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THESIS

STRATEGIC GUIDE TO
NATURAL DISASTER
PLANNING, PREPAREDNESS, RESPONSE AND RECOVERY
FOR
NAVAL SUPPLY CENTER, OAKLAND, CALIFORNIA

by

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and
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June 1990

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The objective of such a program is to reduce the amount of damage caused by a natural disaster, enable effective response to a disaster and facilitate recovery. The plan must be consistent with the supply center's priorities and be within budget limitations. Further, the plan must address additional areas such as supporting other defense activities and responding to taskings from the Federal Emergency Management Agency (FEMA).

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ABSTRACT

The specific goal of this thesis is to provide a strategic guide which can be used as a basis by Naval Supply Center (NSC), Oakland, California to formulate a natural disaster planning, preparedness, response and recovery program.

The objective of such a program is to reduce the amount of damage caused by a natural disaster, enable effective response to a disaster and facilitate recovery. The plan must be consistent with the supply center's priorities and be within budget limitations. Further, the plan must address additional areas such as supporting other defense activities and responding to taskings from the Federal Emergencey Management Agency (FEMA).

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I. INTRODUCTION

A. PURPOSE

This thesis is a strategic guide. It is designed to be used as a foundation upon which a natural disaster plan for the Naval Supply Center (NSC), Oakland, California can be constructed.

Natural disasters which have recently struck various military communities have raised the level of awareness concerning the potential threat which these phenomena pose to military readiness. Hurricane Hugo, which buffeted the southeastern seaboard of the United States in September, 1989, and the Loma Prieta earthquake, which struck the San Francisco bay area on October 17, 1989, both illustrate the extensive amount of destruction which can follow such natural disasters. A review of the geographical locations of military installations reveals that none are immune to the threat of a natural disaster.

The Loma Prieta earthquake resulted in 62 known deaths and 3,757 reported injuries. The earthquake incurred more than $8 billion dollars in property damage in both the public and private sectors. Damage to Northern California Naval shore installations is estimated at $175 million dollars [Ref. 1]. The Navy will spend more than $240 million

for the Hugo recovery effort in Charleston, South Carolina [Ref. 2]. The cost to local communities in terms of future productivity is more difficult to quantify, but represents a major consideration.

Local communities which have experienced such disasters have learned to regard the armed forces that reside in their regions as essential community resources. As such, various military activities are increasingly relied upon to assist the private sector during emergency response as well as recovery efforts. For example, during the Loma Prieta earthquake over 11,000 Department of the Navy (DON), military, and civilian personnel were used to assist civilian authorities in their response and recovery efforts [Ref. 1:p. 2]. This increasing dependence upon the military implies a role that moves beyond parochial concerns and embraces the concept of community awareness and mutual aid. Although this is hardly a new function for the military, the issue must be deliberately addressed by disaster planning documents.

Post-disaster reports detailing the lessons learned from natural disasters by military activities as well as reports by affected metropolitan communities, echo the need for immediate and greater emphasis upon planning and preparation. Commander, Naval Base San Francisco compiled lessons learned from all Naval activities within his jurisdiction as regional planning agent (RPA) for Northern California [Ref. 3].

The document, 17 Oct 89 Loma Prieta Earthquake After Action Report, states:

> . . . Regional and local disaster preparedness plans were too general and not supportive of earthquake-generated issues.

and,

> . . . Due to the fact that there is a high probability of additional major earthquakes occurring, there is a clear need for improved pre-planning, training and preparation by SFBA [San Francisco Bay Area] naval shore activities. The Loma Prieta earthquake was an excellent dress rehearsal. [Ref. 1:pp.S-IV-1, S-IV-2]

In order to focus planning efforts, a fundamental strategy must first be developed. This is especially important given the diverse array of possible primary and secondary effects which a natural disaster can have on a community. All management alternatives must be identified and explored. A strategy must be established which provides a distinct direction and clears the path leading to a rational planning approach.

The specific goal of this thesis is to provide a strategic guide which can be used as a basis by NSC Oakland, California to prepare a natural disaster preparedness, response and recovery plan. Presently, NSC Oakland maintains a plan that was used during the recent Loma Prieta earthquake. The experience revealed limitations in both adequacy and scope of the plan. The supply center has begun an effort to update and improve its plan so that it is comprehensive, workable and remains within budget constraints.

The objective of NSC Oakland's plan is to reduce the hazards imposed by a natural disaster, enable effective response to a disaster, and facilitate short term recovery. The plan must be consistent with the supply center's own perceived mission priorities. Further, the plan must address additional aspects such as the functional support of other defense activities, and response to tasking from the Federal Emergency Management Agency (FEMA).

B. DISCUSSION AND BACKGROUND

1. Discussion

Secretary of the Navy Instruction 3050.32A requires defense activities to have disaster preparedness and response plans. The instruction states,

> DoD Components will, as appropriate, develop contingency plans for major disaster operations. Military commanders shall be responsible for assuring that such contingency plans are coordinated with FDAA [Federal Disaster Assistance Administration] Regions and appropriate civil authorities at State and local levels. [Ref. 4]

An examination of plans from various commands indicates that while most meet administrative requirements, they are inadequate in preparing for and decreasing the effects of a major disaster. Recent natural disasters which involved NSC Charleston, South Carolina and NSC Oakland, California highlight the susceptibility of naval activities to the forces of nature. This underlines the need for a strategy to provide the basis for structuring a comprehensive plan.

Little can be done to prevent natural disasters from occurring. However, technology provides the means for statistically predicting the character and extent of many natural disasters that may occur in a given geographical area during a particular period. For example, the Loma Prieta earthquake is an example of a natural phenomenon which was forecasted by seismologists well in advance of the actual event.[1]

Based upon these statistical predictions, risks can be assessed and plans formulated to deal with the disaster. Actions taken to reduce the level of destruction and loss through the development and implementation of a thorough plan can result in a more efficient, less costly response and recovery effort.

Plan development must be consistent with command goals, priorities and resources as well as conducive to actual implementation. The success of the effort, from planning through implementation, depends heavily on the firm direction, support, and commitment of executive management, both internal and external to the command.

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[1]The specific date, itself, was not predicted, but rather the approximate intensity and time window of occurrence were predicted.

2. Background

a. ***Naval Supply Center, Oakland, California***

The Naval Supply Center, Oakland is a complex of administrative and warehouse structures. Located on the San Francisco Bay, amid an industrial complex and seaport, the center's location and physical attributes render it particularly vulnerable to the effects of an earthquake. Two principal faults, the San Andreas and the Hayward fault, lie to the west and east, respectively, of the complex. Much of the center's infrastructure is built upon landfill which renders the area particularly vulnerable to the effects of liquefaction.

b. ***Loma Prieta Earthquake: October 17, 1989***

The awareness of the management of NSC Oakland about the damage potential of natural disasters was substantially increased by the Loma Prieta earthquake of October 17, 1989. This quake occurred in the remote Santa Cruz mountains about 50 miles southwest of San Francisco. Although the Bay Area suffered some severe damage, this damage was relatively minor compared to the destruction expected in an earthquake of similar magnitude occurring closer to the Bay Area.

C. BARRIERS TO PLANNING

Planning is the conventional function of management. It represents a proactive attempt by management to control and

improve the outcome of a future circumstance. Planning is the only tool that affords management the opportunity to make strategic choices in advance of natural disasters. After action reports by communities affected by natural disasters indicate that a feasible plan can substantially reduce the costs and trauma incurred by such events. The alternative to good advance planning is to simply react when a disaster strikes.

Regarding natural disasters, the planning component is at least a controllable aspect of an overall process containing many variables that can not be controlled.

There is little question that prior planning is an essential component that improves the probability of survival of a community which has been struck by a disaster. However, an examination of various disaster planning documents which are currently in use reveals a propensity to meet an administrative requirement rather than to provide a comprehensive, well prepared plan which can actually be implemented. Factors which contribute to planning deficiencies must be acknowledged and overcome in order to establish a productive planning environment.

The notion that natural disasters occur infrequently and at irregular intervals appears to erode a sense of urgency concerning disaster planning. Given a long term viewpoint, the probability that a natural disaster will strike is relatively high. Unfortunately, short term natural disaster

predictions are fraught with uncertainty. Physical manifestations which signal the onset of a natural disaster may be difficult to perceive and interpret correctly. Additionally, warning signs for some natural disasters may occur so close in time to the actual event that, in all practicality, there is insufficient time to prepare an adequate response.

Planning, itself, is tedious and time consuming. Even a sense of accomplishment is elusive. Because natural disasters occur infrequently, individuals that plan for them may never see the outcome of their labor. The act of planning is often treated by the local military activity as a collateral function of individuals who have primary, day to day responsibility for other, more immediate organizational functions.

Military installations are likely to select representatives from within their organizations to participate in disaster planning for the command. The selected planning representatives may be experts in isolated functional areas, such as training, personnel administration, or even fire fighting and medicine. Few of them are likely to have the breadth of knowledge or experience required to envision the entire scope of a planning enterprise with such diverse implications. The brevity of management tenure which is inherent in many military organizations also is an impediment to continuity and ultimate task completion.

These limiting factors suggest that for disaster planning to be fruitful, it must be an acknowledged and obvious management priority. Management commitment must be evident and continuing.

It is worthwhile to note that plans which appeared to be the most comprehensive in terms of strategic rationale and overall applicability, were those from local metropolitan agencies, such as The City of Oakland Emergency Plan [Ref. 5]. Additionally, there appears to be a positive, evolutionary trend of improvement in these plans.

In observed cases, the plans were the result of a committed and focused effort by civic leaders. One explanation for this may be that disaster planning by civil authorities is considered by them to be one of their prime responsibilities to their constituents. Specific line item funding is provided to correct known planning deficiencies. For example, before the Loma Prieta earthquake, the Association of Bay Area Governments had allocated $42,975 to analyze alternative strategies for reducing the number and severity of hazardous materials incidents during earthquakes [Ref. 6]. This indicates a willingness to dedicate financial resources and use private sector specialists. This is not always characteristic of military planning.

D. ASSUMPTIONS

1. General Assumptions

The thesis assumes that the adverse effects of a natural disaster can be substantially lessened through a series of planning and management implementation actions accomplished prior to the disaster. An important objective of the planning strategy is the identification of major alternatives among which managers can choose before a disaster strikes. Two critical components which must be addressed in detail are readiness planning and a process of informed decision making.

The probability that a natural disaster will, at some point, strike a community implies a range of unsettling assumptions concerning the nature and extent of the devastation. The basis of concern rests with the well founded apprehension that a natural disaster is capable of causing a violent change in an organization's day-to-day operating environment and in the creation of its outputs and procurement of its resources.

According to the U.S. Department of the Interior, the natural disaster which poses the greatest threat to NSC Oakland is that of an earthquake. The Department of the Interior predicts that there is a 20 percent probability of an earthquake of magnitude seven or larger occurring in the next 30 years at either the Southern East Bay, the San Francisco

Peninsula, or the Northern East Bay. The California Division of Mines and Geology and the Federal Emergency Management Agency have forecasted that the following effects will be caused by an earthquake of this magnitude:

- Deaths: 1,500-4,500;
- Injuries: 45,000-135,000;
- Damage: Exceeding $40 billion;
- One or more hospitals will be destroyed;
- All four bridges to the East Bay will probably be closed for hours to days;
- Access to and travel within the East Bay will be difficult and limited to emergency traffic;
- Only the San Jose International Airport may be available for large aircraft. [Ref. 7]

2. Assuming a Worst Case Scenario

For the purposes of this thesis, a worst case scenario is assumed and plan development will proceed using this assumption as a baseline. Accordingly, an earthquake of magnitude 7 or greater along any one of the three bay area faults is expected to produce the following "worst case" scenario:

- A large number of deaths and injuries, destruction of a large percentage of facilities that serve human needs, an overwhelming demand on state and local response resources and systems, severe long term effects on both the general economic activity and on state, local and private sector efforts to carry out initial recovery activities.
- The earthquake will occur without warning at a time of day that produces the maximum number of casualties. Access to

and from the damaged areas may be severely restricted for hours and perhaps days. Communications and life support systems will be severely disrupted or destroyed. Day and night scenarios must be examined.

- Earthquakes and resulting aftershocks may trigger secondary events such as fires, tsunamis, liquefaction, landslides, flooding, release of hazardous materials, and dam failures.

- Immediately after a catastrophic earthquake, the Governor will declare a state of emergency, followed later by a Presidential disaster declaration. State and Federal life support and emergency response operations can then begin. However, resources may not be available in sufficient quantities for several days.

- Although local resources will probably be inadequate to respond to the effects of such a major earthquake, local jurisdictions will have to be self-sufficient for the first few hours and perhaps several days after the earthquake. Local governments must maintain updated resource inventories, and determine priorities and procedures for the use of these resources. [Ref. 8]

3. Planning Assumptions for Naval Supply Center

Considering a worst case scenario, the planning assumptions for the Oakland Naval Supply Center are as follows:

- A large percentage of buildings and facilities are either severely damaged or destroyed. Personnel casualties will include both deaths and injuries.

- The earthquake occurs without warning during normal working hours. However, planning must include after hours recall of employees.

- Communications and utilities are severely disrupted or destroyed. Computer systems are disabled.

- Secondary effects such as fire, flooding, and release of hazardous materials will occur.

- Area resources are severely constrained. The Naval Supply Center must be able to sustain itself for a minimum of 24 hours. Certain types of outside assistance may take substantially longer to arrive.

- The Naval Supply Center will be tasked to provide supplies to area government activities by the Federal Emergency Management Agency.

E. SCOPE

This thesis is intended to provide a strategy and a framework to facilitate the formulation of a comprehensive plan which can lessen the effects that a natural disaster has on a community. To illustrate this process in a specific way, the primary focus of the planning process is Naval Supply Center (NSC), Oakland, California.

Given the diversity of possible primary and secondary effects which a disaster can cause, a strategy which attempts to yield a workable plan must be as dynamic as it is implementable. This implies a scope whose range is sufficiently broad to require a mechanism for plan adjustment throughout the planning, execution and recovery process.

The scope of this thesis addresses only the implications related to natural disasters. The term "natural disaster" is defined to include any crisis in a community that is incurred through circumstances inflicted by nature. Examples of natural disasters are: earthquakes, hurricanes, fires, floods, extremely high tides, volcanic eruptions, landslides, and droughts. Since NSC Oakland, California is the community

used to illustrate the strategic planning process in this thesis, the thrust of concern centers upon the projected effects of a major earthquake upon the supply center.

Conversely, an un-natural or "man-made" disaster is one in which the crisis is caused by direct or indirect human intervention. Examples of man-made disasters are: terrorist actions, pollution, arson, aircraft crashes, ruptures in gas, oil, or water pipelines, nuclear, biological or chemical attacks or accidental releases, and civil unrest.

A major natural disaster is an event that can affect millions of people, not only in the immediate area, but throughout the nation. Depending upon the time and the place of occurrence, a major natural disaster can cause thousands of personnel casualties. Billions of dollars of property may be damaged or lost. Loss of productivity can be widespread, long lasting, and in many instances permanent.

There are distinct similarities in the effects of disasters, both natural and man-made, upon a community. Although the scope of the thesis is limited to natural disasters and is further narrowed to NSC Oakland, many of the assumed conditions may be applied to natural disasters other than earthquakes, as well as to man-made disasters. Additionally, the planning strategy in this thesis is sufficiently general to enable many of its elements to be used as an aide in the development of plans for natural or man-made disasters in other military and civilian communities.

F. PHASES INVOLVED IN THE DISASTER PLANNING PROCESS

There are four main phases to the disaster planning and management process. These phases are listed below in their general order of occurrence:

1. Planning Phase
2. Preparation Phase
3. Execution Phase
4. Recovery Phase

Each phase consists of several functions. These functions are sub-phases or stages of the phase. Stages in the planning phase are the functions of: pre-planning and plan development. In the Execution Phase, the functions are the transition to emergency action stage and the full response stage. Work can proceed simultaneously in several phases, especially in the Planning and Preparation Phases.

The Planning Phase includes a pre-planning set-up interval as well as the construction of a strategic planning design which is unique to the command. Pre-planning erects the basic organizational structure to support the subsequent plan development. Management commitment is established, individuals are grouped to form an executive steering committee and basic assumptions concerning the direction and objectives to be achieved are discussed and promoted.

Under actual plan development (the second stage of the Planning Phase), mission priorities are affirmed, the threat

is defined, limitations are identified, and risk is assessed. Resources are examined for potential applicability to the threat. The outcome of the Planning Phase should include management actions and information which provide a logical rationale and a clear process for confronting the potential disaster. Concepts developed in this stage will be formalized in a natural disaster plan which is written in the Preparation Phase.

The Preparation Phase implements the decisions made during the Planning Phase that relate directly to the community's readiness posture. It is here that management concerns are reflected in a fully documented plan. Consistent with the plan, material is procured and pre-positioned, responsibility for planned actions is delegated, contracts are negotiated and training schedules are followed. The plan is exercised and tested for viability through drills. Adjustments to the plan are made, depending upon the outcome of periodic testing, and the information obtained from doing the Preparation Phase.

The Execution Phase may begin when it is learned that a disaster is imminent, or has happened. Execution comprises two stages: the transition to emergency action, and full emergency response. The period of transition from routine operations to emergency action is a critical step in sustaining a stricken community until a fully orchestrated effort and adequate resources can be brought to bear on the disaster. The interval in which emergency action occurs is

likely to tax the most comprehensive of planning efforts. Emergency action will take place in a dynamic environment in which numerous complex problems must be addressed immediately and severely constrained resources must be carefully allocated.

The Recovery Phase focuses primarily upon actions which are aimed at returning the community to normal operations. Also during recovery, accumulated data is analyzed and used to improve the disaster plan and preparation.

Table I, below, summarizes each phase and applicable stages:

TABLE I

PHASES AND STAGES OF DISASTER MANAGEMENT

1. PLANNING PHASE
   - Pre-Planning Stage
   - Plan Development Stage
2. PREPARATION PHASE
3. EXECUTION PHASE
   - Transition To Emergency Action Stage
   - Emergency Response Stage
4. RECOVERY PHASE

Each phase and its components will be described in a generic sense, and their specific applicability to NSC Oakland, California will be discussed. Where it is possible

to do so, suggestions specific to the supply center will be provided for consideration by the command for their use in the planning process.

II. PLANNING PHASE: PRE-PLANNING

A. PRE-PLANNING OVERVIEW

Pre-planning is the first stage in the overall planning phase. It defines the problem, sets the tone, and provides a direction. It prepares an organization to undertake planning as a coordinated effort. Organizational goals are promoted, executive management prerogatives are revealed and a firm management commitment to the disaster planning process is established. The basic pre-planning steps are as follows:

- Define the planning problem
- Establish and promote management commitment to the planning process
- Establish the planning objectives
- Define the present situation and assumptions
- Define planning responsibilities
- Initiate the command's planning process

B. DEFINING THE PROBLEM

1. Overview

The initial problem should be described in simple and fundamental terms. At this stage, a problem statement which is too specific may unintentionally narrow the scope of subsequent planning efforts. There are many instances where the actual problem may not be known or clearly understood,

however, the symptoms of a perceived problem are evident when manifested. For example, the damage that occurred in the NISTARS warehouse at NSC Oakland, is symptomatic of various structural and non-structural problems. Exploration of these symptoms can disclose the fundamental problem and lead to alternative solutions. It is sufficient, then, to describe the symptoms. The symptoms can later be studied by an executive steering committee who, as one of its first tasks, will attempt to express the problem in more succinct terms.

2. NSC Oakland's Specific Problem

NSC Oakland perceives limitations to its existing disaster, response and recovery plan. These shortfalls were discovered during the October 17, 1989 Loma Prieta earthquake and were carefully documented as "lessons learned." The supply center found that its plan was too general in scope and too awkward in format to permit rapid and effective implementation. Those aspects of the plan which were executed proved inadequate in providing necessary, timely data to decision makers. As a result, the center's mission was impaired and recovery efforts were hampered. [Ref. 9] The supply center is pursuing development of a plan which overcomes these limitations.

C. ESTABLISH AND PROMOTE MANAGEMENT COMMITMENT

It is incumbent upon an organization's executive management to foster and maintain the necessary sense of

urgency, ownership, and commitment throughout the entire disaster planning process. A perception of strong commitment from management is crucial in creating the momentum to carry the task through to successful completion. Commitment entails more than a policy statement concerning the importance of the task at hand. The level of active involvement by executive management personnel throughout the planning and preparation process demonstrates the importance which they place on it.

In the pre-planning stage it is essential that executive management recognizes its fundamental role. Appearances by executive management personnel at critical meetings, the type and status of individuals who are selected for key positions, the level of financial resources which are provided, public and private statements and actions are all critically interpreted by subordinates to determine the level of importance placed on the task by executive management.

Executive management, both internal and external to the command, must be fully supportive of planning efforts if the process is to succeed. Planning for a major disaster is a complex and multi-dimensional task requiring close cooperation across departmental lines within the organization. A successful outcome demands a coordinated effort which can only come with firm support and direction from the top.

1. Suggested Actions to Establish and Promote Command Commitment

1. Commence a program to educate employees about the probability of a natural disaster and its possible effects.

2. Explain command intentions to prepare a natural disaster plan, the direction and methodology to be used, and the importance of the plan.

3. Emphasize command commitment through the dedication of financial resources and personnel necessary to accomplish the task.

2. Suggest Assignments to Establish and Promote Command Commitment

1. Safety Officer: Using available media such as the plan of the day and base newspaper, begin an on-going natural disaster awareness program. Such a program must be well prepared and well presented. The program should go and stay beyond the basics. Information presented should be new, interesting and varied.

2. Planning Department: Prepare a letter to all employees for the commanding officer's signature. The letter should announce the command's involvement and emphasize its commitment toward natural disaster planning and preparedness.

D. ESTABLISH THE OBJECTIVES OF THE PLAN

The objectives to be incorporated into a comprehensive disaster plan are to:

- Define the overall risk;
- Describe actions to minimize structural and non-structural damage to facilities;
- Describe actions to minimize the loss of life;

- Describe actions to lessen the disaster's impact on mission accomplishment and minimize dollar losses;
- Define what is preparedness, response , and recovery;
- Ensure compatibility with guidelines furnished by higher authority;
- Define responsibilities that are easily understood and can be accomplished by the command; and
- Develop a planning document that can be implemented within budget constraints and within a reasonable period of time.

