Search of Mind.* New York, NY: Harper.

Centers for Disease Control. 2002. "Rapid Assessment on Injuries Among Survivors of the Terrorist Attack on the World Trade Center – New York City, September 2001." *Mortality and Morbidity Weekly Report* 51: 1-5.

Clarke, L. 1999. *Mission Impossible: Using Fantasy Documents to Tame Disasters.* Chicago, IL: University of Chicago Press.

Comfort, L. 1999. *Shared Risk: Complex Systems in Seismic Response*. New York, NY: Pergamon.

Crossan, M.M. 1998. "Improvisation in Action." *Organization Science* 9(5): 593-599.

Crossan, M., and M. Sorrenti. 1997. "Making Sense of Improvisation." *Advances in Strategic Management* 14: 155-180.

Drabek, T.E. 1970. "Methodology of Studying Disasters: Past Patterns and Future Possibilities." *American Behavioral Scientist* 13: 331-334.

Drabek, T.E. 1985. "Managing the Emergency Response." *Public Administration Review* 45 (Special Issue – January): 85-92.

Drabek, T.E. 1987. "Emergent Structures." Pp. 259-290 in *Sociology of Disasters: Contributions of Sociology to Disaster Research,* edited by R.R. Dynes, B. De Marchi and C. Pelanda. Milan, Italy: Franco Angeli.

Denzin, N.K. 1989. *The Research Act: A Theoretical Introduction to Sociological Methods.* Englewood Cliffs, NJ: Prentice Hall.

Drabek, T.E. 1996. *The Social Dimensions of Disaster.* Washington, DC: Federal Emergency Management Agency.

Dutton, J. and S. Jackson. 1988. "Discerning Threats and Opportunities." *Administrative Science Quarterly* 33: 370-387.

Dynes, R.R. 1970. *Organized Behavior in Disaster.* Lexington, MA: D.C. Heath.

Dynes, R.R. and T.E. Drabek. 1994. "The Structure of Disaster Research: Its Policy and Disciplinary Implications." *International Journal of Emergency Management* 12(1), March: 5-23.

Dynes, R.R. and E.L. Quarantelli. 1980. "Helping Behavior in Large Scale Disasters." Pp. 339-354 in *Participation in Social and Political Activities,* edited by D. Horton Smith and J. Macaulay. San Francisco, CA: Jossey-Bass.

Eisenhardt, K.M. 1999. "Making Fast Strategic Decisions in High Velocity
Environments." *Academy of Management Journal* 32(3): 543-576.

Eisenhardt, K.M. and L.L. Bourgeois. 1988. "Politics of Strategic Decision-Making in
High-Velocity Environments: Toward a Midrange Theory." *Academy of
Management Journal* 31: 737-770.

Farmer, E.M.Z. 1989. "Structure, Organization, and Social Movements." Pp. 135-165
in *Social Structure and Disaster,* edited by G.A. Kreps. Newark, DE: University
of Delaware Press.

Federal Emergency Management Agency. 2002. *The World Trade Center Building
Performance Study: Data Collection, Preliminary Observations, and
Recommended Actions.* Washington, DC: Federal Emergency Management
Agency.

Fish, S. 2004. "Plus Ca Change." In *The Chronicle of Higher Education*. Retrieved
April 2, 2004. http://chronicle.com/weekly/v50/i30/30c00101.htm

Frances, P.R. and G.A. Kreps. 1984. *Disaster and the Social Order: Organization and
Social Network.* Report Series No. 2, National Science Foundation Grant No.
CEE-9121135.

Fritz, C. 1961. "Disaster." Pp. 651-694 in *Contemporary Social Problems*, edited by
R.K. Merton and R.A. Nisbet. New York, NY: Harcourt.

Fritz, C.E. and J.H. Mathewson. 1957. *Convergence Behavior in Disasters: A Problem
in Social Control*. Committee on Disaster Studies, Disaster Research Group.

General Accounting Office. 2002. *Review of Studies of the Economic Impact of the
September 11th, 2001 Terrorist Attacks on the World Trade Center.* Washington,
DC: U.S. General Accounting Office.

Giddens, A. 1976. *New Rules of Sociological Method: A Positive Critique of
Interpretative Sociologies.* New York, NY: Basic Books.

Giddens, A. 1984. *The Constitution of Society*. Cambridge, England: Polity Press.

Gillespie, D.F. 1991. "Coordinating Community Resources." In *Emergency
Management: Principles and Practice for Local Government*, edited by T.E.
Drabek and G.J. Hoetmer. Washington, DC: International City Management
Association.

Glaser, B.G. and A. Strauss. 1967. *The Discovery of Grounded Theory.* Chicago, IL: Aldine.

