DISASTER ARE DIFFERENT, THEREFORE
PLANNING FOR AND MANAGING THEM REQUIRES
INNOVATIVE AS WELL AS TRADITIONAL
BEHAVIORS

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ABSTRACT

Our major overall theme is that since disasters, as a whole, differ significantly from even everyday emergencies, to plan for and to manage them requires new or innovative as well as traditional behaviors. We discuss this general theme by organizing our remarks around ten general points, with four about the nature of disasters and four about the planning and managing processes required to deal effectively and efficiently with the crises created by such social occasions.

(1) Unlike in the past, our knowledge about disasters is now research based;
Nature of Disasters:
(2) Risks and hazards are myriad and everywhere, but relatively few of them result in crisis situations;
(3) Crises and everyday emergencies create different social occasions;
(4) Crisis occasions can be conflictive or consensus ones;
(5) The consensus crises that are suddenly disruptive of ongoing social life are disasters, either of a major or catastrophic nature;
Planning for and Managing Disasters:
(6) A problem solving rather than a command and control model of planning and managing is more realistic.
(7) Disaster planning and managing are different social processes;
(8) Planning is not enough, it has to be good planning, the major characteristics of which are known;
(9) Good managing particularly has to deal with the organizational heterogeneity that is distinctive of the crisis time period of disasters; and
(10) Social change in societies is a constant that will affect future disasters as well as planning for and managing them.
#1. UNLIKE IN THE PAST, OUR KNOWLEDGE ABOUT DISASTERS IS NOW RESEARCH BASED.

Fifty years ago the remarks I will make today would have been impossible to make. Why? Because almost all of what we will say is derived from a body of systematic research findings that have only been produced in the last four decades.

This relatively new knowledge is the result of now thousands of systematic studies (for work up to 1979, see Quarantelli, 1984). The Disaster Research Center (DRC), the research organization that we represent, has just itself studied over 325 different disaster and mass emergency situations since its establishment in 1963. It is today a part of an extensive social science research effort on disasters that is currently being undertaken in at least three dozen countries around the world, ranging from Armenia to Mexico, from France to China, from India to Sweden.

Most of the work undertaken up to the present has been done in a North American, Western European and Japanese context. Therefore, the full applicability of the research findings from mostly developed countries to developing societies is still an open question. However, my strong conviction is that there are very many generalizations about disaster behavior that are panhuman or that cut across different social systems.

Thus, my remarks unless explicitly qualified, should be presumed to be valid for all disaster-related situations. This is even more likely because I will be primarily discussing a universal situation, namely community type disasters, and the preparedness planning for and the response managing of such occasions. Our hope in presenting this research based knowledge and understanding of disaster related phenomena, is that we will have confidence in our ability to plan for and manage disasters, than by just depending on isolated unsystematic impressions or anecdotal "wartime" stories.

To state this, is not to claim that we as researchers currently know everything that should be known about disasters. There are many topics and issues about which we understand very little, such as, for example, the handling of the dead or mass casualties, decision-making on intervention at national and federal levels, the political factors that affect international disaster relief, or the operation of UN disaster relevant agencies. However, compared to the very little of a systematic nature known fifty years ago, we now have substantial comprehension of many aspects of disasters. It is the latter that we shall be discussing rather than what we do not know.

The Nature of Disasters

What is a disaster? What is its most distinguishing characteristic? Overall, there has been a slow evolution in thinking on this question. Initial approaches looked at physical happenings, for example, an earthquake or a chemical explosion and treated them as disasters. But increasingly there was a recognition that unless there were social consequences, such physical occurrences could not usefully
be treated as disasters. Today, almost all researchers assume that disasters are basically social phenomena.

#2. RISKS/HAZARDS ARE MYRIAD AND EVERYWHERE, BUT RELATIVELY FEW OF THEM RESULT IN CRISIS SITUATIONS.

We have to start somewhere and we will start with the observation that needs little documentation, namely that risks/hazards are myriad and everywhere. Actually their frequencies are not fixed or stable, and they have been increasing over time on a world wide basis. However, more about that trend later.

Although risks/hazards are omnipresent, research has clearly established that relatively few of them ever actualize, that is, come into being. A risk or a hazard, in other words, is a potential, a possibility, not an actuality, a happening. Too often the actual presence of risks/hazards is overstated in popular discourse, in the sense of making an assumption that because possibilities are there, they will become real. If, for instance, we were to take as actual consequences all the risks said to be associated with all foods, there would be nothing we could eat without getting sick or ill in some way. Overall, the very existence of the human race is testimony to the fact that most risks are never realized, otherwise we would not be here to talk about all the hazards around us.

Of interest is that of the relatively few risks/hazards that do become actual, some will lead to a collective crisis. A crisis occasion has certain features. There are three interrelated ones. 1) There is a threat of some kind. 2) It is relatively unexpected, and 3) There is an urgency or a need to act.

(1) In a crisis there is a danger or hazard of some kind. Usually this will involve a perceived threat to life and/or property. At the very least, something valued by endangered persons is considered at risk.

(2) Also, the situation is relatively unexpected when the occasion occurs. Specific anticipation tends to reduce a sense of crisis. Put another way, the occasion is perceived as an abrupt and unforeseen one, although a general foreboding may have existed.

(3) In a crisis there basically is a perceived need to react for the effects are seen as likely to be even more negative if nothing is done. That is, it is thought that there will be more casualties, and/or destruction and damage, and/or social disruptions, and/or costs of all kinds from the economic to the psychological to the ecological, if no remedial actions are attempted. Therefore, most if not all of the involved parties, and especially community officials, deem a return to routine behavior as necessary.

We should note, that with respect to all these three dimensions, what is important is the perceived nature of the occasion. This is sometime talked about as the subjective as over against the so-called objective perception of risk or threat. However, increasingly researchers have recognized that this distinction is not a particularly valid one--in both cases it involves perceptions, whether of experts or laypersons.
Also, we should observe that not all kinds of situations that may involve some kind of threat or danger, require immediate actions. There are hazardous situations where a delay in response of hours, days, or even much longer, will not be significant. These typically are situations where there is considerable lead time before the risk will manifest itself in its most dangerous form. Examples would be instances such as the slow chemical poisonings as might be occasioned by asbestos, radiation contamination by radon, climatological pollution through acid rain, some health epidemics, coastal erosion and land subsidence, and all but the last stages of famines and droughts. Of course whether some of these situations should be defined as crises can become matters of political dispute, as seen in the current AIDS pandemic.