E. PRESENT SITUATION AND ASSUMPTIONS

The assumptions stated in Chapter I, Section D,2, involving an earthquake of magnitude 7 or greater, centering in one of the three primary Bay Area faults, is used as a baseline in formulating a generalized "worst case" disaster scenario. The associated preparedness, response, and recovery plans will be written to address the implications which correspond to this "worst case."

F. DEFINE PLANNING RESPONSIBILITIES

Prior to plan development, the command must define the external and internal command structures specifically related to natural disaster planning and response. These principal parties set policies and procedures as well as participate directly in the disaster management process.

1. External Command Structure

The Naval Supply Center, Oakland has two external command relationships. Concerning its assigned mission of

physical distribution, the Naval Supply Center is directly responsible to the Commander, Naval Supply Systems Command (NAVSUP). NSC Oakland's disaster preparedness plan reflects the following chain of command during periods of emergency:

- President
- Secretary of Defense
- Secretary of the Navy
- Chief of Naval Operations
- Commander in Chief, U.S. Pacific Fleet
- Commander, Naval Base San Francisco, Ca.
- Commanding Officer, Naval Air Station, Alameda, Ca.
- Commander, Naval Supply Center Oakland, Ca. [Ref. 10]

General responsibilities within this latter command structure are as follows:

The Secretary of Defense is responsible for the overall readiness of military forces and activities, and setting policies for disaster preparedness.

The Secretary of the Navy is responsible to the Secretary of Defense for the readiness of military forces and activities under his jurisdiction, and for assignment of activities to execute the Department of Defense Disaster Preparedness Program.

The Chief of Naval Operations is the executor for the Department of Defense Disaster Preparedness Program.

The Commander in Chief, U.S. Pacific Fleet (CINCPACFLT) is designated by the Chief of Naval Operations as the Navy's Principal Planning Agent (PPA) for disaster preparedness. CINCPACFLT's areas of responsibility include Hawaii, Alaska, California, Oregon, Washington, Arizona, Nevada, New Mexico, Utah, Idaho, Montana, Kansas, Guam, American Samoa and Trust Territories of the Pacific. When mobilized for civil defense, areas of responsibility will expand to include Texas, Oklahoma, Louisiana, Arkansas, Missouri, Iowa, and Minnesota.

The Commander, Naval Base (COMNAVBASE) San Francisco, Ca., is designated as one of the Navy's Regional Planning Agents (RPA) by CINCPACFLT. The COMNAVBASE, San Francisco area of responsibility comprises the northern half of the state of California, including San Mateo, Santa Clara, Merced, Mariposa, and Mono Counties, and all counties south of the Oregon border [Ref. 11]. Planning responsibilities within COMNAVBASE's authority include:

- Develop and manage a disaster preparedness program and coordinate disaster preparedness planning for all naval shore activities, within assigned area of responsibility;
- Coordinate with area Army, Air Force, and Coast Guard commands, Headquarters Sixth Continental U. S. Army, the Federal Emergency Management Agency Regional office, and state and local officials for disaster preparedness and planning; and
- Designate Sub-Area Regional Planning Agents.

The Commanding Officer, Naval Air Station, Alameda, Ca., is designated as the Sub-Area Regional Planning Agent (SRPA) by COMNAVBASE, San Francisco. His responsibilities include:

- Develop and manage a disaster preparedness program in assigned area of responsibility;
- Assign activities within their local area, as appropriate, to develop individual activity plans.

Commander, Naval Supply Center, Oakland is tasked with disaster preparedness planning for the Naval Supply Center and tenant activities.

2. Internal Command Structure

Table II illustrates the internal organization of the Naval Supply Center, Oakland. [Ref. 12] This organizational chart provides information on those departmental codes which can be called upon to assist in disaster planning:

TABLE II

ORGANIZATION: NSC OAKLAND

Commanding Officer

Public Affairs Officer --- Executive Officer (Special Assistants) --- Disaster Preparedness Officer

Functional Departments

Civilian Personnel Department	Code 20
Planning and Management Services Department	Code 40
Comptroller Department	Code 50
Data Processing Department	Code 60
Installation Services Department	Code 70
Inventory Control Department	Code 100
Regional Contracting Department	Code 200
Physical Distribution Department	Code 400
Personal Property Department	Code 500
Aviation Department	Code 600
Fuel Department	Code 700
Regional Financial Services Department	Code 800
Special Material Supply Department	Code 900

The Commander, Naval Supply Center, Oakland, or a designated officer in the commander's absence, has overall responsibility for natural disaster preparedness planning and response for the Naval Supply Center and tenant activities. His responsibilities include:

- Develop and manage a Disaster Preparedness Plan for the Naval Supply Center;
- Appoint Officers/supervisory personnel to serve in disaster planning, preparedness, response and recovery positions; and
- Plan for the employment of logistic support of disaster forces both internal and external to the command.

G. INITIATING THE COMMAND'S PLANNING PROCESS

Prior to actual plan development, the command must focus its efforts setting a direction and a methodology to approach the planning problem. Five steps are required:

1. Identify the existing support elements and activities
2. Appoint a Disaster Plan Steering Committee
3. Determine functional categories to be included in the plan
4. Define Functional Sub-committee responsibilities
5. Document Procedures

1. Identify Existing Support Elements and Activities

This step identifies programs and organizations both internal and external to the command that are beneficial to the planning effort. A wealth of knowledge and expertise exists which can be used to provide rich source material, conduct training, or to perform actual analysis, reducing the complexity and need for independent planning and implementation solely within the Planning Department.

Within the command are certain offices whose ordinary functional responsibilities and missions incorporate elements that would prove helpful to disaster planning. The safety office, the fire department, the public affairs office, base security, the civilian personnel office and other offices can be prime contributors and facilitators to plan development.

Disregarding these resources would seriously hamper and restrict the planning effort.

There are a number of local, state and federal agencies external to the command which can support disaster planning efforts. A few of these organizations are the local branch of the Federal Emergency Management Office, the American Red Cross, the Earthquake Education Project, and Association of Bay Area Governments (San Francisco Bay Area).

a. Suggested Actions to Identify Existing Support Elements and Activities

1. Consolidate, organize and review natural disaster information available within the command to assist in plan development and identify potential resources.
2. Contact external sources to identify functional experts. Develop a list of points of contact and telephone numbers.
3. Commence the order, collection and organization of a reference library of material on disaster management.

b. Suggested Assignments to Identify Existing Support Elements and Activities

1. Planning Department: Determine available resources and programs internal and external to the command and provide information to the command disaster preparedness officer.
2. Disaster Preparedness Officer: establish and organize the natural disaster reference library.

2. Appoint a Steering Committee

This committee should consist of key members of the command's organization and will provide the impetus for

command direction and policy. The steering committee will also:

- Determine sub-committee membership
- Set timetables for sub-committee performance
- Review progress of sub-committees
- Resolve conflicts
- Ensure planning continuity
- Review and approve sub-committee recommendations
- Approve the final plan

a. ***Suggested Actions to Appoint a Steering Committee***

1. Determine the composition and appoint members to a steering committee. The size of the steering committee is a command prerogative. However to simplify management control, it is recommended that the committee be limited to one chairman and no more than six top level management personnel.

2. Conduct an initial meeting of the steering committee to orient members concerning the purpose of the committee. Task members to determine the composition of sub-committees.

b. ***Suggested Assignments to Appoint a Steering Committee***

1. Executive Officer: determine steering committee membership. For NSC Oakland it is recommended that the Planning Officer or the Executive Officer chair the Steering Committee. Members of the Steering Committee could include the Director of the Comptroller Department, the Director of the Data Processing Department, the Director of the Inventory Control Department, the Director of the Regional Contracting Department, the Director of the Physical Distribution Department and the Disaster Preparedness Officer.

3. Establish Criteria for Sub-committee Membership

The size and composition of each sub-committee will be based upon the steering committee's determination of the extent and nature of the requirements to meet the proposed objectives of the overall plan. It is recommended that the number of sub-committees which report directly to the steering committee be limited. As the number of sub-committees increases, the level of human resources which they consume will also increase. Initially, it is only necessary to assign sub-committees to broad areas. If further decentralization is required, it can be accomplished by the sub-committees themselves.

For these reasons, it is recommended that only one sub-committee be assigned to each phase of the natural disaster; i.e; one sub-committee will address issues relating to the Planning Phase, a different sub-committee will be concerned with the Preparation Phase, a third sub-committee will be responsible for the Execution Phase, and the fourth sub-committee will confront the problems posed by the Recovery Phase.

Each sub-committee should be chaired by an individual who has considerable knowledge regarding the categories which comprise the phase to which he is assigned responsibility. It is important that his rank or status permit him adequate authority to direct sub-committee members as well as to

communicate on equal footing with other committee chairmen.

The matter of rank is a significant point. Membership to these committees is likely to be a collateral assignment. A sub-committee chairman may be in a position of directing individuals who have other, primary duties. It is likely that some of his members may not be within his usual sphere of influence. He must be sensitive to these considerations, but have enough rank to enlist the cooperation of the members in meeting the committee's goals. Therefore, it is recommended that the chairmen of various sub-committees be at least a GS-12 or the associated military equivalent.

As previously mentioned, an appointment as chairmen to sub-committee is expected to be a collateral duty assignment. There are two recommended exceptions. One individual from the Planning Department should serve in a primary capacity as an administrative advisor at sub-committee meetings and coordinator for sub-committee inputs. The Disaster Preparedness Coordinator should serve as a technical advisor to the various sub-committee chairmen.

Membership in the sub-committees should be restricted to those with ability in the subject area as well as general availability to the enterprise. It may be necessary and desirable to modify sub-committee membership during the course of plan development. Sub-committee members should be aware of this. Members may also be assigned to more than one

sub-committee. An overlap of membership may even assist in insuring better coordination between sub-committees.

4. Forming Categories and Assignments Within the Sub-committee

In order to delineate assignments and responsibilities within a sub-committee, it is helpful to employ a process which identifies and isolates separate categories which reflect a purpose. This step is among the most critical to plan initiation. A "category" in this context refers to a number of tasks which are related and grouped according to their ability to meet a unique need. The need may be to do research and provide information, or it may include the additional step of actually providing a proposal which solves a problem. This rationale implies two basic methods which can be used to group tasks to form a functional category.

a. The Homogeneous, Functional Category

A useful convention is to group together tasks that fall within the normal responsibility of an existing organizational component. For example, all tasks which can be accomplished by the office of the staff civil engineer would be grouped together. Assessing the structural soundness of buildings, measuring the susceptibility of these structures to a projected threat, proposing designs to upgrade the buildings and estimating costs of the upgrade might all be considered tasks which comprise a relatively homogeneous functional

category. The category, itself, might be labeled as "vulnerability of existing structures."

This convention is convenient as well as practical. It permits an organizational component to focus almost entirely upon specific planning areas which it knows best. The resources and chain of command do not have to be altered significantly to accomplish the objectives. Therefore, information can be obtained quickly.

Unfortunately, in many instances, forcing tasks to fit a relatively homogeneous functional category may inadvertently constrain the type of vital data that can be obtained and delay or hamper the final decision making process. The information provided by the Staff Civil Engineer still has to be compared to information from other sources to answer pertinent questions such as:

- Which buildings do we improve first?

Which leads to...

- Which buildings provide the most important functions?
- How much money is available for these improvements?

It is likely that most organizational activities, acting independently, can only provide reliable data or information from their own perspective. To answer the previous questions they have to either make broad assumptions about the command or invest considerable time developing

expertise outside of their functional category. Given parochial or conflicting opinions about mission priorities and the dynamic budget climate, the decisions made may be erroneous or incomplete. The overall plan could be better served by expanding the scope of a category to provide a forum for solving a problem rather than merely providing data.

For example, an engineer may propose concentrating the command's financial resources into correcting deficiencies in the structure most susceptible to a specific natural disaster. He may not be fully aware of such specifics as to the structure's relative importance to the mission or the long term budget forecast for the command.

b. Grouping Tasks to Form Categories Which Solve Problems

A more useful approach than the homogeneous functional category is to structure categories such that their outcomes actually render specific proposals to solve problems. Tasks are grouped according to their utility in solving a particular problem. This suggests that a sub-committee be comprised of individuals with different areas of expertise.

In the last example the category could, instead, be described as "development of a proposal to mitigate structural deficiencies which are deemed to have the greatest impact upon the command's mission." Certainly, the office of the command's staff civil engineer would continue to play a

significant role. However, to discriminate between the relative importance of various facets of the command's mission requires input from and, probably, active representation by major departments. The Comptroller Department would provide valuable and timely information regarding projected funding resources and availability.

The resulting mitigation proposal should reflect a combination of interests whose varied concerns have been confronted, weighed and negotiated. It should be noted that the sub-committee responsible for this category may elect to provide more then one proposal for consideration by the steering committee. In any case, the steering committee is now in a position to decide upon a proposal(s) whose assumptions and merits have been subjected to a broader base of expertise as well as competing interests. The category was deliberately constructed to provide an outcome which not only supplies information, but solves a portion of the overall planning problem.

The determination of specific goals to be achieved within each of the phases (Planning, Preparation, Execution and Recovery) and the associated tasks required to attain the goals, will ultimately govern the selection of specific categories which can best serve the overall plan.

c. Suggested Actions to Form Categories and Assignments within the Sub-committee

1. Derive tasks which meet the objectives to be achieved by the plan.

2. Group related tasks into functional categories. Structure each functional category, such that the outcome renders a proposal(s) which helps meet some portion of the overall objective.

3. Formulate separate sub-committees based upon the required characteristics of the functional categories.

d. Suggested Assignments to Form Categories and Assignments within the Sub-committee

1. Planning Officer: Based upon recommendations of this study and comments from the Disaster Preparedness Officer, submit a list of functional categories tailored to the activity to the steering committee for discussion and approval. The final list will form the basis of the disaster plan.

5. Define Responsibilities of Sub-committees

Sub-committees will undertake the actual formulation of the natural disaster plan. A common understanding of the scope, assumptions, plan direction and format is a necessary pre-requisite for continuity of purpose and coordination of efforts.

a. Suggested Actions to Define Responsibilities of Sub-committees

1. Determine the number and composition of sub-committees.

2. Appoint a chairman of each sub-committee.

3. Assign a clerk typist or secretary to each sub-committee.

b. Suggested Assignments to Define Responsibilities of Sub-committees

1. Disaster Preparedness Officer: Sub-committee technical advisor
2. Planning Department Representative: Sub-committee administrative advisor and coordinator.
3. Sub-committee members and chairmen: to be determined

6. Define the Plan's Format

This step concludes the initiation of the planning process. All elements necessary to commence planning have been defined and the command is ready to move into actual plan formulation. Prior to actual tasking, a plan format should be established by the steering committee. Consideration must be given to:

- practical application (developing a specific plan for a specific disaster that has a medium to high probability of occurring);
- "user friendliness" of the documentation;
- ease of updating;
- elimination of the need to refer to other instructions or publications when reading the plan; and
- the use of simple concepts and checklists to evaluate progress.

The consolidating of various types of disasters into a single planning publication is a common format mistake. When a specific disaster strikes, such combined publications are too complex and unwieldy to be useful. Responsibilities

are not clearly defined, major areas are inadequately discussed or not discussed at all, references (if listed) are not always available, alternatives are not discussed, etc. Restricting each planning document to a specific disaster scenario and the selection of a proper format can eliminate or reduce these types of problems. To facilitate a functional disaster plan, standard military instructional formatting is not a requirement, nor is it recommended. A suggested format for disaster plans is discussed in Chapter VIII.

a. *Suggested Actions to Define the Plan's Format*

1. Develop a modular format for the natural disaster plan based on the phases discussed in this study. Although the concepts and development are closely interrelated, each module should be capable of being independent of other sections.

2. A recommended format outline (see Chapter VIII) should be provided to each sub-committee chairman.

b. *Suggested Assignments to Define the Plan's Format*

1. Planning Department: Develop a generalized plan format (see Chapter VIII) and provide an outline model for use by sub-committees for input submission.

III. PLANNING PHASE: PLAN DEVELOPMENT

A. PHASE DEFINITIONS

A comprehensive plan is developed to address the identifiable aspects of each phase of the disaster management process. The process which attempts to mitigate the hazards imposed by a natural disaster consists of at least four major phases which may each contain sub-phases or stages. The following is a brief discussion of the four phases:

1. Planning Phase

This phase involves the planning of programs and actions to be developed in the short term and long term before the occurrence of an event. It includes measures that will reduce overall loss, costs, and mission impairment. Accomplished in a non-emergency environment, this phase affords management the flexibility to plan for actions which:

- minimize structural and nonstructural damage;
- assess risks and vulnerability;
- set command priorities;
- establish standard operating procedures;
- educate members of the organization; and
- drill members of the organization in immediate disaster response actions.

The purpose of the Planning Phase is to answer the following questions:

1. What is the risk?
2. How vulnerable is the command?
3. What is to be done when the disaster strikes?
4. Who is responsible for doing it?
5. When should the action be completed?
6. What follow-up actions are required?

2. Preparation Phase

In this phase the actual requirements identified during the plan development stage of the Planning Phase are implemented. This is an action oriented phase. It includes actual procurement of materials, correction of structural and nonstructural hazards, assignment of personnel, the actual writing and distribution of a complete planning document and the writing and distribution of emergency procedures guides. The purpose of this phase is to ensure that issues, policies and priorities identified in plan development are carried out.

3. Execution Phase

This is a two stage phase. It consists of a period of transition followed by a second stage in which full response efforts to the disaster are undertaken. During the Execution Phase, the command applies those facets of its plan which permit direct, efficient and effective action to minimize injuries, protect property, and save lives. The interval of

the Execution Phase spans a duration which begins the moment that it is known that a disaster is imminent or has occurred. The phase continues through an evolution of emergency action efforts. There may not be a clear demarkation between the end of the Execution Phase and the beginning of the next phase, Recovery. Recovery begins when it is clear that the preponderance of danger to personnel and to facilities has passed.

a. ***Execution Phase: Transition Stage***

Much of the damage and loss attributed to a natural disaster, especially an earthquake, occurs in the first moments of the event. As buildings collapse, gas and water lines rupture, and fires begin, it is critical that a full and calculated response effort be undertaken quickly. Any delay or an ineffective response can dramatically increase the extent of damage and loss.

Because it plays such a critical role in setting up actions which follow, the transition stage is emphasized here as a separate component. Transitioning comprises those processes and actions which move the command from a routine operational posture into full scale emergency response.

The catalyst which begins transition action is highly dependent upon the availability and recognition of a mechanism(s) which triggers either warnings that a disaster is imminent or that a disaster has struck. Locations which are

prone to hurricanes or typhoons may have warnings several hours or even days in advance. An earthquake, however, may give little or no immediate warning concerning its approach or level of intensity. Therefore, it is important that the transition stage be carefully planned and rehearsed.

b. Execution Phase: Emergency Action Stage

This stage encompasses the procedures and actions taken in the first hours and days following the occurrence of a disaster. After establishing an organization dedicated specifically to emergency response, planning efforts should concentrate primarily upon processes which enable useful information to flow between decision makers.

4. Recovery Phase

This phase includes actions taken after a disaster to restore operations to normal levels. Actions should commence as soon as possible after a natural disaster. The completion of this phase is contingent upon the severity of disaster and the availability of resources to correct the damage. In some cases, it may be years or even decades before total restoration is complete.

B. PLANNING PHASE

The following major functions are included in the Planning Phase:

- Risk Assessment and Hazard Analysis

- Establish Command Priorities
- Vulnerability Assessment
- Formulate an Organization Dedicated Specifically to Disaster Response
- Provide for Logistic Requirements
- Personnel Considerations
- Communication Considerations
- Transportation Considerations

C. RISK ASSESSMENT AND HAZARD ANALYSIS

Regarding natural disasters, an activity must ask itself:

- What sort(s) of natural disaster(s) is the command most likely to be subjected?
- How often do these natural disasters occur?
- What is the expected intensity or magnitude of each occurrence?
- If such a disaster strikes, what general characteristics are likely to be exhibited?

To determine the effect of a natural disaster upon a command, the risk of a disaster occurring and an analysis of the potential outcomes of the disaster must be established.

1. Risk Assessment

Risk assessment determines the susceptibility of the command to a <u>specific</u> type of natural disaster and its expected magnitude. In this process, the organization estimates the frequency that disasters occur during a specified period of time. If probabilities for a natural

disaster and their expected magnitudes or intensities can be established, the command can begin to set a direction to modify the effects of the outcome.

Primarily, geographical location determines the command's level of risk. For example, NSC Charleston is prone to earthquakes, hurricanes, and flooding. In this case, three separate risk assessments should be performed. NSC Oakland is subject to earthquakes. NSC Oakland may also be susceptible to the risk of flood and tidal action [Ref. 13].

Risk assessment for a major earthquake is determined from seismic risk. Seismic risk is based upon geographical location in one of the five uniform building code seismic zones. Zone 4 has the highest probability of an earthquake. Zone 0 had the lowest probability. [Ref. 14]

For example, the Naval Supply Center, Oakland is located in Zone 4. The Naval Supply Center, Charleston is located in Zone 3. In Zone 4, the highest or worst seismic zone, the command must plan for an earthquake of the most severe intensity. In Zone 3, the command should plan for an earthquake of a moderate level of intensity.

Earthquake intensity is measured by seismologists using the Modified Mercalli Intensity (MMI) scale. For public information, the term "magnitude" is used more frequently than "intensity" as an earthquake measure. The most common magnitude scale is the Richter scale. In performing a risk

assessment for earthquakes either scale may be used as long as the command is consistent in the scale used.

The probability of an earthquake of a specific intensity occurring in the Bay Area is documented in publications such as, A Review of Probabilistic Long-term Forecasts for Major Earthquakes in the San Francisco Bay Region [Ref. 15].

2. Hazard Analysis

A hazard analysis estimates the damage that would be caused by a particular disaster, given the command's present state of preparation. In this activity, the organization tries to estimate the result of a specific disaster given that it happens. Hazard analysis must consider both primary and secondary effects of each type of natural disaster.

A hazard analysis can assist the command in determining its vulnerability to the various types of natural disasters. This will enable management to make conscientious decisions concerning direction, policy and priorities for planning.

