State of California
Governor's Office of Emergency Services

Post-Disaster Safety Assessment Program (SAP)

Coordinator Training

Version 3

August 2007

Student Manual

POST-DISASTER SAFETY ASSESSMENT PROGRAM (SAP) TRAINING

FOR

SAFETY ASSESSMENT PROGRAM COORDINATOR

Version 3

August 2007

For current SAP information, please visit our website at **www.oes.ca.gov**, *under the "Training" heading*

Acknowledgements

The Governor's Office of Emergency Services and Global Emergency Management gratefully acknowledge the assistance provided by representatives of the Structural Engineers Association of California, the American Institute of Architects, American Society of Civil Engineers, the California Building Officials, and Mr. Robert Bruce for their time and consideration in reviewing and commenting on this document.

We also acknowledge the assistance of the Applied Technology Council in allowing the reproduction and use of their photographs and diagrams that are used in this document. Specific credit is provided below.

Credits

All photographs and diagrams, except those noted below, were developed or provided by Global Emergency Management, Long Beach, California.

Figures 4-5, 4-6, 4-7	Courtesy of the Applied Technology Council ATC-20 ***Procedures for Postearthquake Safety Evaluation of Buildings***
Figures 5-3, 5-4, 7-8	Courtesy of the Applied Technology Council from ATC-20-T Training program for ATC-20 ***Procedures for Postearthquake Safety Evaluation of Buildings***
Figures 5-5 and 5-18	Courtesy of the University of California, Berkeley – Earthquake Engineering Online Archive – Denali Collection and Steinbrugge Collection
Figures 4-9, 5-7, 5-9, 6-1, 6-4, 6-5, 6-8, 6-9, 6-10, 6-16, 6-17, 6-18, 6-19, 6-20	Courtesy of the Federal Emergency Management Agency
Figure 5-1, 6-24	Courtesy of Robert A. Eplett, California OES
Figures 3-3, 3-4, 3-5, 4-4, 5-12, 6-2, 6-3, 6-6, 6-7, 6-11, 6-12, 6-13, 6-14, 6-15, 6-22, 6-23, 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7	Courtesy of the Hurricane Katrina CA SAP Response Teams, 2005
Figures 5-15, 5-16, 5-19	Courtesy of San Francisco Public Works
Figure 6-26, 6-27, 6-28, 6-29, 6-30	Courtesy of Texas City, TX Firefighters Local 1259 (www.local1259iaff.org)
Figures 5-2, 5-3, 5-4, 5-6, 5-8, 5-10, 5-11, 5-14, 6-25	Courtesy of CA OES staff and others

Table of Contents

INTRODUCTION

The Safety Assessment Program (SAP) provides professional resources to local governments, assisting these with the safety evaluation of buildings and infrastructure in the aftermath of a disastrous event. Their goal is help local government perform accurate facility safety assessments as quickly as possible. SAP has been successful in this endeavor during recent major earthquakes such as Loma Prieta (1989), Big Bear-Landers (1992), Northridge (1994), Napa (2000), and San Simeon (2003). SAP resources were also used under interstate mutual aid, the Emergency Management Assistance Compact (EMAC) to assist the states of Louisiana and Mississippi in the aftermath of Hurricane Katrina.

Volunteers and mutual aid resources are utilized to provide professional engineers and architects, geologists, and certified building inspectors to assist local governments in safety evaluation of their built environment in an aftermath of a disaster. The SAP program is managed by the Governor's Office of Emergency Services (OES) in cooperation with professional organizations. SAP produces two resources, SAP Evaluators, described above, and SAP Coordinators, which are local government representatives that coordinate the program. The latter training is the focus of this manual.

OES is pleased that you are interested in participating in this program as a Coordinator. Your role will be essential in the first hours after a destructive event to estimate the number of Evaluators needed by your agency in order to review your community's structures in a timely manner. There are procedures and limitations in using the SAP Evaluators which this instruction will help you to understand. There are also some examples of "best practices" gathered by use of the program over the years that will be passed on to you. Finally, the information you gather will be very useful to State OES in managing the event. We look forward to working with you and assisting you in adverse times through this program.

(This page intentionally left blank)

UNIT 1 SAFETY ASSESSMENT PROGRAM OVERVIEW

Unit 1 Training Guidance

Overview

This unit presents an introduction to the Safety Assessment Program and discusses qualifications, organization, liability issues, workers compensation, and ends with a glossary of common terms associated with safety assessment.

Training Goal

Provide the participants with the basic background of the program to better understand their role as safety evaluators.

Objectives

At the end of this unit participants will be able to:

- Identify where they fit in the overall emergency response operation; and
- Know and use the common terms associated with emergency response and safety evaluations.

1.0 Safety Assessment Program Overview

Safety Assessment is the process by which structures of all occupancies and lifelines are evaluated for their safety for immediate occupancy or continued use. The Safety Assessment Program (SAP) was developed to meet the needs of local government building departments during an emergency by providing architects, engineers, and building inspectors to assist with safety evaluations.

Through quickly evaluating structures for continued occupancy, we can reduce the demands on shelters and reduce shelter needs. The process of evaluating structures is based on the process and procedures described in the Applied Technology Council publication ATC-20 *Procedures for* ***Postearthquake Safety Evaluation of Buildings*****.**

The Safety Assessment Program has the ability to provide personnel to any level of government to evaluate their building stock and lifeline systems (roads, bridges, pipelines, pump stations, reservoirs [tanks], and treatment plants). City or county building officials have the oversight responsibility for buildings in their jurisdictions, and public works officials likewise are responsible for lifeline infrastructure systems in their jurisdictions. Special districts can include both buildings and lifeline systems within their responsibility.

1.1 Concept of Emergency Operations

During the response to disaster situations, the lowest level of government is always in charge. For a city, this will be the City emergency services, which means that safety evaluations will be performed through the City building department. For unincorporated areas, this may be County departments. Special districts, such as school or water districts, have their own jurisdictional responsibilities and can use the Safety Assessment Program independently of the cities or counties.

All jurisdictions within the State of California use the Standardized Emergency Management System (SEMS) to respond to any type of emergency or disaster. SEMS is a management system that allows a jurisdiction to smoothly transition from day-to-day activities to emergency operations.

The basic framework of the Standardized Emergency Management System (SEMS) provides for a five-level emergency response organization, activated as needed, to provide effective response to inter-agency, multi-agency and multi-jurisdictional emergencies. The five levels of SEMS are:

1. Field,
2. Local Government,
3. Operational Area,
4. OES Region, and
5. State.

All levels of government are connected through the internet with a system known as RIMS (Regional Information Management System). This allows for the swift exchange of information and reports throughout the operation.

Control of operations is always at the lowest level, with each succeeding level of government providing support. In other words, local government determines what they will do, how they will do it, and when they will do it, based on their own priorities.

Under SEMS, counties are considered as local government, and they control the operations within the unincorporated areas. The Operational Area supports local government, the Regions support the Operational Areas and the State supports the Regions. The emergency response hierarchy is depicted below.

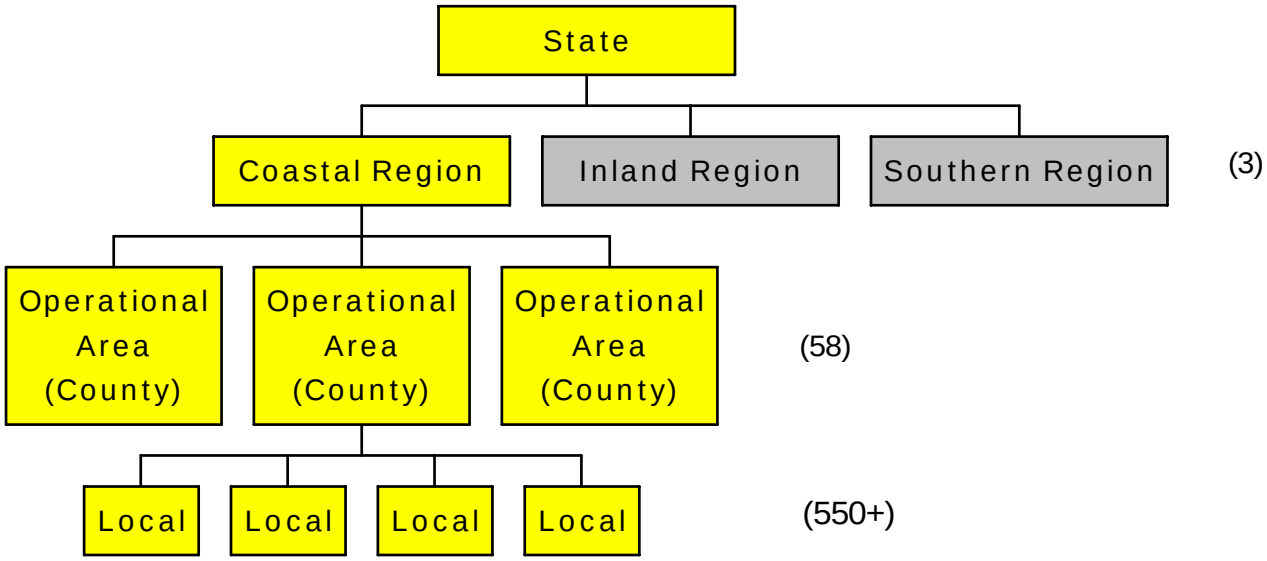


Figure 1-1 – Response Hierarchy

The state of California has been divided into six Mutual Aid Regions. The purpose of a mutual aid region is to provide for the more effective application and coordination of mutual aid and other emergency related activities. The Office of Emergency Services (OES) provides administrative oversight over the mutual aid regions through three Administrative Regional Offices located in the Inland Region at Mather Field, the Coastal Region in Oakland, and the Southern Region in Los Alamitos. These regional offices establish and maintain the Regional Emergency Operations Center (REOC).

1.2 Evaluator Qualifications

Local governments expressed concern in the past regarding the qualifications of Safety Assessment Program participants performing safety assessment. The following qualifications have been established in conjunction with the professional organizations and local government for individuals to be registered into the program as a SAP Evaluator:

- Professionally registered civil, structural or geotechnical engineers, professionally licensed architects (these can be registered in any state),

- Professionally registered geologists or engineering geologists, or

- Certified building inspectors or officials as follows: Building Inspector [ICC], Building Plans Examiner [ICC], Combination Inspector [ICC], Building Code Official [ICC], Certified Building official (ICC), Master Code Professional [ICC], Residential Building Inspector [ICC], Residential Combination Inspector [ICC], Combination Plans Examiner [ICC], Building Code Official [ICC], Construction Inspector – Division II [ACIA], Division of the State Architect Classes 1 & 2, and OSHPD Class A. *(For a current list of recognized certifications, please visit the SAP web page at the OES website,* www.oes.ca.gov. *)*

- CALBO resources must be employed by a local agency responsible for plan checking and/or inspections.

- Those not meeting these requirements may be deployed as part of the program but will serve as assistants to evaluators and coordinators until such a time as they secure their professional registration, license or qualifying certification. Their valuable services may include safety watch and on-site data management, and in the case of code enforcement personnel, necessary interactions with distraught members of the public.

Additionally, individuals must have:

- **General knowledge of construction** - the evaluator must be able to look at any particular framing system and rapidly identify the system, know how it works, and the corresponding load path.

- **Professional experience** - the evaluator must have practical experience working with the various framing systems. This experience may come from designing and detailing systems, reviewing the designs and details prepared by others, or inspecting the actual construction of the systems.

- **Judgment** - above all else, evaluators must be able to look at a damaged or potentially damaged system and, based on their knowledge and experience, make a judgment on the ability of that system to withstand another event of approximately equal magnitude.

Safety Assessment resources available to local government fall into three categories:

- DSW – Volunteer – individuals from the private sector,

- DSW – Local – Engineers, Architects, and Building Inspectors working for local governments, and

- DSW – State – Engineers, Architects, and Building Inspectors working for State Agencies.

1.3 Issues Surrounding Deputizing Individuals, Liability, and Workers' Compensation

There have been concerns over the issues of deputizing, liability, and worker's compensation since the Safety Assessment Program was first developed. The purpose of this section is to identify and address the main issues regarding these three topics.

1.3.1 Deputizing Resources

OES recommends that a jurisdiction deputize the responding resources as Deputy Building Inspectors because only authorized representatives of a jurisdiction can post official jurisdiction placards. These are placards that have been formally adopted by the jurisdiction, carry the jurisdiction's seal and the authorizing ordinance number, and carry the weight of law.

Mutual aid resources are not representatives of the jurisdiction, consequently they cannot post official placards. When performing evaluations, the responding individuals can post only generic placards that are simply recommendations. If the jurisdiction wishes to have official placards used, they must either:

- deputize the responding individuals;

- send one of their inspectors with each team who will post the official placard; or,

- send an inspector out to the subject building and replace the generic placard with an official placard.

Some jurisdictions believe that they become financially responsible for Workers' Compensation if they deputize the individuals who respond through mutual aid. This is not true. State resources from the private sector are provided with Workers' Compensation through the State of California, and local government resources receive their protection from their home jurisdictions.

1.3.2 Liability Issues

Liability protection is available to all who respond. These issues are not as prevalent with local government representatives because, as civil servants, they cannot be held personally liable for their actions while performing the responsibilities and duties of their particular department. When individuals are provided by one jurisdiction to another to assist in the time of an emergency, these individuals perform the duties and responsibilities of their particular department. Once the receiving jurisdiction deputizes the individuals, they are protected through the receiving jurisdiction as a representative of that jurisdiction.

Liability protection for the private sector resources is a bit more complicated but just as viable. There is the general protection provided by California's Good Samaritan Law, which provides general immunity for anyone helping during a situation. This law was not really intended for disaster situations, but does provide some immunity nonetheless. Private sector resources are organized and registered by the Office of Emergency Services as Disaster Service Workers. In accordance with the ***California Emergency Services Act*** Section 8657:

> "*(a) Volunteers duly enrolled or registered with the Office of Emergency Services or any disaster council of any political subdivision, or unregistered persons duly impressed into service during a state of war emergency, a state of emergency, or a local emergency, in carrying out, complying with, or attempting to comply with, any order or regulation issued or promulgated pursuant to the provisions of this chapter or any local ordinance, or performing any of their authorized functions or duties or training for the performance of their authorized functions or duties, shall have the same degree of responsibility for their actions and enjoy the same immunities as officers and employees of the state and its political subdivisions performing similar work for their respective entities."*

In 1977, the State's Attorney General issued a response to a series of questions presented by OES regarding the liability protection afforded by the ***California Emergency Services Act***. The following are extracts of that opinion:

> ***Question:*** *May structural engineers who are registered as Disaster Service Workers be utilized to assess the extent of damages incurred by buildings in an area struck by earthquakes?*
>
> ***Answer:*** *Structural engineers who are registered as Disaster Service Workers may be utilized to perform post-earthquake damage assessments following the proclamation of a State of Emergency or a Local Emergency.*
>
> ***Question:*** *Would the appointment of such engineers as Deputy Building Inspectors, without pay, affect their eligibility for state workers' compensation?*
>
> ***Answer:*** *The appointment, without pay, of structural engineers who are registered Disaster Service Workers as Deputy Building Inspectors by government entities would not affect the engineer's entitlement to State Disaster Workers' Compensation Benefits, which would remain*

the exclusive remedy for physical injuries suffered by them while performing related activities.

Question: *Would such engineers be required to be "fully conversant" with local building safety codes?*

Answer: *Volunteer Engineer/Disaster Service Workers would not be required to be fully conversant with local building and safety codes.*

Question: *If a local engineer, building inspector, or volunteer engineer certifies a structure is safe for occupancy and, when occupied, it collapses and individuals are injured, would the local entity, the state, or the certifying engineer be liable?*

Answer: *No liability would attach to a public entity, its employees, or a Disaster Service Worker under the circumstances presented.*

Additional liability protection exists for licensed architects and registered engineers through the ***State of California Business and Professions Code***, Chapter 30, Section 5536.27 for architects and Section 6706 for engineers. After the Loma Prieta Earthquake in 1989, many architects volunteered their services to the City of Oakland to assist in the safety assessment of buildings. Concerned about future liability, they championed SB46x that passed in 1990. This legislation modified the Business and Professions Code to provide liability protection for professionally licensed architects and registered engineers. The stipulations are that the:

- evaluations must be performed within the first 30 days after the earthquake;
- services must have been requested by a public official, public safety officer, or city or county building inspector acting in an official capacity;
- no fee is paid or taken.

1.3.3 Workers' Compensation

As can be seen from the above extract from an Attorney General's Opinion, the private sector resources are provided with workers' compensation through the ***California Emergency Services Act***. Section 8580 of the Act states:

"The Emergency Council shall establish by rule and regulation various classes of disaster service workers and the scope of the duties of each class. The Emergency Council shall also adopt rules and regulations prescribing the manner in which disaster service workers of each class are to be registered. All of the rules and regulations shall be designed to facilitate the payment of workers' compensation."

CALBO members are covered by their home jurisdiction and State agency personnel are provided Worker's Compensation through the State.

1.4 Program Registration

Safety Assessment Program evaluators are managed in the program through one of two ways:

- Through their professional organization; or
- Through their employment by a State Agency.

In both cases, individuals to be registered by OES must meet the minimum qualifications previously presented. Additionally, to become registered, individuals must:

- Complete the one-day standardized training program presented by a certified trainer;
- Have a digital picture taken for the ID card; and
- Complete and sign the Loyalty Oath.

OES determined that all Disaster Service Worker ID cards issued prior to July 2002 expired in December of 2003. In order to renew your identification card, you must complete this course. In the future, the intent is to have refresher courses available on the Internet. All cards will now expire on a 5-year cycle from the month training took place or the refresher course was completed.

A new ID Card has been designed so all cards will have a similar, identifiable look. Only OES will issue the identification cards.

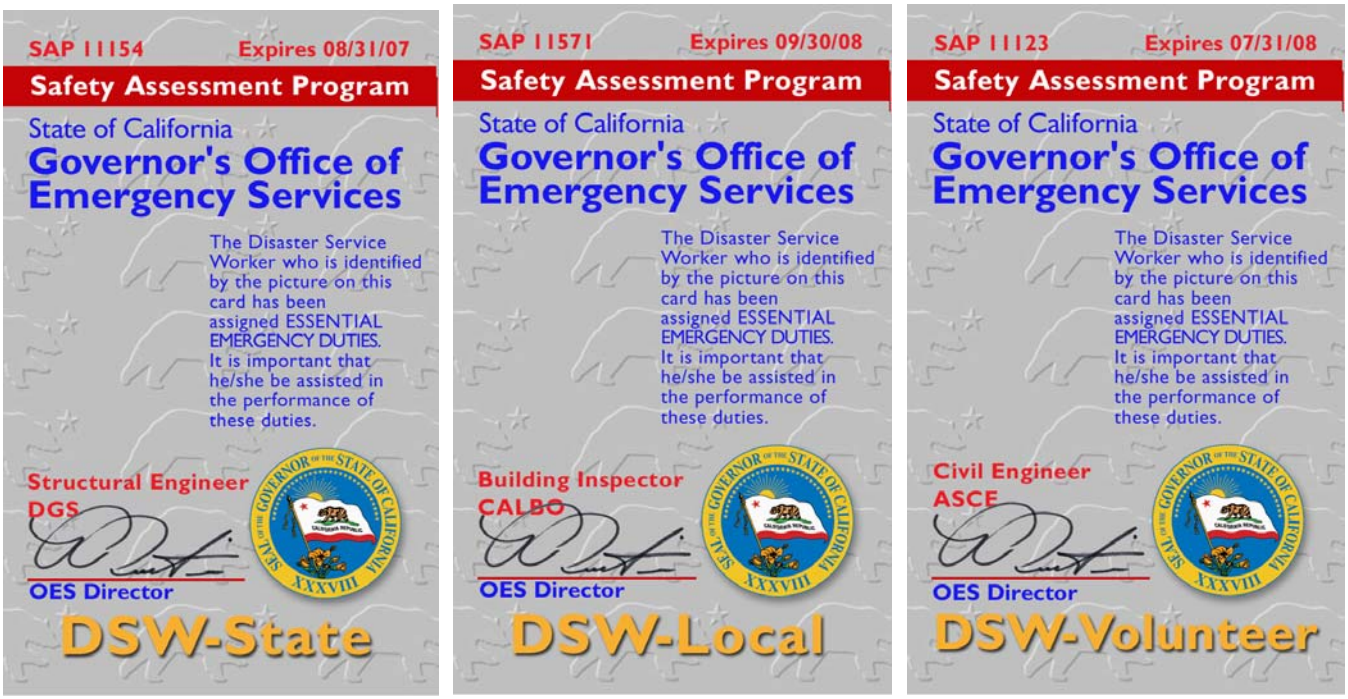


Figure 1-2 – SAP ID Cards

1.5 Reimbursements

All responding individuals will not have to pay for safety evaluation related expenses. They will be reimbursed for all housing, meals, travel and other related expenses. However, there are two reimbursement issues that all should be aware of:

- DSW Volunteers will not be able to receive wages while on a response. If they are paid, they lose their Worker's Compensation coverage through the Emergency Services Act and their employer will be responsible for the coverage. Employees must be on vacation or unpaid leave while working as a volunteer DSW.
- Volunteers who are not part of the OES Safety Assessment Program will not receive State Worker's Compensation coverage.