At any rate, slow onset risks pose both theoretical and methodological research problems, and also practical issues of planning and managing not encountered in quick onset dangers. Given these differences, in this paper we will be discussing only sudden type crises that significantly affect a community.

#3. CRISES AND EVERYDAY EMERGENCIES CREATE DIFFERENT SOCIAL OCCASIONS.

Everyday accidents or routine emergencies are endemic in any society. Crises are far rarer. Nevertheless, both usually precipitate a behavioral reaction at the community level.

Some researchers have long argued that behaviors in crises are significantly different from those in everyday or routine emergencies and accidents (see Dynes, 1974, 1994; Quarantelli, 1989). Their argument is that there are both quantitative and qualitative behavioral differences in what occurs. It is particularly the differences in the former, the kinds of behaviors that appear, more than the degree to which they appear, that especially distinguishes crisis situations.

On a daily basis, many community organizations learn to deal with minor emergencies. For some, such as the public utilities, the cable companies, police and fire departments, hospitals, railroads and airlines, and segments of the chemical and nuclear industries, such responses to routine difficulties and disruptions are a normal part of their everyday activities. They have standard operating procedures (SOPS) to manage such situations. In fact, these organizations frequently have highly experienced and skilled personnel who are quite adept at dealing with minor and localized problems.

Unfortunately this sometime leads, to paraphrase some police officers, to the belief that a disaster is merely a very large scale traffic accident. The thought is that existing SOPS can be used. Similarly, a nationwide study that DRC undertook of the chemical industry in Canada and the United States, found that many plant officials felt that preparedness planning for acute and major toxic releases, chemical explosions, and other such happenings, required no more than the extension of everyday corporate health and safety measures for routine mishaps (Quarantelli, 1984). In another study that DRC made of the delivery of emergency medical services (EMS) in large mass casualty situations, interviews with EMS personnel indicated that many felt that special preparedness planning was
unnecessary because the provision of EMS in disasters required only an extension of EMS in daily operations, given that the difference between the two was merely one of degree (Quarantelli, 1983).

These and similar views, often strongly voiced, are simply wrong. In a crisis, there is a difference of kind, not just degree in the occurring behaviors compared to what appears in an accident or minor emergency. A crisis involves not just more, but something that is qualitatively different. This is true whether planning and training for crises, operating under crisis conditions, and evaluating group or organizational activities during such occasions. In terms of the phenomena we are primarily discussing in this paper, an accident is not a little crisis, nor can a crisis be viewed as a big accident!

This distinction does not only come out of social science research. Some organizations also recognize such a difference. For example, public utility companies in the United States and Canada carefully distinguish, as far as their own operations are concerned, between:

(a) accidents and emergencies, that is, everyday localized breakdowns that can be handled by local resources and personnel; and,

(b) disasters and catastrophes, that is, statistically rare occasions that require external aid because local resources cannot cope with the acute demands that surface.

Thus, public utilities such as electric and telephone companies typically recognize, plan for, and operate as if there is a qualitative difference between emergencies and crises.

To set forth these differences in a more systematic manner, let us note the following differences in the two social settings insofar as organizational behavior is concerned. There is:

(1) A need to relate to far more and different kinds of groups operating at the height of the crisis.

During community crises, organizations are forced into more and different kinds of contacts and interactions with other groups. This results from the massive organizational convergence that is simply part of the great inflow of people, communications, goods, etc. that is distinctive of a crisis, but not of routine emergencies (for the earliest systematic discussion of convergence, see Fritz and Mathewson, 1957). For example, in a study of a massive fire in Nanticoke, Canada in 1990, Scanlon and his research group identified 346 organizations that were on site, that is, being at the scene of the fire, inside the evacuation perimeter or having to pass through a police check point in order to become involved (Scanlon, 1992: 9); they included seven different departments of local government, 10 agencies of regional government, 25 entities from the provincial government and 27 organizations from the federal government, as well as 31 fire departments, 41 churches, hospitals and schools, four utility companies, eight voluntary agencies, four new groups that emerged, and at least 52 different players from the private sector.

The more the number of contacts among responding organizations, the more there is a need to establish new relationships. For example, business corporations may have to interact with social
service agencies for the first time during major crisis periods. In addition, local private groups may have to coordinate their activities with remote and/or unfamiliar government bureaucracies. A community crisis generates a "mass assault" on the impacted area from within (and to some extent from outside the community). Accidents or everyday emergencies do not create such a massive organizational convergence. Thus, persons and organizations in crises have to interact with far more and unfamiliar kinds of responding groups and agencies that they have to on an everyday basis or in routine emergencies.

During periods of normalcy, new relationships between organizations usually develop slowly. There is seldom a need to suddenly and concurrently establish linkages with multiple groups having local, state, regional and/or national components. However, during a crisis there is little time available to adjust, for example, to the blurring or interorganizational boundaries, or the informal sharing or pooling of personnel, task and equipment--common features of major crises but not of minor emergencies. Complicating such occasions of greater interdependence is the number of new groups with varying functions, capabilities, and expectations that will be involved. Even a relatively moderate size crisis will force dozens of unfamiliar local and extralocal organizations to work together on unfamiliar or new tasks that are a part of the community response effort. In short, crises require more and different interorganizational relationships.

(2) Limitations on the degree of organizational freedom of action and autonomy possible.

In crises, all groups lose some of their usual independence and freedom of action, that is, direct control over their own functioning. The needs and values of the community crisis time take precedence over everyday ones (e.g., organizations may be monitored and ordered about by social entities that may not even have existed in normal times). Everyone and all groups in an impacted area and often even just outside it become more directly dependent and responsive to others in the setting, unlike in an accident situation or routine emergency.

In most societies, when there is a serious threat to a community’s ability to function normally, certain civil authorities will assume overall responsibility for the situation. The mayor, the police chief, the head of the local emergency management agency, or other local official, will initiate measures to control and/or coordinate crisis-related activities of both individuals and groups in a given locality.