A comprehensive hazard analysis is usually beyond the capabilities of the command to accomplish. It generally requires the assistance of trained professionals. Federal agencies, local governmental offices, and commercial activities exist that can accomplish hazard analyses either at no cost or at minimum cost to the command. For instance, the

Naval Engineering Facilities Command (NEFC) conducts hazard analysis for Naval shore installations.

3. Maximizing Planning Efforts

A mistake common to planning is to focus management efforts on the natural disaster which occurs most frequently. However, this specific natural disaster may not pose the greatest threat in terms of loss of life, mission impairment, or facility damage. Management must examine all types of disaster risks and gauge their relative effects in order to set planning priorities. Two elements should be used to set planning priorities between disaster types:

- Probability of occurrence of the disaster
- Level of damage, given that the disaster occurs

While earthquakes represent NSC Oakland's primary threat, NSC Charleston must weigh the risk of an earthquake against the risk of a hurricane or severe flooding. Planning should address each type of disaster separately. However, planning priorities should be determined using a combination of probability of occurrence and level of damage.

4. Suggested Actions to Assess Risk and Analyze Hazards

1. Determine the types of natural disasters to which the command is susceptible based on geographic location.
2. Determine probabilistic frequency and intensity.
3. Conduct a site-specific hazard analysis for each type of possible natural disaster.

4. Compare hazard analyses to establish planning priorities between disaster types.

5. Suggested Assignments to Assess Risk and Analyze Hazards

1. Disaster Preparedness Officer: determine command susceptibility to natural disasters. Submit requests for hazard analysis using Department of Defense activities, Federal agencies, or commercial activities. Requests should be coordinated through the command's supporting public works activity.

2. Comptroller Department: if hazard analysis is to be performed through commercial sources, program necessary funding. If hazard analysis is to be performed by other Department of Defense (DoD) or other federal activities, formulate support agreements and reimbursable job orders.

3. Regional Contracting Department: if hazard analysis is to be performed through commercial sources, prepare solicitation documentation and prepare contracts.

D. ESTABLISHING COMMAND PRIORITIES

Establishing command priorities entails a process of choosing between alternatives. Selections are based on the relative importance of each alternative to the command.

The question, "What is most important to the command?" has resounding implications in each phase of the disaster planning and response effort. Its answer implies a sense of direction as well as a system which identifies and prioritizes competing alternatives. Too often, the answer to this question points to some sweeping generalization directed at "mission" or "people." Even when a given priority is announced, there is

often a presumption that its description has the same meaning to everyone.

The organization must determine which of its missions is most important. By emphasizing and defending this primary mission, however, have other missions been disregarded or rendered more vulnerable to the effects of a disaster? Should missions be defended at the expense of human life? Within the context of a disaster, it is important that these issues are deliberately confronted and explored before a disaster strikes.

Disaster plans may fail in their execution because they are too general in scope and application. A command's strategy which does not adequately reflect its goals and priorities contributes to vague generalities in the planning process. A planning process which is unclear will exhibit weaknesses in direction and application which may not surface until periods of crisis.

Without clear direction, a crisis situation can be rendered completely unmanageable. During the Emergency Action Stage of the Execution Phase an immediate question that arises is, "What or who do we save first?" This implies that constrained resources preclude an effort to save everything. Delays or confusion in answering this question can produce tragic consequences. During the Recovery Phase, an activity will have to decide which operations to re-establish immediately and which can be restored later. The Planning

Phase provides a forum for addressing these issues before a disaster strikes.

Risk assessment provides the probability and expected intensity of each type of disaster occurrence. The command is now in position to set a planning direction based upon the forecasted outcome of the risk assessment. This direction will determine the expenditure of large quantities of resources. Given a finite level of resources, it is safe to conclude that complete immunity from the effects of disasters is not a realistic expectation. However, mitigation of the effects of a disaster through a focused, planned effort is still feasible.

Given an environment of constrained resources, the command will have to decide fundamental issues based upon some criteria which reflects the command's sense of relative importance. The notion of choosing between alternatives implies an active process of discrimination. The rationale that the command uses to make its choices should be identifiable, clear and consistent. The basis upon which these choices rest plays a fundamental role throughout the Planning Phase as well as during subsequent phases.

During the Preparation Phase, within the context of constrained resources, the simple question, "What should be fixed first?" provokes further inquiry concerning the basis for a discriminatory rationale. The rationale may be approached from several different perspectives. Given a

forecasted threat, the command may choose to defend any one or a combination of the following basic issues:

- The mission(s): primary and/or secondary
- Inputs and outputs
- Customers
- People

It should be noted that these basic issues are difficult to isolate. They are not mutually exclusive. Certainly, a command's mission can be tied to its customers, its inputs and outputs, and its personnel. However, each issue represents a starting point in discerning the relationships between alternatives and their importance to the command.

Settling upon a basis for differentiating between options, begins a process of command introspection. If "mission" is selected as a fundamental criteria of a system of priorities, some of the questions which are likely to follow are:

- What is the central mission?
- Is there more than one mission?
- Which mission is the most important?
- By defending one mission, are other missions imperiled?

None of these questions are easy to answer. The same questions can be asked of any of the other issues, such as "customers" or "people," if they are substituted as a basic criterion in place of mission.

The most significant limitation to using mission accomplishment as the primary criterion on which to base a system of priorities, is that it does not consider the value of the loss of human life. Neither should the command presume that the protection of lives is a fundamental issue of priority unless it is emphasized.

The notions of direction and ordered precedence are central to a command's philosophy. However, they are grounded in the over-riding practical implications of a limited resource environment. Yet, the question, "What is most important?," must be answered deliberately and in detail to continue the planning process.

1. Suggested Actions to Establish Command Priorities

1. Define and select criteria for setting planning priorities. If more than one criterion is used, a precedence must be established.
2. Determine the level of resources to be dedicated to the planning effort.
3. Determine the intensity of the natural disaster scenario which the plan should address ("worst case" scenario or most likely scenario).

2. Suggested Assignments to Establish Command Priorities

1. Commanding Officer

E. VULNERABILITY ASSESSMENT

This task poses the question, " How vulnerable or exposed is the command, if a disaster strikes?" Based on the risk assessment, hazard analysis and command priorities, the

command must determine its vulnerability to the potential threat of a natural disaster. The vulnerability assessment indicates which elements of the command need to be defended against the potential effects of the natural disaster.

Vulnerability should be determined based on the maximum expected intensity of the natural disaster. Unless otherwise stated, the concept of maximum expected intensity will be referred to as a "worse case" scenario.

To determine vulnerability, one approach that the command may take is expressed in the following steps:

- Step 1: Inventory all structures in the command.
- Step 2: Determine a formula or method to evaluate the relative vulnerability of each structure to the hazard.
- Step 3: Determine and rank functions that are most critical to completion of the command's mission (or other criteria selected when establishing the command's priority).
- Step 4: Develop a formula or method to combine assessments of structure vulnerability and criticality to the mission (or other criteria selected when establishing command priority) to derive a ranking protocol.
- Step 5: Prepare summary matrix for each natural disaster to describe and integrate the structures' ranking in terms of mission importance and vulnerability to the disaster.

1. **Step 1: Inventory All Structures in the Command.**

All physical structures which belong to the command, both owned and leased, should be inventoried and categorized. The categories should include the type of structure, primary use, the geologic materials underlying the site and the age of

the structure. It should be noted that structures may or may not be considered buildings. Examples of structures that are not buildings are: fences; docks; bridges; power distribution networks; sewage treatment plants; etc. All types of structures need to be inventoried and assessed for vulnerability.

Some common types of structural materials used to build structures are:

- Un-reinforced masonry
- Tilt up concrete
- Reinforced concrete
- Reinforced masonry
- Steel frame
- Wood frame
- Light metal

Examples of common structure uses are:

- Warehousing or material stowage
- Office or administrative space
- Protection of production equipment or machinery

Geologic materials underlying the site (foundation) of structures include:

- Bedrock
- Silt

- Sand
- Landfill

The age of the structure can assist in determining the applicable building codes in effect at the time of building construction, as well as the probable methods of construction, and assessment of condition.

The type of structure, materials used in its construction, the geologic materials underlying the site and the age of the building all contribute to the structure's performance when subjected to seismic forces. The following statement describes the significance of earthquake forces on structures:

> Earthquake forces result from the shaking of the ground on which the structure is supported. Although the ground vibrates both vertically and horizontally, it is customary to neglect the vertical components of the shaking since most structures have considerable excess strength in this direction due to safety factor requirements. The critical earthquake forces are horizontal forces, similar to wind except that they are based on the weight of the building rather than the 'sail area' to the wind and are generally much larger. A major factor in earthquake-resistant design is that the forces are so large that they cannot be dealt with elastically (like vertical loads) but must rely on the ductility (or toughness) of the material and its connections to yield and still remain stable. [Ref. 16]

a. *Suggested Actions to Inventory Structures*

1. Inventory and categorize by characteristics, all structures used by command personnel.

b. Suggested Assignment to Inventory Structures

1. Staff Civil Engineer

2. Step 2: Determine Formula/ Method to Evaluate the Relative Vulnerability of Each Structure to the Disaster

a. Terms

(1) Structural Components

The portions of a structure that bear loads and hold it up are called structural components. Structural components resist gravity, and natural elements such as wind and rain. Examples of structural portions of buildings are: columns (posts, pillars); beams (girders, joists); floor or roof sheathing; slabs or decking; load-bearing walls (or walls designed to hold up the building rather than merely divide up space or keep out the elements); and foundations. Most of the structure of a typical building is concealed from view by nonstructural materials. [Ref. 14:p. 1]

(2) Non-structural Components

The nonstructural portions of a building include every part of it and all of its contents with the exception of the structure, or in other words, everything except the columns, floors, beams, etc. Common nonstructural items include ceilings, windows, office equipment, computers, inventory stored on shelves, files, air conditioners, electrical equipment, furnishings, lights, etc. [Ref. 14:p. 1]

b. *Discussion*

Using the results of the hazard analysis, evaluate each structure to determine the types and levels of damage that each is likely to sustain. The evaluation should consider the probability of both structural and non-structural damage. Because of the complexity of this evaluation, the use of architectural-engineering consultants is recommended. In most cases, evaluation of the structure can be completed off-site by providing blueprints of existing structures. Evaluation of a non-structural component should be accomplished by an on-site inspection. The following publications can assist in determining probable damage to structures due to earthquakes in the San Francisco Bay Area: On Shaky Ground [Ref. 17], and Reducing The Risks of Nonstructural Earthquake Damage: A Practical Guide, Second Edition [Ref. 14].

Concurrent with the site evaluation, it is recommended that the survey be used to determine countermeasures or mitigating actions (to prevent structural or nonstructural damage) and to estimate the associated costs necessary to upgrade both structural and nonstructural components. Countermeasures could include equipment anchorage, restraint, building reinforcement or other retrofit measures to reduce the building's vulnerability.

A listing of recommended countermeasures will provide valuable information needed in considering efforts to

mitigate the potential damage to facilities and reduce casualties to personnel. Additionally, an enumeration of the estimated costs of installing countermeasures will enable the command to conduct a cost/benefit analysis. When the survey is complete, a ranking or protocol of building vulnerability should be established.

c. Naval Facilities Engineering Command

The Naval Facilities Engineering Command (NFEC) provides structural and nonstructural vulnerability assessments for Navy shore installations. Activities that do not possess records of these assessments, or if updated assessments are desired, should request them from NFEC.

d. Suggested Actions to Evaluate the Relative Vulnerability of Structures

1. Check whether prior records concerning structural and nonstructural vulnerability assessments exist. If not, determine the structural and non-structural vulnerability for each building. Assistance for NSC Oakland can be obtained through the Naval Facilities Engineering Command P.O. Box 727, San Bruno, Ca 94066, (415) 877-7340.

2. Rank buildings based upon their comparative degree of vulnerability.

e. Suggested Assignment to Evaluate the Relative Vulnerability of Structures

1. Staff Civil Engineer

3. Step 3: Determine Functions Most Critical to the Command's Mission Over a Specified Period of Time

This step ranks the relative contribution of each functional activity to the command's mission over a specified time period. "Mission" is assumed here as the primary element upon which command priorities are based. However, other criterion, such as customers or personnel, may be selected by the command as its fundamental basis for priority ranking. The basic functions performed by the command are determined from the command's organizational chart.

The perspective of time is a secondary aspect which may be used to assist in discriminating between short term contributions to the overall mission. The duration of time that a command can sustain itself without the benefit of an established organizational component, is a measure of that component's time weighted utility. The period considers the consequences imposed by a duration of possible non-performance or impaired performance of the function due to the effects of a natural disaster.

The notion of time creates a unique perspective for distinguishing the relative importance and relationships of major command functions. For example, there is little argument that the Planning Department is vital to the command in the long term. However, if this department is closed for two days, the command could still carry out many aspects of its primary mission. If the Planning Department is closed for

two weeks, its contribution would be missed, but the overall command could sustain itself. The accumulated backlog created by the closure would be substantial, but not crippling. If Planning is closed for two months, the effect upon the command would be significant and long lasting.

A common time period bench mark must be established to make comparisons which weigh the contributions of organizational functions. Regarding natural disasters, and earthquakes in particular, short term contributions are of primary concern. A 30 day time period provides a useful perspective for indicating which functions are absolutely germane in sustaining the command during and immediately after a disaster strikes. Accordingly, functions should be ranked with respect to their ability to contribute directly to the primary mission(s) during the first 30 days.

This ranking emphasizes those functions which require the most protection from the effects of a natural disaster. The first part of this step is to rank each command function. When completed, the actual number of locations where the function is performed must be determined, and what percent of the function is performed at each site. When making this determination, the feasibility of temporarily relocating the function during the 30 day window must be considered.

For example, it is extremely difficult to relocate a computer center. Conversely, the relocation of an administrative function, such as inventory control, to a

portion of the base which is undamaged may prove to be a reasonable, temporary alternative during a thirty day period. The two functions may have of the same relevant importance to the command's mission. However, it is logical to place greater emphasis on protecting the structure which houses the Data Processing Department because it cannot be easily relocated in the 30 day period.

In step 4, it will be necessary to combine this information with the building vulnerability analysis, which was performed in step 2. The information will have to be used to calculate the total functional contribution of each structure. For some structures, this is relatively simple since one and only one function is performed within the structure.

For those buildings containing more than one function or for a function that is performed in multiple locations, the task will be more difficult. To simplify matters, the evaluation criteria can be eased by roughly approximating each building's percentage contribution to the mission.

a. ***Suggested Actions to Determine which Functions are Most Critical to the Command's Mission Over a Specified Period of Time***

1. Using a 30 day window as an operating period, rank the importance of the major functions which are performed by the command (in support of the mission or other criterion used as a basis).

2. Based upon this priority ranking, determine the functional value of each building.

b. *Suggested Assignments to Determine which Functions Are Most Critical to the Command's Mission Over a Specified Period of Time*

1. Commanding Officer and/or Executive Officer: determine basis of system of priorities.

2. Planning Department: determine each building's functional value

3. Steering Committee: review and approve the work performed by the Planning Department to ensure that it is in consonance with the Commanding Officer's functional ranking.

4. Step 4: Derive a Ranking Protocol which Combines Assessments of Building Vulnerability and Critical Importance to Mission

This step consummates the efforts of the prior steps. Its purpose is to:

- provide the command a method for reviewing its physical assets;
- determine the susceptibility of the physical assets to the effects of a natural disaster; and to
- rank the relative contribution of the physical assets to the command's mission.

The final product of this step will enable the command to answer the following questions:

- What is the risk to the command of a specific natural disaster occurring?

- How vulnerable is the command's mission (or other criterion) to the risk?
- The outcome also lays the groundwork for determining: what is to be done to reduce structural and nonstructural hazards?

The accumulated information should be presented in spreadsheet format. This data will change as mitigation efforts are completed during the Preparation Phase. Data and ranking should be updated periodically. For planning purposes, Table III provides a suggested format for vulnerability assessment. All data presented below is fictitious.

TABLE III
VULNERABILITY ASSESSMENT

Type of disaster: Earthquake
Probability of occurrence in the next 20 years: 30%
Planning Intensity : Magnitude 7.0 or Greater

FUNCTION	BLDGS	VULNERABILITY: STRUCTURAL	VULNERABILITY: NONSTRUCTURAL
Physical Distribution	Nistars	Medium	High

(continued)

CONTRIBUTION TO MISSION	OVERALL RANKING
23% *	2

* Note: This represents a contribution of 23% to the command's overall mission (not just to the mission of physical distribution). The sum of all buildings under the cognizance of the Physical Distribution Department represents a total contribution of 76% to the command's mission.

(continued)

STRUCTURAL FACTORS CONTRIBUTING TO VULNERABILITY RANKING	NONSTRUCTURAL FACTORS CONTRIBUTING TO VULNERABILITY RANKING
foundation: landfill, subject to liquefaction	tall shelving not secured by earthquake restraints, electrical equipment not properly braced, etc.

(continued)

ESTIMATED DAMAGE	ESTIMATED RECOVERY TIME
Cracked foundation, Nistars rail distortion, displaced inventory, electrical systems disconnected, computer system disabled and partially destroyed, loss of life probable	Existing Vulnerability structural- 90 days nonstructural - 120 days Upgraded Vulnerability structural- 45 days nonstructural-90 days

(continued)

RECOMMENDED COUNTERMEASURES	ESTIMATED COSTS & FUNDING
Short term..... Long term.....	$$$ O&M,N $$$ OPN $$$ MILCON

a. Suggested Actions to Derive a Ranking Protocol for Structures

1. Rank all structures based on vulnerability to risk and importance to the command's mission (or other criterion selected in setting command priority).

2. Consolidate and present data in an easily understandable format.

b. Suggested Assignments to Derive a Ranking Protocol for Structures

1. Planning Department and Staff Civil Engineer

5. Step 5: Prepare a Summary Matrix that Integrates a Structure's Contribution to Mission with Its Vulnerability to a Disaster

When confronted with the possibility of more than one disaster, it may be helpful to use a matrix that compares a structure's contribution to mission to the level of damage that can be sustained under different "worst case" scenarios. This will assist decision makers in allocating resources to upgrade the most important structures first. Table IV summarizes information derived in Step 4:

TABLE IV
VULNERABILITY TABLE ACCOMMODATING TWO OR MORE NATURAL DISASTERS

Importance To Command Mission	Vulnerability Category: Total Destruction	High	Medium
1. NISTARS Bldg. 422		E *	
2. Gate 1 Overpass	E		
3. Data Processing Bldg. 311		E/F	

(continued)

Vulnerability Category: Minor	Very Minor	None	Overall ** Appraisal
F			medium
		F	medium
			high

* E = Earthquake, F = Flood
** Overall Appraisal may be weighted based on expected probability and intensity of each type of disaster.

As structure upgrades are completed and the vulnerability of a structure is reduced, the matrix should be revised.

a. Suggested Actions to Develop Summary Matrix

1. Using vulnerability assessments for various natural disasters and structures' contribution to mission, prepare a summary matrix.

2. Use the summary matrix to assist in allocating resources to ensure that mitigation efforts are properly prioritized.

b. Suggested Assignments to Develop Summary Matrix

1. Staff Civil Engineer and Planning Officer: prepare summary matrix.
2. Steering Committee: Review and approve the summary matrix.

F. FORMULATE A DISASTER ORGANIZATION

This planning task answers the question, "Who is going to respond to the disaster once it strikes?" The answer must be more than a simple confirmation of the command's organization chart and established chain of command. A complete disaster response organization must be designed which is based on the type of disaster and delineates specific responsibility for disaster response and recovery efforts. The organizational relationships in the disaster organization should facilitate the flow of information between primary decision makers. Some natural disasters, such as the approach of a hurricane, allow management the time to make organizational re-alignments. Other disasters do not afford management this opportunity. The disaster organization represents the transformation of command priorities and resources into specific responsibilities for emergency response actions.

Typically, military organizations are functionally organized to accomplish routine assignments and missions. Naval Supply Centers are no exception to this. All supply centers are organizationally configured to approximate the

same functional arrangement. This functional organization is well suited when:

- a stable environment exists;
- there is a need to foster development of expertise; and
- the mission requires relatively little internal coordination.

During a disaster there are disadvantages to this type of standard organization. The routine, and thus the organization, is abruptly disrupted. The effects of the event appear as random, rapidly changing and disruptive manifestations. Therefore, they cannot be dealt with in the same way as a predicted routine. Command priorities may change significantly. This fosters conflicts between competing interests or stake holders. In the confusion, responsibilities may change substantially or be unclear. The result is a significant delay in a coordinated and effective response effort. Established priorities, clearly delineated responsibilities, and a dedicated rehearsal effort are three important facets which contribute to a reduced disaster response time.

Several findings in the 17 October 1989 Loma Prieta Earthquake After Action Report, revealed that many shore establishments were not prepared to immediately respond to the disaster [Ref. 1]. This may indicate that organizations have difficulty in realigning their functional organizations to

deal effectively with a significant, and organizationally disruptive emergency. As a comparison, the shipboard organization and municipal planning organizations are discussed to gain insight to various methods of rapid organizational transformations.

1. **The Shipboard Example**

Shipboard organizations have a uniquely refined organizational transformation process. At the first indication of an actual emergency or the development of actions that could lead to an emergency, a ship immediately proceeds to "general quarters." This action abruptly alters the routine, functional organization of a ship into a new organization to meet the threat. Pre-established functions necessary to cope with a variety of threat scenarios are fully staffed with the most qualified individuals. Redundancy is built into the transformed structure to cope with degradation due to damage or causalities.

A ship can accomplish this organizational transformation is less than five minutes. It can take hours or even days to accomplish a similar transformation at a shore activity that has not planned for this contingency.

Once transformed, the ship is divided into several different sectors. Each sector is manned by its own repair party, led by a repair officer. The members of the repair party typically comprise a nucleus of individuals who have

received specialized technical training in a wide assortment of areas, such as: medicine, electricity, electronics, structural hull mechanics, plumbing, etc. The remainder of the personnel receive generalized training in shipboard fire fighting and flooding as well as cross-training in other specialties to provide redundancy.

Each repair party works from a repair locker which is located within a designated sector. The repair locker contains repair and medical equipment, diagrams of the ship, and communication terminals to enable contact with other primary repair and command elements throughout the ship.