Hayes, J. 1981. *The Complete Problem Solvers.* Philadelphia. PA: Franklin Institute Press.

Hightower, H.C. and Coutu, M. 1996. "Coordinating Emergency Management: A Canadian Example." Pp. 69-98 in *Disaster Management in the U.S. and Canada: The Politics, Policymaking, Administration and Analysis of Emergency Management*, edited by R.T. Sylves and W.L. Waugh. Springfield: Charles C. Thomas.

Johnson, N. 1987. "Panic at the 'Who Concert Stampede': An Empirical Assessment." *Social Problems* 4 (October): 362-373.

Keeney, B.P. 1990. *Improvisation Therapy.* New York, NY: Guilford.

Kendra, J.M. and T. Wachtendorf. 2003a. "Creativity in Emergency Response to the World Trace Center Disaster." In *Beyond September 11th: An Account of Post-Disaster Research,* edited by J.L. Monday. Special Publication #39. Boulder, CO: Natural Hazard Research and Applications Center, University of Colorado.

Kendra, J.M. and T. Wachtendorf. 2003b. "Reconsidering Convergence and Converger Legitimacy in Response to the World Trade Center Disaster." *Research in Social Problems and Public Policy* 11: 97-122.

Kendra, J.M., T. Wachtendorf, and E.L. Quarantelli. 2003. "The Evacuation of Lower Manhattan by Water Transport on September 11: An Unplanned Success." *Joint Commission Journal on Quality and Safety* 29(6): 316-318.

Killian, L.M. 1994. "Are Social Movements Irrational or Are They Collective Behavior?" Pp. 273-280 in *Disasters, Collective Behavior, and Social Organizations*, edited by R.R. Dynes and K.J. Tierney. Newark, DE: University of Delaware Press.

Klein, G.A. 1993. "A Recognition-primed Decision (RPD) Model of Rapid Decision Making." In *Decision Making in Action: Models and Methods*, edited by G.A. Klein, J Orasanu, R. Calderwood, and C.E. Zsambok. Norwood, NJ: Ablex Publishing Corp.

Kneier, T. 2003. "Preparing for the Worst." Radio Interview with Elizabeth Brackett. NewsHour: Public Broadcasting Service. May 16, 2003.

248

Kreps, G.A. 1989. *Social Structure and Disaster.* Newark, Delaware: University of Delaware Press.

Kreps, G.A. 1991. "Organizing for Emergency Management." Pp. 30-54 in *Emergency Management: Principles and Practice for Local Government*, edited by T.E. Drabek and G.J. Hoetmer. Washington, DC: International City Management Association.

Kreps, G.A. 1998. Disaster as a Systemic Event and Social Catalyst. In What is a Disaster? Perspectives on the Question, ed. E.L. Quarantelli, London: Routledge. 31-55.

Kreps, G.A., J.G. Crooks, and J.R. Linn. 1987. *Organizational Change: Static and Dynamic Aspects.* Final Report, National Science Foundation Grant No. CEE-8400486.

Kreps, G.A. and S.L. Bosworth. 1987. *Social Networks and Organizing: Interdependence as Progress.* Final Report, National Science Foundation Grant No. CEE-8400486.

Kreps, G.A. and S.L. Bosworth. 1993. "Disaster, Organizing, and Role Enactment: A Structural Approach." *American Journal of Sociology* 99(2): 428-463.

Kreps, G.A. and S.L. Bosworth, with J.A. Mooney, S.T. Russell, and K.A. Myers. 1994. *Organizing, Role Enactment, and Disaster: A Structural Theory.* Newark, DE: University of Delaware Press.

Lewin, A.Y. 1998. "Jazz Improvisation as a Metaphor for Organizational Theory." *Organization Science* 9(5): 539.

Lichtblau, E. 2004. "F.B.I. Agents Took Mementos From Rubble of Twin Towers." *New York Times Online*. Retrieved February 26, 2004. http://www.nytimes.com/2004/02/26/nyregion/26agents.html

Lincoln, Y.S., and E.G. Guba. 1985. *Naturalistic Inquiry.* Newbury Park: Sage Publications.

Linn, J.R. and G.A. Kreps. 1987. "Disaster and the Restructuring of Organization." Pp. 108-134 in *Social Structure and Disaster*, edited by G.A. Kreps. Newark, DE: University of Delaware Press.

Lipton, E. 2004. "New York Settles on a Number that Defines Tragedy: 2,749 Dead in Trade Center Attack." *New York Times*, January 23, 2004.

Lofland, J. and L.H. Lofland. 1995. *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis.* Third Edition. Belmont, CA: Wadsworth Publishing Company.