However, in developed societies this is seldom the military. For instance, although there are stories to the contrary--a few even in history books--we should note that martial law or rule has never been declared in disastrous situations in the United States and is extremely unlikely to be ever imposed. Civil control over the military is maintained even during disasters, and this is true in almost all developed countries ranging from Australia to Italy, from Japan to Canada.

Now in many developing societies, although not all, sometimes the army, takes over local operations. In those societies, the role of the army is often simply an extension of the manifest or latent control by the military of most important everyday activities in the country. But even in developing societies, the situation can be more complicated than might appear at first glance. For instance, in disasters outside the capital city, the Mexican Army until recently usually took the major
role in crisis time activities. However, in the Mexican earthquake of 1985, when the military moved according to the national disaster plan in being then, to take over operations in the capital city of Mexico, the highest civil federal authorities intervened and forced the army and navy to take a very secondary role in the crisis time and immediate postimpact recovery activities (Dynes, Quarantelli and Wenger, 1990).

But whether the military does or does not come to take a central role, it is simply a fact that always, the normal, everyday autonomy of individuals and organizations is curtailed everywhere in major crises. Thus, because of loss of personal and organizational autonomy, daily activities taken for granted become problematical. The freedom of mobility within the community, as for example, entering or leaving one's property, may be restricted by police barricades, curfews or an evacuation order. In the United States, during disasters involving dangerous chemicals, control of the site will actually be vested in an outside agency such as a state or regional hazardous material response team, or a federal agency such as the U.S. Coast guard or the Environmental Protection Agency. Additionally, even in the private sector, distant headquarters of national or international corporations will often intervene locally during crises, and assume responsibilities, make decisions, or set policies that normally would be the primary prerogative of the local plant, office or operational personnel. In short, local businesses and other commercial activities can have their autonomy preempted in crises in a way that simply will not occur during minor and routine emergencies.

(3) Different norms for behavior become operative.

Almost always, new social norms emerge regarding what is acceptable and non-acceptable at the height of the crisis. Performance standards for organizations often change (e.g., in hospitals and emergency medical services the speed of response in handling casualties is superseded by a need to more equitably distribute victims in the available medical facilities). Expectations of individuals can also be radically altered (e.g., destruction of property is very allowable to save lives in search and rescue). Emergent new norms while very rare in accidents or routine emergencies, are almost inevitable in crises.

For example, SOPS for fire professionals typically require a swift response to structural fires. In the United States, these procedures are followed by both public or private fire service organizations in dealing with everyday fires. However, fire organizations have increasingly been trained to respond quite differently to fire-related crises involving unidentified chemical substances or materials where there can be the potential for a disastrous occasion. Disaster planning often calls for delaying the response until there is clarification of the situation. By using daily performance criteria as a basis for determining the type of response required to control all chemically related situations, some fire departments can and have turned minor chemical accidents into major chemical disasters.

Similarly, EMS professionals in the United States have SOPS that emphasize quick response time and swift delivery of patients to hospitals. However, when handling many casualties, such routine operations are, or at least should be preempted by special procedures. This appears in good crisis planning and managing for the delivery of emergency medical services. This includes attempting to
triage victims and judiciously distributing injured persons to area hospitals to avoid overcrowding of emergency rooms, and also other risks associated with delays in emergency medical care due to an overloading of hospital staffs.

Thus, performance criteria used during daily routine operations often yield to the adoption of different performance criteria during major crisis occasions. As is the case when fire organizations are faced with crises under conditions of great uncertainty, EMS systems that use daily performance criteria as a basis for determining the actions that should be taken during disasters, find that they will produce inadequate and inappropriate responses to mass casualty occasions. Under the pressure of increased crisis-related demands, emphasis on speed of response and "snatch and run" procedures are not appropriate managing principles, and much EMS crisis planning notes this. Put another way, fire and EMS professionals have learned that crises call for different types of normative behavior or performance standards than do minor emergencies.

(4) The blurring of the usual line between the public and private sector.

A minor emergency is often managed by an organization--public or private--such as the telephone or electric company having the normal responsibility or authority to effectuate an emergency response for dealing with a specific kind of accident or mishap. Or in other cases it is generally managed by a local organization such as the police and/or fire department. Under such conditions, there is little if any crossing of boundaries of public and private sector organizations.

However, in a crisis the lines and boundaries that normally separate the public and private spheres (or in societies where all is nominally public--different public sectors) become quite blurred. Thus, in a crisis the need for the quick mobilization of resources for overall community purposes often preempts everyday individual and organizational rights and domains. For example, goods, equipment and facilities are often without due process requisitioned for the common good from everywhere and everyone, be they persons or groups. Although legally questionable at least in the United States, such actions are frequently undertaken and seen as acceptable during major disasters. Such actions are not necessarily restricted to public requisitioning of private goods only. Researchers have observed that essential personnel and resources from the private sector are often freely offered and used for the public good at the height of a crisis. Under such conditions, there may in fact be public expectations and demands for goods and services from the private sector that would not otherwise occur during periods of normalcy.

Similarly, unrestricted entry onto private property, which is normally very limited on a daily basis, is frequently undertaken in crises. Likewise, the destruction of selected private property for the good of the larger community (e.g., the construction of levees or temporary dams) is done without any negative consequences. Such legal and group boundaries and borders are seldom, if ever, crossed over in accidents or everyday emergencies.

There might be objections that some societies do not have much of a private sector where there is individual as opposed to collective ownership. Actually, in all human groupings there is some kind
of family or household, if not personal ownership of things. More important, even if the state in principle owns practically everything, different governmental subunits have claims of "ownership" (i.e., control) about different properties. Therefore, even in these societies, there is likely to be a melding and blurring of who "controls" what at times of crises.

Overall, therefore, our position is that a disaster is not simply a bigger accident as is sometimes asserted. There is more than a difference in degrees of behavior. The social behavior that appears is qualitatively different as well from everyday behaviors.