- For government employees, in accordance with the Master Mutual Aid Agreement, there is no expectation for reimbursement of salaries while on a response. During past activations of the program, there have been cases where the requesting jurisdiction has reimbursed the providing jurisdiction for their costs.

For requesting jurisdictions, their expenses related to the safety assessment process are eligible for reimbursement under the Public Assistance Program.

1.6 Activation Sequence

Once an event occurs, local government must reasonably commit their available resources to respond. For a building department, this means committing all of their inspection resources. This is usually done very early on, as many inspectors are sent out to do windshield surveys and initial tagging of essential facilities.

After the building department resources are committed, the jurisdiction evaluates their need for additional resources. If the event proves to be beyond their ability to respond to with available resources, they request assistance from the Operational Area.

Operational Areas include the County, all cities within the county, and all special districts. Special districts can include school districts, utility districts, etc. The county will be the lead agency for the operational area unless another arrangement is established by agreement.

CALBO inspectors are available to local governments through mutual aid. That is, a local jurisdiction can request building inspectors either directly from another jurisdiction within their Operational Area (pursuant to mutually agreed upon procedures and in coordination with the Operational Area Coordinator), or by requesting the Operational Area Coordinator to coordinate the request within the Operational Area between unimpacted jurisdictions, in accordance with SEMS. These resource requests follow the following model:

- Local Department Operations Center (DOC) determines need based upon contact with field forces at Incident Command Post(s) or Area Command. (note: small jurisdictions may not have a DOC, and so this coordination level will be done at the EOC)

- DOC forwards request to Local Emergency Operations Center (EOC), Operations Section, Construction and Engineering Branch or Public Works Branch Coordinator. The Branch Coordinator will determine, in coordination with the EOC Logistics Section if there are sufficient local resources available to meet the need from other departments, or through contracting them out.

- Local EOC Operations Section, Construction and Engineering or Public Works Branch Coordinator determines that there are not sufficient resources locally to meet the need in a timely fashion and forwards the request to the Operational Area EOC Operations Section, Construction and Engineering Branch or Public Works Branch Coordinator.

- Operational Area EOC, Operations Section, Construction and Engineering or Public Works Branch Coordinator coordinates the request among the local governments within the OA and obtains the resource or determines that there are not sufficient resources within the OA to meet the need.

- Operational Area EOC forwards the request to the Regional Emergency Operations Center (REOC), Construction and Engineering Branch Coordinator who, in cooperation with the State

Operations Center (SOC) SAP Coordinator, coordinates the request regionally with the unimpacted OAs and obtains the resource or determines that there are not sufficient resources within the Region to meet the need.

- This request is forwarded by the REOC to the SOC where the State SAP Coordinator is located. Knowing the number and classification of individuals that are being requested, the State SAP Coordinator contacts the appropriate organizations to activate them. The organizations then mobilize their members and report to the identified staging area for assignment.

- Generally, once arriving at the staging area, the evaluators sign in, report to the SAP coordinator, and are deputized. They obtain their briefing packet from the jurisdiction, and watch a refresher video on the Safety Assessment Program. Then they receive their work assignments as teams. The SAP coordinator provides guidance to the teams, including having all teams assess a structure together as an example. The teams proceed out to the field. At the end of the day, field staff return to debrief with the SAP coordinator, including review of the assessment forms for completeness and to discuss any field issues. The evaluators sign out for the day and return the next, until they are cycled out to return home.

1.7 Responsibilities

To facilitate activation of the Safety Assessment Program and call-out of the appropriate individuals, the various disciplines have the following recommended responsibilities. In this manner, OES knows which organizations to activate based on the needs of the requesting jurisdiction. This is simply guidance to the jurisdiction and the State for activation and is not intended to limit anyone to certain duties, apart from the limitations of their own qualifications. Actual assignments will be made by the jurisdiction based on their priorities.

By way of explanation, rapid evaluations are a quick safety review of the building, and comprise 95% of the SAP workload in earthquake disasters. (Percentages in flood and windstorm disasters are somewhat different.) Detailed evaluations are usually done after requests from the public or the building department, and are a lengthier, much more detailed review of the facility. Specialized teams are usually sent out to do those. With buildings, 5% of the post-earthquake building evaluations are detailed; all the infrastructure evaluations are detailed. More information on this is provided in Chapters 2 and 4.

- **Building Inspectors** perform ATC-20 rapid evaluations of all occupancies. They will also assist with detailed evaluations as needed.

- **Structural Engineers and Civil Engineers with a background in structures** perform ATC-20 rapid and detailed evaluations of buildings and structures. They also will assist various state agencies such as the Division of the State Architect and the Office of Statewide Health Planning and Development.

- **Civil Engineers and Structural Engineers with a background in lifelines** perform rapid and detailed evaluations of lifeline infrastructure systems and facilities. They are also available to assist state agencies such as the Department of Water Resources and Caltrans.

- **Architects** perform ATC-20 rapid and detailed evaluations of buildings and structures. They will also assist various state agencies such as the State Fire Marshal's Office and the Division of the State Architect.

The figure on the next page shows these responsibilities in the form of an organizational chart. This is the type of chart that the OES SOC will use to determine the appropriate disciplines to be activated

based on requests for assistance. Again, this is provided for guidance only to the State and local government and is not intended to limit any individual or group to a specific type of evaluation. Such limitations come from the individual's experience and background.

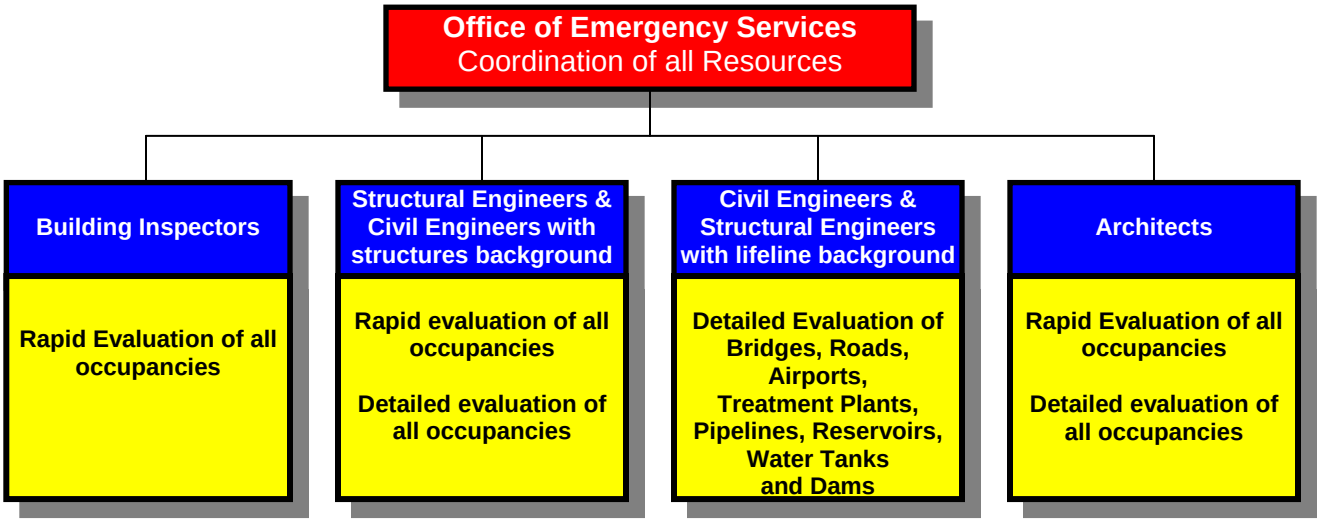


Figure 1-3 Discipline Responsibilities

For small events, only those individuals within the disaster area or immediate surrounding area will likely be activated. In this manner, they will not need housing and will be used on a limited basis.

For large events, individuals from within the disaster area will not be activated. Local government building inspectors will be inspecting buildings within their own jurisdiction and will not be available. Private sector individuals will have their own clients who will require assistance. Consequently, the program will be activated outside the disaster area.

Each professional organization at the state level has appointed a "SAP Coordinator" who oversees the safety assessment activities of the individual chapters or sections. Each section or chapter, known as a subdivision, has a "subdivision SAP Coordinator" who:

- organizes the call-out procedures for the specific subdivision;
- organizes and arranges training and registration programs; and
- initiates the subdivision's call-out.

During activation, DSW-Volunteers are activated for five days. DSW-Local and DSW-State resources are optimally activated for five days as well, but it could be longer. This could lead to a six to seven day involvement, allowing for half to one day each way travel to and from the assignment. Deployed SAP coordinators will usually have an overlapping schedule so as to brief the incoming SAP coordinator on effective procedures for the current disaster, and initially to get set up for the SAP evaluators.

The following chart depicts the organization and the process of activating the Safety Assessment Program.

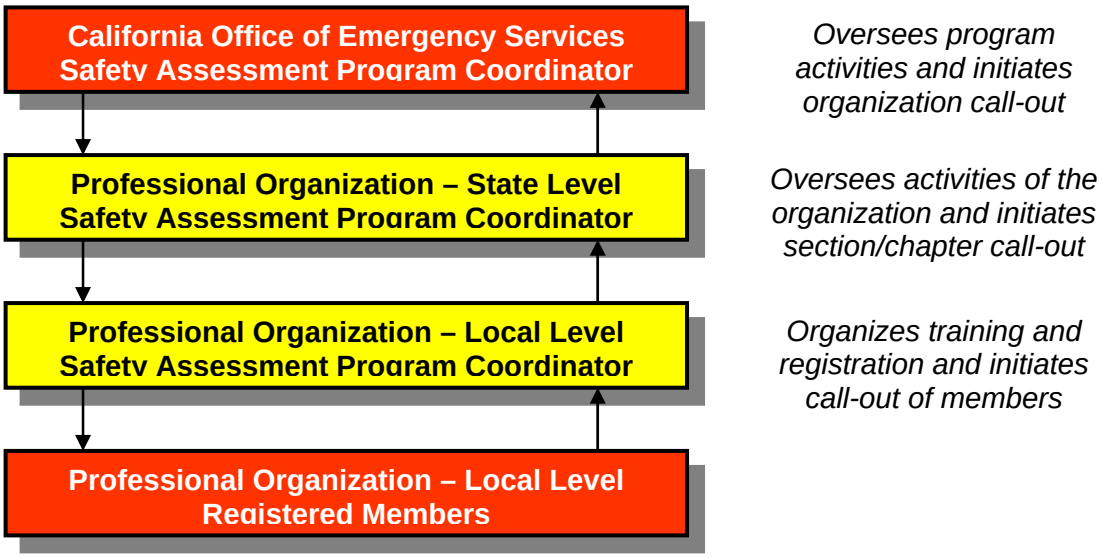


Figure 1-4 Organization of SAP

1.8 Who has Safety Assessment Responsibilities?

Any government entity that regulates building or lifeline construction and is responsible for facility safety has safety assessment responsibilities. This responsibility falls under governments' role of providing for public health and safety.

In the post-disaster theater, it is very important that habitable buildings be identified quickly. Some of these buildings will be used for medical care for victims, emergency management operations, and potential mass shelter facilities; but the vast majority of buildings are privately owned and provide a vital role in the economy of the area. Private businesses need to become operational as soon as possible after a disaster so the economy gets moving. The faster the economy of the impacted area returns to normal, the faster the recovery phase of the operation will be completed.

The following is a list of government agencies responsible for the performing safety assessments and the occupancies under their jurisdiction. These agencies will use the resources available in the Safety Assessment Program.

Buildings and Structures

- *Local government* is responsible for their own facilities, all privately owned businesses, single-family residences, and multi-family residences within their jurisdiction as well as all structures and lifeline infrastructure not specifically excluded below.

- *Division of the State Architect, Structural Safety Section* is responsible for all public schools (Kindergarten through 12th grade), Community Colleges, and all state-owned or -leased facilities. DSA will be developing safety assessment response protocols for these jurisdictions, but currently does not have the oversight responsibility for the safety assessment of schools. The Safety Assessment Program resource is one of the options available for school districts for safety evaluation and tagging of facilities after a disaster.

- *Office of Statewide Health Planning and Development* is responsible for all hospitals and skilled-nursing facilities.

- *State Fire Marshal's Office* is responsible for the fire and life-safety elements of all state-owned or -leased facilities, as well as non-ambulatory care facilities. Fire elements refer to fire suppression systems, alarms, detectors, etc. Life-safety elements refer to exits, corridors, stairways, etc.

- *Department of Housing and Community Development* is responsible for over 80% of the mobile home and manufactured home parks in California.

- *Federal government* is responsible for all federal buildings and installations no matter where the facilities are located. These assessments are usually performed by the U.S. Army Corps of Engineers from the area in which the disaster event occurs.

Lifelines:

- *Local Government Public Works* are responsible for the streets, bridges, storm drains, sewers, etc., which traverse the jurisdiction.

- *Special Utility Districts* are responsible for the pipelines and/or transmission lines that they install and maintain.

- *Department of Water Resources, Safety of Dams* is responsible for all dams except those owned or operated by the US Army Corps of Engineers or the Bureau of Reclamation.

- *Department of Water Resources, Flood Operations* is responsible for all levees, canals, and state water projects.

- *Caltrans* is responsible for all Federal in-service roads (those which are part of the national highway system) and all state-owned and -operated roads, highways, bridges, and overpasses.

The evaluation/inspection process is not limited to the jurisdiction's building department and the additional resources they may request. Many other agencies will be in the area performing various types of inspections and evaluations. Understanding and being prepared for the potentially large number of individuals who will be in the jurisdiction can help eliminate redundant efforts and lead to a sharing of information and cooperation between the agencies.

In addition to those agencies with safety assessment responsibilities, the following agencies and individuals will be in the area performing evaluations or reporting on the damage:

- *Red Cross* **-** within 24 hours of the event, the Red Cross will be in the area performing its preliminary damage assessment, which consists of a windshield survey. This process is followed by a detailed assessment, which will be completed within 72 hours after the event. These inspections assist the Red Cross in determining sheltering, food, and temporary housing needs.

- *State Department of Insurance* - sends a team, which includes state and private insurance representatives, immediately after an event. The team is called the Insurance Damage Assessment Team (IDAT).

- *Insurance Companies* - once individuals begin to file claims with their insurance companies,

adjusters will be in the area performing verification inspections.

- *Media - print, radio and television* - their presence will be apparent within minutes of the event. Reporters and camera crews will tour the streets looking for damage to broadcast and damage information from public officials. If the media are encountered while performing evaluations, the evaluators should politely refer them to the building department, or to the EOC Public Information Officer (PIO). Each jurisdiction has their own protocol for addressing media questions, and evaluators should not be providing information without the express permission of the building department.

After a local government requests that the Governor proclaim a State of Emergency, the Office of Emergency Services will send in damage assessment teams to work with local government to perform preliminary damage assessments (PDA) of those facilities eligible for State financial assistance. PDAs are inspections for developing more accurate repair estimates than the windshield surveys furnish by rapidly inspecting the facilities for potential repairs. Once the Governor asks the President to declare a major disaster, the Federal Emergency Management Agency (FEMA) sends in damage assessment teams. SAP teams are not part of this process and are not to be requested to perform "damage assessment" for recovery work. However, local governments may request recovery assistance utilizing mutual aid channels from other local governments.

- *OES Disaster Assistance* **-** OES usually arrives before FEMA to perform state PDAs. The inspectors team up with local representatives and begin assessing the damage. This early assessment helps provide information as to whether or not the State needs to request assistance from the Federal Government.

- *FEMA - damage assessment for public assistance* - FEMA inspectors will make contact with the State inspectors and join local government representatives to perform the preliminary damage assessment of public facilities for federal public assistance. They inspect damaged buildings and facilities and gather cost information relating to the emergency response, repairs, and the budgets. Once there is a Presidential Declaration, these inspectors perform more detailed inspections of the damaged facilities in order to develop project worksheets, which are the funding grants for Federal financial assistance.

- *FEMA - damage assessment for individual assistance* **-** as with public facilities, FEMA will have inspectors teamed with State inspectors to look at residential areas and the commercial business districts. They gather information and make cost estimates on the potential repairs of these damaged areas. Once a Presidential Declaration is made, the FEMA inspectors perform verification inspections when the property owner has applied for individual assistance.

- *Small Business Administration* - once there is a Presidential Declaration, the Small Business Administration will be in the area providing assistance to businesses and homeowners. Their inspectors perform verification inspections after applications for assistance have been made.

As we can see by the list of agencies involved in various forms of building inspections, there will be a large number of individuals in the area at any given time. Be prepared!

1.9 Roles and Responsibilities

Throughout the safety assessment process, there are clearly defined roles and responsibilities for the evaluator and local government.

Evaluators will:

- Assess the safety of essential services facilities (these are facilities deemed necessary to the emergency management effort and/or per the local emergency plan, not necessarily "essential services facilities" as described in the building code);
- Perform rapid evaluations of all occupancies;
- Perform detailed evaluation of those questionable buildings, or as assigned by the building department.

Evaluators will NOT:

- Provide cost estimates for the buildings they have evaluated. There are two reasons for this. Estimating disaster-caused building repair costs is "damage assessment," and is not directly eligible for reimbursement under state and federal disaster grant regulations. Also, building costs can be widely different from one location to another, and it is best left to the local entity to derive these repair costs.
- Perform evaluations using code compliance as a criteria;
- Provide escort or property retrieval for owners or occupants of buildings.

Local government's roles and responsibilities include:

- Appointing a SAP Coordinator who will be responsible for managing the program during a response and will develop the Department Operations Plan;
- Formally adopting the placards and issuing them to the evaluators as needed.
- Deputize the responding evaluators. If local governments do not wish to deputize the evaluators, they must be prepared to either send their staff out to replace generic placards, or assign one of their inspectors to each evaluation team.
- When the evaluators arrive, provide them with a formal briefing on conditions within the jurisdiction, what they will be doing, and who to report to,
- Provide the evaluators with lodging and meals, or the means to get reimbursed for same;
- Ensure that all authorities for the work to be performed are in place and current; and
- Provide them with key telephone and address information regarding disaster assistance to provide to the public if asked, along with police, fire, utility, and hazardous materials response telephone numbers for their own use.

1.10 Terminology

The following are key terms or concepts that the responding safety assessment evaluators should be familiar with:

- **ATC-20 - INSPECTED - Habitable, minor or no damage** - this green placard is used to identify buildings that have been inspected but in which no serious damage has been found. These structures are in a condition that allows them to be lawfully reoccupied; however, repairs may be necessary.

- **ATC-20 - RESTRICTED USE - Damage which represents some degree of threat to occupants** - Restricted Use is intended for buildings that have been damaged; yet the damage does not totally preclude occupying the structure. It can mean that parts of a structure could be occupied, or it could be used to denote those buildings that can be entered for a brief period of time only to remove possessions. The use of a Restricted Use placard will minimize the number of buildings which will require additional safety assessments because restrictions can be placed on the use and occupancy of the structure until such a time as the owner can retain an architect or engineer to develop the necessary repair program.