Mallak, L. 1998. "Putting Organizational Resilience to Work." *Industrial Management* 40 (6): 8(6). Retrieved via Expanded Academic ASAP/Infotrac database.

McKeon, K.L. 1997. "Analytic Induction and Role Performance During Disaster." Honor's thesis, College of William and Mary, Williamsburg, VA.

Mendonca, D. 2001. "Improvisation in Emergency Response Organizations: A Cognitive Approach." Dissertation Thesis, Rensselaer Polytechnic Institute, Troy, NY.

Mendonca, D., G.E.G. Beroggi, and W.A. Wallace. 2001. "Decision Support for Improvisation During Emergency Response Operations." *International Journal of Emergency Management* 1(1): 30-38.

Morgan, G., P.J. Frost, and L.R. Pondy. 1983. "Organizational Symbolism." Pp. 3-35 in *Organizational Symbolism,* edited by L.R. Pondy, P.J. Frost, G. Morgan, and T.C. Dandridge. Greenwich, CT: JAI Press.

National Academy of Sciences. 1999. *The Impacts of Natural Disasters: A Framework for Loss Estimation.* Washington, DC: National Academy Press.

Neal, D.M. 1992. "Issues of Donations Following Hurricane Andrew." Paper presented at the International Sociological Association's Disaster Research Meeting.

New York City Department of Health and Mental Hygiene. 2003. World Trade Center (WTC) Health Registry. Retrieved March 15, 2004. http://www.ci.nyc.ny.us/html/doh/html/wtc/index/html

New York State Museum. 2003. New York State Museum Recovery: The World Trade Center Recovery Operation at Fresh Kills. Retrieved January 15, 2003. http://www.nysm.nysed.gov/exhibits/recovery.pdf

Nigg, J.M 1979. The Emergence of Issues and Collective: Community Response to Earthquake Prediction and Its Consequences. Dissertation thesis, University of California, Los Angels, CA.

Nigg, J.M. 1994. "Influence of Symbolic Interaction on Disaster Research." Pp. 33-50 in *Self, Collective Behavior, and Society: Essays Honoring the Contributions of Ralph H. Turner*, edited by G. Platt and C. Gordan. Greenwich, CT: JAI Press.

Noji, E. 1997. *The Public Health Consequences of Disasters.* New York, NY: Oxford University Press.

Office of Emergency Management. 2001. New York City Office of Emergency Management Homepage and Related Pages. Retrieved October 4, 2001. http://www.nyc.gov/html/oem/home.html

Park, R.E. and E.W. Burgess. 1921. *Introduction to the Science of Sociology.* Chicago, IL: University of Chicago Press.

Peplowski, K. 1998. "The Process of Improvisation." *Organization Science* 9(5): 560-561.

Phillips & Jordan. 2004. Anatomy: World Trade Center/ Staten Island Landfill Recovery Operation. Retrieved January 15, 2004. http://disaster.panj.com/World%20Trade%20Center%20Forensic%20Recovery.pdf

Quarantelli, E.L. 1979. "Studies in Disaster Response and Planning." Newark, DE: Disaster Research Center, University of Delaware.

Quarantelli, E.L. 1980. *Evacuation Behavior and Problems: Findings and Implications from the Disaster Literature.* Columbus, Ohio: Disaster Research Center, Ohio State University.

Quarantelli, E.L. 1994. "Disaster Studies: The Consequences of the Historical Use of a Sociological Approach in the Development of Research." *International Journal of Mass Emergencies and Disasters* 12: 25-49.

Quarantelli, E.L. 1996. "Emergent Behaviors and Groups in the Crisis Time of Disasters." Pp. 47-68 in *Individuality and Social Control: Essays in Honor of Tamotso Shibutani*, edited by T. Shibutani and K.M. Kwan. Greenwich, CT: JAI Press.

Quarantelli, E.L. 1997. "Ten Criteria For Evaluating the Management of Community Disasters." *Disaster* 21: 39-56.

Quarantelli, E.L. 1998. *Problems of Field Research: Techniques and Procedures of the Disaster Research Center in the 1960's.* Historical and Comparative Disasters Series #11, Newark, DE: Disaster Research Center, University of Delaware.

Quarantelli, E.L. and R.R. Dynes. 1977. "Response to Social Crisis and Disaster." *Annual Review of Sociology* 3: 23-49.

Sandelands, L.E. and R.E. Stablein. 1987. "The Concept of Organization Mind." Pp. 135-161 in *Research in the Sociology of Organizations*, edited by S. Bacharach and N. DiTomaso. Greenwich, CT: JAI Press.

Saunders, S.L. and G.A. Kreps. 1987. "The Life History of Emergent Organization in Disaster." *Journal of Applied Behavioral Science* 23: 443-462.