It is important to note that we are primarily talking of community disasters, that is, occasions where community life is disrupted. It is possible to have disasters that do not have such an impact. The best examples are some transportation accidents such as a plane crash or a train carrying hazardous materials derailing in an isolated rural area. While much of what we discuss with respect to community disasters is applicable to non-community disasters, there are some important differences. For example, there usually is less convergence and thus fewer interorganizational problems in non-community disasters.

4. CRISIS OCCASIONS CAN BE CONFLICTIVE OR CONSENSUS ONES.

The four social features we have just noted that separate crises from everyday emergencies can be seen in such happenings as civil disturbances and riots as well as in earthquakes and chemical explosions. There are some similarities in behavior across all these kinds of crisis situations. However, while all crises share certain common features, they are not all similar (see Quarantelli, 1993 for an analysis of the similarities and differences in community crises such as riots and disasters). There can be and are major differences in the behaviors that occur, in what some social scientists call consensus and conflict types of crises.

Thus, many self-designated disaster researchers doing studies in the field separate out conflict types of crisis situations from what they consider as consensus types of crisis occasions. In conflict type situations, one or more of the parties involved are consciously and deliberately trying to inflict damage, destruction and/or disruption on some of the populations involved. Included in the category of conflict crises would be such situations as wars, riots and civil disturbances, terrorist attacks and hostage takings, product tampering and sabotage, and pogroms and massacres. The deliberate conflict that characterizes these situations is what make them different in important way from natural and technological disaster occasions. Conflict may occur in disasters, even in the emergency or crisis time period. However, it is not the essence of the occasion.

As an example, let us note some contrasts in the operation of hospitals in civil disturbances and in disasters in the United States. In the former situation, for instance, because of curfews and roadblocks often only the shift on duty is available compared with the three that can be mobilized in disaster situations. In disasters usually incoming victims rise to a peak and then drop off sharply, whereas in riots they come to hospitals in very irregular patterns. Everyone will agree to medical treatment in disasters, but not in riots (leading to difficult ethical questions for medical personnel). Fights can occur in emergency and operating rooms in riots, which of course would not occur in
disasters. Finally, in riots various hospital facilities and ambulances, etc. may come under direct physical attack, whereas no such situation will ever arise in a disaster.

So while conflict situations and consensus occasions share some features, there are very important differences in the behaviors that will be present at all stages or phases of the phenomena. Therefore, although some researchers still do not make a distinction, increasingly it is being recognized that consensus and conflict type crises have to be distinguished from one another.

On the other hand, another at one time frequently made distinction, that is, between so-called natural and technological disasters, has not proved very useful in understanding the social aspects of disasters. Therefore, analysts have increasingly dropped this distinction.

A kind of separate agent specification might seem obvious. Are not chemical threats different from earthquakes? Are not floods different from massive fires in high rise buildings? The answer of course is "yes." But in a very important sense, this is an answer to the wrong question, i.e., the source of the crisis.

The agent specific approach assumes that each type of disaster related agent (e.g., a volcanic eruption, a nuclear radiation fallout) or classes of agents (e.g., the sources being in the natural or in the technological spheres) possess certain distinctive features that have consequences for what occurs. However, more and more there has been the recognition that a hazard or risk per se is not a disaster; a disaster is a social happening. Thus, there has been a movement away from agent specific formulations and an emphasis on across-the-board features in the response. There has been a clear going from an agent specific approach to a generic approach; thus, a going away from a focus on hazards to one on disasters.

There are both theoretical and empirical reasons for the shift.

The first is related to the fact that it has been finally recognized that a disaster is a social happening or occasion. There is more and more the logical recognition that, for example, the occurrence of an earthquake or a chemical explosion per se does not automatically result in a disaster. Unless there are some significant social consequences or effects of some kind, the physical happenings remain only a geophysical event or a chemical process.

From this perspective a disaster is only identifiable in terms of the features of a social occasion, i.e., something in the reactions of the individuals and groups in the situation. This socially oriented conception of a disaster forces a focus on common or similar properties of the social happening and away from the physical features of the natural and technological agents involved (Actually disasters can occur as the result of the circulation of "rumors," see Danzig, Thayer and Galanter, 1958).

Empirically, for very many of the human and organizational problems in disasters, the specific kind of agent involved does not matter. Whether the crisis time tasks are warning, evacuation, sheltering, feeding, search and rescue, disposition of the dead, mobilization of resources, information flow, etc., the same general actions have to be undertaken irrespective of the specific agent involved. For
instance, there is a need for the same kind of warning messages and the same kind of warning system to get people to evacuate. The agent does not matter be it a tornado, an oil spill, a tsunami or a major fire in a hazardous waste site—what will motivate people to give credence to warning messages, what messages will be effective, what will limit the acceptance of a warning, and so on, will be the same in all cases. These human aspects of a disaster do not depend on the specific type of agent involved.

Similarly, if there is need for organized search and rescue, or the delivery of EMS, the more important organizational aspects that have to be dealt with do not depend on the specific agents in the situation. For example, research has consistently shown that the less seriously injured are treated first, that one or a few hospitals will take a disproportionate number of the injured victims, and that there will be no overall coordination of the medical-health response.

Studies have also concluded that ordinary citizens in impacted localities will quickly undertake most (up to 90-95%) of the initial search and rescue, that the handling of dead bodies is very psychologically disturbing especially if there are many or they are disfigured or are children, and that formal search and rescue efforts often operate in a very unintegrated way. The specific agent involved does not matter very much in the carrying out of these crisis time tasks.

Disastrous occasions do differ from one another, but along other lines or dimensions. For instance, some disasters give forewarning, others do not (such as most chemical explosions and earthquakes). Some disasters have a very short duration and their immediate impact are over almost immediately (most explosions), but in others the effects may impact over a long time period (e.g., radiation from a fallout). Some disasters are very localized with clear-cut points of impact (many tornadoes, explosions), while others are very diffuse (many riverain floods, hurricanes and many hazardous chemical spills). These differences and others we will not discuss, do matter, but they clearly are not distinguishable along a natural/technological dimension.

#5. THE CONSENSUS CRISES THAT ARE SUDDENLY DISRUPTIVE OF ONGOING SOCIAL LIFE ARE DISASTERS, EITHER OF A MAJOR OR CATASTROPHIC NATURE.