- **ATC-20 - UNSAFE - not habitable, significant threat to life safety** - the red ATC-20 Unsafe placard is used on those structures with the most serious damage. Typically, these are structures that represent a threat to life-safety should they be occupied. It is important to note that this category does not mean the building must be demolished. This placard carries the statement, "THIS IS NOT A DEMOLITION ORDER" to clarify that the building simply is not safe enough to occupy. In the vast majority of cases, structures posted unsafe can be repaired to a safe and usable condition.

- **Damage assessment** - The process that local and state agencies must perform to determine type and quantity of damage and the cost to repair those damages. This work is usually associated with disaster assistance applications from the jurisdiction to the State, or through the State to FEMA.

- **EOC - Emergency Operations Center** - A local government facility from which the emergency management is done. It provides support for all field operations and sends resources to various field operations. Additionally, policy decisions are developed and dispersed through the EOC.

- **Mutual Aid** - A process to facilitate assistance to areas stricken by an emergency without the execution of written agreements customarily entered into by public agencies exercising joint powers. Mutual aid is based on the concept of "neighbor helping neighbor" in time of need without the expectation of being compensated. Mutual aid assistance can encompass any type of resource (material, equipment, or personnel) from other jurisdictions, the State, and even the private sector. The State of California Master Mutual Aid Agreement governs California's mutual aid program.

- **Incident Command System (ICS)** – A management tool that is used during emergency response operations. ICS is an organizational structure that encourages communication vertically through the organization as well as laterally between sections. ICS also incorporates incident action planning into operations, allowing for the definition of measurable goals to keep the operation coordinated.

- **Operational Area** – One of the five levels of the Standardized Emergency Management System. Generally speaking, an Operational Area is composed of a county and all cities and special districts within that county. The Operational Area is responsible for supporting all cities and special district tactical operations, and communicating event operational status to the next SEMS level, *i.e.*, the State Regional Emergency Operations Center (REOC).

- **Red Cross Designation - DESTROYED - Not habitable, cannot be repaired** - Red Cross

volunteers will perform evaluations for determining sheltering needs immediately after a disaster. These volunteers are seldom individuals with engineering or construction background, and their evaluations are usually limited to subjective visual windshield surveys of damaged areas. The criteria for the various categories are based on flood type damage and have very little comparison to earthquake damage. This designation is used by the Red Cross to help them determine the need for long-term housing.

- **Red Cross Designation - MAJOR - Not habitable, needs extensive structural repair** - This designation is probably closer to being equivalent to the ATC-20 UNSAFE placard. Again, this information is used by the Red Cross to determine sheltering and housing needs only and may have no relation to actual structural condition.

- **Red Cross Designation - MINOR - May be habitable, needs minor repairs and/or clean-up** - This designation falls somewhere between the ATC-20 RESTRICTED USE and the INSPECTED placards.

Participants should keep in mind that only authorized representatives of the jurisdiction or Safety Assessment Program Evaluators who have been deputized as Deputy Building Inspectors are authorized to post official habitability/occupancy placards as designated by the jurisdiction and defined by ordinance.

- **REOC - Regional Emergency Operational Center** - This is the facility operated and maintained by the State of California within the regional area being served. REOCs are located in Los Alamitos for the Southern Region, Oakland for the Coastal Region, and Mather in Sacramento County for the Inland Region. It is through these operations centers that the State provides support to the Operational Areas, coordinates requests for statewide resources, and provides the communication link between local government and the State of California. REOC operations are under the jurisdiction of the Governor's Office of Emergency Services.

- **Safety assessment** - The process by which buildings of all occupancies, and infrastructure lifelines, are evaluated for their safety for immediate occupancy or continued use. This process is under the direction of local government through their building and safety or public works departments. During safety assessments, damage assessment must not be done.

- **SOC - State Operations Center** - This is the facility operated and maintained by the State of California in Sacramento County from which all requests for assistance are coordinated. All response efforts from State Agencies and State resources are also coordinated and directed from this location.

Notes:

(This page intentionally left blank)

UNIT 2 ICS / SEMS / NIMS OVERVIEW

Unit 2 Training Guidance

Overview

This section is a basic overview of the Incident Command System (ICS), the Standardized Emergency Management System (SEMS), and a review and update of the National Incident Management System (NIMS).

Training Goal

This course will provide participants with a basic awareness of ICS, SEMS, and NIMS, and their use and/or requirements.

Objectives

At the end of this unit participants will be able to:

- Explain the features of ICS
- Understand how the Safety Assessment Program fits within the ICS functions
- Be aware of the use of ICS within SEMS
- Understand the features and components of SEMS
- Understand the five levels of government within SEMS;
- Relate the additional requirements of NIMS on SEMS
- Explain the measure for NIMS compliance in California

2.0 ICS / SEMS / NIMS Overview

2.1 Incident Command System (ICS)

The Incident Command System (ICS) was developed as a part of the FIRESCOPE (Firefighting Resources of California Organized for Potential Emergencies) program during the 1970s. Property losses ran into the millions, and there were many casualties. These losses prompted a case study which revealed that inadequate management was the single largest contributor to response problems.

Weaknesses in incident management included:

- Lack of accountability
- Poor communication
- Lack of a planning process
- Overloaded Incident Commanders
- No method to integrate interagency requirements

It was learned that the often unique local emergency response systems were not equipped to deal with massive mutual aid responses involving scores of responding agencies. As a result, ICS was developed to provide an integrated and consistent framework for disaster response. ICS eventually became one of the foundation elements of the Standardized Emergency Management System (SEMS), and is at the heart of the National Incident Management System (NIMS). ICS is recognized worldwide as the preferred approach for managing incidents and disasters.

2.1.1 ICS Features

ICS allows for a consistent approach for responding agencies to work together to combat the incident or disaster. The primary features of ICS are:

1. **Five Functions:** ICS divides the workload into five functions, these being management/command, operations, logistics, planning/intelligence, and finance/administrative. This allows each of the workload items to be handled by persons experienced in these fields.

2. **Span of Control:** ICS also defines an effective "span of control," restricting the number of staff under a manager or commander to a maximum ratio of one to seven, and an ideal ratio of one to five or less.

3. **Chain of Command:** ICS establishes that there will be a single authority completely responsible for the outcome of the incident management. This can either be a Single Command where there is one agency involved, or a Unified Command which can involve multiple jurisdictions. In a Unified Command, a single, coordinated Action Plan will direct all activities.

4. **Unity of Command:** In ICS, a staff member reports to only one supervisor or commander. This eliminates conflicting direction from more than one manager to staff.

5. **Management by Objective:** The Management/Command and Planning/Intelligence functions are responsible for developing a set of Strategic Objectives in an Action Plan that will be carried

out during the next Operational Period. The Operational Period can vary in length from an hour to twelve hours or longer, depending on the nature of the incident.

6. **Common Terminology:** Essential for interagency cooperation is the use of a "plain language" common set of terms for communications and team building.

7. **Integrated Communications:** Use of a common communications plan is also essential, so that communications between agencies occurs unimpeded. This element is also known as "interoperability," and consists of the necessary hardware, the planning effort for using all available communications resources, and the networks for transferring information internally and externally.

8. **Comprehensive Resource Management:** ICS requires the tracking and accounting of all assets and personnel during an incident response, from mobilization to demobilization.

2.1.2 ICS Functions

The following table provides a brief summary of the titles and definitions of activities associated with these functions. **The Safety Assessment Program generally fits under the "Construction and Engineering Branch" of the Operations Function.**

Primary ICS Function	Field Response Level	Emergency Operation Center Level
Command/Management	Command is responsible for the directing, ordering, and/or controlling of resources.	Management is responsible for overall emergency policy and coordination.
Operations	The coordinated tactical response of all field operations in accordance with the Incident Action Plan.	The coordination of all jurisdictional operations in support of the response to the emergency in accordance with the EOC Action Plan.
Planning/Intelligence	The collection, evaluation, documentation, and use of information related to the incident.	Collecting, evaluating, and disseminating information and maintaining documentation relative to all jurisdiction activities.
Logistics	Providing facilities, services, personnel, equipment, and materials in support of the incident.	Providing facilities, services, personnel, equipment, and materials in support of all jurisdiction activities as required.
Finance/Administration	Financial and cost analysis and administrative aspects not handled by the other functions.	Broad fiscal and recovery responsibility as well as overall fiscal accountability.

2.2 Standardized Emergency Management System (SEMS)

As a result of the 1991 East Bay Hills Fire in Oakland, Senate Bill 1841 was passed by the legislature and made effective January 1, 1993. The law is found in Section 8607 of the Government Code. The intent of this law is to improve the coordination of state and local emergency response in California.

The statute directed the Governor's Office of Emergency Services (OES), in coordination with other state agencies and interested local emergency management agencies, to establish by regulation the Standardized Emergency Management System (SEMS). The SEMS Regulations took effect in September of 1994.

2.2.1 Purpose and Scope of the SEMS Law

The basic framework of SEMS incorporates the following:

- The Incident Command System (ICS)
- Inter-agency coordination
- The State's Master Mutual Aid Agreement and mutual aid program
- The operational area structure
- Five-level emergency management response organizational structure, activated as needed.

More information on each of these is found later in this discussion.

The use of SEMS facilitates:

- The flow of emergency information and resources within and between involved agencies at all SEMS organizational levels.
- The process of coordination between responding agencies.
- The rapid mobilization, deployment, use, and tracking of resources.

SEMS is designed to be flexible and adaptable to the varied emergencies that can occur in California, and to meet the emergency management needs of all responders.

By law, State agencies must use SEMS when responding to emergencies involving multiple jurisdictions or agencies. Local governments are strongly encouraged to use SEMS, and they must use SEMS to be eligible for state funding of eligible response related personnel costs. While local governments are not required to take the SEMS Approved Course of Instruction (ACI), they are required to ensure that responders can successfully implement SEMS when necessary through their training.

SEMS is a management system based on a proven approach that has been in use for over twenty years. SEMS provides an organizational framework and guidance for operations at each level of the State's emergency management system. It provides the umbrella under which all response agencies may function in an integrated fashion.

2.3 Need for SEMS Training

Training is essential to the effective use of SEMS at all levels. The State has developed and provided an Approved Course of Instruction (ACI). Agencies may use the Approved Course of Instruction developed by the State, or use an internal training program to meet required training competencies. Training competencies are described in the State's training curriculum as performance objectives. This training is available through the California Specialized Training Institute (CSTI); more information is available at OES' website at www.oes.ca.gov.

There are four courses within the SEMS Approved Course of Instruction:

1. **Introductory Course** - A self-study or instructor-based course.

2. **Field Level Course** - Seventeen modules of instruction on the Incident Command System are available for the Field Response Level.

3. **Emergency Operations Center (EOC) Course** - This course consists of three chapters that can be adapted for use by all agencies or organizations utilizing emergency operations centers.

4. **Executive Course** - An executive overview of SEMS, provided as self-study or instructor based.

The Approved Course of Instruction includes participant reference materials, instructor guidelines, visual materials, and tests and exercises.

2.4 SEMS Components and Features

2.4.1 Four Components of SEMS

SEMS integrates several of the State's primary emergency response programs. The primary components within SEMS are:

1. **The Incident Command System (ICS)** - developed as a part of the FIRESCOPE program, (Firefighting Resources of California Organized for Potential Emergencies), during the 1970's, by an inter-agency working group representing local, state and federal fire services in California.

   After field tests, ICS was adopted by the fire services in California as the standard all hazards response system. ICS also has been adopted nationally by the federal land management agencies as the standard for response to all wild land fires.

   A National, generic version of ICS was developed by a multi-discipline working group which is used in the SEMS Field Response Level Course. Modules on Mutual Aid and addressing coordination between the field and other SEMS levels have been added to that curriculum.

2. **Inter-agency Coordination** - as it applies to SEMS, means the participation of various agencies and disciplines involved at any level of the SEMS organization working together in a coordinated effort to facilitate decisions for overall emergency response activities, including the sharing of critical resources and the prioritization of incidents.

   The cooperative and collaborative working relationship between police, fire, public works, and parks departments in an EOC is an example of Inter-agency coordination as intended in SEMS. Another example would be the collaborative operational coordination that might occur between municipal police, county sheriff, California Highway Patrol, and National Guard elements that are involved in the same response.

   SEMS Guidelines and the Approved Courses of Instruction all describe how inter-agency coordination takes place at various SEMS levels.

3. **The Master Mutual Aid Agreement** - was originally signed in 1950. Under this agreement, cities, counties and the State joined together to provide for a comprehensive program of voluntarily providing services, resources, and facilities to jurisdictions when local resources prove to be inadequate to cope with a given situation.

   Written mutual aid plans and operating procedures have been developed for several discipline specific mutual aid systems that function on a statewide basis within the Master Mutual Aid Agreement. Examples of these are fire and law enforcement.

The mutual aid systems, current and planned, form essential links within SEMS. A comprehensive discussion of mutual aid is contained in SEMS Guidelines, and Module Sixteen of the Field Level Course of Instruction is devoted to the subject of Mutual Aid.

4. **Operational Areas** - one of the five organizational levels in SEMS. An Operational Area consists of a county, and all political subdivisions within the county area. The governing bodies of each county and of the political subdivisions in the county organize and structure their operational area. The county will be the lead agency for the operational area unless another arrangement is established by agreement.

   The lead agency is responsible for:

   - coordinating information, resources, and priorities among the local governments within the operational area,
   - coordinating information, resources, and priorities between the regional level and the local government level, and
   - using inter-agency coordination to facilitate decisions for overall operational area level emergency response activities.

   Overall responsibility for the formation of the Operational Area rests with the Chairman of the Boards of Supervisors in each county.

   The operational area is used:

   - for coordination of emergency activities within the geographic area of the county, and
   - to serve as a link in the system of communications and coordination between the OES Regional EOC (REOC) and the EOCs of the political subdivisions within the operational area.

2.4.2 Organizational/Response Levels and Activation Requirements

SEMS regulations describe five organizational response levels; ICS is used at each level. The levels are:

- Field
- Local Government
- Operational Area
- Region
- State

The following is a brief description of each level:

1. **Field Response Level** - the level where emergency response personnel and resources carry out tactical decisions and activities under the command of an appropriate authority in direct response to an incident or threat. SEMS regulations require the use of ICS at the field response level of an incident. The Field Response level is described in the SEMS Guidelines, and in the Field Level Approved Course of Instruction.

2. **Local Government Level** - includes cities, counties, and special districts. Local governments manage and coordinate the overall emergency response and recovery activities within their jurisdiction. In SEMS, the local government emergency management organization and its relationship and connections to the Field Response level may vary depending upon factors related to geographical size, population, function, or complexity. The local government level is described further in the SEMS Guidelines.

3. **Operational Area Level** - an intermediate level of the state's emergency services organization, which encompasses the county and all political subdivisions located within the county. The Operational Area manages and/or coordinates information, resources, and priorities among local governments within the operational area, and serves as the coordination and communication link between the local government level and the regional level. It is important to note, that while an operational area always encompasses the entire county area, it does not necessarily mean that county government itself manages and coordinates the response and recovery activities within the county. In most cases, the county EOC will function as both the Operational Area EOC and the EOC for the county.

4. **Regional Level** - the state has been divided into six Mutual Aid Regions. The purpose of a mutual aid region is to provide for the more effective application and coordination of mutual aid and other emergency related activities. The Office of Emergency Services (OES) provides administrative oversight over the mutual aid regions through three Administrative Regional Offices. In SEMS, the regional level manages and coordinates information and resources among operational areas within the mutual aid region, and also between the operational areas and the state level. The regional level also coordinates overall state agency support for emergency response activities within the region. The regional level is described further in the SEMS Guidelines.

5. **State Level** - operates the State Operations Center (SOC) at OES Headquarters in Sacramento. It is responsible for coordinating resource requests and resolving priority issues that might arise at the Region level, between the three OES Administrative Regions. The State Operations Center is also responsible for coordinating with FEMA and other federal agencies involved in the implementation of the Federal Response Plan in California. The state level is described further in the SEMS Guidelines.

2.4.4 SEMS Concept of Teamwork, Coordination, and Effectiveness

SEMS as a management system provides for a fully integrated and coordinated response to emergencies involving multiple agencies and jurisdictions at all SEMS levels.

2.4.5 SEMS Implementation

The SEMS Statute requires all state agencies to implement and use SEMS in responding to emergencies involving multiple agencies and jurisdictions.

Local agencies are encouraged to implement SEMS, but are not required to do so under law. Use of SEMS by local government agencies is required to obtain state reimbursement for eligible response related personnel costs.

The following material has been developed by an inter-agency working group to assist state and local agencies in implementing and maintaining SEMS:

1. SEMS Statute - Government Code Section 8607, January 1993.

2. SEMS Regulations - California Code of Regulations Title 19, Division 2, Sections 2400-2450.

3. SEMS Guidelines - in three parts.

4. SEMS Approved Course of instruction:

   - Introductory Course
   - Field Course
   - Emergency Operations Center Course
   - Executive Course

2.5 National Incident Management System (NIMS)

NIMS is a federal program with the aim of implementing ICS into the emergency management structures of all 50 states, territories, and tribal governments. It also seeks to unify these systems into a single approach to emergency management.

Because NIMS borrowed from California's SEMS structure, the integration of NIMS into SEMS has not involved any vast, profound adjustments of SEMS. The changes to date have been in the form of add-ons or simple adjustments to the SEMS processes. These have mostly occurred with regards to:

- After Action/Corrective Action Reports,
- resource management (equipment and personnel typing), and
- training.

California as a whole is far in advance of other states with respects to compliance with NIMS, due to California's successful implementation and daily use of SEMS.

2.5.1 NIMS After Action/Corrective Action Reports

California's SEMS law requires that OES produce a statewide After Action Report compiling the efforts of state agencies and local governments with respect to the response and recovery efforts of declared disasters. NIMS goes beyond this and requires After Action/Corrective Action Reports for all disasters (state and federal), incidents, and events, including planned public events and exercises.

As the report's name indicates, NIMS requires accountability for corrective actions. Agencies and/or local governments must agree to carry out corrective actions, and must be able to report the date that the corrective action was completed. CA OES is working to improve the After Action Report process so as to make it more compliant with NIMS.

2.5.2 NIMS Resource Typing

NIMS requires that resources such as personnel, equipment, and teams be identified and accounted for. There are 120 resource types identified in NIMS; however, not all of these match up to resources as currently used in local government in California. In any event, local governments do not need to change

their resource types to match those described in NIMS, and only need to report those resources that match the 120 NIMS types.

In 2006, OES embarked on creating a resource typing system that will be NIMS compliant and will be accessible for use by emergency managers. NIMS has the Incident Resource Information System (IRIS) to be used for nationwide resource typing.

One of the issues regarding resource typing has to do with duplication. For example, a fireman may be on various teams, such as Urban Search and Rescue, emergency medical, and hazardous materials. If the fireman is called out in one of these teams, that person is no longer available for participation in the other teams. The other teams may end up depleted and not in a deployable condition if there are no back-ups for the empty positions. If this does indeed happen, whatever system is used to account for and monitor availability of the resources must be able to identify this.

2.5.3 NIMS Training Requirements

Agencies and local governments seeking NIMS compliance must have those employees assigned to emergency management responsibilities trained in the following FEMA courses:

- FEMA IS-100, "Introduction to Incident Command Systems"
- FEMA IS-200, "ICS for Single Resources and Initial Action Incidents"
- FEMA IS-700, "NIMS – An Introduction"
- FEMA IS-800, "National Response Plan: An Introduction"

Other staff may be trained in these courses over time as opportunity allows. (It is recommended that the IS-800 course be taken after a break from other courses, due to its extensive use of acronyms and its having a different focus from ICS and NIMS.) The California Specialized Training Institute (CSTI), a branch of OES, conducts NIMS-required training. Visit www.oes.ca.gov for more information about available CSTI training in California.

The 2008 version of NIMS may also require training for emergency management staff in FEMA IS-300, "Intermediate ICS," and FEMA IS-400, "Advanced ICS."