Within each repair party, line and staff relationships are clearly defined to provide an immediate means of succession, should leaders be taken out of action. Each repair party reports to a central authority, Damage Control Central (DCC), which coordinates the efforts of all of the repair parties in combatting the threat. Damage Control Central is manned by the ship's Damage Control Assistant (DCA) who heads a team of technical experts and communicators. If Damage Control Central, itself, sustains damage or casualties, there is a provision to move its location to a predetermined site, usually another repair party. Communications resume, and the line/staff relationships remain intact.

The DCA is charged with maintaining a clear picture of the sustained damage and the progress in combatting the overall threat. He has the authority to direct the efforts of

the repair parties to confront specific damage or to move repair parties into other sectors to assist another repair party. The DCA reports directly to the ship's Captain regarding the status of repair. The Captain maintains overall accountability for the condition of his ship. He has the authority, at any time, to assume control of the repair effort from the DCA or to delegate responsibility for repair efforts to someone other than the DCA.

The shipboard organization and environment embodies unique characteristics which contribute extensively to its ability to ready itself for an emergency. A primary function of a naval ship is to respond to situations which are likely to place it in harm's way. Additionally, a ship knows that its survival is dependent on its own actions. This element, alone, provides a considerable motivation for crew members to know and understand their roles during an emergency.

A ship represents an almost entirely self-sustaining unit. It is purposely outfitted with resources to withstand a certain level of threat. An abundance of real shipboard experience and data exists upon which to base resource levels and emergency action plans.

A ship is a closed community. Access to a ship is rigidly controlled. Even in port, visitors are recorded and closely monitored. In an emergency situation, all personnel can be immediately and precisely accounted for and pressed into action. The nature of a contained environment limits the

nature of external distractions that can impede a response effort. A ship rarely has to contend with media representatives or VIP visits amid a crisis situation.

Crew members live within the confines of the ship and are subjected to a highly disciplined regimen. A ship's crew is governed by the Uniform code of Military Justice (UCMJ), which implies that harsh penalties can be imposed upon crew members who do not follow direct, legal orders. The chain of command is clear and recognizable. Because of this unusual degree of control, a crew can be trained and rehearsed until the procedures are ingrained.

Twenty four hours a day, a designated Officer of the Deck (at sea) or a Command Duty Officer (in port) presides over an organization of watch standers whose primary responsibility is to actively search for any indication of a threat. If a threat is encountered, a recognized alarm is sounded which can be heard in every space throughout the ship.

The facets which enable the routine, shipboard organization to transform itself so rapidly and effectively are:

- primary mission of Navy ships is naval warfare. This mission is easily identified with states of emergency and self-preservation;
- a shared sense of urgency promotes training efforts;
- experience and data exists which are used to provide manning and resource requirements dedicated to addressing a threat environment;

- all personnel are subjected to a disciplined environment with clear lines of authority;
- the commanding officer is ultimately accountable and has considerable latitude to make decisions independently and quickly;
- personnel are assigned specifically to watch for and identify a threat;
- an easily recognized warning system that can be heard throughout the ship; and
- a specific event (coming to "general quarters") triggers the transition from the routine organization to the disaster organization.

2. The Municipal Example

Municipal districts are open communities. Access is not restricted, thus individuals may move freely in and out of communities. Individuals are governed by public laws which emphasize the protection of both individual freedoms and private property.

The sum of community resources may be extensive. They comprise both publicly owned and privately owned assets. However, it is difficult to mobilize these resources quickly and in concert when a disaster strikes. At the center of the dilemma, is whether the public sector has the right to co-opt private assets to combat a public threat. This appears to be a problem which is inherent in a governmental system of elected representatives who are sworn to protect the rights of individual property owners.

Typically, a body of elected and appointed officials preside over public agencies to protect private property and

allocate public resources. A system of checks and balances purposely limits the power and authority of any single individual. This tends to spread authority among a body of community leaders and thus, dilute the accountability of any one leader. Decision making, then, becomes an involved, time consuming and often evolutionary process. It is characterized by negotiated compromises which are designed to appease competing interest groups.

The onset of a natural disaster demands a rapid, directed response. Municipal communities have recognized the need to incorporate a mechanism to ensure such a response. The mechanism must facilitate immediate action, as well as provide adequate time to ready public response agencies, take stock of the overall damage caused by the disaster and arrange for additional resources, if necessary.

A review of several municipal plans reveals a common organizational convention for ensuring a rapid transition to an emergency organization. By pre-arrangement, when an emergency situation is enacted, an emergency operations center (EOC) is established to centrally manage a number of response groups who are headed by separate incident commanders. An incident commander orchestrates all efforts and personnel at a specified disaster site. [Ref. 5] Usually the plan has determined what public resources and personnel are at the immediate disposal of the EOC and incident commanders. Both the chief of the EOC and the incident commanders lead staffs

of individuals who are experts in specific areas. All required skills which are necessary to respond to a natural disaster are already identified and explicitly provided to the municipal disaster organization. Therefore, little cross-training is needed to gain adequate proficiency or provide redundancy of expertise.

In most plans, it is not clear how much authority the emergency operations center can exercise. Generally, the center is permitted broad powers within the stated provisions of a civic plan. In some cases, the EOC chief reports to an established civic body or agency which coordinates overall response efforts with other local and federal agencies. In other instances, the chief of the emergency operations center appears to have the authority to negotiate, on his own, to obtain additional resources, if required.

The incident commander's ability to use private resources against the wishes or without the explicit consent of a private owner is questionable. The threat of personal liability, as well as the protection of individual freedoms play a substantial role in the decision to avoid using private assets. However, the private sector often displays a strong willingness to cooperate.

Echelons above the emergency operations center often comprise a confusing array of public agencies who claim to have authority over some aspect of the response process. This appears to cloud the issue of ultimate accountability for

command and control. Most plans are vague regarding whether the orders issued by the operations center can be usurped by higher authority, such as a mayor, or a federal agency.

The main thrust of these municipal plans is to enable a team(s) of experienced disaster experts to rapidly assemble and respond to an afflicted area(s). The plans appear feasible as long as the destruction remains relatively isolated to specific locations. However, if the scope of the disaster and the associated destruction is widespread, the incident teams and the emergency operations center can easily become overwhelmed.

The open access to civilian communities poses substantial control problems to the EOC and incident commanders. Even under conditions in which the damage is isolated in pockets, an incident commander can become saturated with distractions, information and requirements. The presence of media representatives and various VIP's at local disaster sites demanding information, proved to be a considerable annoyance during the Loma Prieta earthquake. Additionally, the incident commanders had to sort through an influx of volunteers and individuals bearing critical information at the disaster sites. [Ref. 18] The incident commander may not be fully aware of all available resources, or diminished resources outside of his sphere of assignment. The emergency operations center is prone to the same types of problems. Efforts by the EOC chief to obtain

information or additional resources from his superiors is likely to be hampered by a lengthy bureaucratic screening process.

3. Overview of Typical Navy Shore Installations

Most Naval shore installations can be described as hybrids of both the ship and the municipal examples. However, there are also fundamental features that cause Naval shore facilities to be different enough from both examples to be considered unique.

The physical characteristics of a Navy shore installation are very similar to any civilian community. A Navy base may have family housing developments, industrial centers, a police or security force, fire department, retail establishments, churches, recreation facilities, etc. Access to a Navy shore installation is only somewhat restricted. It is much more open than a Navy ship, but significantly less accessible than a civilian community.

Unlike a ship, most military installations, such as supply centers, are not equipped or manned, as a matter of deliberate design, to withstand the effects of a physically damaging, external assault. Supply centers are staffed to maintain continuity of service to its customers throughout periods of ebbing and surging requirements. The physical plant and manpower remain relatively stable. The occurrence of a natural disaster disrupts this stability. Since

resources are not dedicated specifically to a natural disaster response effort, a unique organization must be formulated from within the existing organization to deal with such an event.

Similar to a ship's commander, the shore installation commander is held strictly accountable for all actions which affect his base. The base commander has substantial latitude, in terms of authority, to centrally control the actions of his subordinates and the physical resources that are within his jurisdiction.

A Navy shore installation represents a diverse community of members who are military and civilian. These two categories of personnel have distinctive relationships with the base commander. These unique relationships lead to differences in the approach and the degree of influence that a base commander can exercise over them.

In devising a separate disaster response organization, it is important that individuals who are to assume key roles, are also those personnel over whom the base commander has substantial authority. A majority of a supply center's organizational members are typically civilian, not military. Unlike military members, civilians are not subject to the UCMJ. Therefore, the base commanders can exert more control over the actions of military members who are within his direct chain of command than their civilian counterparts.

Civilian government employees are bound by contractual obligations to fulfill general and specific task descriptions. According to Federal Personnel Manual Supplement 910-1, during emergency situations, civilian government personnel are also compelled to follow legal orders issued by their commanders in support of emergency response efforts. However, the penalty for not following orders issued under these circumstances is possible termination of employment, not fines and/or a prison term.

4. A Proposal of Compromise for NSC Oakland

In formulating an emergency response organization for NSC Oakland, both the municipal example and the ship example provide clues to what is important, in terms of feasibility and survival. A typical shore installation has certain limitations which preclude either example from being used exclusively to design a disaster organization.

The disaster organization must be able to emerge and take action quickly. Personnel involved in the initial response process must already be trained and have intimate knowledge of the geographic location(s) in which they will work. Personnel must also be knowledgeable in a wide assortment of skills. Individuals in positions of authority must have a clear concept of the limits of their control. Additionally, they must be empowered with enough authority to

enable the accomplishment of a wide range of tasks independently.

Lines of authority and succession must remain distinct despite the occurrence of casualties to critical positions. The organization must be designed to facilitate the flow of pertinent information up and down the chain of command. Provisions must be made to relieve on-site decision makers of distractions such as media representatives, VIP's, and inexperienced volunteers.

Several basic functional skills are needed during disaster response efforts to facilitate an accurate evaluation of the damage and effect of a rapid, positive reaction effort. As a minimum, the following broad categories of basic skills must be included as considerations when developing a disaster response organization:

- Rescue and first aid
- Structural and nonstructural damage assessment and repair
- Utilities personnel
- Hazardous material assessment
- Flooding and fire fighting assistance
- Communications
- Transportation

There are three basic methods which can be used to organize a disaster response:

1. Organization strictly along functional skill lines.
2. Organization which groups with a variety of skills to focus on a generalized threat scenario.
3. A combination of both, i.e., certain response groups are organized strictly along functional lines and other response groups may comprise a variety of functional skills.

a. *Organization Strictly Along Functional Skill Lines*

This method may appear to be the most feasible choice since it takes advantage of the existing command relationships and the separation of functional categories inherent in the routine organizational structure. This implies less disruption to the existing organization when disaster training is held. It also permits the use of the established chain of command without appreciably altering the fundamental command relationships.

The first requirement for this alternative is to assign functions required to cope with the disaster to specific codes or offices in the command. Efforts should be made to assign disaster functions to those offices whose mission closely approximates the functions required during a natural disaster scenario. For example, the public affairs office will naturally handle the dissemination of public information during a disaster. This would include addressing concerns of media representatives and visiting dignitaries.

The base fire department would handle fires and flooding. Public works would be directed to those areas requiring the management of utilities.

Functions required that are typically not provided within the routine organization should be assigned to those offices whose services are not needed elsewhere during the disaster. For example, the personnel property office could be tasked with setting up emergency messing and berthing or with providing rudimentary first aid.

After all functions have been assigned, they must be organizationally placed under a central authority who will coordinate and direct their efforts during the disaster. Again, the existing command organization already provides such a structure for command and control. Under this method, the command center would probably comprise the commanding officer and/or the executive officer, the designated disaster preparedness officer and various other individuals whose authority and expertise are deemed critical to the decision making process. If a functional area or even the command center sustains casualties, a clear, recognizable line of succession must exist to maintain command and control.

Despite the apparent convenience of this organizational method, there are several limitations which should be considered. Under this method, the command center is forced to centrally manage every aspect of the response process. Each functional area will have to be directed

individually to attend certain aspects of the response. Each disaster site may require a significantly different type of response effort. If the effects of the disaster are widespread, the functional response teams, themselves, will have to be split between different sites. This allocation process will delay the response effort. Additionally, the control center is likely to become overwhelmed processing information needed to coordinate efforts at a number of disaster sites.

b. Organization which Groups a Variety of Skills to Combat a Generalized Threat

Both the ship example and the public municipal example employ a central authority (damage control central and emergency operations center, respectively) to coordinate the actions of separate response units (repair parties and incident teams, respectively) which are directly involved at local disaster sites. The central coordinating authority and the individual response units are both comprised of individuals with various types of expertise.

A similar solution can be used by the base. The base can be divided geographically into sectors. A response team would be assigned to each sector. Each response team would be drilled intensively to ensure that it has an intimate familiarity with its sector's potential vulnerabilities, transportation and communication paths, and the locations of

all utility and repair facilitates which can be employed in the response effort.

Each response team would be comprised of members with assorted areas of expertise to enable the team to work independently while gathering information and dealing with the damage. Individuals in functional departments, such as public works, would be allotted to the various response teams and the command center. It is important that members of each team conform to a ranking protocol which delineates authority for decision making and eases succession of leadership. This will enable continuous response action even if the team sustains casualties.

All response teams would report to a command center, similar to an EOC or Damage Control Central. The command center would be charged with monitoring the actions of each team and coordinating their efforts to overcome the effects of the overall disaster.

The main limitation to this method is that it requires a great deal of training time. Depending upon the number of teams that are needed, there may not be enough people in the command having a needed skill to place one or more of them on each team. A certain amount of cross-training between individuals in a team is needed to provide an overlap of skills, to raise the level of proficiency for each required skill and to enhance coordination between members.

Ships routinely spend significant time training and cross-training personnel. For a ship, preparing for an emergency response is an integral part of its primary mission. However, for a supply center, frequent and lengthy training of this nature is disruptive to its primary mission(s) as well as costly in terms of lost productivity. As a practical consideration, it may not be feasible for a supply center to routinely devote large blocks of time to training its people in disaster response.

c. Combined Method

This method still employs response teams and a command center to enable an immediate response posture. Aside from those individuals assigned to response teams, there is a reserve of personnel which represent different functional skills that the command center can draw upon to supplement the response teams, where needed. This ready reserve force minimizes the number of personnel with rare skills required on each response team.

For example, although the Public Works Department would have representatives on each team, the main body of the department would be held in reserve to be directed by the command center. The public works member(s) on each team would provide feedback assessments to the command center regarding the extent and nature of the structural and utility damage, as well as request specific support. When the command center

sends reserve public works personnel to the site, they would be directed by the on-site public works representative who is a member of that response team.

A department, such as the Personal Property Department, whose specific functional specialty may not be required during disaster response, could be assigned, as needed, to jobs requiring specialty skills not normally included in the supply center organization. One such skill that will be required is advanced first aid. After receiving specialty training, a representative from the first aid team would be placed on each emergency response team to forward assessments to the command center. Specific backup support would be provided from the main body which is concurrently setting up an aid station.

Some departments could continue to work relatively independently within their functional specialties. The Public Affairs Office (PAO) would be involved in gathering, screening and releasing pertinent information to the public. It would act as a buffer between the command and media representatives, VIP's and concerned citizens. There is little need for public affairs representatives at a disaster site unless media representatives or others are present who may distract the emergency workers. There may be a need for a PAO member at the command center to pass information to the Public Affairs Office and to divert phone calls and questions

concerning public information to the appropriate office for resolution.

The combined disaster organization method has the advantage of keeping command functional relationships relatively intact. As much as possible, members of different departments should find themselves working within their functional specialties and reporting to personnel who are routinely within their chains of command.

This method also minimizes the disruption to the command for disaster training since it does not uproot large numbers of people and scatter them among a number of diverse tasks and unfamiliar reporting relationships. Most training can be scheduled and accomplished separately within a department. The need for mass training, involving the entire command, is substantially decreased. Also, this type of organization decreases the number of essential personnel necessary for initial response efforts. The reduced size of the response teams simplifies mobilization and facilitates a more rapid response.

5. Suggested Actions Leading to the Formulation of a Disaster Organization

1. Determine the most feasible type of Disaster Organization.
2. Determine composition of response teams, EOC and reserve force based on type of disaster organization selected and functions to be performed. Functions are described later in this thesis.

3. Formulate a disaster organizational chart.

4. Select and assign specific coded positions to fill duties required by the disaster response organization.

6. Suggested Assignments Leading to the Formulation of a Disaster Organization

1. Steering Committee: determine most feasible type of disaster organization.

2. Planning Officer and/or Disaster Preparedness Officer: determine composition of disaster response organization.

3. Planning Officer: formulate an organization chart for disaster response.

4. Sub-committees: select and assign specific coded positions to fill duties required by the disaster response organization.

G. LOGISTIC REQUIREMENTS

To successfully cope with natural disasters, planners must thoroughly examine the following:

- Material and Services Considerations
- Personnel Considerations
- Communication Considerations
- Transportation Considerations

1. Material and Service Considerations

The logistic requirements needed to contend with the effects of a natural disaster can be complex and diverse. The problem is often made more difficult by the failure of a command to fully anticipate and prepare for these requirements. Complicating matters further, an increased

demand for disaster related supplies and services from public and private sectors rapidly depletes their availability from normal commercial sources.

Naval organizations are experienced in identifying logistic requirements in support of diverse scenarios and contingencies. The ability to provide and sustain logistic support is rigorously tested in numerous fleet exercises. However, these exercises do not test a supply center's ability to respond when it is the focus of a rapidly changing environment, such as that caused by a natural disaster.

The wide availability of supplies at a Naval Supply Center may contribute to a false sense of logistic security. Supply centers may fail to identify and plan for material requirements that are not carried in stock. In a disaster situation, supply centers may not consider the difficulties in accessing materials which are dispersed widely among several warehouses. The loss of basic utilities and computer systems complicates these problems.

Identification and planning for material and service requirements prior to a disaster will:

- enable management to focus on problems unique to the disaster;
- reduce response and recovery time;
- minimize damage to property;
- contribute to minimizing the loss of life; and
- reduce personnel requirements needed to locate materials.

2. Steps to Consider Regarding Material Support

1. Identify material requirements.

2. Determine the time frame in which material will be required (immediately or several days after the event).

3. Determine the anticipated quantity and costs of material required.

4. Determine whether material is carried or not carried in stock.

5. For material not carried in stock: procure material if it is needed immediately prior to or after a disaster occurs. Because of budget constraints, material may have to be procured over a number of budget cycles. If so, procurement priorities must be established. For material that may be required days after the disaster, skeletonized procurement documents should be prepared identifying sources that are at least 50 miles outside of the anticipated disaster destruction zone. Pre-established Blanket Purchase Agreements (BPA's) will expedite ordering and delivery.

6. For material carried in stock, it is recommended that a minimum quantity be issued from stock to the using activity with the remaining inventory available for replenishment.

7. Determine pre-positioning locations. For earthquake preparedness, it is recommended that materials be pre-staged outside in trailers, not adjacent to any buildings. The trailers can have the same function as repair lockers on ships. Trailers should be supported or shored to prevent toppling or collapse during an earthquake and anchored if subject to high winds. The use of trailers provides logistic mobility and reduces the risk of loss due to the structural collapse of a permanent storage site(s).

8. Assign accountability for the pre-positioned material.

a. *Suggested Actions to Address Material Support*

1. Follow recommended material support steps. A list of items carried by a large ship repair locker should provide a baseline for determining the list. Items unique to a shore activity's needs should be added to

this list, such as: electrical generators, portable toilets, emergency lighting, and portable pumps.

b. Suggested Assignments to Address Material Support

1. Inventory Control Department: Do steps 1 through 6 above with advice from the Disaster Preparedness Officer and approval of the steering committee.

2. Physical Distribution Department: Do steps 7 and 8.

3. Steps to Consider Regarding Service Support

There are four steps to consider regarding service support:

1. Identify which services will be required.

2. Determine which services can be procured through military channels and which require commercial procurement.

3. Prepare interservice and intraservice support agreements (ISSA's) or memorandums of understanding (MOU's) for services available through military channels.

4. Modify existing commercial contracts and/or prepare new contracts to include provisions for support during emergencies. Be sure to assess the ability of the commercial service supplier to survive the disaster and be able to continue to function.

a. Examples of Required Services

- Heavy lift equipment services to clear debris
- Search dogs to assist in locating personnel that may be trapped in collapsed structures
- Construction personnel to correct structural and non-structural damage
- Food service workers and food preparation equipment
- Utility firms to restore utilities or install temporary utilities

- Medical services
- Transfer of mission responsibilities
- Hardware and software computer experts to restore information and application systems.

b. For Services Available Through Military Channels Prepare Interservice and Intraservice Support Agreements (ISSA's) or Memorandums of Understanding (MOU's).

Activities selected for ISSA's and MOU's should be outside of the anticipated disaster destruction zone.

(1) Interservice Support Agreements

Interservice support is support provided by one federal agency to another federal agency. At least one of the participating agencies or subdivisions is the Department of Defense (DoD) or a DoD Component. [Ref. 19] For example, NSC Oakland may want to transfer Personal Property/Household Goods responsibilities to a nearby Army or Air Force activity for the duration of the disaster and recovery.

(2) Intraservice Support Agreements

Intraservice support is action on the part of one activity to provide support to another activity within the same DoD Component or federal agency [Ref. 19]. For example, NSC Oakland may anticipate requirements for messing and berthing facilities. An ISSA could be established in advance through a nearby Naval installation on a reimbursable funding basis.

(3) Memorandum of Understanding

A Memorandum Of Understanding (MOU) is the documentation of mutually agreed statements of facts, intentions, procedures, parameters and policies for future actions and matters of coordination [Ref. 19]. For example, NSC Oakland may establish MOU's with NSC San Diego or NSC Puget Sound to facilitate the transfer of various mission responsibilities until normal services are restored.

c. Commercial Service

Provisions of existing service support contracts should be modified to include emergency support requirements. Skeletonized documents should be prepared for requirements anticipated from the natural disaster not covered under current contracts. Indefinite delivery, indefinite quantity type contracts or basic ordering agreements can assist in speeding up the procurement process. Again, the commercial sources used for this purpose should be outside of the area of the anticipated disaster destruction zone.

4. Moving Support Functions

Depending on the level of damage sustained, it may be necessary to move the contracting function (as well as other functions) temporarily to another geographic location. One solution is to establish a remote support base at another defense activity. Through the use of an ISSA, arrangements

can be made for a contracting team to be formed at a remote site immediately before or after a natural disaster.