The essence of a disaster is the interruption and disruption of the routines of social life, and not the presence of casualties or property destruction alone. In fact, it is possible to have a disaster even absent any deaths/injuries and damage/destruction to property or material goods. This is because there can be major disruptive effects of normal behavior along other key dimensions of community life such as the social, the psychological, the economic, the religious or symbolic, and the political (or in a more general overall sense, the world of meanings that is the context of life for all human beings; see Gilbert, 1995). To be certain, the great majority of disasters involve threats, if not actual damages, to the biological survival and the material substratum existence necessary for any community life. However, we should not confuse that statistical probability with the fact that disasters can occur without such losses.
What happened at the Three Mile Island (TMI) nuclear plant in the United States provides a good illustration of this last point. No one died or was injured (and it is extremely unlikely there will be any such direct effects in the future from the minor radiation spillage that occurred), and the damage to the plant was rather minimal.

However, along other lines, this occasion was nearly catastrophic. It disrupted for days the everyday lives of millions of nearby residents. The routines (households, work, school, recreational, religious, governmental) of many nearby communities ceased. The occasion put numerous persons under tremendous and sudden psychological stress, quite different from everyday stresses. In fact, for some individuals the danger persists to this day and represents a threat yet to be realized. This is why according to some social scientists, TMI was an extended disaster in time and for some is yet in being, akin to suddenly perceived threats near hazardous waste sites (such as in Sevso, Italy or near Love Canal and Times Beach in the United States).

Economically, in TMI there were costly short run disruptions of most everyday businesses, industries and commercial activities in the effected area. There were also indirect negative effects on tourism in the region and even the nation wide sales of chocolate bars since a major manufacturer (Hershey) was located not too far from the plant. In the long run, the economic losses and costs were tremendous. As Slovic has written:

> Despite the fact that not a single person died at TMI and few if any latent cancer fatalities are expected, no other accident in our history has produced such costly social impacts. In addition to its impact on the utility that owned and operated the plant, this accident also imposed enormous economic costs on the nuclear industry and on society. These came from stricter regulation, reduced operation of reactors worldwide, greater public opposition to nuclear power, reliance on more expensive energy sources, and increased costs of reactor construction and operation. The point is that traditional economic and risk analyses tend to neglect these higher-order impacts; hence they greatly underestimate the costs associated with certain kinds of mishaps (1992: 124).

In another paper Slovic additionally wrote:

> It also imposed enormous costs (estimated at 500 billion dollars...) on the nuclear industry and on society (1987: 282).

Furthermore, not only were almost all governmental activities in the surrounding communities disrupted, but there was an interruption of routines in the political system at distant and higher level all the way up to the federal government and the President of the United States. Politically too there were certain negative fallouts and at the very least the occasion has become a symbolic event affecting governmental and political actions and policies in countries far from the United States.
By almost any criteria of interruption and disruption of community life TMI was a disaster. Despite the absence of casualties and destruction of property, the routines of the social systems of several nearby towns and cities could not be continued. Later we shall discuss how upcoming failures of computer systems illustrate how we will increasingly have these kinds of non-fatal and nondestructive disastrous occasions.

Also, as partly indicated in the TMI example, disasters can be of a major or catastrophic nature. That is, according to some researchers, just as it is worthwhile to differentiate disasters from everyday emergencies, so similarly it is valid to separate out major disasters and catastrophic ones. Again, according to those who have analyzed a range of these situations, there are both qualitative and quantitative differences between major disasters and catastrophic ones. (For purposes of exposition from this point on, when we discuss major disasters and catastrophic ones together, we shall encompass both of them under the term "disastrous occasions").

Recent examples of catastrophes would be the social behavior in Hurricane Andrew in the United States and the Kobe earthquake in Japan. Clearly of course the size of the community impacted has to be considered. Behaviors that would be a minor emergency in a metropolitan area could of course be catastrophic for a small village.

There are at least four ways in which major disasters and catastrophes differ. In a catastrophe:

1. Most or all of the total residential community is heavily impacted.

For example, Hurricane Hugo destroyed or heavily damaged more than 90% of all homes in St. Croix in the US Virgin Islands. This made it impossible, for instance, for displaced victims to seek shelters with nearby relatives and friends as is typical in major disasters. In contrast, only some neighborhoods or parts of a community are typically impacted even in major disasters. For instance, in the Mexico City earthquake of 1985, it is clear that at worst less than two percent of the residential housing stock was lost, with only 4.9% of surveyed respondents reporting that there was great damage to the building in which they lived (Dynes, Quarantelli and Wenger, 1990: 13).

Furthermore, in a catastrophe not only are all or most of the residences in a community affected but typically those in nearby localities will also be similarly stricken, as frequently can be seen in the typhoons that hit southwestern Asia such as in the Philippines, and as occurred in areas around Chernobyl after the accident in the nuclear plant there. In short, catastrophes tend to affect multiple communities.

2. The facilities and operational bases of almost all emergency organizations are themselves directly hit.

After Hurricane Andrew, in southern Florida, for instance, many buildings housing police, fire, welfare and local medical centers were seriously impacted, making their work operations all but impossible. While in a major disaster some such facilities may be impacted, the great majority usually...
survive with little or no damage. Thus, the first organizations that mobilize in major disasters generally cannot do so in catastrophes because they often have no place from which to operate. This happened in devastated Darwin, Australia after Cyclone Tracy, in the massive flooding in Bangladesh a few years ago, as well as in the Tangshan earthquake in China in 1976.

(3) Local officials often are unable to undertake their usual work roles, and this extends into the recovery period.

Related to the two observations just made, is that in catastrophic situations, local personnel are often unable for some time both right after impact and into the recovery period to carry out their formal and organizational work roles. This is because the local workers are either dead or injured, and/or are unable to communicate with or be contacted by their usual clients or customers and/or are unable to provide whatever information, knowledge, skills, etc. they can usually provide. For instance, in some recent catastrophes in developing countries practically all the medical or police personnel in some towns were fatalities. In impacted Florida communities after Hurricane Andrew, many social workers had no good way of communicating with or being reached by past and/new users of their services. This general inability to provide usual services happens, if at all, only on a very minute scale in major disasters, and if it does, endures only for relatively short periods of time.