2.5.4 NIMSCAST

The NIMS Compliance Assistance Support Tool (NIMSCAST) is a web-based system for measuring compliance with NIMS and overall emergency readiness. The NIMS Integration Center, or NIC, has arranged a series of questions or "metrics," to measure these. In California, NIMS compliance is being measured by the 58 counties completing this process, as well as a select group of state agencies. Cities and special districts in California are not being required to complete the NIMSCAST metrics, however, *any government entity receiving preparedness grants must be NIMS compliant*, so there is a strong incentive to examine their own compliance status by completing NIMSCAST.

UNIT 3 SAFETY ASSESSMENT OPERATIONS

Unit 3 Training Guidance

Overview

This unit will look at the basics of emergency management, focusing on the roles of government. The remainder of the unit looks at building department disaster operations and provides background in developing a successful safety assessment program.

Training Goal

To provide the participant with sufficient information so that they can develop a department operations plan for safety assessment, implement the plan, and order sufficient resources to carry out the plan.

Objectives

At the end of this unit the participant will:

- Know the roles of government in emergency operations.
- Be able to develop a department operations plan.
- Be able to determine the number of resources to request and how to request them.

3.0 Safety Assessment Operations

3.1 Roles of Government During Emergencies and Disasters

In the context of emergency management there are three levels of government: local, state, and federal. Local government includes cities, counties, and special districts. Each level of government has its own resources that it can bring to bear during emergencies or disasters. Resources in this context means any type of material, equipment, personnel, financial, legal, or other asset that can be provided to assist with the response to an emergency. Simply stated, the contribution of each level can be summarized as follows:

- *Local* --direct motivation, knowledge of the situation, personnel, materials, equipment, and proximity to both event and resources;

- *State* -- legal authorities, administrative skills, personnel, equipment, fiscal resources, and a conduit between local and Federal resources; and

- *Federal* -- legal authorities, fiscal resources, research, technical information and services, and specialized personnel.

The primary role of government at each level is to maintain its continuity. Careful planning is required in order to prevent unlawful assumption of authority, preserve law and order, maintain leadership, deliver essential government services for the public welfare, and ensure that clear lines of communication remain open among the various levels of government and the public. In planning for continuity of government, seven principals are considered:

1. A list should be created of those individuals entitled to succeed one another under disaster conditions along with a process by which succession will take place.

2. A process of delegating disaster authority should guide leaders.

3. There should be a set of standard operating procedures or checklists for taking disaster steps, such as notifying emergency personnel and identifying emergency duty stations.

4. Emergency Operating Centers (EOCs), from which all disaster efforts can be coordinated and directed, should be identified.

5. Alternate EOCs should be designated.

6. Steps should be taken to safeguard those records that would be essential to the effective functioning of government and to ensure the protection of rights and interests of persons under disaster conditions.

7. Finally, the process should protect government resources, facilities, and personnel so that the government can operate effectively to allocate needed resources, provide essential public services, and restore government functions after disaster conditions.

3.1.1 Roles of Local Government

The local level is the first line of official public responsibility for emergency management activity. In an emergency, Federal and State resources may not be readily available. Therefore, the local emergency management agency must accept responsibility to maintain an ongoing program of mitigation,

preparedness, response, and recovery, known as integrated emergency management.

It is at the local level that potential hazards are seen most clearly, resources most fully known, first response is made, and emergency events begin. At this level are those individuals who know about the uniqueness of the community, who know where something may go wrong, where special complexities exist, and where sources of aid may be found.

The responsibility of local government in emergency management can be summarized through the functions of integrated emergency management. If a local jurisdiction is addressing these activities thoughtfully and effectively, it is fulfilling its important role in protecting public lives and property.

This includes the following functions:

1. *Emergency Operations Planning* - Developing and maintaining emergency operation procedures appropriate to local hazards and resources.

2. *Direction and Control* - Having the ability to direct emergency response operations from an EOC or field location.

3. *Emergency Communications* - Capable of directing operating forces in an emergency.

4. *Alerting and Warning* - Able to alert public officials, response personnel, and the public that an emergency may exist.

5. *Emergency Public Information* - Distributing information on hazards relevant to the area.

6. *Continuity of Government* - Having legally designated lines of authority and other provisions to preserve the government under emergency conditions.

7. *Resource Management* - Able to quickly require, distribute, and use personnel and material needed in an emergency.

8. *Shelter* - Prepared to provide temporary emergency shelter and other life support to displaced persons in an emergency.

9. *Evacuation* - Able to evacuate the population efficiently in an emergency.

10. *Radiological Defense* - Has a program to minimize exposure to radiation in a nuclear attack or radioactive material release.

11. *Emergency Support Services* - Involves key emergency organizations (such as police, fire, health and medial officials, and public works) in the integrated planning process.

12. *Emergency Reporting* - Ensure that all levels of government have access to essential information required to perform emergency management functions.

13. *Training and Education* - Trains public officials, emergency response personnel, and the public on hazards, protective measures, and emergency management concepts and skills.

3.1.2 Roles of State Government

State governments have a strong public mandate to do what they can to prepare for and respond to disasters. This mandate is translated into legislated authorities and extraordinary gubernatorial powers.

The State is a source of laws affecting disasters. In addition, States have responsibilities as outlined in the ***Superfund Amendments and Reauthorization Act*** (SARA), Title III. Under the Emergency Planning Community Right-to-Know portion of this Act, they are responsible for establishing a State Emergency Response Planning Commission and in turn approving districts, or areas, where Local Emergency Planning Committees (LEPCs) will be formed. The LEPCs must formulate emergency plans to be used should an incident involving the manufacture, storage, or transportation of hazardous materials occur. State government can provide public administration skills in emergency management (primarily in preparedness planning and long-term recovery administration) and limited financial resources.

The role of State government in emergency management parallels the role of the Federal sector. Legislative and executive authorities exist for State emergency programs with a range of programs usually operating in a variety of State agencies. The State has a responsibility to develop and maintain a comprehensive program of mitigation, preparedness, response, and recovery activities. The State role is to supplement and facilitate local efforts before, during, and after emergencies. The State must be prepared to maintain or accelerate services and to provide services to local governments when local capabilities fall short of disaster demands.

State government is in a unique position to serve as a link between those who need assistance and those who can assist through determining the needs of local emergency programs, assessing available state and federal resources, and helping local government apply for, acquire, and use those resources effectively. The State provides direct guidance and assistance to its local jurisdictions through program development, and channels Federal guidance and assistance down to the local level. In a disaster, the State helps coordinate and integrate resources and apply them to local needs. The State's role might be best described as "pivotal."

A state governor is responsible for the general welfare of the citizens of the State and has certain legislated powers and resources that can be applied to all-hazards emergency management. All governors in the United States have authority and responsibility for:

- Issuing State or area emergency proclamations,
- Invoking State response actions (personnel, material),
- Activating emergency contingency funds and/or reallocating regular budgets for emergency activities, and
- Applying for and monitoring Federal assistance.

All States have laws that require them to have or designate a state emergency management agency, and have a preparedness plan coordinated by that agency. In California, that agency is the Governor's Office of Emergency Services (OES). OES has developed and maintains the ***State Emergency Response Plan***. Through the ***State Emergency Response Plan*** and the ***California Emergency Services Act***, OES has been designated the State Coordinating Agency. During a response to an emergency, all State agency activities are coordinated by OES. During non-emergency times, OES:

- coordinates the State's role in disaster recovery and associated hazard mitigation;
- assists local governments in developing their emergency plans;
- develops and initiates preparedness activities and campaigns;

- assists local government to develop and implement preparedness activities; and

- provides training to local government in various areas of emergency management through the California Specialized Training Institute (CSTI).

3.1.3 Role of the Federal Government

The federal government provides legislation, executive orders, and regulations that influence disaster activities. It maintains, through congressional allocation, the largest pool of fiscal resources that can be applied to emergency management. Some federal agencies are sources of specialized research, technical information, and services needed in disaster work. Finally, the federal government is a limited source of specialized personnel.

Research by the National Governors' Association has identified more than 100 Federal laws containing provisions directly relating to natural, technological, and national security emergencies. In fact, virtually every department and agency of the Federal government has some emergency-related responsibility mandated by law. Further extending and complicating the intricate federal level disaster authorities are a large variety of executive orders, regulations, and interagency agreements.

At the initiation of President Carter, Congress established the Federal Emergency Management Agency (FEMA) on April 1, 1979, and brought a number of previously fragmented disaster programs into a coordinated structure. FEMA does not include or direct all Federal disaster efforts, but they are the Federal Coordinating Agency for all forms of disaster assistance.

The Federal government's involvement in emergency management is primarily in the areas of assistance, regulations, and standards. Assistance may take the form of fiscal, material, personnel, or research and technical information. The response activities of the Federal government are organized and described in the ***Federal Response Plan***. Within this plan, each of 12 functions are described and defined as "Emergency Support Functions" (ESFs) establishing a primary agency and support agencies. The following are the ESFs and the primary agencies:

- ESF #1 - Transportation - Department of Transportation

- ESF #2 - Communications - National Communications System

- ESF #3 - Public Works & Engineering - Department of Defense - U.S. Army Corps of Engineers

- ESF #4 - Firefighting - Department of Agriculture - Forest Service

- ESF #5 - Information and Planning - Federal Emergency Management Agency (Department of Homeland Security, or DHS)

- ESF #6 - Mass Care - American Red Cross

- ESF #7 - Resource Support - General Services

- ESF #8 - Health and Medical - Department of Health and Human Services – Natural Disaster Medical Service (DHS)

- ESF #9 - Urban Search and Rescue - Federal Emergency Management Agency (DHS)

- ESF #10 - Hazardous Materials - Environmental Protection Agency
- ESF #11 - Food Annex - Department of Agriculture
- ESF #12 - Energy - Department of Energy

The following table shows the relationship between the Federal ESFs and the Regional Emergency Operations Center (REOC) functions:

REOC Organization	Emergency Support Functions
Operations	
Fire & Rescue	Firefighting (ESF #4) Urban Search & Rescue (ESF #9)
Hazardous Materials	Hazardous Materials (ESF #10)
Law Enforcement & Coroners	
Medical & Health	Health & Medical Services (ESF #8)
Care & Shelter	Mass Care (ESF #6)
	Food (ESF #11)
Construction & Engineering (incl. Safety Assessment)	Public Works & Engineering (ESF #3)
Utilities	Energy (ESF #12)
Planning/Intelligence	Information and Planning (ESF #5)
Logistics	
Information Systems Communications Computer Systems	Communications (ESF #2)
Transportation	Transportation (ESF #1)
Personnel Procurement	Resource Support (ESF #7)

Figure 3-1 REOC – ESF Relationships

3.2 Planning a Successful Operation

An effective and efficient safety assessment operation must be planned in advance of disaster. Building Departments need to develop post-disaster operation plans that include:

- identifying all the post-disaster functions of the department;
- key personnel and the positions they will hold during the operation;
- process and procedures; and
- recovery operations.

Having the entire process thought out and documented before the event occurs allows the staff to move

directly into the post-disaster operation and frees management from having to develop an operational plan during the operation. Included as Appendix A is a model post-disaster operations plan developed by the California Building Officials that covers personnel and the safety assessment work during the response. This model is intended as a guide for jurisdictions to use in developing their own plans.

The information presented in this section is provided as a planning guideline, not a requirement. Organizational structure and position descriptions are based on SEMS terminology. Each jurisdiction must establish the positions and operational requirements which best reflect the capabilities of the jurisdiction and the staff. A good additional tool to assist in the development of your operational plan will be your jurisdiction's emergency plan. The building department disaster operations plan should become an annex to the jurisdiction's emergency plan so it is available to all departments within the jurisdiction.

3.2.1 Identifying Post-Disaster Functions

Prior to developing any operations plan, all functions must be identified, defined, and placed into some form of chronology. A well-defined and detailed plan that addresses all functions of the department during an emergency or disaster will be an asset to the staff in ensuring an efficient and successful operation.

During an emergency or disaster, the department's day-to-day operations will be modified to account for the emergency conditions. However, to the extent possible, those day-to-day duties will still need to be performed. The emergency situation may not impact every citizen within the jurisdiction. They will have their expectations for continued permitting and construction activities.

Some of the department's disaster or post-emergency functions may include:

- Safety assessment to determine condition of damaged structures for continued occupancy;
- Developing and passing an ordinance that formally adopts placards;
- Printing a supply of placards that include the legally enabling ordinance citation and the jurisdiction seal;
- Damage assessment to determine the total impact to the jurisdiction from the damage;
- Developing criteria for owners and tenants to gain access to UNSAFE structures to retrieve important and needed possessions;
- Defining imminent hazards and determining procedures for mitigating those hazards;
- Developing and passing an ordinance defining when placards can be removed;
- Process and procedures for owners to follow to change placards and develop repair documents;
- Establishing and implementing repair criteria;
- Implementing permitting and inspection procedures for the repair of damaged buildings; and
- Providing the public information on the various processes that must be followed to gain access to their buildings and complete repairs of the damage.

Most of the process, procedures, and information can be developed now, before the emergency, and then implemented at the time of event. Probably the most important in this area will be to establish an alternate location to carry on response activities if the structure in which the building department is located has been damaged. Without a predetermined alternate location, staff will not know where to report to if the main building has been damaged. Part of this planning will include how you will get necessary equipment and supplies from the damaged facility to the alternate location.

Another area that will have significant importance to the overall recovery will be the development of repair criteria. For those events that are proclaimed emergencies by the Governor or declared emergencies or disasters by the President, the codes and standards for repair need to meet certain criteria so the repair work performed will be eligible for financial assistance. Per ***Title 44, Code of Federal Regulations, Section 206,*** standards must:

1. Apply to the type of repair or restoration required (Standards may be different for new construction and repair);

2. Be appropriate to the pre-disaster use of the facility;

3. Be in writing and formally adopted by the applicant prior to the date of declaration, or be a legal federal or state requirement applicable to the type of restoration;

4. Apply uniformly to all similar types of facilities within the jurisdiction; and

5. For any standard in effect at the time of a disaster, it must have been enforced during the time it was in effect.

Additionally, these repair standards must provide "objective," not "subjective," triggers to determine the level of repair required. Further, the repair standards used must be developed and adopted prior to the occurrence of the event if state and federal reimbursement for permanent repairs for publicly owned buildings and structures is expected.

For the purpose of this program, we will look at the sections of the operational plan that lead up to and include the safety assessment process. The other functions included above are provided for discussion purposes and as a guideline for developing an effective operational plan.

3.2.2 Department Organization - Personnel and Positions

Once an event occurs, we must recognize that the day-to-day operations of the building department will alter significantly until the recovery is well on its way. This means that part or all of the staff will be working in new duties with different responsibilities. Moreover, your daily, non-disaster activities will need to continue. To minimize the impact on the department's operations, key disaster operations positions will need to be identified and individuals selected to fill those positions.

3.2.2.1 Management Staff

Once the event has occurred, and the building official is notified that buildings have been damaged, the building official will activate the Department Operations Center (DOC), operations plan, and establish his/her command staff. One of the advantages of the ICS structure in SEMS is its ability to collapse and expand as the situation requires.

3.2.2.2 Operations Section

Once the Operations Section Chief is appointed, he/she will perform a staff analysis to determine the level of staffing required. Figure 4-3 shows a typical Operations Section.

The position descriptions are as follows:

- Section Chief is responsible for the management of all operations directly applicable to the primary mission. The Operations Chief:
  - activates and supervises organization elements in accordance with the incident action plan; directs its execution;
  - requests and releases resources;
  - makes expedient changes to the incident action plan as necessary;
  - reports changes to the action plan to the DOC Director.
- Assessment Processing Unit Leader is responsible for implementation of the portion of the incident action plan that relates to office support activities. The assessment processing activities for the Operations Section are in direct support of the Safety Assessment Branch.
- Safety Assessment Branch Coordinator is responsible for implementation of the portion of the incident action plan that relates specifically to the safety assessment operations and managing the staff. This individual could be someone assigned from the jurisdiction staff or the Response Team Leader of the responding resources as appointed at the staging area.

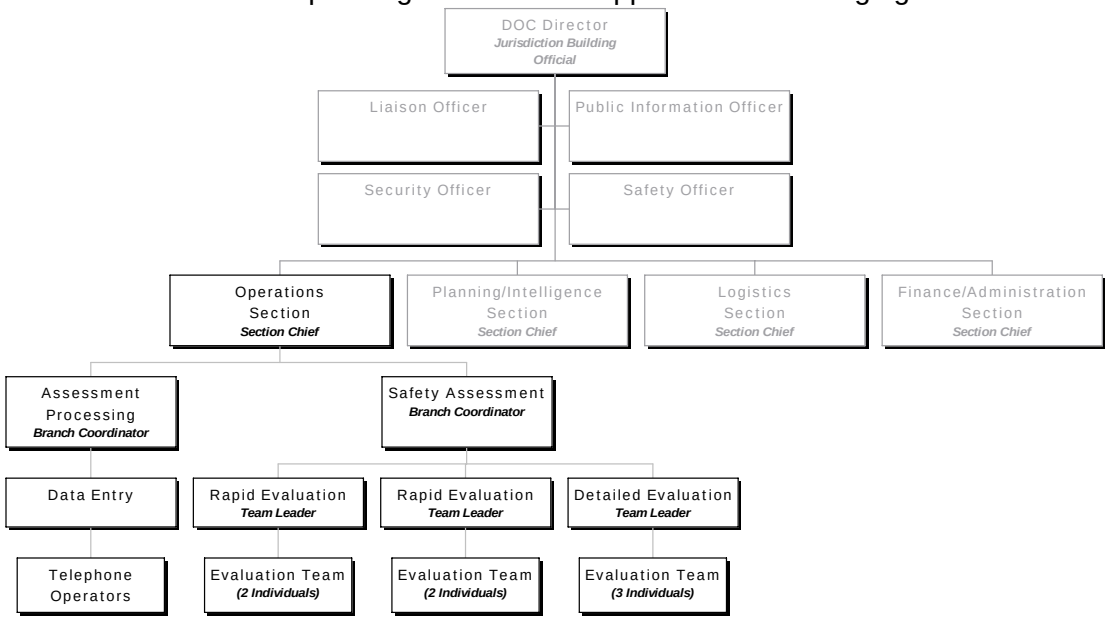


Figure 3-2 - Operations Section

3.2.3 Process and Procedures

This section of the operations plan outlines the step-by-step process that the jurisdiction will follow from identifying damaged structures through repairing or demolishing the structures, that is, the process of moving through response into recovery and completion of the recovery process.

Some of the procedures that should be considered are:

- establishing priorities,

- how the jurisdiction will approach the safety assessment process,
- performing the windshield survey,
- determining resources needed,
- performing the safety evaluations,
- procedures for changing placards based on engineering evaluations,
- securing possessions from UNSAFE buildings,
- plan check and permitting of repair projects, and
- project closeouts.

For the purpose of this training we will limit our discussion to those issues related to safety assessment. The recovery issues will be left to the jurisdiction.

3.2.3.1 Establishing Priorities

Laying out a successful operation begins with developing a general approach to the operation that guides management and staff in the first few hours of the operation. This general approach should remain somewhat flexible so as to deal with the specifics of the incident.

The initial pre-event steps include identifying all of the essential service facilities within the jurisdiction and where they are located. These are the facilities that need to be operational after the event and require inspection immediately. One approach to handling the essential service facilities would be to assign staff to a specific facility. It is their responsibility to respond immediately to the facility before reporting to the operations center. The individual is activated ***by the event***, not by a call from the operations center. This approach allows the individual to become familiar with the facility before the event, which then expedites the inspection of the facility. The drawback to this approach is that the jurisdiction can only assume a facility has been inspected and will not know for sure until the individual assigned to the facility calls or reports back to the operations center. Unless the individual calls and indicates that they cannot respond, the jurisdiction does not know to send someone else to perform the initial inspection.

Another approach would be to prioritize the facilities based on the jurisdiction's and community's needs for the services provided. As staff report to the operations center, they are sent to the facility to provide the initial inspection. This ensures that all essential service facilities are inspected and management knows they are being inspected, but it can delay the initial inspections based upon how fast individuals can respond to the operations center.