Naval Supply Center, Oakland, could consider the Naval Supply Center, San Diego or Defense Logistics Agency, Tracy, California as a potential remote support base. Upon activation, the remote support base can place all commercial orders and arrange delivery for emergency requirements. Skeletonized documents of anticipated requirements should be prepared and forwarded to the selected support activity. For this concept to operate smoothly, an open line of communication must be maintained between activities.

a. *Suggested Actions Regarding Service Support*

1. Determine service requirements.
2. Prepare ISSA's, MOU's as appropriate.
3. Investigate feasibility of using remote support base to relocate primary service functions, such as contracting, messing and berthing, bill paying, etc.

b. *Suggested Assignments Regarding Service Support*

1. All departments: determine anticipated service requirements.
2. Regional Contracting Department: consolidate requirements that are anticipated from commercial sources. Establish measures necessary to expeditiously contract for commercial requirements.
3. Comptroller: prepare ISSA's and MOU's anticipated for disaster related services to be performed by DoD or other federal activities.

H. PERSONNEL CONSIDERATIONS

As discussed in Chapter I, section D,3, an activity must be able to sustain itself for a minimum of 24 hours or until outside assistance arrives. Self-sufficiency implies that a command must be able to respond to the disaster as it evolves without the benefit of outside help. A disaster whose damage encompasses a wide area is likely to severely tax the resources of the surrounding communities.

For example, a disaster that causes numerous fires throughout a wide area will heavily burden the available fire fighting services in the surrounding communities. A naval activity that does not have its own fire station, and has not planned on how to independently fight a fire resulting from a natural disaster, can accomplish little to prevent a structure from burning to the ground. At best, the activity may be able to contain the fire and prevent it from spreading to adjacent structures provided that equipment and trained personnel are available.

Planning must take into account available material and personnel resources in determining the command's flexibility in confronting each situation. Required materials are assumed to have been identified and procured in Chapter III, section G. The availability of qualified personnel is limited to:

- functional skills of individuals in the organization;
- skills acquired by the work force from prior work experience;

- skills acquired through employee training;
- skills acquired by individuals in off-duty pursuits; and
- management's awareness of these skills.

A distinct advantage navy shore installations have over their civilian counterparts is the composition and diversity of their work force. Their typical work force is comprised of civil service and military employees.

Characteristically, civilian government employees possess a broad range of skills resulting from career related job transfers, as well as skills which may have been acquired as a result of prior military service. These various traits can prove to be invaluable assets during a period of emergency response, particularly when outside assistance is not immediately forthcoming.

Military personnel, through shipboard experience, have acquired certain skills that can be adapted to a natural disaster scenario. In particular, damage control training qualifies military personnel to augment the fire fighting force. Watch standing skills can be applied to base security.

The command should identify those skills essential to the requirements associated with the various functional categories which are listed in the Execution and Recovery Phases. By focusing on specific disaster related skill requirements, the command can eliminate the need to identify and classify all skills available within the command.

For example, the function of debris clearance requires crane operators, forklift operators, riggers, truck drivers, a heavy equipment supervisor, and carpenters for shoring operations. Identifying which skills are required will enable the command to:

- match personnel resources with personnel requirements;
- determine which individuals should be selected as essential personnel who will be subject to recall;
- assist management in determining the best organization to cope with a natural disaster;
- determine available personnel who can be used to augment functional areas that become overburdened; and
- relieve exhausted or injured personnel during the course of the Execution Phase.

After a list of required skills is developed, the next step is to match these requirements with specific, primary and collateral skills that employees possess. One method of accomplishing this is to use a questionnaire. The skill survey can be combined with a simple skill level rating scheme. The questionnaire could either be a generic list of all needed skills or it can be divided into categories based on related skills. Skill categories, such as equipment operators would include: truck drivers, crane operators, forklift operators, etc.

For simplicity, it is recommended that the questionnaire be a generic listing of required skills. This will reduce the chance of duplicating efforts. Additional personnel

information, such as addresses and phone numbers for recall, or for notification of relatives in the event of death or injury can be solicited at the same time.

When the survey of all skills is completed, a database and skill summary listing can be established. Updates can be performed continuously or at specified intervals. Where skill shortages exist, it must be determined if they can be satisfied by another local military activity or through contracted commercial services. If commercial support is required, refer to the preceding section concerning material and service considerations.

Illustration I provides a sample generic skill survey listing:

ILLUSTRATION I

SKILL SURVEY FOR NATURAL DISASTER PLANNING

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SKILL SURVEY FOR NATURAL DISASTER PLANNING

NAME_____ DEPARTMENT_____

JOB LOCATION_____ POSITION_____

GM/GS/WG LEVEL_____ PHONE_____

RECALL INFORMATION: (Where can you be reached when you are not on duty?)

ADDRESS_____

PHONE_____

The following is a list of some specific skills that may be required to immediately respond to a natural disaster. Please check those skills that you possess and the level of proficiency you have.

SKILL	PROFICIENCY HIGH	MEDIUM	LOW
Small engine operation (generator)			
Small engine repair/maintenance			
Forklift Operator (all types)			
Forklift Operator (small)			
Message drafting			
Message typing			
Electrician (low voltage)			
Electrician (high voltage)			
Radio operator (ham, citizen band)			
Radio operator (Navy)			
Fire Fighting			
Welding			
First Aid/CPR/Emergency Rescue			

Nurse/ Medical Services			
Truck driver (stake)			
Truck driver (semi)			
Crane Operator (heavy)			
Crane operator (light)			
Crane riggers			
Vehicle dispatcher			
Hazardous material handler			
Mason			
Carpenter			
Warehouseman			
Warehouse supervisor			
Plumber/pipe fitter			
Microcomputer operator			
Security/ law enforcement			
Food service worker			
Helicopter ground crew (VERTREP)			
Telephone line repairman			
Humanitarian Services (counseling,religious lay person, CACO, etc)			
Perform physically demanding work			
Requisition Preparation (commercial)			
Requisition preparation (military)			
Contracting (small purchase)			
Contracting (> $25,000)			
Financial accounting			
Time card preparation			
Field or Production supervisor			
Administrative worker			

Administrative supervisor			
Building Inspector (structural)			

Remarks_____

_____

For civilian employees please check the appropriate response:

___ I volunteer to serve as a member of the natural disaster organization and agree to serve in time of emergency. I understand that I may be called upon to serve in areas outside the installation boundary if the organization is tasked to do so by higher authority.

___ I do not desire to volunteer to be a member of the natural disaster organization. I will abide by specific guidance regarding the participation of civilian employees during an emergency situation as contained in FPM Supplement 910-1.

In the event that a natural disaster results in my serious personal injury or death, notify:

Primary_____

Phone_____

Address_____

Secondary_____

Phone_____

Address_____

_____ _____
Signature Date

****

1. Suggested Actions Regarding Personnel Considerations

1. Develop an employees' skills questionnaire. A draft listing should be submitted for review and comment to all departments. The final listing should be reviewed and approved by the disaster preparedness officer and the steering committee. Skills classifications may, but don't necessarily have to coincide with the Federal Personnel Manual (FPM) classifications. However, the various job skill classifications defined by the Navy, Air Force, Army and for civilians can serve as a good point of departure for developing this survey.

2. Administer questionnaire to all employees (military and civilian).

3. Establish, maintain and update employees' skill database.

2. Suggested Assignments Regarding Personnel Considerations

1. Civilian Personnel Office: for civilian personnel.

2. Administrative Department: for military personnel. The Administrative Department should maintain the complete database of all personnel.

I. COMMUNICATION CONSIDERATIONS

In a natural disaster scenario, it is important that clear lines of communications be established and sustained at all times. The following excerpt from the Commander, Naval Education and Training Center's Disaster Preparedness Plan emphasizes the importance of communications during these events:

> Communications is the most important element of any disaster or crisis response. Without a workable communications network, the success of emergency actions is questionable. It is essential that responsible Commanders identify all available communication assets and

> plan for their employment during emergencies. When providing communications during disasters, every precaution must be taken to assure that there is no degradation of capability to perform the military mission. [Ref. 20]

Open communication channels facilitate the movement and sorting of pertinent information between decision makers. There are two separate and distinct communication concerns. Internal communications, or communications between individuals within the command, are an essential component of the command's decision making process. External communications involve contact with other military activities outside of the base, as well as contact with civilian entities in the surrounding communities. External communications are necessary to exchange information regarding the availability of additional resources, to gain more insight concerning the extent and nature of the damage, and to inform superiors about mission impacts.

Assumptions stated earlier regarding the nature and extent of expected damage from a major natural disaster will have a profound effect on planning for communications. The probable effects will require that a second and in some cases a third communication network be established in advance.

1. Internal Communications

The sensitivity of internal communications to the effects of a disaster are often overlooked. Land line telephone services, the normal mode of internal communication,

are the most vulnerable to serious disruption or total loss. Activities that have not anticipated and planned for the loss of telephone communication may have to resort to using couriers to relay information.

There are relatively inexpensive alternatives to land line telephone services. For example, many commands have internal radio frequency systems installed for dispatching public works, security, fire department, and personal property personnel. These systems can easily be expanded to meet communication requirements in times of a natural disaster.

When using radio frequency systems during a disaster, several problems commonly occur and must be addressed in planning:

- Radio assets are insufficient to meet the needs.
- Provisions are not made for the command center to monitor all available frequencies nor to monitor them simultaneously.
- Base stations in the command center were not connected to the electrical generator.
- Use of a single channel resulted in frequency cluttering.
- Radios required special batteries that were not available or if available were not charged. When the installed battery ran low, no provision existed for its replacement.
- Loss of electrical power at battery recharging stations made them inoperable. Sufficient recharging capability was not considered at the command center.
- Radio call signs were not established or they were too difficult to remember resulting in increased dialogue and further cluttering the network.

Forty channel citizen band radios are another internal communication alternative. These are considered "line of sight" radios. They are prone to signal interference caused by physical barriers and/or distance. However, they can be reasonably employed outside of buildings and may satisfy the needs for communication between response teams who are working outside. The units should not be the permanent mount type if this alternative is selected. Standard, battery operated, portable units or units that can plug into a vehicle cigarette lighter are a better selection. Aside from the aspects of portability and ease of use, signal strength or range should be considered.

The multiple channel capability of citizen band radios will enable response teams to communicate between themselves on separate channels without interfering with control center communications. The ease of registering citizen band radios with the Federal Communication Commission is another advantage.

Primary disadvantages to using citizen band radios are the loss of confidentiality and possible interference from other sources. California is fortunate that these units are not as widely used as they are in other regions. Therefore, the likelihood of interference is significantly reduced.

2. External Communications

The inability to communicate with activities outside of the command during a disaster effectively isolates the command. This lapse in communications bars the command from either receiving or giving assistance. It may unnecessarily extend the period in which the base must remain self sufficient. It also hampers the accurate appraisal of the extent of the damage. Finally, external communication problems compound the anxiety of personnel on base and off base who desire information concerning family and friends.

When considering planning for external communications, the command needs to answer the following questions:

- With whom should the activity establish or reestablish communication links?
- What is the purpose of the communication link?
- When will these communication links be required?
- What is the priority for establishment?
- How long must each link be maintained (continuously, periodically, or intermittently, as required)?
- What mode of communication is preferred?
- What are the secondary and tertiary modes of communication?
- What modes are within current capabilities?
- What modes are accessible to the command?
- What communication upgrades are required to meet the needs identified?

In a disaster scenario, it is important not only to recognize the need to re-establish external communication links that existed prior to the disaster but to recognize the anticipated communication channels which will be newly established in response to the disaster. Communication links may have to be established with:

- local and non-local naval activities;
- naval ships and aircraft;
- local and non-local Department of Defense Activities;
- local civil authorities (police, fire, local government representatives);
- local radio and television stations;
- commercial activities;
- commercial ships and ferries; and
- Coast Guard ships and helicopters.

To meet military communication requirements, the Naval Supply Center Oakland must comply with Annex K of the Naval Base, San Francisco Disaster OPLAN 1-87 for periodic voice and message reports and the Navy's OPREP reporting requirements [Ref. 11:Annex K]. However, mere compliance with military communication regulations may not provide the full scope of external communications that are needed. Any deficiencies in communications will hamper recovery efforts as well as limit opportunities to offer and/or receive assistance. For example, the inability to communicate with civilian

helicopters may delay evacuation of injured personnel or the transfer of supplies to other activities.

An activity must also have knowledge of communication procedures. For example, not knowing that the city of Oakland's fire and police dispatchers receive and transmit on frequencies 154.355 and 155.37 respectively makes its difficult to establish communications with them [Ref. 5:p. 1-132].

To simplify determining communication requirements and procedures it is recommended that a communication matrix be developed which addresses the communication questions stated above. Table V illustrates a sample communication matrix.

TABLE V
COMMUNICATION MATRIX

ACTIVITY	PURPOSE OF COMMUNICATION	WHEN REQUIRED
U. S. Coast Guard	Movement by helo of casualties and supplies	as needed or as directed
Naval Air Station, Alameda Ca	Sub-Regional Planning Agent	OPREP Reporting

(cont)

PRIORITY	DURATION	PRIMARY MODE
high (5 of N)	as required	radio 2181 Khz
high (1 of N)	Immediate voice report, followed by message report	voice- 263-4046 (telephone)

(cont)

BACKUP MODES	WITHIN CAPABILITIES	EXTERNAL SOURCES
156.8 Mhz (ch-16) 500 Khz CW	Yes	Navy Ships pier side
radio XXXX Mhz	Yes	Navy Ships pier side

(cont)

REQUIRED UPGRADES	ESTIMATED COSTS
none	not applicable
none	not applicable

One requirement that is frequently overlooked is communication of personnel matters. This includes notifying personnel for recall, contacting military and civilian employee's families in case of injury or death, and enabling

families to contact the activity. When telephone services are inoperable this becomes exceptionally difficult. Notification of recall is usually done either automatically based on the occurrence of the event or through radio stations that are part of the Emergency Broadcasting Network.

When telephones services are not available, communication with families that reside outside the command may be limited to personal contact. Assistance in notifying the family of an employee's status can be accomplished by non-essential personnel when they are released from the work site or by an ombudsman communication network. Data gathered in the employee skill questionnaire will help in contacting an individuals's family. Individuals who are trained in humanitarian services or have close personal relationships with a family are best suited to notify the family in the case of death or injury to an employee.

Essential personnel who are required to remain on base will be concerned regarding their family's welfare after a disaster. The absence of information can increase the employee's stress and affect their performance. A strong family ombudsman communication network may be the best method for gathering and passing this type of information.

3. Suggested Actions to Fulfill Communications Requirements

1. Determine and define internal communication requirements.

2. Determine and define external communication requirements.

3. Determine communication deficiencies and associated costs to correct the deficiencies.

4. Establish an ombudsman communication network that can be used to relay information between family members. The ombudsman network should not be limited to the military members of the command, but should also include civilian employees.

4. Suggested Assignments to Fulfill Communications Requirements

1. Administrative Department: define internal and external communications requirements and capabilities and develop a communication matrix.

2. Command Ombudsman: establish a family communications network.

J. TRANSPORTATION CONSIDERATIONS

After a disaster, transportation requirements, both military and civilian, will be critical. Transportation assets are necessary to support movement of personnel, transport food, water, and supplies, and assist in debris clearance. The predominant form of transportation is motor vehicles. This capability is expected to be severely disrupted due to roadbed, bridge, and overpass damage. The movement of emergency vehicles in areas of high population density will further strain road access.

If the natural disaster occurs during working hours, transportation assets including military, commercial, and private vehicles will be temporarily isolated within the

confines of the base. Vehicles will not be able to move until transportation avenues are cleared and certified for use.

Most vehicular military transportation assets are under the control of the local public works department. This department may or may not be in the command's operational chain of command. For disaster response, an inventory of transportation assets should be provided to the area coordinator and to the responsible Public Works Department.[2]

Commercial vehicles awaiting loading or unloading may be used as possible assets to enable the movement of materials. Prior to releasing these vehicles, the command may want to consider the possibility of contracting them for the duration of the response and recovery effort.

Another alternative to supplementing available transportation is to use privately owned vehicles, operated by their owners, to move personnel and material. For example, injured personnel may be transported in private vans, station wagons, and trucks to the nearest medical facility or triage area. Coordination of these volunteer efforts will be required.

The first transportation priority will be dedicated to life-saving functions such as:

- Ambulance support

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[2]For NSC Oakland, the area coordinator is Commander, Naval Base San Francisco. Transportation assets are controlled by Navy Public Works Center, San Francisco Bay.

- Fire fighting
- Search and rescue

Secondary priorities will include such aspects as:

- Food transportation
- Materials transportation
- Personnel transportation

In disaster planning, unique transportation requirements should be anticipated. For example, the 17 October 1989 earthquake closed the San Francisco Bay Bridge for over one month. To move personnel between Oakland and San Francisco, special bus and water ferry services were instituted. Dock facilities at a Naval Supply Center are well suited to support this type of movement.

In a major disaster, Naval Supply Centers may be tasked to serve as the port of embarkation or debarkation for supplies for both the military and civilian community. For replenishment by helicopter or by ship, the Naval Supply Center will be required to provide necessary support services to include, ground crews, line handlers, stevedores, etc. This will require advance planning and coordination and should be specifically addressed in the final planning document.

Planning for the refueling of transportation vehicles is the final transportation consideration. The loss of electrical power will require fueling stations to have backup

generators or hand pumps to dispense fuel. If an activity does not have a refueling capability, siphon pumps may be needed to transfer fuel from non-essential to essential vehicles until tanker services become available.

IV. PREPARATION

A. PURPOSE

This phase begins the implementation of functions identified under Plan Development. It is the first of three action oriented phases. Preparation entails the:

- actual procurement of materials;
- correction of structural and nonstructural hazards;
- further definition of duties, assignment of personnel; and
- preparation and distribution of a planning document.

The specific purpose of the Preparation Phase is to enable the command to meet the predicted threat with a calculated response. It is here that issues and priorities identified in the Planning Phase are carried out. The final execution of this phase will result in tangible outputs that will permit the command to manage the effects of a natural disaster within command guidelines and budget limitations.

B. FUNCTIONS

Preparation encompasses functions and associated actions to be implemented in a non-emergency environment, within an established time frame. Time frames for accomplishment depend on the availability of funding, type of appropriation involved and command priorities. Certain preparation actions can be

completed after simply procuring the correct material, while other actions, such as training will remain a continuous function.

Specific functions to be accomplished within the Preparation Phase include:

- Structural hazard mitigation
- Nonstructural hazard mitigation
- Employee training
- Disaster management
- Interservice/Intraservice Support Agreements, Memorandums of Understanding and Mutual Aid Agreements
- Financial analysis
- Emergency team assignment
- Employee recall procedures
- Logistic requirements
- Writing and distribution of Disaster Response Guides

C. STRUCTURAL AND NONSTRUCTURAL HAZARD MITIGATION

Structural and nonstructural hazard mitigation describes improvements made to physical structures to reduce the level of damage incurred by a natural disaster, as well as enhance employee safety. Such improvements are based upon assessments of the risk of a natural disaster occurring in the geographic area as well as the vulnerability of the structures to a natural disaster if one occurs. Mitigation efforts should encompass both short term and long term endeavors to upgrade

the existing facilities. Hazard mitigation should be also be incorporated into the designs of new structures.

1. **Structural Hazard Mitigation**

Structural hazard mitigation cannot be performed by unskilled individuals. The identification of structural deficiencies is complex and requires mechanical and civil engineers who are specifically trained in this area. Countermeasures to correct deficiencies vary in terms of methods, capabilities and costs. Qualified engineers will be able to outline these alternatives for evaluation by decision makers.

The responsibility of primary organizational decision makers is to:

- pursue identification of potential structural weaknesses;
- set priorities for corrective action;
- submit funding requirements; and
- make employees aware of the existence of possible dangers.

Assessments concerning risk and vulnerability were discussed in Chapter III, sections C and E. These assessments, coupled with the command's priorities, establish a baseline for determining when and how the physical facilities can be improved to lessen the potential damaging effects of a natural disaster. In many cases, the scope and

nature of the necessary improvements will qualify for Military Construction, Navy (MILCON) funding resources.

2. Nonstructural Hazard Mitigation

A command, such as NSC Oakland, with a civil engineering office, is capable of minimizing many of its nonstructural hazards using its own personnel. Nonstructural hazard mitigation is simpler and less costly to perform than structural hazard mitigation. Also, considerable reference material exists that can assist the command in identifying and correcting nonstructural hazards.

A comprehensive checklist of commonly encountered nonstructural hazards should be developed by the office of the Staff Civil Engineer. Checklists will differ depending on the type of disaster expected. If the command desires to prepare for more than one type of natural disaster, the checklist should reflect information concerning the probable types of disasters and possible secondary effects.

Earthquakes are NSC Oakland's primary natural disaster threat. A useful source of information regarding the identification and mitigation of nonstructural earthquake hazards is the BAREPP 85-10 publication entitled, Reducing The Risks Of Nonstructural Earthquake Damage: A Practical Guide [Ref. 14].

Cognizant departmental managers and an individual from the office of the staff civil engineer should conduct a

physical survey of each building to identify nonstructural hazards. When complete, the engineering staff should review the results of the physical survey and determine the countermeasures that can be done with in-house resources and those which must be done with outside assistance. The review should include a list of all associated costs. The results of the review should be provided to the steering committee. The steering committee will assist the command in setting priorities for funding and task accomplishment. As described in Chapter III, sections C and E, the basis for setting these priorities depends upon the structure's relationship to mission accomplishment as determined in the vulnerability assessment.

Repair and hazard mitigation actions can now commence. Any work performed by non-engineering personnel such as attaching restraining straps and anchoring equipment should be inspected and approved by one of the command's engineers.

3. Suggested Actions for Structural and Nonstructural Hazard Mitigation

1. Pursue identification of structural and nonstructural hazards and mitigation actions.
2. Set priorities for corrective action.
3. Submit funding requirements and MILCON projects.
4. Make employees aware of existing unmitigated hazards.
5. Unique, practical and cost effective recommendations to reduce hazards should be considered for monetary awards under the beneficial suggestion program.