One overall consequence is that because local personnel are casualties and/or usual community resources are not available, many leadership roles have to be taken by outsiders to the community. Planning which assumes that local community officials will take an active work role in the immediate postimpact period of a major disaster is realistic. However, such an assumption may not be valid for a catastrophe.

However, it should be noted that insofar as individual, household and small group level and other more micro level behavioral responses are concerned, there may not be many behavioral distinctions between catastrophes and major disasters. For instance, as is true in major disasters, the great bulk of the search and rescue was done by the immediate survivors even in the catastrophic earthquake in Armenia a few years ago.

(4) Finally, most if not all, of the normal everyday community functions are sharply and simultaneously interrupted.

Thus, in a catastrophe, places of work, recreation, worship and education such as schools totally shut down, and the lifeline infrastructure is so badly disrupted that there will be stoppages or extensive shortages of electricity, water, mail, or phone services as well as other means of communication and transportation. For example, this could be seen in many communities after Hurricane Andrew where in southern Dade County 14.1% of homes were totally destroyed and 46.9% of them suffered major damage (see Smith and McCarty, 1995). Similarly for days after the tornado that devastated the town of Xenia and surrounding areas, regular community life was mostly nonexistent, given that 39.1% of homes were completely destroyed and 19.1% were severely damaged (Taylor, Ross and Quarantelli, 1976). This also occurred in the very widespread Armenian earthquake. In major disasters, there is no such massive across-the-board disruption of community life, even if particular neighborhoods may
be devastated as happened in the Mexico City earthquake of 1985 but with life in many areas going on almost normally (Dynes, Quarantelli and Wenger, 1990); similarly, this was true of the Northridge, Los Angeles earthquake of January 1994.

Now the distinction we have just drawn between catastrophic and disasters is not important in itself. What is crucial is that catastrophes require different kinds of planning than do major disasters. This is true whether the focus is on planning mitigation, preparedness, response or recovery measures. We noted above, possible problems in sheltering victims or mobilizing organizations. This does not mean that everything is different; in fact, although we have some good idea of what is involved, what still needs further research clarification is exactly what are the most significant differences.

Similarly, planning and managing principles that hold for major disasters are not necessarily totally invalid for catastrophes. For example, it is probably still true that the crisis time planning for even a catastrophe should be as close as possible to every day, traditional ways of doing things. On the other hand, it is also probable that more innovation and emergent behaviors will be needed for coping with a catastrophe than with a major disaster. The research and operational problem, as Kreps (1991) notes is to establish the best balance between building on old or traditional social patterns and creating new ones.

We did not get very far when we tried to deal with disasters as if they were simply larger everyday emergencies. We will similarly not do the best that can be done if we try to treat a catastrophe as we do a major disaster.

Let us now turn to the planning for and managing of major disasters and catastrophes. What has research found out about these processes? We can start with the general assumptions that can be made about the behaviors that occur in the crisis time periods of disastrous occasions.

#6. A PROBLEM SOLVING RATHER THAN COMMAND AND CONTROL MODEL OF PLANNING IS MORE REALISTIC.

My colleague, Russell Dynes, has written many papers (e.g., 1993, 1994) contrasting what he calls the conventional or military model and the problem solving or human resources model for dealing with crisis occasions. He has also depicted in a chart the basic assumptions of the two models. This is set forth in CHART I. The first model sometimes is explicitly called the "command and control" model because supposedly it is drawn from military thinking. (We say supposedly because studies have shown that this model is usually not operative even in the military, see Rochlin, La Porte and Roberts, 1987; Rochlin, 1988).

The command and control model.

It makes many assumptions. Among them is that there will be almost complete personal and social chaos, along with a reduced capacity by relevant organizations for action, and also a loss of emergency workers in part because they will abandon their work roles. Therefore, it seems to follow that there is a need to create order and that this can be done by imposing command and control from
a centralized decision making top level structure. In more popular terminology, it attempts to answer the question: who is in charge? Therefore the planning assumes the need for standardized scenarios and operational procedures, and the use of established organizations and the minimizing of volunteers. This represents a closed model of social behavior at the time of disasters and catastrophes.

The problem solving model.

Among its assumptions is that while behavior during crises often moves away from traditional patterns, what occurs is nonetheless socially structured, and not chaotic and purely random. Therefore, it follows there is no need to try to impose order; instead what is required are efforts to coordinate the decentralized and pluralistic decision making that goes on. Consequently, the planning should allow for improvisation and encourage new initiatives and the use of non-traditional groups and volunteers. In essence, this is an open model of social behavior at times of crises.

Overall, our point is that an open system, human resources or problem solving model is more realistic for planning and managing disaster occasions than is a command or control one. Of course, this does not mean that all or even most attempts to deal with disaster crises necessarily use the best model. Unfortunately, even at present many disaster/emergency planners and managers seem to use some variant of the less realistic model, namely the command and control one (One version of which underlies the Incident Command System procedure, whose problems and flaws are discussed in Wenger, Quarantelli and Dynes, 1990).

#7. DISASTER PLANNING AND MANAGING ARE DIFFERENT SOCIAL PROCESSES

Up to this point we have used the terms, "planning" and "managing" without distinguishing between them. However, they denote two distinctively different social processes. In fact, at best there is only a partial correlation between the behaviors they encompass, that is, the existing planning at the time of a disastrous occasion, and the managing of such an instance.

It might be thought that because planning is in place there will be good managing of a crisis. Certainly such managing is one of the major purposes of planning. But because that is the objective does not mean that it will be realized. There are two reasons for this. The planning can be poor in the first place (and we will discuss this later).

The second and more important reason is that the planning process and the managing process are two different processes. Planning is not managing, and the former does not automatically transform into the latter. The last point is important because it cannot be assumed that just because good planning is in place, it will actually be implemented or carried out as planned.