While the essential service facilities are being inspected, the remainder of the inspection staff can begin the windshield survey to identify those areas where damage has occurred. This process can be aided by information obtained from the surveys performed by police and fire.

3.2.3.2 The Approach to Safety Assessment

A key part of the operational plan will be the approach taken to expedite the safety assessment process. Historically, the safety assessment process has not been planned. Developing the process before the incident allows management to take a proactive approach rather than a reactive one. One

approach will be to work through the highest intensity areas with rapid evaluations in a "sweep" where individuals are assigned blocks and they simply inspect every building within that assigned area. Once one intensity area is complete, the next priority becomes the next lower intensity zone.

This becomes a highly viable approach through a program known as the California Integrated Seismic Network (CISN). CISN is a cooperative agreement between USGS, California Geologic Survey, and OES. Through the State's monitoring program actual ground motion recordings are read and shake maps developed within a few minutes of the event. These maps are then posted on the OES and USGS websites and can be used by a building department as a management tool for assigning both windshield surveys and Rapid Evaluations.

Another approach would be to inspect facilities based on established priorities of the jurisdiction, that is, the types of facilities that will more rapidly move the jurisdiction into recovery. Under this approach, OES recommends inspections be prioritized as follows:

- **Essential Facilities** – These are the buildings that are essential to the continued operation of the jurisdiction and/or the local government emergency plan.

- **Commercial, industrial, school, and office buildings** - these buildings represent the economic and educational base of the community. The faster we can get the economy moving, the faster the jurisdiction can recover.

- **High-density residential structures** - these are typically hotels and motels that can be used for short- and long-term sheltering of victims.

- **Single family and low-density residential units** - It is important to inspect residences as rapidly as possible in order to restore the feeling of comfort and stability within the citizens. However, in a general sense these inspections can be somewhat delayed in order to get as many people back to work and to get their children back into schools as rapidly and safely as possible.

This approach is probably a more viable approach when an intensity zone includes a mixture of occupancies. This allows the jurisdiction to concentrate on those occupancies that will expedite the recovery. In the case where the highest intensity zones include a predominate type of occupancy, the process becomes more of performing a "sweep" type operation.

Included in the planning process are lifeline systems. These systems can be under the jurisdiction of special districts as in the case of utilities, or they are usually under the jurisdiction of the public works department. In those jurisdictions where the building department and public works are separate departments, close coordination is needed when developing the operations plan. For those jurisdictions where the two departments are combined, or one is a part of the other, the coordination becomes somewhat easier. When considering lifeline systems and facilities, working with Mercalli Intensity zones may not be the most efficient manner in addressing the priorities. OES recommends the following priorities in dealing with lifeline systems and facilities:

- **Airports, Highways and Bridges** - these systems must be opened as soon as possible to expedite the movement of resources.

- **Reservoirs, water treatment plants, sewage treatment facilities** - these facilities affect a large segment of the population.

- **Pipelines and other utilities** - in cases where domestic and fire water lines are damaged,

these facilities may have a higher priority than reservoirs and treatment facilities.

- **Dams** - the State of California Department of Water Resources has responsibility for all dams in California except those owned and operated by the U.S. Army Corps of Engineers or the Bureau of Reclamation. DWR has established criteria based on the amount of water being stored; consequently, dams that a local jurisdiction may have to evaluate are very small, possibly located on private property, and used for irrigation. SAP evaluators will not be reviewing state or federally-owned dams.

3.2.3.3 Performing the Windshield Survey

The local police and fire departments will initiate assistance to the public within minutes of the event. They are thus in a good position to provide vital information on where the damage has occurred.

The windshield survey is a process of traveling up and down the streets of the jurisdiction looking for damaged areas where individuals are likely to need assistance. As soon as the building department staff can mobilize, they need to begin their windshield survey that will identify those areas of the community that will need structure safety assessments.

A process for performing this survey should be developed and addressed within the department's operations plan. The survey should be performed with at least two individuals in each vehicle so one can drive and one can record information regarding location and number of damaged buildings within each area surveyed. The forms used to record this information should be simple and not require excessive detail. Additionally, they should be designed for quickly calculating a very rough percentage estimate of the damage observed. This is the first of several estimates that will be developed.

Elected officials will begin asking for these estimates very early in the operation. Using estimates communicates the magnitude of the event to these officials and the general public very well. In addition to the elected officials, the jurisdiction's Emergency Operations Center will also be requesting the information along with the numbers of damaged buildings. As the EOC receives the information, they will pass it to the Operational Area EOC, where it will be recorded and passed on to the State through the Regional Emergency Operations Center.

One of the easiest methods to use to develop these initial estimates is to record the number of damaged buildings within a block by general categories of damage, estimate the total area of damaged buildings, estimate an average percentage of damage, and use an average cost of new construction for the typical occupancy within the block.

> **Example:** The 900 block of Main Street has 30 buildings on the block, 15 of those buildings sustained damage ranging from full collapse to moderate structural damage, the block is primarily commercial and retail occupancies. What is recorded might look like this:
>
> 900 Block Main Street: Total buildings 30 Damaged buildings 15
>
> 1 total collapse 5 partial collapse 6 severe damage 3 moderate damage
> Estimated total area of damaged buildings 100,000 square feet;
> approximate percentage of damage = 25%;
> Average cost of construction $200/square foot;
> Cost = 100,000 sf x $200/sf x 0.25 = $5,000,000 of damage

When this information is turned in to the operations center, it should be marked on a jurisdiction map with some method of color-coding which tells the staff the phase at which the estimate was developed. This map can then be used to prioritize the safety assessment operation.

3.2.3.4 Determining Resources Needed for Earthquake Disasters

The Operations Section will now need to calculate the additional resources needed to perform safety evaluations in a timely manner. During past operations, more attention has been paid to recording information on the number of posted buildings than to the number of resources used and the time that it took to complete the evaluations.

During the safety assessment response to the 1994 Northridge earthquake, more complete records were kept regarding numbers of posted buildings and resources used which provided data to OES for rapidly calculating the number of resources needed. This will be a valuable tool for building officials to use in determining their resource needs.

The following spreadsheets show the information collected from the Northridge earthquake response and the analysis that was performed to develop the criteria for determining the number of resources required.

Table 3-1 - Assigned Resources

JURISDICTION	January												NO. OF DAYS PER CITY (1)	TOTAL RESOURCES BY CITY (2)	AVERAGE NO. OF RESOURCES ASSIGNED PER DAY (3)
	18	19	20	21	22	23	24	25	26	27	28	29			
City of Fillmore	4	14	14	10					8				5	50	10.0
City of Santa Monica	12	12	12				10	10	10	10	10	10	9	96	10.7
City of Santa Clarita	10	10	10				20	20	20	20	20		8	130	16.3
City of Los Angeles	50	50	70	70	160	177	177	177	246	286	296	353	12	2112	176.0
TOTAL RESOURCES ASSIGNED BY DAY	76	86	106	80	160	177	207	207	284	316	326	363		2388	213

Table 3-2 - Placard Distribution

JURISDICTION	RED PLACARDS (4)	YELLOW PLACARDS (5)	GREEN PLACARDS (6)	TOTAL PLACARDS (7)	% OF RED & YELLOW PLACARDS BY CITY (8) (4)+(5) / (7)
City of Fillmore	198	319	1,532	**2,049**	25.23%
City of Santa Monica	131	382	1,835	**2,348**	21.85%
City of Santa Clarita	15	66	674	**755**	10.73%
City of Los Angeles	1,690	5,715	17,742	**25,147**	29.45%
City of Culver City	30	124	484	**638**	24.14%
TOTALS	2,064	6,606	22,267	**30,937**	**28.02%**

Table 3-3 - Assessments per Day

JURISDICTION	ACTUAL DAYS PER CITY From (1) (9)	NUMBER OF ASSESSMENTS PER CITY (10) (2)+(3) / (8)	NUMBER OF ASSESSMENTS PER CITY PER DAY (11) (10) / (9)	NUMBER OF ASSESSMENT DAYS (12) (10) / (11)	AVERAGE NUMBER OF RESOURCES ASSIGNED PER DAY From (3) (13)	ASSESSMENTS PER PERSON PER DAY (14) (11) / (13)
City of Los Angeles	12	26,423	2,202		176.0	
City of Santa Monica	9	1,831	203		10.7	
City of Santa Clarita	8	289	36		16.3	
City of Fillmore	5	1,845	369		10.0	
TOTAL		**30,387**	**2,810**	**11**	213	**13.19**

The following is a description of the calculation:

1. Identified damaged buildings during the windshield survey will most likely receive "RED" or "YELLOW" placards. Northridge records indicate that the total of RED and YELLOW placards represent approximately **30 percent** of the total number of inspections performed.

2. Records kept for Northridge included only the additional resources that a jurisdiction requested. The numbers of jurisdiction staff involved where unknown. Analysis of the data allowed OES to determine the average number of inspections performed per day. Knowing how many resources were provided to the jurisdictions, a weighted number of inspections per day per person was determined. Based on the data recorded, **approximately 13 inspections per "person" per day were made**. This number was determined by dividing the total number of inspections per day by the total number of resources provided.

3. The actual number of resources that will be needed will be based on the number of days in which to complete the process. Therefore, the building official needs to estimate a reasonable number of days in which to complete the process. Depending on the size of the jurisdiction, a safety assessment operation would take anywhere from five to fifteen working days. Using this as a guide you will know how many resources to request. Most activations of the Safety Assessment Program have encompassed ten to fifteen inspection days. For Northridge, Program resources were used for 12 days.

Example: A jurisdiction has completed its windshield survey and determined that there were 1,200 damaged buildings with varying degrees of damage. Each of these buildings will need to be inspected as well as other buildings within the areas of damage and from public requests for inspections. Here is how you would determine the number of resources needed from the Safety Assessment Program.

Estimated number of inspections = 1,200 / 0.30 = 4,000 inspections
Time to complete = 11 days
Number of resources needed = 4,000 / 12/ 13 = 26

For this specific example, the jurisdiction's inspection staff would need to be augmented with 26 individuals from the Safety Assessment Program. Since some of these 26 individuals will only be available for 5 days at a time, plans should be made to request additional groups of 26 timed such that the jurisdiction has a constant level of resources.

It must be noted that the calculations for a flood disaster is different from an earthquake disaster. Please see the Job Aid on page 176 for this discussion.

In addition, thought should be given by the SAP Coordinator on how many persons to deploy as assistants, both in the field and at the SAP coordinating location. If the local government has sufficient resources to provide a safety watch person for each team (who also knows their way around the jurisdiction) as well as persons to assist the SAP Coordinator with data entry and other necessary tasks, then it may not be necessary to deploy persons with SAP certificates from the CA OES call list. However, if the local government is overwhelmed, the SAP Coordinator would do well to ask for certified persons from the CA OES call list, rather than pull SAP evaluators from the field for these purposes. It would be very useful especially for the field teams if the safety watch person also had a code enforcement background, as these individuals have experience in handling persons under duress.

3.2.3.5 SAP Deployment under Catastrophic Disasters

Coordinating SAP evaluators under the extreme conditions of a catastrophic disaster such as Hurricane Katrina will require creativity, endurance, patience, and determination. As the SAP Coordinator, you should arrive at least a day before the SAP evaluators do so you can make preparations for the teams to start work. In a catastrophic disaster, arriving early is imperative, as there may be next to nothing in the way of available resources, and you as the coordinator may have to have vital equipment and supplies shipped in. Scouting out the situation before work begins will allow you to see if anything can be obtained locally, or if a trip out of the disaster area is needed to get essential materials. It will also allow you to set up communication lines with CA OES' Statewide SAP Coordinator, if these are not readily available, so day-to-day issues can be ironed out at that level.

Figure 3-3 – CA SAP Evaluator at the Louisiana Superdome, Hurricane Katrina, 2005

3.2.3.6 Performing Safety Evaluations

The Operations Section Chief will assign jurisdiction inspection staff to begin Rapid Evaluations throughout the damaged area(s) based on the process established in the operational plan. Once the requested resources arrive at the building department operations center, the Finance and Administration Section or the SAP Coordinator will ensure **they sign in using the SAP ID number on their badge**, are given a time sheet, and any other administrative requirements have been handled. A SAP Evaluator Tracking Form is included at the end of this chapter for this purpose. The Operations Section will meet with the responding personnel and make appropriate assignments, provide the necessary briefing, provide a brief training session, and deputize the responding resources as Deputy Building Inspectors. The Logistics Section will issue the appropriate equipment and brief the individuals on lodging, food, and transportation. At this point, the teams are ready to move to the field and join the jurisdiction staff in performing Rapid Evaluations.

A recommendation that came out of the CA OES SAP deployment to the Hurricane Katrina disaster theater was for the SAP Coordinator to gather all the newly deployed evaluators at a damaged building

and evaluate it together. This served to help establish a common way of looking at these structures, in effect 'grounding' the teams so as to work in greater unison.

Figure 3-4 – Team 'grounding,' Hurricane Katrina, 2005

Another recommendation from the Katrina experience was that numbers be used to identify common types of damage on the assessment forms, rather than writing out the same information on the assessment forms each and every time. The placards would still need to be written in plain English, but the use of numbers helps speed up work in the field and also when the damages are being recorded by data entry in the local government office. More work needs to be done to create a unified numbering system to identify commonly found damage, and more information will be released to the SAP evaluators and coordinators in the future. The numbering system will be different based on the type of disaster and conditions in the field.

Once the Rapid Evaluations are complete, or nearly complete, the jurisdiction can begin the process of performing Detailed Evaluations of those buildings that require more time. The original concept of the Detailed Evaluation was to deal with those buildings that were determined to be questionable during the Rapid Evaluation and give them a "RED" or "GREEN" posting. By using the "RESTRICTED USE" placard instead, a Rapid Evaluation team can spend a little longer evaluating the building in order to develop appropriate restrictions on continued use or occupancy and potentially eliminate the need for a Detailed Evaluation. In most cases, owners will be able to retrieve their possessions but not be able to fully occupy the building. Since we know the building is damaged, this allows the owner to move directly to retaining an engineer and performing an engineering evaluation.

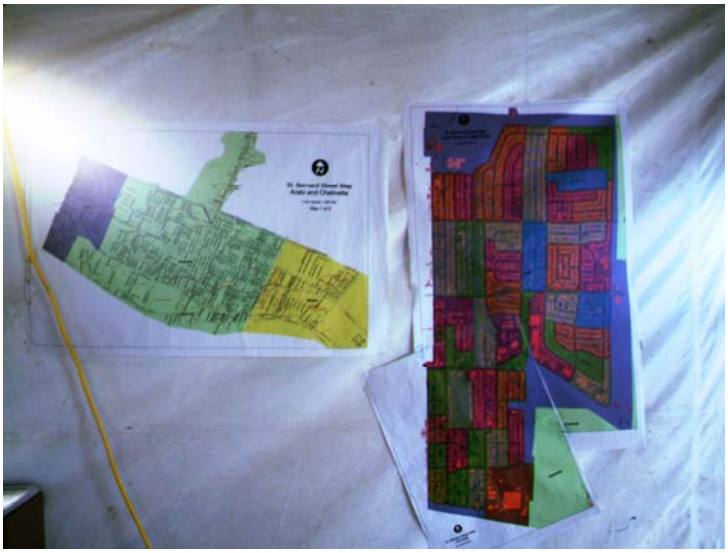
However, there will be some buildings where Detailed Evaluations will be desired. In these cases, the Operations Section Chief will begin to develop detailed evaluation teams as soon as the need for these evaluations becomes known. By developing specific teams and assigning them only the Detailed Evaluations, there will be little or no impact on the remaining rapid evaluations.

As the evaluation teams go to their various assignments, their primary function is to assess the safety of buildings and facilities only for continued occupancy. Evaluation reports should not necessarily reflect elements that should or could be repaired; however, it may be necessary in some cases. In other cases, if a certain element is repaired, the classification of the building may change. This too should be noted on the evaluation forms.

When an evaluation team completes its evaluation, the building should be posted at each exterior door. If the team has been deputized, use the official jurisdiction placard that best represents the results of your evaluation. If the team has not been deputized, either a local building inspector will have to place an official placard, or the evaluation team would place a generic placard. Placards should be placed at all normal entry points into the building or facility.

Once the evaluation teams complete their assignments, they return to the operations center where they review their evaluation forms with the team leader. This review ensures that the forms are filled in

completely and any special conditions that must be addressed with the jurisdiction are noted. Once the review is complete, the team leader submits the forms to the Safety Assessment Unit Leader, the SAP Coordinator, or their designee.



A great aid to the Hurricane Katrina effort which helped with both organizing the field work and boosting general morale was to mount a large area map on a board or wall, and highlighting the blocks, streets, etc. that were finished by the evaluators at the end of each day. The evaluators became enthusiastic about contributing to the overall work, and could easily see that their contribution meant something for the common good. Moreover, people in general working at the disaster response facility housing the SAP effort could readily see the good work being done by the evaluators.

Figure 3-5 – Progress map, Hurricane Katrina, 2005

From a SEMS standpoint, the following coordination is taking place simultaneously between the building department operations center and the jurisdiction's EOC:

- The DOC Director (building official) is coordinating with the EOC management to establish overall priorities and ensuring obtained information is relayed.

- The Operations Section is providing the obtained information to the Planning Section; determining their resource needs and providing that information to the Logistics Section; beginning their evaluation process with the essential services facilities; coordinating their field operations with the Operations Section in the EOC; and beginning to develop objectives for the next incident action plan.

- The Planning Section is documenting and collecting forms provided by the Operations Section; coordinating with the Planning Section in the EOC to establish the next operational period; assisting the DOC Director in developing the overall strategy and objectives; establishing the operational period for the building department operation; beginning development of the incident action plan; and looking to advance planning for demobilization and moving from response to recovery.

- The Logistics Section is coordinating with the Logistics Section at the EOC; coordinating with the Operations Section for needed resources; documenting and submitting their request(s) for additional resources to the Logistics Section at the EOC; arranging lodging and feeding for the staff and incoming resources; arranging for transportation; and making sure that all needed equipment (as outlined in the operation plan) is available and ready for issuance.

- The Finance and Administration Section is coordinating with the Finance and Administration Section at the EOC for purchasing requirements and appropriate purchase orders; ensuring that all personnel have properly signed in and been given time sheets for tracking purposes; and preparing to receive and process the incoming resources.

3.2.3.7 Procedures for Changing Placards

After the buildings have been posted, the owners need to retain engineers to perform engineering evaluations of the damaged structures. The primary function of the Engineering Evaluation is to develop repair recommendations. This evaluation provides the engineers with sufficient information to determine why the building was damaged. The repair program can then address the specific damage, as well as provide appropriate mitigation to reduce the potential for the same damage in a future event.

Additionally, the Engineering Evaluation can be used to address the conditions of the original placards in two basic ways:

- The more involved evaluation might indicate that the original posting may have been too restrictive or not restrictive enough based on the actual damages; or

- The evaluation might identify temporary measures where, if implemented, the placard on the building could be changed to something less restrictive.

When writing your Building Department Plan, develop the process and procedures that will be required to change official placards. In past earthquakes, jurisdictions have accepted signed and sealed letters from the engineer of record when the evaluation has shown that a different posting is more accurate. In the case of the identification of mitigation measures implemented to change posting, departments have accepted sketches showing the installation of the measure. When the change in posting is approved, remember that a representative of the jurisdiction will need to go to the building and change the placard to the appropriate one. Whatever process the department develops should be clearly spelled out in the Department Plan so the process can be implemented immediately upon the completion of the Safety Assessment process.

As a basic caution to the Building Department, the wording of the UNSAFE placard restricts building access to only those with official permission; this restriction is more definitive in the revised placard than in the earlier version. This restriction should not impede the efforts of professionals completing the Engineering Evaluations. The placard entry restrictions are addressed to the general public; engineers and contractors will require access so they can complete their Engineering Evaluation and install any necessary temporary stabilization measures. It is assumed that design professionals and contractors will take all necessary precautions to protect themselves during their work.