Sawyer, R.K. 2001. *Creating Conversations: Improvisation in Everyday Discourse.* St. Louis, MO: Washington University.

Sawyer, R.K. 2003. *Improvised Dialogues: Emergence and Creativity in Conversation.* Westport, CT: Ablex Publishing.

Scanlon, J. 1988. "Disaster's Little Know Pioneer: Canada's Samuel Henry Prince." *International Journal of Mass Emergencies and Disasters* 6: 213-232.

Scanlon, J. 1994. "The Role of EOCs in Emergency Management: A Comparison of American and Canadian Experience." *International Journal of Mass Emergencies and Disasters* 12 (11): 51-75.

Shibutani, T. 1986. *Social Processes. An Introduction to Sociology.* Berkeley, CA: University of California Press.

Simon, H. 1987. "Making Management Decisions: The Role of Intuition and Emotion." *Academy of Management Executive* 1: 57-64.

Stallings, R.A. 1970. "Hospital Adaptations to Disaster: Flow Models of Intensive Technologies." *Human Organizations* 29: 294-302.

Stallings, R.A. 1978. "The Structural Patterns of Four Types of Organizations in Disaster." Pp. 87-103 in *Disasters: Theory and Research*, edited by E.L. Quarantelli. London: Sage Publications.

Stallings, R.A, and E.L. Quarantelli. 1985. "Emergent Citizen Groups and Emergency Management." *Public Administration Review* 45: 93-100.

Strauss, A. and J. Corbin. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Newbury Park: Sage Publications.

Tierney, K.J. 2002. "Lessons Learned from Research on Group and Organizational Responses to Disasters." Paper presented at Countering Terrorism: Lessons Learned from Natural and Technological Disasters. Academy of Sciences, February 28 – March 1.

Turner, B.A. 1995. "The Role of Flexibility and Improvisation in Emergency Response." Pp. 463-475 in *Natural Risk and Civil Protection*, edited by T. Horlick-Jones, A. Amendola, and R. Casale. London: E. & F.N. Spon.

Turner, R.H. 1989. "Aspects of Role Improvisation." Pp. 207-213 in *Social Structure and Disaster*, edited by G.A. Kreps. Newark, DE: University of Delaware Press.

Turner, R.H. and L.M. Killian. 1987. *Collective Behavior.* Third Edition. Englewood Cliffs, NJ: Prentice-Hall.

Wachtendorf, T. 2000a. "When Disasters Defy Border: What We Can Learn From the Red River Flood About Transnational Disasters." *The Australian Journal of Emergency Management* 15(3) Spring: 36-41.

Wachtendorf, T. 200b. "A River Runs Through It: Cross Border Interaction During the 1997 Red River Flood." Master's Thesis. University of Delaware, Newark, DE.

Webb, G.R. 1998. "Role Enactment in Disaster: Reconciling Structuralist and Interactionist Conceptions of Role." Dissertation thesis, University of Delaware, Newark, DE.

Webb, G.R., M. Beverly, M. McMichael, J. Noon, and T. Patterson. 1999. "Role Improvising Under Conditions of Uncertainly: A Classification of Types." Preliminary Paper#289. Newark, DE: Disaster Research Center, University of Delaware.

Weick, K.E. 1993. "The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster." *Administrative Science Quarterly* 38 (4): 628-652.

Weick, K.E. 1998. "Improvisation as a Mindset for Organizational Analysis." *Organization Science*, 9 (5) September – October: 543-554.

Weick, K.E., and K.H. Roberts. 1993. "Collective Mind in Organization: Heedful Interrelating on Flight Decks." *Administrative Science Quarterly* 38: 357-381.

Weick, K.E., K. M. Sutcliffe, and D. Obstfeld. 1999. "Organizing for High Reliability: Processes of Collective Mindfulness." *Research in Organizational Behavior* 21: 81-123.

Wenger, D., J. Dykes, T. Sebok, and J. Neff. 1975. "It's a Matter of Myths: An Empirical Examination of Individual Insight in Disaster Response." *Mass Emergencies* 1(1): 33-46.

Wenger, D.M., T. Guliano, and P. Hertel. 1985. "Cognitive Interdependence in Close Relationships." Pp. 253-276 in *Compatible and Incompatible Relationships*, edited by W. Ickes. New York, NY: Springer-Verlag.

Wenger, D.M., R. Erber, P. Raymond. 1991. "Transactive Memory in Close Relationships." *Journal of Personality and Social Psychology* 61(6): 923-929.

Westley, F.R. 1990. "Middle Managers and Strategy: Microdynamics of Inclusion." *Strategic Management Journal* 11: 337-351.

White, E.B. 1949. Here is New York. Harper: New York, NY