What needs to be recognized here is a distinction that the military developed a long time ago. They made and continue to make a distinction between strategy and tactics. Somewhat oversimplified, strategy has reference to the overall approach to a problem or objective. Yet there are always situational factors or other contingencies that require particular adjustments to attain a specific goal if the overall objective is to be attained. This is the area of tactics.
In somewhat parallel terms, disaster planning involves the general strategy to be followed in preparing for a sudden disastrous occasion for a community. Management involves using particular tactics to handle the specific situational contingencies that are present or arise during a disaster occasion. Just as the military believes that they can enunciate principles of both strategy and tactics although the two are in different areas, there is also the need in the disaster area to distinguish between planning, the strategies that should be used, and tactics, the means that have to be used to cope with situational contingencies.

A consequence of this is that it is actually possible to have good planning in place, but very poor managing of a disaster occasion, and vice versa. It is also possible to have poor planning, but end up with relatively good managing. This is not to be recommended, but it can occur.

In reality, this useful distinction between strategy and tactics is frequently badly confused in the particulars of specifics plans and planning. Thus, even among organizations and in communities that do plan, the planning process is often incorrectly mixed with the managing of the occasion. However, it is of interest and perhaps indicative of a growing awareness of the differences between the two processes that in the United States at least, those organizations concerned with disastrous occasions initially tended to have the word "planning" or "preparedness" as part of their titles. Whereas these days, they use the term "management." Thus, the present day Federal Emergency Management Agency that is a reincarnation of one earlier organization named the Defense and Civil Preparedness Agency.

This problem of confounding the two processes is compounded by the fact that there is also a tendency to equate planing with only one end product of that process, namely a formal disaster plan. However, the production of such a document—while sometime legally required and bureaucratically preferred—is not absolutely necessary for good planning. There are many other aspects of the planning process that can be of greater importance. They include:

- Undertaking public educational activities;
- Establishing informal linkages between key groups;
- Assessing, monitoring and communicating information about local risks;
- Developing techniques for training, knowledge transfer and assessments;
- Convening meetings for the purpose of sharing information;
- Holding disaster drills, rehearsals and simulations;
- Involving citizens, business and industrial organizations, non-emergency public agencies and relevant non-local groups (e.g., state or federal agencies) in the planning process;
- Updating strategies, resources and laws as necessary;
- Checking that relevant local regulations and ordinances are in place and kept up to date; and, although this is seldom mentioned by anyone, maintaining consciousness of the risk and problem by paying continuing attention through thinking and talking about it.

To focus only on producing a written document misses most of what is really important in the planning process.
#8. PLANNING IS NOT ENOUGH, IT HAS TO BE GOOD PLANNING, THE MAJOR CHARACTERISTICS OF WHICH ARE KNOWN.

As said earlier, there can be poor planning in the first place. What is crucial is not planning but good planning. Now there exists some accepted research-based principles of good planning, especially for the preparedness and response phase of crises.

Let us mention ten of them, the ten Commandments if you will. The best or most appropriate planning to have in place, at any level, but particularly at the local community level is planning which (mentioning several aspects to which we have already made allusion):

(1) views disasters as quantitatively and qualitatively different both from accidents and minor emergencies, and from catastrophes;

(2) highlights a continuing process rather than an end product such as the production of a written plan;

(3) includes all four time phases of the planning process (that is mitigation, preparedness, response and recovery) rather than just one time phase;

(4) aims at multiple rather than single hazard or risk reduction goals;

(5) focuses on general principles rather than specific details;

(6) is multihazard rather than single in focus, generic rather than agent specific;

(7) assumes potential victims will react rather well instead of poorly during the emergency time periods of major crises; and

(8) emphasizes the need for intra- and interorganizational as well as community coordination rather than control;

(9) builds on research findings derived from systematic data rather than just personal experiences;

(10) distinguishes between planning and managing, between the strategies and the tactics necessary.

#9. GOOD MANAGING PARTICULARLY HAS TO DEAL WITH THE ORGANIZATIONAL HETEROGENEITY THAT IS DISTINCTION OF THE CRISIS TIME PERIOD OF DISASTER OCCASIONS.

Almost inevitably, the organized response to disaster occasions is highly fragmented and differentiated, and involves a variety of entities representing many sectors of governmental and non-
governmental layers. In addition, the organizational response is not uniform at different time phases, with some groups just starting to get involved when others are phasing out (e.g., weather agencies have usually phased out before relief groups start operating), and with tasks of the same organization often changing through time (e.g., police who initially may help in distributing warning messages undertaking search and rescue after impact).

Apart from substantive tasks, organizations and groups responding in crises also differ in the general structures and functions they manifest. A four fold typology developed by DRC captures the phenomenon well. There are:

Type I organizations--established ones which do not markedly change their general structure and traditional functions at times of disasters (e.g., many police and fire departments maintain their traditional forms and spheres of activity).

Type II organizations--expanding ones which have new structures but old functions (e.g., Red Cross chapters who by preplanning incorporate many volunteers into a new social structure but carry out traditional organizational tasks).

Type III organizations--extending ones that have old structures but new functions (e.g., a construction company using its traditional group structure to undertake building or street debris clearance).

Type IV are new groups--entities that had no preimpact existence but which carry out new disaster functions (e.g., an emergency search and rescue team or a damage assessment group).

While these last kinds of groups play crucial roles in crisis time periods, they have no corporate or formal existence.

This extreme heterogeneity in organizational response stems from a variety of factors. It can result as in the United States, for example, by law and tradition as well as expectation, that governmental response is to be decentralized. So local agencies will be complemented by state organizations, and both in turn will be jointed by federal agencies. Also because of societal factors, organizations in the public and the private sectors take and are assigned differing responsibilities for varying crisis time tasks.

As illustrated earlier, one notable feature of the crisis period is the tremendous convergence to the disaster site both from within and outside the community of very many different kinds of public and private organizations attempting to do often rather different tasks. To give a further illustration, one DRC field study of a 1987 plane crash near Detroit found official records showed that at a minimum there were 241 responding organizations, including 59 different police agencies. There were at least 69 different officials who appeared at the EOC (Emergency Operation Center). Even in the most preplanned of occasions, disasters draw to themselves a massive convergence of people, communications and material goods from outside the impacted area. These all contribute to the
organizational heterogeneity that is a major feature of disaster response. Even in the most preplanned of occasions, disasters draw to themselves a massive convergence of people, communications and material goods from outside the impacted area. These all contribute to the organizational heterogeneity that is a major feature of disaster response.