3.2.3.8 Securing Possessions From UNSAFE Buildings

One of the more difficult tasks will be determining the requirements for building owners to retrieve possessions from UNSAFE buildings. This is a task best performed during the planning stages when the situation can be thoroughly discussed and considered. This is also one of the critical responsibilities of the building department as owners and tenants will want and need to secure their belongings and records.

During the response to Loma Prieta in 1989, the City of San Francisco used some safety assessment "volunteers" as well as local engineers to provide escorts for owners and tenants so they could enter the buildings and retrieve their possessions. Time limits were established, which were generally 15 minutes. The escorts would lead the individuals through the safest portions of the buildings and let the owners and tenants know which rooms were safe enough to enter. Following the Loma Prieta response, this concept was thoroughly discussed and OES came to the conclusion that SAP resources were limited, and, as such, can not be used to provide escorts to building owners/tenants for possession retrieval. However, CALBO has decided they want to provide this service. In this case, the jurisdiction will need to request special resources through mutual aid, those CALBO members committed to safety evaluation will remain performing the evaluations.

In their response to the Northridge earthquake in 1994, the City of Santa Monica used their fire department to retrieve possessions for individuals. This occurred in very hazardous apartment buildings where the tenants absolutely could not enter. Each tenant would describe where in their apartment the important possessions were kept. A firefighter would then enter the apartment and collect the items requested.

Since Loma Prieta and Northridge there has not been much discussion on the best ways to get individuals into the buildings to retrieve possessions. But, we do know that it is imperative that procedures be developed to permit this activity. To help the jurisdictions to determine which buildings can be entered, the safety assessment evaluators will attempt to look at the condition of access in those buildings they determine to be UNSAFE for continued occupancy. They will be able to tell the department if the exit ways are clear, the stairs are stable and structurally able to be used, if there are any significant falling hazards, and what the level of illumination is in the corridors and rooms. With this information, the department will be able to determine if they will allow anyone to enter the building.

It will be up to the department to develop their procedures for how the building will be entered. The department will not be able to use the safety evaluators as escorts. The chances are those resources will be needed by some other jurisdiction to complete the safety evaluation process. Should you determine that escorts are the best way to get people into the buildings to retrieve possessions, those escorts will have to be jurisdiction personnel. They could be building inspectors, fire personnel, or law enforcement personnel.

One other consideration to include in the development of your process and procedures for possession retrieval will be proper identification of the owner or tenant. Remember also that those same individuals may have left their identification in the building when they vacated. While you want to have an easy procedure for securing possessions, you do not want to have a procedure that could lead to the wrong people entering buildings.

3.2.3.9 Manufactured/Mobile Homes

The installation and alteration of mobile homes or manufactured homes is regulated by the State's Department of Housing and Community Development (HCD). Generally, mobile homes can prove hazardous after a disaster because of damaged utilities, damaged support systems, or significantly damaged accessories such as room additions, awnings, carports, porches, etc. However, in many cases heavily damaged mobile homes may continue to be occupied because there is no life safety hazard.

After the 1994 Northridge earthquake, HCD and CALBO began discussions on how to supplement HCD staff in order to ensure that mobile homes were properly evaluated. Out of those discussions came an agreement that gives the local building official the authority to evaluate the safety of mobile homes following an earthquake or other disaster. OES agreed to include a section on mobile homes within the SAP Evaluator training program.

As a Coodinator, you will need to be aware of the location of the mobile home parks within your vicinity, and their need for safety assessment. Please keep this in mind in your planning efforts, and in your mobilization efforts, such as when doing windshield surveys.

3.2.3.10 Historic Structures

Historic structures have presented unique problems for the safety assessment process. After past earthquakes, some jurisdictions have been accused of using the earthquake as an opportunity to "get rid of" their historic building stock. This was primarily done by posting the buildings UNSAFE and then

ordering their demolition. Our purpose here is not to second-guess or place value judgments on past actions of jurisdictions, but to look at some of the discussions and issues surrounding historic structures.

OES was asked by the historic preservation community to develop evaluation procedures for historic structures that would be different than for other structures to address the demolition issue. OES resisted that effort for the simple reason that the conditions within a structure that restrict or forbid its continued use are not dependent on the age of the structure. Damage that represents a hazard to occupants determines the conditions of continued occupancy. Different evaluation procedures are not necessary. However, awareness of the damage potential for older forms of construction can help in better evaluating these buildings.

The revisions to the original ATC-20 UNSAFE placard have reduced the fears of the preservation community that older buildings will be demolished wholesale following a large earthquake. The addition of the parenthetical phrase, "THIS IS NOT A DEMOLITION ORDER," clarifies that the posting is referring to continued occupancy, not whether or not the building can be repaired. All the basic criteria of ATC-20 apply to historic structures as much as to new construction.

As discussed earlier in this unit, the evaluation team must be careful that the condition of the building, or its particular vulnerability to earthquake or other damage, is not a primary consideration in their determination of the posting. The pre-event safety of a building refers to its structural integrity, as it exists before. In other words, has it been strengthened?

Using unreinforced masonry as an example, we know that:

- unreinforced masonry that has not been strengthened is a collapse hazard.

- the collapse potential is significantly reduced when the building has been strengthened and proper anchorage installed.

The point here is that the unstrengthened building was technically unsafe prior to the event. However, this point has nothing to do with a post-disaster safety evaluation. If the building was undamaged by the event, it is as safe now to occupy as it was prior to the event. We do not post an older building with restrictions or as being unsafe simply because it is old.

As with all types and ages of structures, we evaluate the impact of the damage on continued occupancy. Older structures are vulnerable to earthquake damage. However, the actual damage to the particular building should be the main factor used to determine continued occupancy. This is not to say that vulnerability should not be considered at all. The actual damage should be the primary determining factor, with vulnerability used to temper the judgment.

Therefore, a little more time should be spent in the evaluation to make sure there is sufficient information to make a determination. As with any other type of construction, posting consideration deals ONLY with continued entry and occupancy.

Federal regulations state that any structure that is 50 years or older is potentially historical. Historic structures are protected under the National Environmental Protection Act (NEPA). From a standpoint of federal disaster assistance any structure that is 50 years or older must be subjected to a review under NEPA to determine the impacts of the repairs.

The first step in the process is to have the State Historic Preservation Officer (SHPO) determine if the structure is on a local, state, or National Register of Historic Places. If not, SHPO must then determine if the structure is eligible for inclusion on the National Register. If all, or parts, of the building are considered to be "eligible for the National Register," the repair work must comply with the Secretary of

Interior's standards for historic structures as well as the State Historic Building Code. If the structure is deemed as not historic, then repair falls under the requirements of local building codes even though the building may be more than 50 years old.

There are four main issues for determining eligibility for the National Register: (1) a place where a historic event took place, or that is associated with a historic person, (2) an example of the work of a master, such as Frank Lloyd Wright (Marin Civic Center) or Julia Morgan (Hearst Castle), (3) an example of a period architecture, such as Craftsman or Art Deco, and (4) a location with cultural or architectural significance.

3.2.3.11 Shoring

There are many ways in which buildings, or portions of buildings, can be stabilized to reduce the imminent hazard. These methods can be very complicated and involve a significant amount of material and labor to accomplish, or they can be very simple and intended to stop the continued or potential movement of the building. There are several publications that address the specifics of stabilization that include design examples. One such publication is ***Temporary Shoring & Stabilization of Earthquake Damaged Historic Buildings*** by Roy W. Harthorn and is published by the California Building Officials. This document was developed with a grant from the U.S. Department of Interior administered by the State of California Office of Historic Preservation.

The concept of stabilizing buildings is not limited to those that pose an imminent hazard to life safety or the public right of way. In some cases, portions of buildings can be stabilized to reduce a threat that would allow a sidewalk or alley to reopen, or even to allow owners or tenants to enter the building for possession retrieval. These methods are not necessarily long-term stabilization measures but often only address a specific hazard and allow access to a building or an area.

SAP Evaluators may be contacting you as the coordinator to inform you of buildings that either need shoring, have insufficient shoring, or need better solutions than what was installed in the field. You will need to be prepared to take action on the shoring issues that are brought to your attention, as these can alter the safety of structures and reduce the risk to the public.

3.3 Jurisdiction Responsibilities

The operations plan needs to cover those items that are the responsibility of the jurisdiction when the safety assessment program is activated. Basically, these items are simply what it takes to support the resources while they perform their safety assessments. These responsibilities cover the support needs of the jurisdiction staff as well as those of additional resources that may be requested. Having these support functions addressed prior to the event simplifies the work of the logistics section and allows them to concentrate more fully on obtaining additional resources if the event so requires.

These support needs include:

- **Lodging, food and transportation.** Generally, this covers the primary support needs of incoming resources through the Safety Assessment Program. The best way to fulfill this is to make prior arrangements with local hotels by reserving blocks of rooms for the responding individuals. Food can be arranged through similar agreements with local restaurants. The more difficult part is providing transportation. For small jurisdictions where operations are confined to small areas, transportation can be provided with school or municipal busses that take the personnel into the appropriate area(s) in the morning and pick them up again in the afternoon. For larger jurisdictions it may be more appropriate for the responding resources to drive themselves into their assigned areas. In this case, the jurisdiction would be responsible for

reimbursing their mileage to and from their home and around the jurisdiction. Costs incurred by the jurisdiction are eligible for reimbursement through Public Assistance under a declared disaster.

- **Provide communications.** SAP evaluators are currently encouraged to either bring their own cell phones to the deployment, or upon learning that they are about to be deployed, go obtain a disposable cell phone. If this does not work out, cell phones or radios should be provided to the evaluation teams. One way of minimizing this expense would be to provide the communications equipment to the team leaders and make sure that assignments are such that a team leader's teams are all working in the same area. Arrangements can be made with local cellular phone companies who might provide the necessary phones free of charge or at reduced rates. Again, expenses incurred to secure communication equipment can be eligible for reimbursement through Public Assistance under a federally declared disaster. (In the Hurricane Katrina disaster, the cell phones often worked, despite the widespread devastation.)

- **Local inspectors to work with the evaluation teams.** Local inspectors from the building department are a valuable resource to the evaluation teams. Whenever possible, the jurisdiction should try to assign as many of their inspectors as possible to work in the field with the teams. One good way of doing this would be to use these inspectors as team leaders.

- **Access to interiors of buildings.** The evaluation teams will need access to the interiors of the buildings when they are performing detailed evaluations. Access to the interior is helpful but not mandatory when performing rapid evaluations.

- **Equipment and supplies that may be needed.** The jurisdiction is responsible for providing the volunteers with any equipment and supplies that may be needed. Typically this would be evaluation forms, placards, tape, incident tape, maps, and any other logistical support that may be required. Placards and other critical field supplies must be kept in a location or locations that will be accessible after a disaster, including when essential buildings are rendered "Unsafe."

- **Reimbursement of individuals for out-of-pocket expenses related to evaluation work.** If the individuals are required to pay for any supplies or items needed to complete their evaluations, the jurisdiction is responsible for reimbursing these costs. In turn, these costs can become eligible for reimbursement through Public Assistance under a declared disaster.

When a jurisdiction receives mutual aid assistance, the responding individuals are not likely to be familiar with the jurisdiction and the services provided. That is, they won't know the locations of hospitals, fire stations, police stations, or key utilities. As these individuals are performing their evaluations, they will be representing the jurisdiction to the public, and may be the first public representatives besides emergency personnel that the public can speak with. Therefore, the mutual aid inspectors and jurisdiction staff should have ready access to phone numbers and locations of key services that are available to the public. By addressing this issue in the operational plan, the basic list is always available and simply needs to have final phone numbers and locations added before it is printed and handed out. Some of the services to include on the list are:

- Location of first aid stations

- Location of emergency shelters

- Location of food and water distribution centers

- Emergency Agencies (police, fire, hazmat)

- Utilities

- Locations of the Red Cross Disaster Service Centers. These are the locations where people can go to apply for Red Cross assistance programs.

- Teleregistration phone numbers for business owners, homeowners, and renters if the President has declared the event a disaster.

  For businesses: 1-800-462-9029
  1-800-462-7585 (TTY)

  For homeowners and renters: 1-800-621-FEMA (1-800-621-3362)

3.4 Debriefing

The operational plan should explain the process for debriefing the evaluation teams. This should include where the debriefing will take place, when, and who will be involved.

The purpose of the debriefing is to discuss the general condition of each building evaluated. It should always be used as a method for obtaining information that is not included on the evaluation form or to expand the information contained in the forms. The jurisdiction can ask questions at the debriefing regarding the conditions observed; however, evaluation teams are instructed not to offer opinions regarding demolition or repair. Additionally, evaluation teams should not provide opinions on how much time occupants should be allowed for possession retrieval in UNSAFE buildings.

In the Hurricane Katrina event, evening debriefings proved invaluable for discussing safety issues or other field-related matters that came up during the day.

Typical questions might be:

- *Was the building posted? If so, with what placard and why?*

  This type of question allows the evaluation team to discuss in some detail what they observed without offering opinions.

- *Can you provide more information on the type and extent of damage?*

  This type of question allows the evaluation team to completely discuss the specific damage to the facility. In turn, this will allow the jurisdiction to develop more information about specific buildings to complete the files.

In those cases where a building was deemed to be UNSAFE or to have severe restrictions on its use, typical questions might be:

- *What is the condition of access to the building or structure?*

  The evaluation team can then discuss the condition of the various components affecting access, such as exits, corridors, or stairs.

- *Are there any immediate measures that can be taken to change the status?*

  If it were appropriate to the conditions within the building, this information would appear on the

evaluation form in the comments section. The evaluation team can then talk about specific hazards such as cracked and damaged parapets, or other types of falling hazards where, if removed, the condition could easily change.

3.5 Documentation

Documentation is an area that the SAP Coordinator will need to pay attention to. Early in the response the EOC will be asking for damage information so they can file their Initial Damage Estimate (IDE) with State OES. This request will probably come through before the windshield surveys of the damaged area are completed. Based on information coming in from the field, you could extrapolate and give the EOC your best guess of what the windshield survey is showing. This estimate can be updated as soon as the windshield survey is completed. In Section 4.10.1, there is an example of how to do a rough estimate of damages based on what is found during the windshield survey.

Documentation does not stop with the updating of the IDE. Past earthquakes, especially the 1994 Northridge earthquake, have shown that the collecting of safety assessment information is very helpful to the jurisdiction in determining repair procedures and shaping how the permitting process will work. Additionally, you can start building a historic database for comparing different earthquakes and identifying areas receiving repetitive damage. This historic database will also provide good research information to the engineering and scientific community.

It is highly recommended that jurisdictions record their safety assessment information for historical purposes, and to pass it on to the Operational Area, OES Region and the OES Statewide SAP Coordinator for their use as well. To assist in capturing this information, a sample form is provided on the following page that can be used for this purpose. The form can also be a simple spreadsheet that GIS operators can use with geocoding to develop maps.

At a minimum, all information shown except the repair estimates should be captured. This is information that appears on both the Rapid and Detailed Evaluation forms. Capturing estimated repair costs and actual repair costs allows the jurisdiction to develop better methods of developing these important cost estimates.

As the forms are turned in, one or more jurisdiction personnel can review the form and work with either the Assessor information or the jurisdiction's permit evaluation tables to develop the appropriate cost estimates. The forms can then be provided to clerical staff for entering into the database during the night shift. Each morning the updated database can be sent to the Operational Area, the OES REOC, and the OES Statewide SAP Coordinator.

Table 3-4 Safety Assessment Information - Sample

Jurisdiction	City of Lawson	**Phone #**	(707) 555-7743
Address	4221 Camino Alto Road	**Fax #**	(707) 555-7231
Contact Name	John Pires, Building Official	**E-mail address**	jpires@circle.net

Type (Res=R, Comm =C)	Street Address	City	Bldg Damage Description	Posted Placard	Comments	% Estimated Loss
R	32 Mayberry Lane	Lawson	Off foundation, racked	Red	Entry is at side of house	90%
R	36 Mayberry Lane	Lawson	Stucco & chimney cracked	Yellow		10%
R	40 Mayberry Lane	Lawson		Green		0%
C	224 Hispania Avenue	Lawson	Parapet damaged	Yellow	Front entry unsafe	30%

3.6 SMALL GROUP ACTIVITY IMPLEMENTING AN OPERATION

Your community has just been hit by a Richter magnitude 6.0 earthquake on a fault that runs through the city. The epicenter was located in the heart of your central business district. Staff has completed the windshield survey and results are as follows:

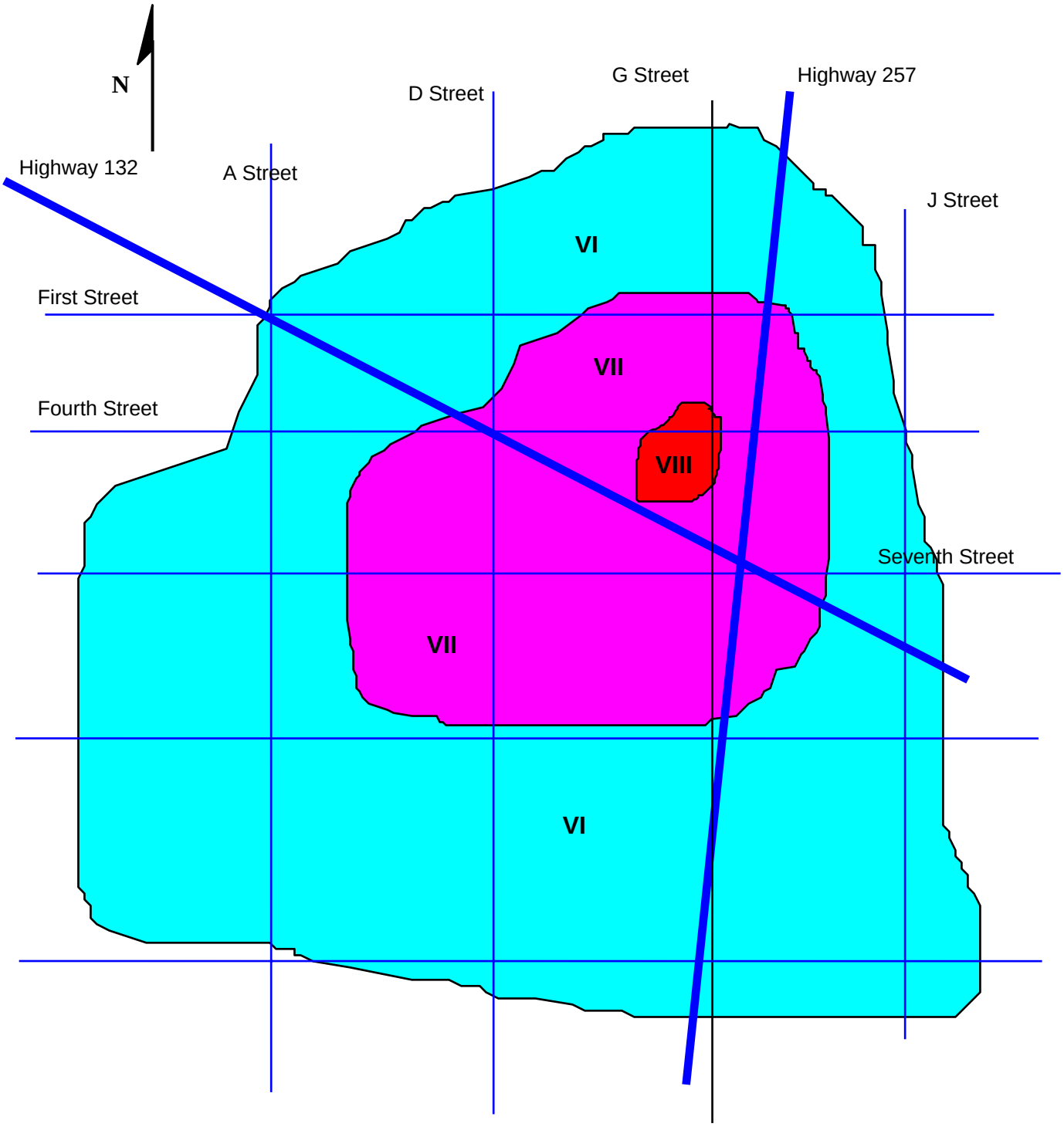
1. Damaged buildings = 1,440 (600 commercial-retail; 400 office; 200 apartment buildings; 100 single family residences; and 140 industrial buildings).