4. Suggested Assignments for Structural and Nonstructural Hazard Mitigation

1. Staff Civil Engineer: plans, directs, coordinates and supervises structural and nonstructural evaluation and mitigation

2. Steering Committee: sets command direction, sets policy and determines priority for accomplishment

D. EMPLOYEE TRAINING

Experience may be the best teacher, but it can be costly. The 1989 Loma Prieta earthquake caused damage to local naval installations that is estimated at $175 million. Casualties to military personnel were minimal, and no deaths occurred on these military installations. However, the earthquake was not considered catastrophic in severity. In fact, federal and state geologic agency studies predicted a significantly larger number of deaths and injuries than actually occurred. [Ref. 1:S-III-1] Bay Area naval activities were fortunate that the costs of the lessons learned were not more expensive in terms of property damage and personnel casualties.

A comprehensive training program is an essential component for combatting the effects of a natural disaster. Natural disasters occur infrequently. The disaster response organization is usually quite different from the routine organization. During a disaster, personnel are confronted, suddenly, with an alien, changing environment which can include every aspect of destruction and human tragedy. The

experience is disorienting. A comprehensive and active training program can help prepare individuals for such an experience.

When a major disaster strikes, training contributes directly to the ability of individuals to survive. Training creates a bank of knowledge and experience to draw upon during moments of confusion. A sound training program builds confidence, focuses one's actions and sharpens skills. Aside from communications, training is probably the most important element in dealing successfully with an emergency situation.

Commands have two training responsibilities. The first is to conduct generalized training for all employees. Generalized training is broad in scope. Generalized training should include the precautions which are taken by individuals to protect themselves. The second responsibility of the command is to provide specialized training for individuals who will perform specific jobs during or after the disaster.

1. Generalized Training

Generalized training is a focused extension of the command's natural disaster awareness program. It includes actions an employee should take both at work and at home. Training should include actual classroom lectures and disaster simulation.

Disaster simulation is often not done because adults tend to be non-receptive to this training method. The

importance of conducting these drills should not be overlooked. A simple earthquake drill such as "duck and cover" may seem trivial to adults. However, repetition of this drill reinforces desired behavior and counteracts the natural instinct to flee.

Generalized training can be conducted either by the fire department, police department, or by the safety office. A wealth of information and training aids, such as pamphlets, videos and slide shows is readily available from the Red Cross and other government organizations.

2. Specialized Training

Specialized training is necessary to develop and hone the skills of individuals who perform essential roles during the response and recovery efforts. Additionally, training is needed to foster a coordinated effort:

- among members of each disaster response team,
- between response teams, and
- between response teams and the emergency command center.

Specialized training is normally conducted in two phases. The first phase involves group training for individuals responsible for a single functional skill. For example, all personnel who are responsible for first aid will receive training. Selective training will be provided to

these individuals to develop and sharpen their first aid skills.

The second phase of specialized training involves testing the various response teams with problem scenarios or disaster simulations. The scenarios should be as realistic as possible in order to evaluate strengths, highlight weaknesses and provide feedback for improvement. These disaster drills are often staged by higher authority. It is important that these training exercises do more than just test the command's ability to fulfill the administrative requirements of disaster response.

An example of a good practical exercise is to temporarily prohibit members of the disaster organization from using the telephone system. This tests the command's ability to implement its disaster communication plan. Coupling this with a simulated disaster scene would integrate the other disaster team functions as well. Advance notification to customers and the technical capability to do call forwarding would make this type of training feasible.

3. Suggested Actions Regarding Employee Training

1. Commence generalized training of employees. Training should be interactive and not just the dissemination of information.

2. Conduct specialized training of functional teams.

3. Develop disaster drills and damage scenarios. Scenarios should include details of the event plus checklists for measuring accomplishment of desired actions. Evaluation checklists should only be available for use by

individuals evaluating the command's response to the situation.

4. Test the command's ability to respond to various scenarios.

4. Suggested Assignments Regarding Employee Training

1. Fire Department and Safety Officer: conduct general training.

2. Planning Department: develop scenarios and checklists to evaluate training.

3. Officers-in-Charge of functional categories: conduct specialized training.

4. Department Directors: responsibility for conducting and evaluating drills should be alternated between departments to enhance command involvement. Certain latitude should be given to allow departments to use their creativity.

5. Naval Supply Systems Command: assimilate scenarios from all Naval Supply Centers for conducting periodic evaluations of selected activities and to test their own capability to provide support.

E. DISASTER MANAGEMENT

These actions define management's organizational profile and responsibilities for the management of equipment and personnel resources associated with response and recovery efforts. Actions include:

- defining manning for the command center;
- designating a primary and secondary location for the command center;
- defining command center responsibilities;
- determining what supplies and equipment will be maintained in the command center;

- establishing methods for obtaining, sorting and analyzing information for decision making; and
- overview and testing of operational plans and procedures.

1. **Command Center Manning and Location**

The command center is vital for orchestrating disaster efforts. Mistakes to avoid when determining command center manning and location include:

- not providing for the relief of command center personnel during extended operations;
- assigning department directors to the command center, when their expertise is needed as on-scene commanders;
- assigning command center responsibilities to the Commanding Officer. Commanding Officers should be free to personally conduct site visits to observe damage, oversee overall relief efforts, and provide moral support. A suggested action is to assign the Executive Officer or Chief Staff Officer to manage the command center;
- placing command centers in buildings with high structural and nonstructural vulnerability. Many activities use the command's duty office or quarterdeck as their primary command center. It is not uncommon for the duty office to be located in the primary administrative building which may be one of the oldest and most susceptible structures in the command;
- failure to consider the diversity and magnitude of command center manning. A typical command center may consist of management personnel, message drafters, typists, communications personnel, information collectors, damage plotters, public information personnel, dispatchers, log keepers, photographers, and messengers;
- failure to plan for command center mobility, in the event that primary and secondary sites are damaged beyond use.

2. Command Center Supplies and Equipment

Command center supplies and equipment should include:

- communication radios for internal and external communication, and associated support equipment such as batteries and chargers;
- several phone lines;
- answering machines to provide pre-recorded messages for employee information;
- facsimile and copying machines;
- electrical generators;
- vehicles;
- visual aids to includes maps, blueprints, plotting charts;
- administrative supplies and equipment such as pens and paper, manual and electric typewriters, forms and checklists;
- generator fuel;
- food and water rations;
- emergency supplies such as flashlights, foul weather gear, cots and blankets, etc.
- physical security for the command center.

The mobility of the command center often depends upon installed equipment. An activity may consider placing portable equipment in specially fabricated boxes for ease of transportation in case a temporary command site must be used. To increase communication equipment transportability and to reduce procurement costs of expensive back-up equipment, an alternative is to install secondary antenna array systems and

provide for the quick disconnection and connection of communication hardware.

3. Methods of Obtaining, Sorting and Analyzing Information for Decision Making

The management of data is a critical requirement. This step addresses the gathering of pertinent information regarding the nature and impact of the disaster. Decision makers will have to depend exclusively on the quality and timeliness of this information during a period of confusion and disarray.

Again, the command's overall priorities should be kept in mind as a factor used to rank the kinds of required information. The objective is to obtain the most critical information first and to ensure that follow-up information in these areas continues to flow. One way to accomplish this is to develop a standard situation report format which leads decision makers to request information for pre-identified areas.

Simple desk guides and checklists should be prepared for use by members of the command center. For example, a desk guide containing sample messages that must transmitted immediately after a natural disaster should be prepared for message drafters.

4. Overview and Testing of Operational Plans and Procedures

This step represents the culmination of the efforts of functional teams. This acts as a dress rehearsal for an actual situation. The purpose of the dress rehearsal is to:

- test the viability of the disaster response organization;
- determine the overall continuity of the plan; and
- correct any deficiencies.

5. Suggested Actions Regarding Disaster Management

1. Determine manning, equipment, supplies for the command center and a primary and secondary location.
2. Develop desk guides and checklists for command center personnel.

6. Suggested Assignments Regarding Disaster Management

1. Administrative Department

F. INTERSERVICE/INTRASERVICE SUPPORT AGREEMENTS AND MUTUAL AID

This function establishes formal and informal agreements governing interservice and intraservice support that may be required by an activity during or after a natural disaster. Specific services and functions to be supported were discussed in Chapter III, section G,3. Additionally, this function will define the provisions and limitations of providing mutual aid to civil government.

1. Interservice/Intraservice Support Agreements

Interservice/Intraservice support includes all actions that result in the provision of material, facilities or services support between Department of Defense (DoD) activities or a federal agency. The normal method used to convey support is through memorandums of understanding, letters of agreement, or logistic support plans. Typical disaster related interservice/intraservice support requirements for a Naval Supply Center include:

- Provisions for an emergency relocation site
- Provisions for the processing of daily transactions. This may range from requisition processing to the assumption of all stock point customer support roles.
- Security support
- Medical support
- Fire fighting support
- messing and berthing support
- Contracting support
- Communication support
- Logistic support

When considering ISSA's, all nearby Department of Defense activities should be considered as candidates for either requesting or providing support. For example, NSC Oakland should consider the capabilities of activities that will probably be unaffected or, at least, less seriously effected. Possible resources for such support are: Naval Air

Station (NAS) Moffet Field, Defense Logistics Agency (DLA), Tracy, CA and Fort Ord in Monterey, CA. Conversely, NSC Oakland should consider the possible needs of NAS Alameda, Naval Station (NAVSTA) Treasure Island and other military activities that are likely to sustain damage. It should be noted that activities which have not requested an ISSA may still require support during or after a natural disaster.

Navy schools, training activities, and ships should be considered as candidates for providing knowledgeable and experienced manpower, if required. For example, during the recovery phase, additional Navy supply officers and/or members in supply enlisted ratings may be needed to augment NSC Oakland's staff. The Naval Postgraduate School in Monterey, California, the Military Transportation School located in Oakland, California, and home ported ships are all candidates for providing such temporary assistance. This action should be considered in the Planning Phase and the supporting activities should at least be contacted in the Preparation Phase. Wherever possible, a explicit agreements should be drawn between the parties to confirm support requirements.

It is recommended that disaster related ISSAs' be kept separate from ISSAs' established for other purposes. When finalized, copies of the disaster related ISSA's should be included as an appendix to the disaster plan.

2. Mutual Aid

Provisions regarding the use of Naval resources to provide civil disaster assistance within the United States is outlined by applicable military instructions. The Department of Navy may provide assistance to civil authorities only under the following circumstances:

- The President has declared a major disaster to exist or a major disaster or emergency is imminent.
- The Executive Secretary, Office of the Secretary of Defense, authorizes DoD response.
- When a disaster is of such severity that awaiting authorization from higher authority would result in unnecessary human suffering or severe property damage.
- When directed by the Principal Planning Agent (PPA) and the Regional Planning Agent (RPA). [Ref. 3:Encl. (4), p. 11]

Prior to entering any mutual aid agreement, it is important that approval be granted by higher authority. This will avoid conflicts in resource allocation. For NSC Oakland all proposed mutual aid agreements with civil authorities must be reviewed and approved by the Commander Naval Base, San Francisco, legal staff.

3. Suggested Actions Regarding ISSA's and Mutual Aid

1. Determine and/or refine all disaster ISSA's requirements and potential sources.
2. Establish ISSA's, MOU's as required.
3. Determine Mutual Aid requirements and submit requests to the prescribed higher authority for approval.

4. Suggested Assignments Regarding ISSA's and Mutual Aid

1. Comptroller Department: collect and screen information from all departments regarding potential ISSA's, MOU's and Mutual Aid requirements. Prepare documentation.

G. FINANCIAL ANALYSIS

1. Overview

The allocation of resources plays an instrumental role in disaster preparation. In order to reach an adequate level of disaster preparation, it is likely that additional command resources must be expended. As discussed in Chapter III, section D, a system of command priorities is helpful in determining the way in which existing resources can be re-allocated to fulfill preparation requirements. The mechanism for resource allocation is the command's internal budgetary process. The implementation of a comprehensive disaster preparation plan, especially in the initial phases, requires close coordination between planners and the command's financial and budgetary experts.

2. Three Sources of Additional Military Funding

Depending upon the nature of the requirements, and the extent of existing resources, the command may find it necessary to submit requests through their major claimant for additional funding or for specific funding. Three specific Navy funding appropriations can play major roles in meeting the command's needs. For general supplies, services, and nonstructural building modifications, the Operations and

Maintenance, Navy appropriation is the primary funding source. Other Procurement, Navy funding may be necessary for the procurement of major equipment such as non-standard communication hardware. Military Construction, Navy funding is the principal funding source for modifying physical structures.

3. Using Funding Opportunities

Prior to the October, 1989 Loma Prieta earthquake, little real data existed to accurately assess the viability of earthquake preparation measures previously undertaken by local Bay Area Naval activities. The Loma Prieta earthquake rigorously tested physical structures as well as the existing plans and procedures. As a result, a number of limitations and weaknesses were noted in existing disaster preparation plans. Additionally, the Loma Prieta earthquake has substantially raised the level of awareness among government and military officials concerning the possible ramifications of inadequate preparation if a catastrophic earthquake should strike.

Both the Planning Phase and the Preparation Phase led decision makers to identify and appreciate the essential requirements which must be considered in preparing for such a disaster. This information can be used to justify requests for additional funds to be applied to the mitigation of natural disaster hazards. Costs to correct damage

attributable to this and other recent natural disasters have adversely affected the availability of funds for fiscal year (FY) 1990. However, the abundance of current data provides an opportunity for commands to aggressively pursue funding in subsequent years. To capitalize on this funding opportunity, timely identification, prioritization and forwarding of requirements to various funding sources is essential.

Given the current, heightened sense of awareness concerning the potential damaging effects of natural disasters, a command which takes the lead in designing a comprehensive disaster preparation program may be considered for preferential funding as a pilot program. For example, if NSC Oakland can substantiate its requirements in its natural disaster preparation program, as well as point out the need for similar programs at other supply centers, the Naval Supply Systems Command may have grounds to incorporate the generic portions of Oakland's program throughout its claimancy. As the pilot, NSC Oakland would receive priority funding, and increased visibility and attention.

4. Organizing the Resource Effort

Specific job orders should be established for tracking resources (both labor and material) expended in planning, preparing, responding, and recovering from natural disasters. The creation of a unique set of job orders will enable the command to quickly gather and provide financial information to

higher authority. This information will support requests for additional funding for disaster preparation, should it become available. After a disaster, job orders will help to reconstruct the costs associated with response and recovery efforts. The accuracy of financial records will provide the basis to recoup reimbursable costs and for requesting budget augmentations from funding sources.

5. **Suggested Actions for Financial Analysis**

1. After material and service requirements and costs have been identified, develop a multi-year funding plan.
2. Establish a unique set of job orders for tracking disaster preparation, response, and recovery expenditures.

6. **Suggested Assignment for Financial Analysis**

1. Comptroller Department

H. EMERGENCY TEAM ASSIGNMENT

This function determines the numbers of personnel needed to fill specific responsibilities identified in the disaster organization and matches personnel assets to requirements.

The number of personnel to be assigned to specific disaster response and recovery functions relates to:

- the physical size of the activity;
- the determined level of risk and vulnerability;
- the type of disaster organization selected;

- the skill level of its employees; and
- command priorities.

Functional experts, both internal and external to the command, can assist management in determining the personnel requirements for the functional areas related to the disaster organization. For example, based on an expected number of rations to be fed, a food service officer can easily compute the number of food service workers required for emergency messing.

After personnel requirements are identified, the command can match the requirements with available assets. The employees' skills survey discussed in Chapter III, section H, will assist in this endeavor. Actual assignment of personnel to fill essential billets is the responsibility of the department heads. Military personnel can be designated to fill certain requirements. Civilian personnel may volunteer to serve or may be assigned positions in accordance with established federal civil service regulations.

An alternative to assigning individuals by name to the disaster organization is to assign codes from the routine organization structure to fill disaster organization positions. These assignments would remain permanent regardless of the individuals who occupy the positions. Note, however, this method is not suitable for filling disaster positions that require individuals possessing unique skills

which are not identified in the routine operational organization.

The maintenance of a complete personnel roster for the disaster organization is important. It is also a continuing responsibility due to employee turnover, retirement, and military transfers. Periodic updates should be performed on a scheduled basis.

1. Suggested Actions for Emergency Team Assignment

1. Determine the number of essential personnel required.
2. Assign personnel (by code or by name) to fill emergency manning requirements.
3. Maintain and update the personnel roster for the disaster organization.

2. Suggested Assignments for Emergency Team Assignment

1. Subcommittees: determine personnel requirements.
2 Department Heads: identify individuals (or codes) in the command to fill disaster organization positions.
3. Steering committee: review and approve personnel requirements and selections of individuals (or codes).

I. EMPLOYEE RECALL

The establishment of employee recall procedures assists in recalling essential personnel in the event that a natural disaster occurs before or after normal working hours. Radio, television, telephone, automatic triggering mechanisms, or any combination can be used to initiate the recall. For example, if the command desires to use an automatic triggering

mechanism to initiate a recall, it may state that if an earthquake of sufficient intensity to cause extreme shaking of residences occurs or visible damage is evident, all essential personnel will immediately report to the activity.

For recall which uses radio and television networks, it is suggested that the public affairs officer establish specific code words, numbers, or phrases. These will be used to notify radio or television stations that an individual with the proper authority is contacting them with essential information. This will minimize the possibility of prank calls and miscommunication. Information on these codes should be placed in a secured location that is available to the duty office.

Recall identification cards should be provided to employees to enable them to travel on restricted highways and for gaining access to the base. Recall information should be consolidated and copies made available to the duty office.

1. Suggested Actions Regarding Employee Recall

1. Establish internal recall procedures.
2. Establish procedures with local radio and television stations for receiving and transmitting the recall directive.
3. Advise employees which broadcasting networks they should monitor for command information.
4. Maintain current recall lists.

2. Suggested Responsibilities Regarding Employee Recall

1. Civilian Personnel Office: establish recall procedures and maintain recall lists.
2. Public Affairs Officer: liaison with local radio and television stations.

J. LOGISTIC REQUIREMENTS

This step involves taking actions that satisfy all logistic requirements identified in Planning Phase under Chapter III, section G. It includes:

- identifying all sources and preparing all documentation necessary to satisfy commercial material and services requirements;
- procurement and installation of all communication equipment and establishing procedures for its operation; and
- procurement and pre-staging of other emergency materials.

In view of the importance of this function, the complexity of logistic requirements, and the diversity and number of requirements, a central coordinator should be placed in charge to screen the requirements. In this respect, he would be responsible for ensuring that departmental logistic inputs adequately cover the stated planning requirements. He would also be in a position to eliminate unnecessary redundancies. It is suggested that this responsibility be assigned to the Inventory Control Department.

To simplify planning for logistic requirements, it is recommended that material and service categories be

established by the central logistic support coordinator to classify and coordinate inputs from other groups involved in the disaster planning process. Examples of material categories include: administrative support equipment, communications equipment, fire fighting equipment, medical supplies, food and water supplies, electrical equipment, sanitation equipment, and transportation assets. Examples of service categories include: utilities, computer support, security, food service, fire fighting, transportation requirements, and medical services.

1. Suggested Action for Logistic Support

1. Assign a central logistic support coordinator

2. Suggested Assignment for Logistic Support

1. Inventory Control Department

K. DISASTER RESPONSE GUIDES

This step involves the actual writing and distribution of a disaster response guide. A disaster response guide is a specific written document which:

- is extremely easy to read;
- has a thorough index and table of contents;
- is clearly tabbed by appropriate sections;
- contains the information needed by a key disaster manager or team supervisor to respond to a specific disaster;

- contains specific information that the user cannot be reasonably expected to memorize; and
- may contain enough information so that a backup user, who is less well prepared (trained) than the primary user, will be able to successfully perform in the job.

Additional information regarding a format for the final disaster plan is provided in Chapter VIII.

V. EXECUTION PHASE: TRANSITION TO EMERGENCY ACTION

A. PURPOSE

The Transition Phase moves the command from a routine operational posture into full scale emergency response. This is management's immediate reaction to a natural disaster in order to mitigate the consequences. A term commonly used in the business world to describe an organization's calculated response to an emergency situation is crisis management [Ref. 21].

There may be some confusion concerning the use of the term "crisis management." To some people, the expression "crisis management" represents a criticism of management. This implies that management is at fault for placing the organization at risk. The term implies that an otherwise routine chain of events has, because of mismanagement or insufficient planning, evolved into a situation which must be dealt with immediately and at greater cost. However, as used in this thesis, "crisis management" refers to deliberate techniques which an organization employs to preserve itself in the face of a crisis. It is a necessary, immediate and calculated response to an emergency situation.

Concerning natural disasters, the crisis situation is not the fault of management. The circumstances have arisen as a

result of natural phenomena. As such, the situation demands an immediate and determined response. The organization must transform itself, mobilize and employ a conscious strategy to overcome potentially debilitating events. An organization which is adept at this form of crisis management, increases its chance of surviving such events. In order to avoid confusion concerning the meaning of this expression, the term "transitional management" will be used to indicate the deliberate and immediate actions of an organization to combat an emergency situation.

B. PREREQUISITES FOR TRANSITIONAL MANAGEMENT

For transitional management to succeed, certain essential elements are required. They are:

- clearly defined disaster policy and objectives;
- an established disaster organizational structure;
- delineated disaster team responsibilities;
- selection of individuals to man disaster teams;
- team training;
- team testing; and
- explicitly defined trigger mechanisms which activate a deliberate response to the disaster;

With the exception of explicitly defined trigger mechanisms to activate a deliberate response, the elements

listed above have been addressed in the Planning and Preparation Phases.

1. **Trigger Mechanisms for Response**

A trigger mechanism is a catalyst or alarm device which begins the organizational shift from routine operations to emergency response. It marks the beginning of plan implementation. This mechanism depends upon the availability and recognition of signals which either warn that a disaster is imminent or that a disaster has struck. Locations that are subject to hurricanes or typhoons may receive indications that a disaster is imminent, several hours or even days in advance. An earthquake, however may provide little or no immediate warning concerning its approach or level of intensity.

There are two kinds of trigger mechanisms. The first type is one which is generated by the event itself. As stated earlier, there are certain precursors to some natural disasters that can be used to forecast that an event is imminent. Unfortunately, technology involving earthquakes has not provided a consistent, reliable set of measures that can be used to precisely pinpoint the probability of occurrence, its geographic location and its level of intensity. However, once an earthquake has struck, useful measures can be developed to rapidly gauge the need for a full or modified response effort.