Faced with this kind of occasion, community officials sometime try to impose some overall order in the crisis. They may attempt, using traditional structures and organizations, to impose what we have earlier called a "command and control" model on the situation. This as we also indicated before, essentially involves the idea of centralizing authority and operating with a top down, decision making structure.

However, research indicates that this cannot usually be done in most disaster occasions. Coordination rather than control is the best that can be achieved, and in certain respects a loosening of the command structure and decentralization of decision making to lower levels will be the most effective response possible.

Good managing deals well with at least four major problems that arise in the crisis periods of disasters; namely, the mobilization of resources, the information flow, the decision making and the coordination of activities.

Seldom in major disasters although more often in catastrophes, relevant resources are rarely completely absent or not available somewhere in or near the impacted area. But often there are problems in identifying where the resources are located and delays in getting them to where they are needed. Thus, a management problem in disastrous occasions is simply the mobilization of needed resources.

Another set of crisis management problems has to do with the information flow in the communication process. Within this there typically can be five sources of difficulty, namely in the:

- intra and interorganizational information flow;
- information flow to and from organizations and citizens;
- information flows within systems of organizations.

The physical or technical means of communication seldom are the roots of serious trouble. If they are disrupted or destroyed usually alternate means of communication are found.

Still another set of difficulties and problems can be in organizational decision making. These can stem from the following conditions as well as others:

- losses of higher echelon personnel because of overwork;
- conflict regarding authority over new disaster tasks;
- confusion over jurisdictional responsibilities.
But it would be extremely rare in disaster occasions to have any breakdown in the chain-of-command and formal lines-of-authority in established organizations.

Finally, there are the problems associated with the need to have interorganizational coordination as well as a loosening of the command structure. These can result from:

- lack of consensus about what constitutes "coordination";
- strained relationships created by new disaster tasks; and,
- the magnitude of the disaster impact.

If all of the named problems are handled well, good managing is assured. However, it should be clear that many of them cannot be dealt with by existing or traditional behavior patterns. Improvisation in or the development of new organizational behaviors becomes necessary.

Finally given what we said earlier, clearly there will be more difficulty in handling catastrophic than major disasters. In fact, although we can not address them in our remarks here, it is the qualitative rather than the quantitative differences between major disasters and catastrophes, that exacerbates the managing problem (for example, in catastrophes, assistance from outside the community is more likely to be needed, which however makes coordination at the height of the crisis period all but impossible).

#10. SOCIAL CHANGE IS A CONSTANT THAT WILL AFFECT FUTURE DISASTERS AS WELL AS PLANNING AND MANAGING THEM.

In concluding, let us say the following. One major research finding about communities and organizations impacted by disastrous occasions, is that they plan for future ones on the basis of their last experience with such happenings. This may seem, from a common sense point of view, a valid approach. However, research has shown this is not the case. Good disaster planning requires planning for the kinds of disasters and catastrophes that will occur in the future, and not just what has happened in the past.

Now social change is a constant. Even the most seeming of stable communities or societies will always be undergoing some changes. Such a social dynamism is important in many areas of social life. More relevant for our purposes, is that present day macro level social changes will affect the future of the disaster area. The changes will probably create both more and worse disasters, and add complexity to planning for and managing disaster occasions (for discussions of trends and their consequences, see Quarantelli, 1992).

Let us note here merely two examples of probable trends in future disaster occasions. One is an old kind of general threat that will have worse effects in the future. The other is a new kind of risk that did not exist before.

Increasingly, old kinds of natural and technological disaster agents will simply have more to impact. While such physical agents as floods, tornadoes, earthquakes, volcanic eruptions, hurricanes, etc. are
probably not increasing (at least on any observable human time scale), what they are socially impacting is changing. Population growth and movement, building of structures and economic development means that in most places, more people, more property, more wealth, more aspects of community life are increasingly at risk. For example, there are more people and settlements than ever before in riverain flood plains or near hazardous chemicals or nuclear plant. Where in the past there were marsh or swamp areas, or simply farm land, there are now housing complexes and industrial parks. Where empty space might have been hit in the past, in the future people and developed areas will be hit. There is practically nothing of the reverse—abandonment of withdrawal from dangerous localities.

One way to document this probable greater future impact is to ask the following: If the last disaster to hit a particular area were to hit exactly in the same way now or in the future, would there be less, the same or more disrupted and lost? In the vast majority of cases, the answer would have to be more, particularly in terms of social disruptions and economic losses.

Then there are the new risks that are developing such as in biotechnology. However, let us note some consequences of the computer revolution. We already have some examples both from Japan and the United States of disastrous occasions associated with such changes. To be sure, the computer revolution can improve disaster planning and managing. But our increasing dependency on computer technology will magnify future disasters and turn some minor ones into major ones. When the technology fails, and it will fail at times, what will those who have come to depend on them do? We know of one chemical plant, because the computer monitoring system failed, where it took hours to warn the surrounding population; in pre-computer days the warning would almost certainly have been issued much earlier.

To provide more details for illustrative purposes let us cite figures from a recent incident in Hinsdale, Illinois where a fire disabled a major Bell Telephone switching center in the Chicago area. This telephone outage as a result of its links to computers affected both voice and data communications for more than a half million residents and business customers in six metropolitan suburbs for periods ranging between two days to three weeks. In addition, local and long distance communications for both telephone and computer networks were also severely affected since the Hinsdale center affected was an aggregation point for major telecommunications links. The outage:

- affected the normal operations of dozens of banks, hundreds of restaurants dependent on reservations, three large catalogue sales companies headquartered in the Chicago area, about 150 travel agencies, most of the paging systems and cellular telephones in the affected area, and hundreds of businesses located in the area or others not located in the affected area but conducting business with those that were...At present, a conservative estimate for the business losses and the repair costs of the accident are set at $200-300 million (Pauchant, Mitroff, Weldon and Ventolo, 1990: 244).
The clear implication of this is that we need to aim our planning for and managing of community disasters and catastrophes for what we will encounter in the future. Future disastrous occasions will not simply be repetitions of past ones. As the saying goes, forewarned is forearmed.

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