2. Total collapse = 10; Partial collapse = 50; Severe structural damage = 300; Moderate structural damage = 1080.

Your building department staff consists of one building official, two assistant building officials, 5 plan reviewers, one chief inspector, 15 full time inspectors, and appropriate clerical staff.

Using this information, the Mercalli Intensity Map on the following page, the description of the Incident Command System provided in this unit, and other information covered to this point, answer the questions following the map. The operational period has been defined as the next 12 hours.

Notes:



1. The Business District is located between First and Seventh Streets and D and G Streets.

2. The Industrial area is located along Highway 257 (primarily on the east side of the highway) south of Highway 132.

3. The remaining areas are residential.

Discussion Questions

1. Place yourself in the role of the building official. Immediately after the event what do you need to do to begin the operation?

2. You have been appointed as the Operations Section Chief. What is your recommendation to the DOC Director regarding the performance of safety evaluations?

3. You have determined that you do not have sufficient resources to respond to this emergency. How do you go about getting the resources you need? How many individuals will you request?

4. What functions would be your responsibility under Operations? How would you arrange your staff to perform these functions?

5. Establish your operational priorities and explain how you will accomplish the safety assessment goals for this event.

6. The operational period has been established as the next 12 hours. As the Operations Section Chief what will be your objectives during this period? (Objectives are a part of the overall incident action plan and should be attainable within the operational period.)

Notes:

(This page intentionally left blank)

UNIT 4 SAFETY ASSESSMENT PROCESS AND PROCEDURES

Unit 4 - Safety Assessment Process and Procedures

Overview

This unit presents the process and procedures for performing safety assessment and addresses the placards, forms, procedures, and criteria used in performing safety assessment.

Goal

Participants will become familiar with and understand the different types of evaluation, how to use the forms, and the definitions of the placards.

Objectives

Upon completion of this unit, participants will be able to:

- Describe the differences between the various placards; and
- Identify the various forms and properly fill them out.

4.0 Safety Assessment Process and Procedures

4.1 The Safety Assessment Program

Programs must be goal-oriented in order to be successful and the Post-Disaster Safety Assessment Program is no different. When on a response, evaluators need to know that local government has a specific goal in mind when they begin the safety assessment process. Many evaluators believe the goal of the process is to simply identify damaged structures. This is not the case. Identification of damaged buildings is a by-product of the process that will be very useful to local government. However, in accordance with the ***Post-Disaster Safety Assessment Plan***, the goal is:

- **to get as many people as possible back into their buildings as quickly and safely as possible.**

Evaluating and categorizing buildings and structures to reflect their condition for continued occupancy, which, in turn, assists local government greatly in its recovery and reconstruction efforts, accomplish this goal. The faster we can get people safely back into their buildings, the faster the economic base of the city can recover. Furthermore, the faster people can return safely to their homes, the financial strain on government of maintaining shelters is reduced, as is the emotional strain on the people.

Since 1989, when the Applied Technology Council presented ATC-20 ***Procedures for Postearthquake Safety Evaluation of Buildings*** and the companion field manual ATC-20-1, two additional publications have been developed by ATC: ATC-20-2 ***Addendum to the ATC-20 Postearthquake Building Safety Evaluation Procedures***, and ***ATC-20-3 Case Studies in Rapid Postearthquake Safety Evaluation of Buildings***. In addition, in 2004 the ATC-45 ***Field Manual: Safety Evaluation of Buildings after Windstorms and Floods*** was released. These publications well define the process and procedures for determining the safety of buildings for continued occupancy. As time goes on, the Safety Assessment Program will be activated for any type of event, emergency, or disaster that impacts the integrity of structures.

In 1992, OES published the state plan on safety assessment known as the ***Post-Disaster Safety Assessment Plan***. Where the ATC-20 publications define the process, procedures, and criteria for safety evaluation, the plan provides local government guidance on how to access the resources of the Safety Assessment Program available to assist in the safety assessment process.

4.2 Placards Used for Safety Assessment

The ATC-20 procedures are based on a three-placard system. These placards are intended to convey to the owner and/or tenants of a building the condition of the building in relation to continued occupancy. The selection of the appropriate placard is determined by performing either a rapid or detailed evaluation with occupancy the main criterion. The evaluation performed as part of the safety assessment process is not sufficient, in most cases, to determine how to repair the observed damage or whether it is economically feasible to repair it. The evaluation is only sufficient to determine whether or not the building can be occupied.

ATC-20 introduced the three original placards: INSPECTED, LIMITED ENTRY, AND UNSAFE, which are also color coded green, yellow, and red, to easily identify their meaning. These placards were based on the original placards developed by SEAOC and OES in the late 1970s. The first use of the ATC-20 placards was during the Loma Prieta response in 1989 within the San Francisco area. At the same time, the original OES placards were used within the Santa Cruz area. This provided a good test of the two similar sets of placards.

After Loma Prieta there was much discussion on the placards relating primarily to the LIMITED ENTRY concept. This resulted in the Federal government, through FEMA, funding the Applied Technology Council (ATC) to review the placards, forms, and procedures of ATC-20 in light of the experiences of Loma Prieta. ATC was to make modifications as necessary and provide additional information on the process that was not included in the original publication. The main accomplishment of the new publication, ATC-20-2, was the development of new placards which more clearly define the condition of a building for continued occupancy and new evaluation forms intended to provide better information to justify the selection of the appropriate placard.

Due to the fact that the great majority of jurisdictions no longer use or have in stock the old versions of the placards, this course will focus on the use of the new placards.

4.2.1 Inspected (Green)

The following is a representation of the INSPECTED placard.

INSPECTED

LAWFUL OCCUPANCY PERMITTED

This structure has been inspected (as indicated below) and no apparent structural hazards have been found.

☐ **Inspected Exterior Only**

☐ **Inspected Exterior and Interior**

Report any unsafe condition to the local authorities; reinspection may be required.

Inspector comments:

_____
_____
_____
_____

Facility Name and Address:

_____
_____

Date: _____
Time: _____

(**Caution:** Aftershocks since inspection may increase damage and risk.)

This facility was inspected under emergency conditions for:

_____
(Jurisdiction)

Inspector ID / Agency

_____
_____

Do Not Remove, Alter or Cover this Placard until Authorized by Governing Authority

The definition of the INSPECTED placard is:

- No apparent hazard found;
- Repairs may be required;
- Lateral load capacity has not been significantly decreased;

- Vertical load capacity has not been significantly decreased;
- Lawful occupancy is permitted.

In looking at the criteria it needs to be pointed out that "significantly decreased" is a subjective criterion. There is no scale by which to measure "significant." One must use judgment as to the impact of potential damage on the capacity of the lateral force and vertical load systems. Such judgment comes from experience in designing or reviewing designs of the systems.

A Comments Section has been added so that important information can be relayed to the occupant regarding the condition of the structure. This placard does not mean the building was not damaged. It simply means that any damage that occurred does not represent a hazard to the occupants. The Comments Section is intended to provide a means of indicating to the owner that damage which must be repaired. Information that appears in the Comments Section of the placard must also appear in the Comments Section of the evaluation form.

The third revision is the addition of a caution statement relating to aftershocks. This is intended to let the occupant know that the building may have to be reinspected after a large aftershock. The addition of this caution statement tends to limit the use of the placards to earthquake events only. However, for other types of events, the owner can ignore the caution statement. The final change is a wording change to the bottom of the placard regarding the removal of the placard.

4.2.1.1 Example of the Use of the INSPECTED (Green Placard)

Figure 4-1 - Home - Landers/Big Bear Earthquakes, 1992

This photo shows a home that has been damaged locally in that the carport has collapsed. There was no damage to the home and no threat to the occupants. The carport represents only a minor hazard in its current condition. The house could be posted **INSPECTED** (or Green) since there is no direct hazard to the occupants. The area around the carport could be posted as an "area unsafe." On the placard, in the Comments Section, a notation that once the carport is taken down the area unsafe condition could be removed would be appropriate. The same notation would also appear on the evaluation form. If, for example, the carport had not fallen but was still marginally attached to the house, the condition of the structure could change to **LIMITED ENTRY** or **RESTRICTED USE** (yellow).

The restriction on occupancy would be to not occupy rooms on the carport side of the home until such time as the carport was removed or repaired. The damage to the carport is a falling hazard that poses a threat to anyone in the vicinity of the carport. The hazard would be outside the structure and should be posted as "area unsafe."

4.2.2 Restricted Use (Yellow)

During the development of the publication ATC-20-2, two examples of a RESTRICTED USE placard were developed.

RESTRICTED USE

Caution: This structure has been inspected and found to be damaged as described below:

_____
_____
_____
_____

Entry, occupancy and lawful use are restricted as indicated below:

_____
_____
_____
_____

Facility Name and Address:

_____
_____

Date: _____
Time: _____

(**Caution:** Aftershocks since inspection may increase damage and risk.)

This facility was inspected under emergency conditions for:

_____
(Jurisdiction)

Inspector ID/Agency

_____
_____

Do not Remove, Alter or Cover this Placard until Authorized by Governing Authority

RESTRICTED USE

Caution: This structure has been inspected and found to be damaged as described below:

_____
_____
_____
_____

Entry, occupancy and lawful use are restricted as indicated below:

☐ Do not enter the following areas: _____
_____

☐ Brief entry allowed for access to contents:
_____

☐ Other restrictions: _____
_____

Facility Name and Address:

_____
_____

Date: _____
Time: _____

(**Caution:** Aftershocks since inspection may increase damage and risk.)

This facility was inspected under emergency conditions for:

_____
(Jurisdiction)

Inspector ID/Agency

_____
_____

Do not Remove, Alter or Cover this Placard until Authorized by Governing Authority

The criteria for this placard are:

- The building has been damaged but may or may not be habitable;
- There may be a falling hazard present in part of the structure;
- There may be damage to the lateral force and/or vertical load resisting systems, however, they are still able to resist loads;
- Occupancy is permitted in accordance with noted restrictions.

RESTRICTED USE is clearly understood by everyone. The concept behind this placard is that the building has been damaged, but portions of it may be occupied; or the damaged portion is stable and the owner should have free access to retrieve possessions as needed. This placard now provides space to briefly explain the damage and then place appropriate restrictions on how the building is occupied. These restrictions may range from allowing entry only to retrieve possessions to restricting occupancy to only certain rooms. During Loma Prieta and more recent events, we found that more yellow placards are posted than **UNSAFE** or red placards. These buildings were not in a "questionable" condition; the damage present was such that full occupancy could not be allowed, but there was no need to totally disallow entry.

The concept of possession retrieval is a major concern. After Loma Prieta some jurisdictions were looking to the safety assessment evaluator to establish time lines for individuals to enter damaged buildings to retrieve possessions. This placed the evaluator in the awkward position of trying to decide if 15 or 30 minutes was an acceptable risk. Now, through the use of **RESTRICTED USE**, we can eliminate that problem by allowing for possession retrieval on the placard. Permission is not needed from the jurisdiction.

4.2.2.1 Examples of the Use of the LIMITED ENTRY or RESTRICTED USE (Yellow) Placards

(Continued next page)

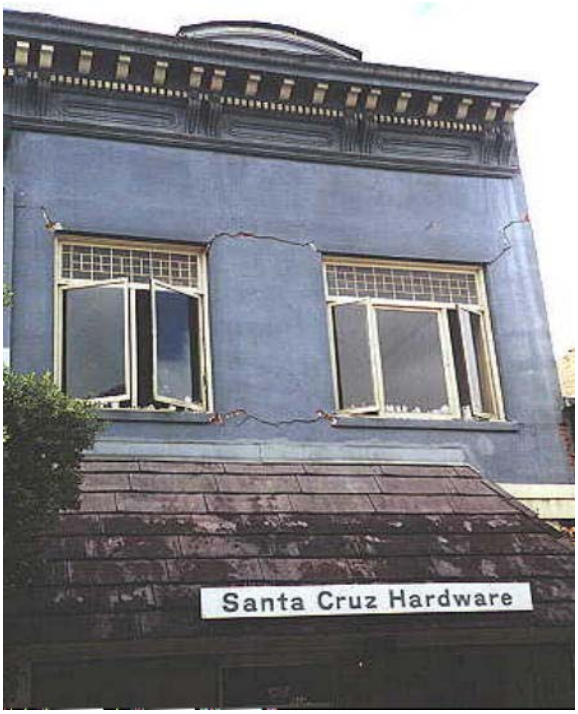


Figure 4-2 - Commercial Building - Loma Prieta Earthquake, 1989

This photo shows a condition that represents a decrease in the lateral capacity of the wall. However, this condition is not necessarily a significant decrease in that the piers are still able to resist forces without collapsing by rocking on their base. From a safety assessment standpoint, this is a serious condition but not one that would preclude entry to the building for possession retrieval. Consideration should be given to restricting access to this front portion of the building until the wall can be stabilized.

Figure 4-3 - Loma Prieta Earthquake, 1989

This photo shows damage as a result of pounding of different height buildings. The damage seen in the brick veneer occurs just at and below the floor line. The broken windows are also an indication of the level of motion experienced by the building. If the evaluation were a rapid evaluation (discussed later in this unit) the most appropriate placard would be **RESTRICTED USE**. Due to the potential for damage to the support of the floor framing, initial restrictions on occupancy would be severe in that no entry into the area around the damage would be permitted, and access to other parts of the structure would be for possession retrieval only. A detailed evaluation, where access to the interior would be provided, may show little or no damage to the support of the floor framing. In this case the restrictions could be modified to provide free access, or the condition of the building could change to **INSPECTED**.

Here is damage to a URM from Hurricane Katrina storm surge. This level of damage may not be as significant in this setting due to a lack of repetitive lateral motion, but in an earthquake would not be a safe condition due to the threat of aftershocks. A **RESTRICTED** tag here could in either case prevent persons from use of this part of the building.

Figure 4-4 – URM wall shear failure, Hurricane Katrina, 2005

4.2.3 Unsafe (Red): The following is a representation of the revised UNSAFE placard:

UNSAFE

DO NOT ENTER OR OCCUPY
(THIS PLACARD IS NOT A DEMOLITION ORDER)

This structure has been inspected, found to be seriously damaged and is unsafe to occupy, as described below:

_____
_____
_____
_____
_____

Do not enter, except as specifically authorized in writing by jurisdiction. Entry may result in death or injury.

Facility Name and Address:
_____
_____

Date: _____
Time: _____

This facility was inspected under emergency conditions for:
_____
(Jurisdiction)

Inspector ID / Agency:
_____
_____

Do Not Remove, Alter, or Cover this Placard until Authorized by Governing Authority

The criteria for the use of this placard have not changed from ATC-20. The placard indicates that one or more of these conditions are present:

- There is extreme hazard and the building may collapse;
- There is imminent danger of collapse from an aftershock;
- There is a significant decrease in lateral and/or vertical load capacity; and
- The building is unsafe for occupancy or entry except by authorities. In this case, "authorities" includes engineers and contractors who need access to the building to develop stabilization methods as well as repair designs.

Originally, the public believed that an **UNSAFE** placard meant that the building had to be demolished. This is not true. Most buildings can be repaired. The repair-demolition issue usually boils down to one of economics. As an example, San Francisco had 350 red-tagged buildings after Loma Prieta, but only 50 of those buildings were demolished. Most of the demolition resulted as a decision of the owner based on economic reasons. The **UNSAFE** placard is used when there is an immediate risk associated with entry, use, or occupancy.

To clarify matters, this placard has the phrase "**This placard is not a demolition order**." The placard also indicates that the building has been inspected and found to be unsafe and that a brief description of the damage is required. The placard further requires written authorization from the jurisdiction for the owner or tenant to enter the building. This statement allows entry for possession retrieval when it is deemed appropriate by the jurisdiction. Further, it allows the building owner to mitigate the hazard in a manner acceptable to the local building authority in order to have access to the building.

4.2.3.1 Examples of the Use of the UNSAFE (Red) Placards

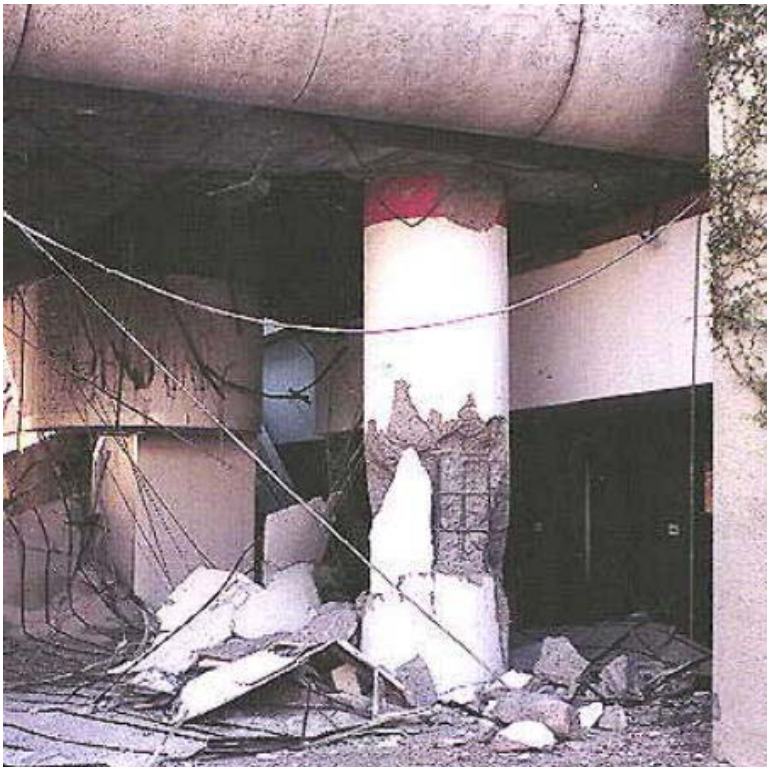
Figure 4-5 - Loma Prieta Earthquake, 1989

The condition shown here can be considered as a significant decrease in lateral capacity. This picture was taken as the building was being repaired and emphasizes the cracks in the wall piers. These cracks are a result of diagonal tension in the pier from in-plane lateral forces the wall was subjected to. This type of cracking is commonly referred to as "shear cracking."

What is important to note is that this is a good example of an **UNSAFE** structure that did not need to be demolished. The **UNSAFE** designation relates solely to continued occupancy of the structure.

This photo shows an obviously **UNSAFE** structure from the Landers/Big Bear earthquakes that experienced a partial collapse of the building wall. This picture also shows significant problems in relation to the pool. This structure is located in Big Bear near the epicenter of the Big Bear earthquake. Vertical ground motion could have pushed the pool upward or sufficient amounts of pool water could have been "sloshed" out of the pool and into cracks in the surrounding slab causing the pool to float and the surrounding slabs to subside.

Figure 4-6 - Landers/Big Bear Earthquakes, 1992



This photo shows a large concrete column supporting a bridge between the parking structure and a department store that was damaged by the Northridge earthquake. The plaster soffit has also failed and is lying on the ground blocking easy access to the department store. The damage to the column appears to be spalling of the concrete cover that probably has not significantly reduced the vertical load carrying capacity of the column. Looking at the thickness of the concrete cover, one can conclude that the column size was for appearance, not load capacity. Additionally, the plaster soffit is on the ground so there is no falling hazard. The initial view of the damage could lead one to believe that it looks worse than it really is. Repairs are required, but there has not been a significant loss of capacity.

Figure 4-7 - Department Store - Northridge Earthquake, 1994

Figure 4-8 - Department Store - Northridge Earthquake, 1994

Take a close look at the column. Here we see two significant items of concern: 1) permanent deformation of the vertical reinforcing; and 2) significant cracks through the core of the column. The deformation in the column shows that a potential P-Delta condition exists which could cause continued damage until such a time as the column is shored. The large crack in the concrete core indicates that there has been a decrease in the lateral capacity of the element. The existence of both of these conditions is sufficient to post the structure as **UNSAFE**.