The second type of trigger mechanism is one which is sounded by the organization as an alert. On a ship, the general quarters alarm is heard throughout all spaces and intensive training induces a universal recognition of its unique sound. The bell is followed by voiced instructions which inform the crew concerning the nature of the threat. While bells and whistles can be employed with some effect at a Naval station, additional measures are necessary to signal essential response personnel who may not be on base when the disaster strikes.

Trigger mechanisms must be carefully selected and defined. The goal of the selection process is to have the trigger mechanism(s) activate the plan only when required. If the trigger mechanism(s) is not properly selected and defined, the result may be unnecessary or premature plan implementation or delayed plan implementation.

There are repercussions to consider as a result of implementing a full response effort unnecessarily or prematurely. Resources are used ineffectively and inefficiently, normal operations are disrupted, and needless costs are incurred. For example, tremors and earthquakes occur with regularity on the West Coast. The "chicken little" approach of activating the earthquake disaster plan each time the ground shakes is unreasonable and ineffective. A sound and reliable plan will tend to lose much of its effectiveness if its use is perceived as arbitrary. Occasional plan

activation may be a suitable training drill. However, unless the event is a pre-planned exercise, unnecessary or premature implementation should be avoided.

Conversely, a hesitation in implementing a needed response effort also causes problems. A delay of this sort precludes the command from responding in time to contain the damage and minimize the number of casualties. Therefore, a set of criteria must be developed to rapidly gauge the need for a response.

There is a danger in selecting one and only one trigger mechanism. For example, when an earthquake occurs, vital information, such as its intensity and epicenter, is not immediately available. Therefore, there is little point in using the results of this data as primary criteria to trigger a response. It is likely that more obvious signs of the intensity of the disaster will be evident well before seismologists render their precise calculations.

The solution may be the integration of several triggering mechanisms that will enable management to make a rapid decision on whether to implement the disaster plan. A combination of triggering mechanisms for an earthquake could be:

1. earthquake clustering (a series of small earthquakes that indicate the immediate possibility of a major quake) or a seismic warning that a major earthquake is imminent;
2. violent shaking of structures;

3. visible damage;

4. loss of utilities;

5. personnel casualties; and/or

6. secondary effects such as fire or flooding.

After selecting appropriate trigger mechanisms, the command should define the way in which the mechanisms are applied. The method selected must be adaptable for use, both during and after normal working hours. For example, the command may decide to automatically implement the plan if mechanism 1 is triggered or if mechanisms 2 or 3 are triggered. A simple checklist, provided to all members of the command is useful in determining if and when the disaster plan will be implemented. Awareness of these mechanisms throughout the command is vital. Command Duty Officers, Officers of the Deck, Petty Officers of the Watch, department heads, and all personnel who are designated as essential to the response and recovery effort should be equally well versed in recognizing those mechanisms which are geared to triggering a response.

2. Suggested Actions Regarding Triggering Mechanisms

1. Determine triggering mechanism(s) used to implement the disaster plan.

2. Develop a simple checklist for command distribution indicating which conditions trigger disaster plan implementation.

3. Insure trigger mechanisms are incorporated in training plans for watch standers and essential personnel.

3. **Suggested Assignments Regarding Triggering Mechanisms**

1. Steering Committee

C. TRANSITIONAL FUNCTIONS

The following functions will assist the command in smoothing the process of transition to emergency response:

- Preliminary damage reporting
- Assessment of impact
- Determining the level of the crisis
- Commence transition from normal operations to response (plan execution)

It is important to recognize that while each function is a part of the Transition Phase, the order of occurrence may vary. For a hurricane, determining the level of the crisis and transitioning to emergency action could begin days prior to the actual disaster. The perceived level of the crisis could also change rapidly as the hurricane's track shifts away or towards the activity. Of course, the actual consequences of the disaster cannot be determined until it occurs. However, the probable effects can be gauged in advance and actions can be taken based on these probabilities.

In the case of an earthquake, it is not likely that there will be adequate warnings in advance of the event. Therefore, the functions should occur chronologically as they are listed above.

D. PRELIMINARY DAMAGE REPORTING

This step provides the basis for determining the disaster's actual impact on facilities and personnel. It entails the observation, collection and reporting of actual data which is pertinent to decision making. As discussed in Chapter III, section I, 1, procedures and equipment should be in place to ensure that the flow of information to and from decision makers is unimpeded. At this stage, the type of data which is collected and reported is important. This data will be used to assess the actual impact of the disaster on the mission as well as provide information needed to satisfy initial reporting requirements to superiors external to the command.

One aspect worth noting is that unimpeded communication channels substantially increase the volume of information which must be processed. Decision makers can rapidly become saturated with diverse and seemingly unrelated bits of information. It is important to employ an information reporting process which aids in the collating of related pieces of information. For example, a simple checklist can be used to format and tie together pieces of related information. The following sample checklist, Illustration II, is provided:

ILLUSTRATION II

SAMPLE DISASTER REPORT CHECKLIST

****

DISASTER REPORT

Building location _____ Time of report_____

Report number: initial____ follow-up _____

Name of individual making the report_____

FIRE OR SMOKE VISIBLE: yes____ no____

if yes: major____ minor____ not sure____

(immediately report all fires)

EXTERIOR STRUCTURE DAMAGE:(circle) HIGH MEDIUM LOW

a) collapsed exterior walls? yes____ no____
b) shifted off foundation? yes____ no____
c) visible cracks? yes____ no____
d) electrical wires on ground? yes____ no____
e) may building be safely entered?
maybe____ yes____ no____

PERSONNEL:

a) injuries? yes____ no____

if yes: life threatening? yes____ no____
if yes: report immediately!

b) are any personnel trapped inside the building
unknown but probable____ yes____ no____
unknown but unlikely____

c) deaths?
unknown but probable____ yes____ no____
unknown but unlikely____

COMMUNICATIONS AND UTILITIES:
(if structure can be safely entered):

a) electrical power on? yes____ no____
b) fire systems operational? yes____ no____
c) telephone services on? yes____ no____
if yes: closest phone number_____

INTERNAL DAMAGE: (circle one) HIGH MEDIUM LOW
(if structure can be safely entered)

a) flooding? yes____ no_____
b) hazardous material spill? yes____ no_____

(if any unusual odors are present leave immediately!)

****

Specific time frames should be stipulated for reporting data. Initial reports should be submitted to the command center as soon as possible, at the most, ten minutes after the event occurs. Fire reports and reports of life threatening injuries must be reported immediately. In any case, reporting must not be delayed in order to complete the checklist. The inability to generate a report or the failure of the command center to receive a report should imply to the command center that a problem exists.

1. Suggested Actions for Preliminary Damage Reporting

1. Develop checklists for making preliminary damage reports.
2. Develop procedures and time frames for reporting.

2. Suggested Assignments for Preliminary Damage Reporting.

1. Disaster Preparedness Officer: prepare preliminary damage report checklist.
2. Response Team Leaders: in the event of a natural disaster, complete checklists and forward to the command center.
3. Command Center: track and process checklist information.

E. ASSESSMENT OF DAMAGE

The preliminary assessment of overall damage normally begins a few minutes after the disaster occurs. If an earthquake strikes after normal working hours or on weekends or holidays, it is likely that the duty watch section will make the initial assessments. During this period, information is gathered and evaluated to gain a picture of the extent and nature of the damage. The purpose is simply to ascertain what has happened and to discern the possible ramifications of what has happened.

F. DETERMINING THE LEVELS OF CRISIS

Crisis levels are used as a means of rapidly communicating general information concerning a natural disaster to all concerned individuals. The level of crisis is a descriptive evaluation and statement of the situation by the commanding officer, based on an analysis of information received regarding the disaster's impact (probable or actual). Its purpose is to provide broad, continuous guidelines for the command to follow during a period which is disruptive and confusing.

The framework for determining crisis levels should be established in advance and adjusted as events develop. Each level conveys the command's expectations concerning an

impending disaster or the command's progress through various stages of a disaster.

Crisis levels for hurricanes act as warnings to trigger preparedness response actions prior to the event. The following list illustrates the progression of levels that are used to communicate hurricane information:

- level 5: Normal operations.
- level 4: Warnings indicate that a hurricane with winds greater than 64 knots is expected to strike this geographic area within 72 hours.
- level 3: Warnings indicate that a hurricane with winds greater than 64 knots is expected to strike this geographic area within 48 hours.
- level 2: Warnings indicate that a hurricane with winds greater than 64 knots is expected within 24 hours.
- level 1: Warnings indicate that a hurricane with winds greater than 64 knots is expected within 12 hours. [Ref. 20:Appendix I to Annex B, p. 1]

The main purpose of hurricane crisis levels is to take full advantage of the advance warning that this sort of natural phenomena usually affords. There are two problems with this approach. Each natural disaster is unique. Not only in its physical characteristics but its impact on the command as well. The extent of damage to facilities; injury to personnel; effect on the mission; and the time, effort and cost to recover are all variables that must be considered when setting the level of crisis. A mere descriptive statement of a disaster approaching is not sufficient. For example, a

command would take different precautions for a hurricane of 150 knots than it would for a hurricane of 70 knots. Unfortunately, the levels do not distinguish between situations on the basis of forecasted storm intensity, but only on the basis of forecasted arrival time.

The second weakness of the hurricane crisis level system is that it stops at the moment the disaster strikes. It would be advantageous to use a system of crisis levels to describe the events and invoke responses as the event progresses from warning stages through full recovery.

A review of municipal and military disaster plans indicates that crisis levels are not used at all for earthquakes. A sample maximum crisis and minimum crisis level that could be applied in this situation is provided for clarification.

- Maximum level: Situation is dire. The command is (is expected to be) incapable of performing any part of its primary mission, disaster complications are (will most likely be) beyond command capabilities. Maximum internal and external disaster response is directed to commence immediately. Command priority is to concentrate rescue operations to structures that have the maximum number of personnel missing and the highest probability of survival. Fire fighting efforts will be limited to containment. Outside medical assistance is urgently needed.
- Minimum level: mission (will be) slightly impaired, disaster complications are (will most likely be) minor, continue normal operations.

By defining and stating the level of crisis, the commanding officer leaves no doubt on desired direction and

policy the command should follow. It is imperative that all disaster organizational elements both internal and external to the command remain constantly aware of the crisis level in effect.

1. Suggested Actions to Define the Levels of Crisis

1. Establish levels of crisis for each type of natural disaster and incorporate them into the disaster plan.
2. As soon as possible, before or after a disaster occurs, define the level of the crisis.

2. Suggested Assignments to Define the Levels of Crisis

1. Disaster Preparedness Officer: determine levels of crisis.
2. Steering Committee: review and approve levels of crisis.

VI. EXECUTION PHASE: EMERGENCY ACTION

A. PURPOSE

The emergency action portion of the Execution Phase represents specific steps taken by the command to confront the ramifications of the disaster. Its purpose is to minimize the post-disaster effects on property and personnel through the physical deployment and coordination of personnel and resources.

This period begins when all emergency functions are fully manned and ready to respond. The period lasts until the threat of further property damage or endangerment of lives ends. Depending on the magnitude of the disaster, and its secondary effects, the duration of emergency action could be as short as hours or as long as a week or more. During this stage, the command center and emergency response teams remain fully manned.

B. FUNCTIONS

The emergency action phase includes the functions of:

- Disaster management
- Detailed damage assessment
- Establishment of communication channels
- Transportation of personnel and material

- Debris clearance
- Search and rescue
- Fire fighting and flood prevention
- Hazardous spill response
- Emergency medical care
- Procurement and logistic support
- Security
- Public information
- Emergency messing and berthing
- Utilities restoration and emergency repairs
- Disaster accounting
- Humanitarian services
- Graves registration activities

1. Disaster Management

These actions involve the allocation and management of all resources which have been mobilized to counteract the effects of the disaster. The actions to be taken are based on command priorities which were developed in Chapter III, section D.

Responsibility for disaster management rests with the Commanding Officer and is executed by the command center and on-site coordinators. Included in this activity is the coordination with and reporting to authorities external to the command. Information processing and decision making are the

two primary components of disaster management, which facilitate the response effort in this stage.

a. ***Suggested Actions for Disaster Management***

1. Receive, sort, prioritize and process information.
2. Allocate resources based on initial damage reports and the level of crisis set by the Commanding Officer.
3. Maintain a chronological record, either recorded or written, of all events and management directives.
4. Prepare all outgoing reports.

b. ***Suggested Assignment for Disaster Management***

1. Command Center

2. Detailed Damage Assessment

These actions are an extension of the initial damage assessment. Its purpose is to further refine information concerning the extent of damage to structures and injury to personnel.

a. ***Suggested Actions to Detail Damage Assessment***

1. Dispatch damage assessment teams to inspect structures. Predetermined command priorities and initial damage reports are considered baseline reference points for this inspection. However, it is important that these reference points are viewed with some flexibility given the dynamic circumstances at hand. A standardized, in-depth damage assessment checklist should be used. The checklist should encompass both structural and nonstructural assessments including freight elevators, piers and stored material.
2. Determine the extent of damage to utilities. (water, electrical, sewage, telephone, steam)

3. Using detailed damage assessment reports evaluate initial priority of resource allocation and search and rescue operations.

4. Attempt to define estimated costs of structural and nonstructural damage to facilities.

5. Determine need for outside assistance and notify contracting/logistic support teams of desired outside services.

b. Suggested Assignments to Detail Damage Assessment

1. Damage Assessment Teams

2. Command Center

3. Establishment of Communication Channels

These actions activate the disaster communications plan. Its purpose is to determine damage to communication systems and to re-establish internal and external communication links through all available methods, including: phone, message, radio, and computer media. Communication controls may be needed to prevent the compromise of classified information and to keep available channels from becoming saturated.

a. *Suggested Actions to Establish Communication Channels*

1. Activate internal communication systems and the Regional Disaster Response Communications Plan.

2. Using the communication matrix developed in Planning Phase, identify which communication links can be established. Periodic attempts should be made to establish communications with activities that cannot be initially contacted.

3. Provide decision makers with a list of open communication links.

b. Suggested Assignment to Establish Communication Channels

1.Command Center

4. Transportation of Personnel and Material

This activity determines the level of disruption to transportation. Damage to roadbeds, bridges, and overpasses must be evaluated and alternate routes selected. Transportation management includes all modes of mechanized equipment, such as trucks, cars, cranes, and materials handling equipment.

Transportation arteries both internal and external to the command and non-standard transportation modes must be considered in determining transportation solutions. For example, unique transportation modes such as tramp freighters, Navy logistic ships, helicopters, ferry boats, tugs and barges may be needed to transport critical personnel and materials if the Bay bridges are not in operation. On the base, private vehicles such as pickup trucks, station wagons, and vans may be temporarily converted for use as ambulances or for the movement of material.

a. Suggested Actions Regarding Transportation of Personnel and Material

1. Assess damage to internal and external transportation systems and determine alternate routes. Clearly mark routes that have been approved for use.

2. Mobilize and coordinate deployment of transportation assets and operators.

3. Determine transportation problems that cannot be solved internally. Request assistance from higher authority, as needed. Surplus transportation assets should be made available to other military activities.

4. Maintain records of transportation assignments for both government and non-government assets.

b. Suggested Assignments Regarding Transportation of Personnel and Material

1. Security Division: assess damage to transportation systems. Determine and mark which transportation routes are available for use.

2. Command Center: advise response teams concerning approved transportation routes.

3. Command Center/Transportation Coordinator: mobilize and coordinate transportation assets. Determine need for outside assistance. Maintain transportation records.

5. Debris Clearance

This function is responsible for the movement of debris and wreckage which impedes search and rescue operations or the transportation of personnel or material. If heavy lift equipment is not available, debris clearance may be limited to forklifts, block and tackles, and physical manpower.

a. *Suggested Actions for Debris Clearance*

1. Determine need for debris clearance.
2. Provide requirements to transportation coordinators.
3. Take actions within capabilities and command priorities.

b. Suggested Assignment for Debris Clearance

1. Warehousemen in Physical Distribution Department: assign to debris clearance.

6. Search and Rescue

This activity consists of locating and removing trapped and injured personnel from collapsed or damaged structures. When working amid unsafe structures, personnel engaged in search and rescue may be exposed to substantial personal risk. It is recommended that military personnel be assigned and trained to perform this function. The legal ramifications of using the civilian work force for this activity should be investigated.

Until heavy lift equipment becomes available, operations may be restricted to light rescue. Sources of heavy lift equipment and search and rescue dog teams is a consideration of the Planning Phase.

a. *Suggested Actions for Search and Rescue*

1. Remove trapped and injured personnel from collapsed and damaged structures. Probability of survival should be used in setting priorities for recovery.
2. Remove, identify, tag, and forward casualties to a designated temporary morgue.

3. Notify the command center of names and amplifying information on injured personnel and causalities.

b. *Suggested Assignments for Search and Rescue*

1. Search and Rescue Team: coordinate with response teams in search and rescue.

7. Fire Fighting and Flood Prevention

This activity responds to direction from the command center regarding reports of fire and flooding. Typically, fire and flooding are secondary effects of the natural disaster. However, these secondary effects can be more devastating than the initial event. Area wide fires, gas leaks, and loss of fire main services may compound response and require the dedication of substantial resources.

Ground shifts caused by earthquakes typically rupture underground utility pipelines. Contingency planning which includes the availability of gas operated pumping and de-watering equipment will minimize these effects. Planning for fighting fires in structures distantly located from secondary water sources (ocean) should be part of disaster training.

a. *Suggested Actions for Fire Fighting and Flood Prevention*

1. Deploy fire fighting and flood prevention resources, as needed.
2. Setup equipment for providing a secondary water source for fire fighting.

b. Suggested Assignment for Fire Fighting and Flood Prevention

1. Command Center: direct fire department to priority areas for fire fighting and flood prevention.

2. Reserve Force: set up and test pumps and other equipment to access secondary water supply.

8. Hazardous Spill Response

This activity minimizes contamination caused by the release of hazardous material. Spills can be caused by toppled barrels or containers, gas cylinder leaks or ruptures, ruptured fuel lines or any other type of hazardous material or hazardous waste spill. Airborne or ground release of hazardous materials due to the effects of fire or flooding is included in this activity.

a. Suggested Actions for Hazardous Spill Response

1. Check sites used for storage of hazardous materials for signs of environmental contamination.

2. Contain hazardous material spills, and decontaminate spill areas within the command's capability.

3. Request outside assistance, as necessary.

4. Periodically monitor storage sites throughout the Execution Phase.

b. Suggested Assignments for Hazardous Spill Response

1. Warehousemen in Physical Distribution Department: investigate and respond to hazardous material spills. Report findings and action taken to the command center.

2. Command Center: request outside assistance, if necessary. Prepare required reports related to hazardous spills.

9. **Emergency Medical Care**

This activity involves providing rudimentary first aid to injured personnel. Also, arrangements are made for the movement of personnel from the disaster site to a designated triage area, and then, to a formal medical treatment facility.

a. Suggested Actions for Emergency Medical Care

1. Provide first aid to injured personnel at the disaster site.
2. Move injured personnel to a designated triage area for further treatment and sorting based on the degree of injury.
3. Move deceased personnel to designated morgue facility.
4. Arrange for transportation of injured personnel to a designated medical treatment facility. For NSC Oakland this may be a field hospital, local civilian or military hospital, or the hospital ship, USNS MERCY (T-AH 19), if available.
5. Document all injuries, deaths and movement of injured personnel.
6. Provide information to the command center regarding, injuries, deaths and movement of personnel.

b. Suggested Assignments for Emergency Medical Care

1. Disaster Response Team: provide on-site first aid treatment. Provide information to the command center concerning deceased and injured personnel. Request assistance from the command center if medical care resources at the disaster site are overtaxed. Request assistance to move injured personnel to triage area.
2. Emergency Medical Team: set up and operate triage area. Prepare injured personnel for further transfer to a formal medical facility. Document care provided to injured personnel and information on deceased members. Periodically inform the command center regarding casualties. Request transportation services from the command center.

3. Command Center: track information concerning the identification, status and movement of personnel casualties. Arrange transportation for injured and deceased from the disaster site and from the triage area. Arrange for a formal medical facility to receive injured personnel. Notify the humanitarian service team concerning injuries and deaths.

10. **Procurement/Logistic Support**

This activity is responsible for obtaining supplies and services from commercial, Federal or Civil sources. Included in this function is the accounting, receipt, storage, and distribution of essential resources. Supplies and services that may be received include: consumable material, equipment, manpower, transportation assets, fuel, utilities, food, and professional services.

a. ***Suggested Actions for Procurement/Logistic Support***

1. Satisfy logistic requirements through the activation of ISSA's and through commercial contracting.
2. Account for all reimbursable expenditures and commercial contracts.

b. ***Suggested Assignments for Procurement/Logistic Support***

1. Inventory Control Department: based on information from the command center, prepare documentation to satisfy logistic requirements. Use standard requisition channels to obtain material which is available through government sources. Pass requirements for commercial contracting to the Regional Contracting Department.
2. Regional Contracting Department: contract for supplies and services not available in the federal sector.

11. Security

This function is responsible for the control and maintenance of physical security. The possible loss of electrical power, damage to perimeter security systems, general confusion, large inflow of civilian personnel seeking shelter, medical care and feeding, and other external influences may lead to theft, looting or malicious destruction of unprotected buildings.

The physical size of the base, the proximity and character of adjacent residential areas, and the magnitude of the disaster influences the level of security required. Careful evaluation of security needs will protect both property and personnel. The decision must be made whether to arm personnel augmenting the normal security force or simply provide them radios to request assistance.

a. Suggested Actions Regarding Security

1. Determine security needs and deploy forces accordingly.
2. Enforce base regulations to preserve peace and order and control traffic flow.
3. Periodically advise the command center concerning the status of base security.

b. Suggested Assignment Regarding Security

1. Base Security: provide base security and determine need for supplemental security forces. Periodically report security status to the command center.
2. Command Center: receive reports from security forces. Augment security forces, as necessary.

12. Public Information

This activity is responsible for maintaining liaisons with public media and Navy news sources. Its purpose is to disseminate information regarding personnel recall and to prepare items of interest for the local and national media. Additionally, this activity acts as a buffer between the base and the public media to minimize distractions during disaster response and recovery efforts.

a. *Suggested Actions Regarding Public Information*

1. Maintain open lines of communication with news media.
2. Prepare news releases.
3. Monitor information media reports and provide pertinent emergency information to the command center.
4. Receive and coordinate requests for visits from VIP's and news media.

b. *Suggested Assignment Regarding Public Information*

1. Public Affairs Office

13. Emergency Messing and Berthing

This activity provides food and shelter to emergency services personnel and to other individuals or families as may be directed.

a. *Suggested Actions Concerning Emergency Messing and Berthing*

1. Activate the emergency messing and berthing plan.
2. Maintain accurate records of personnel using shelters, and meals consumed.

b. Suggested Assignments Concerning Emergency Messing and Berthing

1. Emergency Messing and Berthing Team

14. Utilities Restoration and Emergency Repairs

This activity provides temporary and permanent repairs to restore electricity, water, steam, sewer and telephone services and other services as may be necessary. Included in this function is the operation of electrical generators, staging temporary lighting, and placing of portable toilets.

a. Suggested Actions for Utilities Restoration and Emergency Repairs

1. Restore utilities necessary for emergency response activities.
2. Secure utilities and perform needed repairs to correct or minimize life threatening situations or limit damage to property.

b. Suggested Assignments for Utilities Restoration and Emergency Repairs

1. Office of the Staff Civil Engineer or members of the Public Works Department if they are included in the disaster organization.

15. Disaster Accounting

This function maintains all accounting and financial records for services, labor and materials provided or used by the command for emergency response and recovery.

a. *Suggested Actions for Disaster Accounting*

1. Track all expenditures for material, labor, and services used for emergency response and recovery.

2. Prepare summary documents.

b. *Suggested Assignments for Disaster Accounting*

1. Comptroller Department: coordinate with other functional areas to collect and summarize expenditures.

16. Humanitarian Services

This activity assumes responsibility for services normally provided by the family service centers, child care centers, and religious organizations, such as the chaplain's office. The purpose of this category is to provide counseling and care for personnel who may be experiencing loss, confusion, or disaster related stress. Included in this function is the performance of last rites for personnel, and notification of next of kin in the case of death or serious injury.

17. Graves Registration Services

This activity is responsible for identifying, recording and shipping the remains of deceased individuals. The "worst case" scenario assumes that a number of deaths will occur in the first moments of the natural disaster. A cadre of individuals should be trained to deal with the deceased remains as they are discovered by emergency response teams. The work to be carried out includes:

- Removal of bodies from the scene of the disaster. Quick and quiet removal of bodies from public view is important in maintaining morale.

- The placement of bodies in a morgue facility. If a morgue facility or refrigerated space is not available in the area, the bodies should be segregated in a cool dry space away from public view. At the first opportunity, arrangements should be made to transport the bodies to an appropriate facility.

- Establishment of legal proof of death. This is the responsibility of a medical examiner who issues a death certificate. In the absence of a medical examiner, records should indicate: the likely cause of death, the precise area in which the body was found, and the individual(s) who discovered the body.

- Identification of the dead. Efforts should be made to identify bodies or at least to obtain all possible information.

- Preparation of an official record of death. An identity tag should be attached to the body and all available information recorded in a special book.

- Return of valuable personal effects. Personal effects which are found on or near bodies should be taken into custody, inventoried and recorded. The next of kin should receive the valuable personal effects of the dead. In the event that the body is released to other than the next of kin, records should be maintained which traces the chain of custody by signature for the body and the personal effects.

a. *Suggested Actions Concerning Graves Registration Services*

1. Remove bodies from the disaster scene and place in a morgue or other suitable receiving facility.

2. Attempt to identify bodies and circumstances surrounding the respective deaths.

3. Establish accountability and chain of custody for each body and their respective personal effects.

4. Arrange for the movement of the deceased to a suitable receiving facility as soon as it is feasible.

5. Provide information concerning the deceased to the humanitarian services team for notification of the next of kin.

b. Suggested Assignments Concerning Graves Registration Services

1. Graves Registration Team: perform all steps above and coordinate actions with the Humanitarian Services Team. Notify the command center at periodic intervals concerning actions taken as well as the identification of bodies. Request transportation services as needed from the command center.

2. Humanitarian services Team: verify information provided by the Graves Registration Team. Notify the next of kin at the earliest opportunity.

3. Command Center: receive reports from the Graves Registration Team. Coordinate efforts between the Graves Registration Team and the Humanitarian Services Team. Arrange for transportation as needed.

VII. RECOVERY PHASE

A. PURPOSE

The purpose of Recovery Phase is to restore normal operations. Recovery begins when the damaging effects of the natural disaster have been contained and danger to personnel is neutralized. The command's emphasis shifts from emergency action to restoration of its facilities and its mission. Additional secondary effects, such as earthquake aftershocks, can be expected. If the damage sustained by ensuing aftershocks is substantial, the command may revert to full emergency response. Recovery efforts will continue until long term reconstruction is complete.

Typical conditions which are present in the aftermath of a major natural disaster include:

- a large segment of the work force is either injured, deceased, suffering psychological trauma, coping with family related problems or physically and emotionally exhausted from emergency response;
- damage and destruction to facilities is widespread;
- confronting unfamiliar circumstances, employees and managers who normally perform in an outstanding manner may be ineffective;
- lack of direction, resources, and necessary skills result in wasted manhours;
- bureaucratic procedures governing funding and procurement of supplies and services may delay recovery response; and

- work backlogs are considerable.

The severity and duration of these conditions can be reduced by effective management, establishment of clear objectives, and by efficient coordination of efforts.

The passing of the immediate danger may be accompanied by a relaxed attitude within the command. Management should be aware that a reaction such as this is probable. Planning for fresh relief forces specifically geared toward recovery will help prevent delays in the recovery response. For NSC Oakland, relief forces could come from other Naval activities outside the destruction area, as discussed in Chapter IV, section F,1.

B. Functions

The Recovery Phase includes the following functions:

- Recovery management
- Recovery financing
- Temporary, then permanent restoration of structures, utilities, and transportation
- Re-establishment of services/mission(s)
- Inventory accuracy, accountability and condition
- Recovery assistance
- Public information activities and recognition of personnel
- Lessons learned and disaster plan updating
- Long term reconstruction

1. **Recovery Management**

This activity includes:

- evaluation of the situation and its impact;
- studying alternatives for corrective action;
- setting priorities for recovery actions;
- determining rough estimates of labor, services, and funding required in the near term to restore operations;
- establishing a short-term and a long-term recovery plan; and
- implementing the recovery plans.

The recovery management team should convene as soon as the threat is under control. Each manager should be prepared to thoroughly discuss with the recovery management team the impacts of the disaster on his/her respective areas and possible impact on other areas' functions.

The purpose of the recovery management team is to set clear objectives for restoration, and to avoid premature or delayed resumption of functional responsibilities.

When conditions for recovery begin to stabilize, recovery management can be assigned to a smaller staff, that maintains and oversees the continuing recovery effort.

a. ***Suggested Actions For Recovery Management***

1. Activate the recovery management team.
2. Evaluate impact of the disaster on the mission on each functional area and on the command's overall mission.

3. Estimate resource requirements, costs, and duration of recovery efforts.

4. Review all recovery options and select the best.

5. Determine recovery/reconstruction priorities.

6. Determine who should do what and when.

b. Suggested Assignments for Recovery Management

1. Recovery Management Team

2. Recovery Financing and Accounting

This activity includes tracking expenditures associated with recovery, submitting requests for supplemental funding, and preparing summary reports. This is a continuation of disaster accounting, and should be performed by the same individuals.

a. Suggested Actions for Recovery Financing and Accounting

1. Assign specific job orders for tracking recovery expenditures including labor, services and material.

2. Assess recovery effects in terms of dollars (i.e., lost productivity, overtime, replacement of damaged or expended material).

3. Prepare all supplemental budget justifications and budget requests.

b. Suggested Assignments for Recovery Financing and Accounting

1. Comptroller Department

3. **Temporary, Then Permanent Restoration of Structures, Utilities, and Transportation**

This activity restores all essential structures, utilities and transportation arteries necessary to resume the command's mission. Precedence for restoration is based on previously established criteria. Refer to Chapter III sections C, D, and E.

a. ***Suggested Actions for Temporary, Then Permanent Restoration of Utilities, Transportation Capabilities and Hazard Abatement***

1. Repair buildings within capabilities and priorities, condemn, close and tear down unsafe structures.
2. Systematically restore utilities to buildings based on priorities.
3. Clear transportation avenues, and certify bridges and overpasses for use.

b. ***Suggested Assignments for Temporary, Then Permanent Restoration of Utilities, Transportation Capabilities and Hazard Abatement***

1. Staff Civil Engineer: coordinate actions to restore mission capabilities.

4. **Re-establishment of Services and Mission(s)**

Eventually, the decision must be made to reinstate suspended or curtailed services. This decision depends on various factors. The importance of the timing of this decision is critical. The effects of either premature or delayed resumption of services, particularly for a service

activity, will directly affect the command's customers. Additionally, the command must decide whether services should be resumed in increments, or wait until systems are fully restored.

Primary and supporting services should be tested prior to resumption to full operation. Customers should be fully appraised of backlogs, processing delays or possible problems when service is resumed.

a. Suggested Actions for Re-establishment of Services and Mission(s)

1. Return employees to normal positions as soon as possible.
2. Test service capabilities.
3. Assess service capabilities against requirements for services.
4. Decide to re-establish services or take corrective actions and return to step 2.
5. Notify customers of capabilities, limitations, and any new or modified procedures.

b. Suggested Assignments for Re-establishment of Services and Mission(s)

1. Department heads in charge of service functions test capabilities in respective areas. Appraise the Commanding Officer concerning service capabilities and estimated time of recovery.
2. Customer Services Division: liaison with customers, inform them of the command's capabilities and the expected dates of resumption of services.

5. **Inventory Accuracy, Accountability and Condition**

The effects of a major natural disaster on a supply center's inventory accuracy could be devastating. Considerable inventory may be damaged or destroyed, records and documentation may be lost or incomplete, emergency issues and receipts may not be recorded.

This activity's primary purpose is to reestablish the command's inventory accuracy and accountability. Aside from updating inventory records on computer systems, this activity includes restowing displaced inventory in warehouses. Depending on the degree of structural and nonstructural damage, inventory reconciliation may require either spot inventories or complete wall to wall inventories. To reduce recovery time, the command may desire to temporarily hire additional personnel. Another alternative is to contract inventory services through the Integrated Supply Support Overhaul Team (ISSOT).

The command must assess the costs of material totally destroyed, change damaged material condition codes, and identify material that must be repaired.

a. Suggested Actions Regarding Inventory Accuracy, Accountability and Condition

1. Follow standard inventory reconciliation procedures to account for material that is damaged or destroyed in the disaster.
2. Account for damaged repairables and return them to designated overhaul points.

3. Adjust the Navy Stock Fund accounts to reflect lost and damaged inventory.

b. Suggested Assignments Regarding Inventory Accuracy, Accountability and Condition

1. Inventory Control Department
2. Data Processing Department
3. Physical Distribution Department

6. Recovery Assistance

This activity includes actions aimed at assisting departments to cope with the effects of the disaster. Work sites that received little damage can contribute their manpower and skills to help restore areas that were heavily damaged. This is a team approach to recovery. The objective is to distribute the recovery work load such that the time required to restore overall operations is minimized.

Recovery actions involve physically demanding and dirty work. Requirements may warrant temporary assignment of GS level office workers to warehouses to assist in restowing material or conversely assigning warehouse workers to assist in removing debris from offices. Employees and managers should be aware that the needs of the activity may require these temporary reassignments.

Disaster assistance should also be expanded to include tenant activities and possibly other federal activities in the area.

a. *Suggested Actions Regarding Recovery Assistance*

1. Evaluate each department's immediate personnel requirements to recover from the disaster and internally reassign personnel as necessary to balance out the recovery workload.

2. If warranted, seek personnel augmentation from activities and ships in the local area, or provide assistance to requesting activities if it is within the command's capability.

b. *Suggested Assignments Regarding Recovery Assistance*

1. Department Heads: determine need for personnel reassignments. Reassign military personnel, as needed.

2. Civilian Personnel Office: prepare temporary assignment documentation for civilian employees.

7. Public Information Activities and Recognition of Personnel

This activity provides supplemental information to the media concerning damage sustained, the progress of recovery efforts and estimated time frames for recovery. Human interest stories which recognize heroic and exemplary acts by employees should be included with information which is forwarded to the media.

Historical and pictorial files related to the natural disaster should be maintained. This information is vital to future planning efforts and will contribute to "lessons learned" reports.

a. Suggested Actions Regarding Public Information Activities and Recognition of Personnel

1. Continue communications with local and national television and radio stations and newspapers.
2. Prepare news releases on command activities and any heroic or exemplary actions.
3. Dispatch photographers to record the progress of recovery efforts.
4. Prepare documentation for award recognition.

b. Suggested Assignment Regarding Public Information Activities and Recognition of Personnel

1. Public Affairs Office

8. Lessons Learned and Disaster Plan Updating

Disaster reports and "lessons learned" reports provide important information and recommendations for command action. "Lessons learned" enable the command to re-evaluate its disaster response and recovery plan. They also provide a useful data bank for other commands that did not experience the actual disaster. Activities facing a similar risk/vulnerability profile can then improve their own disaster plans using this data bank. This prevents them from having to learn these lessons the hard way.

a. Suggested Actions Regarding Lessons Learned and Disaster Plan Updating

1. Compile information from reports generated by recorders in the command center, response teams, and department heads to develop "lessons learned". Include reports from

other Naval Activities to gain a perspective on how similar problems may have been solved.

2. In light of recommendations and observations, evaluate the command's natural disaster plan and modify it as appropriate.

3. Disseminate "lessons learned" to other commands and to higher authority.

b. Suggested Assignments Regarding Lessons Learned and Disaster Plan Updating

1. Administrative Department: collect data from internal and external sources.

2. Planning Department and Disaster Preparedness Officer: review data, publish findings, and update the command's natural disaster plan.

9. Long-term Reconstruction

This activity plans and coordinates long-term recovery efforts. It includes projects to rebuild or replace damaged structures, structural and nonstructural mitigation, and actions designed to return the activity to full operation. Suggested actions and duration of long-term reconstruction is dependent upon circumstances related to the nature and extent of the disaster. Depending on funding availability and mission impact, full recovery may take years. A plan should be devised that stipulates a target date for project completion. Periodically this plan should be reviewed to ensure that recovery action progresses steadily.

VIII. WRITING THE PLAN

A. PURPOSE

As outlined in this thesis, the primary emphasis in planning is the development of a executable disaster and recovery plan. However, even the best planning efforts can fail, if the concepts, procedures and responsibilities weaken by lack of continuing emphasis and loss of corporate memory over time. The written word is one avenue for maintaining plan continuity and clearly defining plan responsibilities.

Generally, disaster plans, both military and municipal, follow a standard administrative format. It is difficult to write an executable disaster plan to fit the constraints imposed by the format of a military instruction. To obtain a better planning product, it is suggested that the plan be modular in format and structured around the various functions in each of the four phases.

The ultimate goal is to have a written plan that is thorough yet concise; effective and efficient; responsive and simple to use. To achieve these objectives and to orient the various groups in the same direction, a procedure should be developed explaining how the physical writing of the plan should proceed. General guidelines will allow sufficient

latitude for groups to be creative in their approach and in their solutions.

B. METHOD

The following procedure is suggested for writing the plan:

- Determine if the desired planning, preparation, execution and recovery functions, as outlined in this thesis, meet the command's needs. Amend selected functions, suggested actions and assignments or add new functions as deemed necessary.

- Determine the desired natural disaster organizational structure.

- Assign a lead code (department or division) to be responsible for plan development for each function or category. Category refers to those defined in Chapter II, section G, 4. The lead code will be responsible for organizing the various departments or divisions involved in plan development for that function or functional category. When possible, the code selected to write a segment of the plan or functional category should be the same one which is primarily responsible for its execution.

- Task each code which is assigned a function or functional category to develop a subcommittee to write the plan. The director of this subcommittee should be assigned as a member on the phase subcommittee.

- State the expected threat and the assumptions (expected outcomes of the disaster).

- Give the Commanding Officer's statement of priorities and desired level of planning effort.

- Determine if a plan format is desired (see plan format below).

- Determine time frames for accomplishment. A simple Gantt chart is suggested. The time allotted for completion depends on the planning priorities as stated by the Commanding Officer. For routine plan development, a year to two years is not an unrealistic period for completion. Certain functions or categories, such as the operation of the command center, which encompasses coordination of

several functions, will continue for most of the allotted time.

- Provide all personnel involved in the planning effort a copy of the planning guide (as amended).

- Use established civilian and military award systems to motivate and provide incentives for individuals or groups who do outstanding work. It is suggested that incentives be stated up front in the form of a contest, with a group awards going to the codes that have the best functional plans. The best functional plans would be based on both the written plan and on demonstrated executability.

- Periodically, the steering committee should evaluate plan progress and make adjustments as necessary.

- Consolidate all draft functional plans. Return complete packages back to responsible codes to revise their respective segments to ensure continuity, brevity, executability, and thoroughness.

- Consolidate all second drafts. Using a developed scenario, test the plan.

- Distribute the working plan. Continue to test and update the plan, as necessary.

C. PLAN FORMAT

A specific plan format is not recommended. A general plan format, that can be used as a rough guide for the groups who are writing the plan, may include the following:

- Function title
- Responsible code
- Threat Statement
- Assumptions specific to the function
- Function organization (to include specific codes) (Individual names are not recommended because of personnel turnover)

- Function responsibilities
- Logistic requirements (manpower, materials, services, communications, transportation, etc). Skeletonized requisitions and contracts (if applicable)
- Communication requirements (internal and external) and procedures should be outlined in detail
- Training requirements
- Funding requirements
- Procedures and checklists for executing disaster response and recovery functions
- Prior lessons learned
- Sample reports and messages (if applicable)
- Potential problems/ alternatives
- Testing scenarios

IX. CONCLUSIONS AND FURTHER RESEARCH

A. CONCLUSIONS

This thesis stresses the importance of a planning strategy to mitigate the damage and loss of lives resulting from a natural disaster. Natural disaster planning sets up a rational process and establishes decision making criteria.

As a process, planning for a natural disaster:

- establishes the command's commitment and sets the direction for the organization;
- forces managers to periodically look ahead at the inevitability of a major natural disaster occurring;
- requires communications within the organization about goals, strategic issues and resource allocation in preparing for and responding to a natural disaster;
- stimulates longer-term analyses than would otherwise be made, creating a proactive command environment instead of reactive environment;
- creates a psychological backdrop and an information framework about a future event which allows managers to make decisions ahead of time;
- provides a method to protect investments in personnel and the physical infrastructure; and
- deliberately incorporates flexibility in the plan by identifying alternative solutions to problems and examining methods for adapting to a changing environment. For example, it is not possible to predict the exact time, intensity or effects caused by an earthquake. Therefore, management must purposely plan for various primary and secondary effects related to a specific natural disaster.

In establishing decision-making criteria, planning for a natural disaster enables the command to:

- make commitments involving the dedication of resources and manpower;
- formalize and focus on a program to deal with an external threat to the organization; and
- help determine the who, what, when, where, why, and how these tasks are going to be accomplished as well as forecast the associated costs.

Additionally, this thesis implies that a command must have a planned strategy and not an imposed strategy to successfully cope with a natural disaster. A planned strategy is a deliberate strategy. Precise intentions are formulated and articulated by executive management in advance, and reenforced by procedures to ensure an orderly and timely implementation.

Conversely, an imposed strategy is an emergent strategy. The external environment dictates patterns of actions, which because of the situation and time constraints for action, limits organizational choices. In the confusion caused by a natural disaster, an imposed strategy may lead to hasty management decisions which can fail to identify and resolve key problems and issues. At its worst, an imposed strategy can misdirect limited resources and delay or impede an effective response.

By using a planned strategy to deal with a natural disaster, the command sets priorities, policies, and procedures to control an unfamiliar, chaotic environment.

B. FUTURE RESEARCH

Disaster planning is a diverse subject covering a broad array of functional areas, such as engineering, management, logistics, finance, communications, and manpower. The difficulty in planning for a disaster is incorporating these areas into a cohesive plan that will meet the needs of an organization at a reasonable cost in time to mitigate the effects of a natural disaster. Because of these impediments to planning, many organizations have inadequate plans. In these cases, the occurrence of a disaster will cripple the organization.

Available disaster planning literature encompasses general guidelines for business or municipalities to follow. Little effort has been given to tailoring this information into a package suitable for military organizations. This deficiency provides many opportunities for further study.

C. SUGGESTED STUDIES

1. Measuring Disaster Vulnerability

Using probabilities of disaster occurrence, develop mathematical formulas to measure a military command's vulnerability to a natural disaster. Formulas could be developed to measure:

- the expected loss in terms of structures, facilities, and personnel;
- the expected loss in terms of inputs and outputs;

- the expected loss in terms of customer support;
- expected loss in terms of financial impact; and
- expected loss in terms of mission accomplishment.

2. **Structural and Nonstructural Cost/Benefit Analyses**

Perform cost/benefit analyses of structural and nonstructural hazard mitigation actions and determine the best methods for using these analyses to justify and request funding for completion.

3. Disaster Communication Plan

Develop a disaster communications plan and matrix (internal and external) for military activities that can be used in a variety of scenarios.

4. Disaster Scenarios

Develop disaster scenarios that can test both the administrative and physical capabilities of military organizations to handle a specific disaster of a given magnitude. The use of unique methods, such as using a computer software program that provides a chronological sequence of events to test spontaneity should be investigated.

5. To Plan or Not to Plan

Perform a cost/benefit analysis to compare the development of a disaster plan against the expected impact of not having a plan when a disaster strikes.

6. Contracting Out Disaster Planning

Compare the costs and benefits of a disaster plan developed using in-house assets against the costs and benefits of contracting out disaster planning to commercial activities. Analyze the strengths and weaknesses of both approaches.

7. Plan Execution

Determine criteria and checklists for evaluating a command's disaster plan for executability.

8. Formulate a Disaster Organization for Naval Supply Centers

Using personnel resources from the normal command organization, develop a separate organizational structure which can accommodate various types of natural disasters.

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