Figure 4-9 - Loma Prieta Earthquake, 1989

There are times when a building is obviously unsafe and individuals need to be kept away from the area around the building as well as from the building itself. In this case the **AREA UNSAFE** concept should be used. Figure 4-8 shows an example of this condition. The building is obviously unsafe as a result of a portion of the wall from the adjacent building falling through the roof. There is no question about the condition of the building. However, the fact that a portion of the wall fell indicates that the rest of the wall is more than likely unstable and could come down during an aftershock. Therefore, the desire is keep people well away from both buildings. Using the **AREA UNSAFE** designation in combination with some form of barricade will provide a reasonable level of protection until the hazard can be addressed.

Figure 4-10 - Landers/Big Bear Earthquakes, 1992

The Landers/Big Bear earthquakes presented geologists and seismologists tremendous opportunities to study surface faulting conditions. From the standpoint of the Safety Assessment Program, surface faulting can constitute an **UNSAFE** condition if the fault trace is "close" to the building, passes under the foundation, or occurs next to a slope. There are no clear criteria for "close;" this will depend on the judgment of the evaluator. Fault traces passing under a building can lead to differential settlement and damage to foundations that is not readily visible. Traces located next to a slope (either at the top or the toe) can lead to a later failure of the slope resulting in a landslide.

4.3 Evaluation Process

As discussed with the placards, ATC-20 has defined a three-step evaluation process. The Safety Assessment Program will be involved in only the first two of these evaluations.

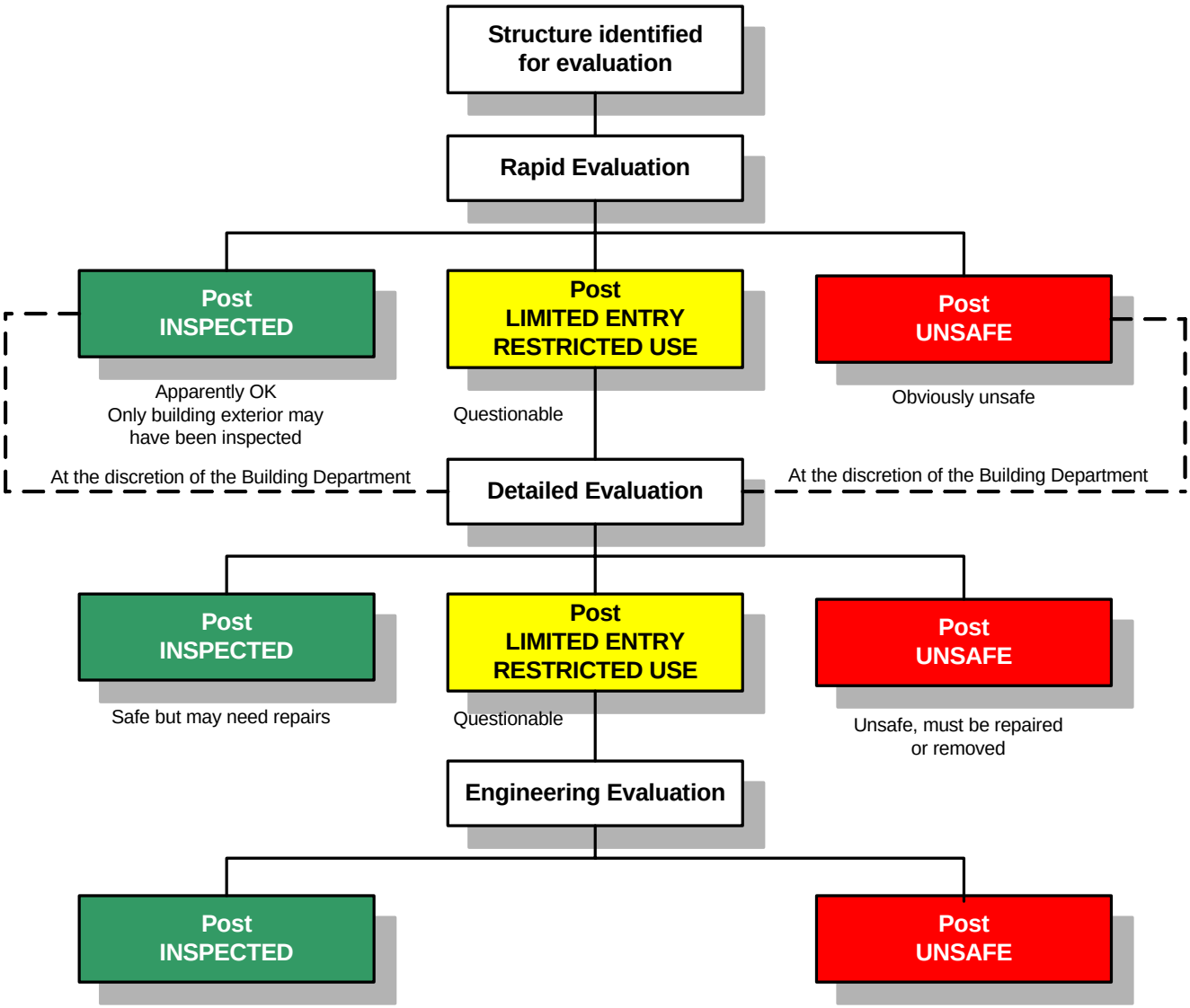


Figure 4-11 - Process Flow Chart

The three types of evaluations are defined as:

- **Rapid Evaluation -** where buildings are rapidly inspected, spending approximately 10 to 20 minutes per building. The intent of this level of evaluation is to quickly identify and post the obviously safe or unsafe structures. If access to the interior is available, and the building is safe enough, it should be entered for a quick walk-through. This allows the discovery of any potentially serious damage or falling hazards within the building.

- **Detailed Evaluation** - where buildings are inspected more thoroughly, with more investigation into the framing systems. Detailed evaluations can take anywhere from one to four hours. Usually this level of evaluation is used for buildings in which the condition is not obvious.

- **Engineering Evaluation** - where buildings are inspected using all available data to ascertain the damage, its cause, and how to repair it. This is a detailed engineering investigation performed by architects and engineers retained by the building owner. Engineering evaluations can take anywhere from one full day to seven days or more depending on the size of the building.

The original idea behind the safety assessment process was to perform rapid evaluation to identify the obviously safe and unsafe structures, and then perform detailed evaluation of those structures where the condition was not obvious. After the detailed evaluations, it was then up to the owner to retain an engineer to perform the engineering evaluation and develop a repair program.

Two important points must be made about the process as originally proposed. First, after the engineering evaluations, engineers will not post buildings. However, if the engineering evaluation shows that a different posting is more accurate, a letter from the engineer to the building official could result in a change of posting. Another option would be to perform enough immediate mitigation of the hazards to warrant changing the posting from **UNSAFE** to **RESTRICTED USE**.

The second point is that experience has shown that most likely only one level of evaluation will be performed. For smaller events (small number of damaged structures) a jurisdiction may decide to perform nothing but detailed evaluations. For larger events, such as the Northridge earthquake, the jurisdiction will most likely elect to perform rapid evaluations only. As there becomes more understanding of the **RESTRICTED USE** placard, the less need there will be to perform two levels of evaluation before turning the structures over to the owner's engineer. For a questionable structure, the importance is to place the correct limitations or restrictions on the occupancy. When that is done, the owner can then retain an engineer to begin the repair process.

4.3.1 Rapid Evaluations

Early in the response phase of a disaster, local government is more interested in getting buildings evaluated as rapidly as possible. It will be in these early days when property owners and elected officials will be concentrating on other areas of the disaster so the building official will not be "swamped" with calls to evaluate specific properties. It will be at this time that the building official will implement the priorities, which will always begin with essential service facilities, as established in the operational plan. In all likelihood, the evaluations performed at this time will be rapid evaluations where teams will spend 10 to 20 minutes per building, posting as many as possible. Later in the response, there will be many phone calls requesting inspections and involvement of the elected officials in "taking care of their districts." At this time the methodical approach to safety assessment tends to break down. It will also be during this phase that the likelihood of performing detailed evaluations will increase.

4.3.1.1 Rapid Evaluation Forms

Since the 1989 Loma Prieta earthquake and the first use of the ATC-20 forms, there has been discussion regarding the contents of the form. The most significant discussion centered on the concept of developing dollar estimates of the damage. This was a concept that was part of the original OES form but was dropped by ATC at the request of the engineers who had performed safety evaluations in the past. Local government, on the other hand, wants dollar estimates of the damage. The result of the discussions was to take a compromise position with the revised forms and estimate the percentage of damage (as was done with the original OES forms).

This controversy needs to be discussed and reasons for providing or not providing dollar estimates clearly understood. Speaking from a federal assistance standpoint, FEMA must evaluate the cost of damage against the ability of the jurisdiction to recover. This evaluation is what FEMA uses to make their recommendation to the President. In order to get the cost of damage, FEMA performs preliminary damage assessments (PDAs) for public assistance and individual assistance in conjunction with OES and the local government. During these PDAs, the inspectors will develop estimates of the cost to repair the damaged facilities. In the case of public assistance, if local government has a rough dollar estimate of the damage before the PDA begins, they are in a better position to have significant influence with the FEMA inspectors on the costs. From an individual assistance standpoint, having locations and extents of the damage gives local government the ability to help speed the process to see if the individual assistance program is activated with a Presidential Declaration.

Developing costs of the damage also provides the jurisdiction with a mechanism of describing the damages to their elected officials. Telling a mayor that there were 25,000 buildings that received some level of damage says very little. Consequently, the way to describe damage to elected officials in a meaningful way is with costs. It is more readily understood to say, "We have suffered approximately $45 million in damage." Additionally, the news media is looking for the same information. Telling their readers or listeners that 25,000 buildings were damaged does not tell them much. However, to report $45 million in damage puts the magnitude into a perspective that is easily understood. These are the main reasons why local government asks for dollar estimates on the damage.

The engineers rightfully believed that they were not spending enough time on each building to provide a dollar estimate supported with any degree of accuracy. Further, the way the program is activated, engineers were responding into areas where they did not know the prevailing construction costs. This also made it difficult to be accurate. These engineers were also concerned that the estimates would tend to take on a life of their own and be considered as hard estimates, thereby causing confusion with building owners who may find that actual costs were significantly higher or possibly lower.

To put the discussions into context, the dollar estimates are of value in putting the damages into context that everyone can understand. Order of magnitude estimates are the best that can be expected in the process and all that local government is looking for. The responding safety evaluators need to understand that the initial estimates are used primarily to assist in obtaining financial assistance from the State and Federal governments not to define repair schemes. Once a PDA has been performed, the initial dollar estimates developed by local government are replaced with the PDA estimates. However, the issue of SAP Evaluators not knowing prevailing construction costs is still very valid.

ATC-20 Rapid Evaluation Safety Assessment Form

Inspection

Inspector ID:_____ Inspection date and time _____ ☐ AM ☐ PM
Affiliation:_____ Areas inspected: ☐ Ext. only ☐ Exterior and interior

Building Description

Building Name: _____
Address: _____
_____
Building contact/phone: _____
Number of stories above ground:___ below ground:___
Approx. "Footprint area" (square feet) _____
Number of residential units: _____
Number of residential units not habitable:_____

Type of Construction

☐ Wood frame ☐ Concrete shear wall
☐ Steel frame ☐ Unreinforced masonry
☐ Tilt-up concrete ☐ Reinforced masonry

Primary Occupancy

☐ Dwelling ☐ Commercial ☐ Govt.
☐ Other residential ☐ Offices ☐ Historic
☐ Public assembly ☐ Industrial ☐ School
☐ Emergency Services ☐ Other:_____

Evaluation

Investigate the building for the conditions below and check the appropriate column.

Observed Conditions:	Minor/None	Moderate	Severe
Collapse, partial collapse, or building off foundation	☐	☐	☐
Building or story leaning	☐	☐	☐
Racking damage to walls, other structural damage	☐	☐	☐
Chimney, parapet, or other falling hazard	☐	☐	☐
Ground slope movement or cracking	☐	☐	☐
Other (specify) _____	☐	☐	☐

Estimated Building Damage (excluding contents)

☐ None
☐ 0 - 1%
☐ 1 - 10%
☐ 10 - 30%
☐ 30 - 60%
☐ 60 - 100%
☐ 100%

Comments: _____
_____

Posting

Choose a posting based on the evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an UNSAFE posting. Localized *Severe* and overall *Moderate* conditions may allow a RESTRICTED USE posting. Post INSPECTED placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.

☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)

Record any use and entry restrictions exactly as written on placard _____
_____
_____

Further Actions Check the boxes below only if further actions are needed.

☐ Barricades needed in the following areas: _____
_____
☐ Detailed evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other: _____
☐ Other recommendations: _____
Comments: _____
_____
_____
_____
_____

A compromise was reached in the development of the new rapid evaluation forms whereby the evaluators determine a percentage of damage within given ranges. The evaluator can then use whatever procedure they wish to determine the percentage. In conjunction with this, the evaluator will also provide the "footprint" area of the building and the number of stories. One approach local government can use to determine the dollar estimate would be to use the information on the evaluation forms with standard construction cost tables. For example, if the type of construction had a value of $215 per square foot; the building had a footprint area of 2,000 square feet; the building height was 3 stories; and there was 10 percent to 30 percent damage, the dollar estimate of the damage would have a range:

$215 x 2,000 x 3 x 0.1 = $129,000

$215 x 2,000 x 3 x 0.3 = $387,000

The jurisdiction could use the mid-point of the range and say there was $258,000 worth of damage, or go with either end, depending on them.

A copy of the revised rapid evaluation form appears on the preceding page.

4.3.1.2 Filling Out the Rapid Evaluation Forms

As with the placards, you will need to be familiar with the original evaluation forms as well as the revised forms. Also you need to be prepared for jurisdictions to develop their own forms. When jurisdictions develop their own forms, they usually use the ATC forms as a starting point, and then add boxes and lines for the kinds of additional information that they are looking for. Some jurisdictions will also add information in Spanish and other non-English languages common to their area. A guidance point on this is to consider those languages in which official information such as voter's materials are translated.

To understand and be familiar with the forms will greatly assist you when you are activated and respond to a jurisdiction's request for safety assessment assistance.

Rapid Evaluation Form

The following is the information that should be provided:

1. **Inspector ID:** As with the original form, this block is filled with either your ID number or your name. Again, if the jurisdiction has deputized you, they have the right to require you to use your name not an ID number. As with the original form, use of your name does not minimize your liability protection.

2. **Affiliation:** This information allows the jurisdiction to keep track of the evaluations that are done by their own staff and from mutual aid resources obtained through OES. As a resource, you would write in your home jurisdiction if you were a part of the CALBO program or OES if you are from the private sector.

3. **Inspection Date and Time:** This is one of the most important boxes to fill out. In the event of a large aftershock, the jurisdiction can rapidly review the evaluations that have been performed and determine which buildings should be re-inspected.

4. **Areas inspected:** This allows the jurisdiction to know at a glance how thorough the evaluation was. Obviously, if the evaluation were performed both inside and outside the building, it will be more thorough than from just the outside. However, many times the condition of the building can be determined from the exterior only, and there is no need to enter the building. As an

example the jurisdiction could use this information to prioritize buildings for re-evaluation after a large aftershock. Those that had been evaluated from the exterior only might receive a higher priority for re-evaluation. Again, if there is no need to go inside the building, don't go in.

5. **Name**: This is the name of the building, facility, business, or onsite manager. If you cannot find the name of the building then provide the name of the business or the onsite manager. In the case of single-family residences note the name of the owner or tenant, or simply leave the line blank.

6. **Address**: To the extent possible, this information should always be provided. If the number is not found on the building, look at adjacent buildings to see if you can find a number and try to determine the street number of the building being evaluated. In residential areas, if the address is not found on the building, look at adjacent homes or on the curb in front of the home.

7. **Building contact/phone:** If the owner and/or tenant are available when you are performing your evaluation, getting their phone number is advantageous to the jurisdiction. This gives the jurisdiction the ability to easily follow up on the repairs to the building. If the individual who is there when you do your evaluation is reluctant to give you this information, or if no one is there, simply indicate "NOT AVAILABLE" in the space provided.

8. **Number of Stories:** This is simply to record the height of the building. This is information the jurisdiction will use if they wish to place a cost estimate on the damage. In the new form, you now provide the number of levels above grade and the number below grade. For hillside sites, use the same criteria as noted for the original rapid evaluation form.

9. **Approximate "footprint area:"** This is another piece of information that the jurisdiction will use to place costs to the damage. Footprint area is specified so the jurisdiction knows exactly what area is being presented, and to differentiate from gross or total area.

10. **Number of residential units and Number of units not habitable:** This allows the jurisdiction to track displaced persons as well as to determine needs for short-term sheltering of these displaced persons. When the operation changes from response to recovery, this information helps in determining the needs for long-term sheltering or temporary housing.

11. **Type of Construction:** This information is provided to the jurisdiction for two reasons: 1) for use in determining the cost of the damage; and 2) for statistical information. At the rapid evaluation level, this information is very general and usually can be determined from the exterior of the building.

12. **Primary Occupancy:** This information is used primarily for cost estimating and statistics. The actual use of the building does not necessarily have a bearing on the continued occupancy. This is also helpful to the jurisdiction when it comes time to do a preliminary damage assessment to ascertain whether or not the President declares a major disaster.

13. **Observed Conditions:** In this case there is more allowance for judgment in answering the questions. Instead of simply yes or no, we now look at degrees of damage. Answering the questions in this manner becomes a tool for determining the estimated building damage.

14. **Estimated Building Damage:** This is purely a judgmental factor. There is no set methodology to calculate this information. As you can see, the ranges of percentages are rather broad once you reach the 10 percent mark. Probably the easiest method of determining the percentage is to roughly estimate the repair cost excluding contents (to the nearest $10,000 on light damage and to the nearest $100,000 on more heavily damaged structures) and divide it by the

replacement cost. Some individuals will feel comfortable in simply "sight" estimating this percentage. This information, plus the footprint area of the building, number of levels, type of construction, and occupancy, allows the jurisdiction to develop a dollar estimate of the damage.

The Posting section places the culmination of the evaluation in one place. Simply check the box that represents the placard you post. If the building is posted as RESTRICTED USE, use the lines provided to record the restrictions on continued occupancy. In the instructions portion is the reminder of where to post the building.

Though laid out slightly differently, the Recommendations section is the same as the Recommendations section on the old Rapid Evaluation form.

4.4 Detailed Evaluation

The next level of evaluation is the Detailed Evaluation. This type of evaluation is a thorough visual examination of the damaged building, usually from the exterior and interior. It is commonly performed on those buildings for which there are some questions regarding the structural condition. In most cases, the building will have been posted with a **RESTRICTED USE** or **UNSAFE** placard.

Detailed Evaluations may be used for other than structurally related problems with the building. A very common form of Detailed Evaluation would be for geotechnical problems where the expertise of a geotechnical engineer may be needed. In this case, the evaluation would be performed using the Geotechnical Evaluation Form (copy included in appendix A). Another form of detailed evaluation that can be performed is one relating to the potential for hazardous materials. This is an evaluation that can be performed by the local fire department or the building department, or may require the owner to retain a professional consultant and include their report as a part of the engineering evaluation.

4.4.1 Evaluation Form

The discussions, revisions, and reasons for modifications to the Detailed Evaluation are the same as for the Rapid Evaluation forms. The main purpose was to provide local governments with more information to allow them to develop dollar estimates of the damage and to provide more historical data on the damaged buildings. The use of these forms will be determined by the jurisdiction in charge of the operation.

ATC-20 Detailed Evaluation Safety Assessment Form

Inspection
Inspector ID: _____
Affiliation: _____
Inspection date and time: _____ ☐ AM ☐ PM

Final Posting from page 2
☐ Inspected
☐ Restricted Use
☐ Unsafe

Building Description
Building Name: _____
Address: _____
_____
Building contact / phone: _____
Number of stores above ground ___ below ground ____
Approx. "Footprint area" (square feet)_____
Number of residential units: _____
Number of residential units not habitable: _____

Type of Construction
☐ Wood frame ☐ Concrete shear wall
☐ Steel frame ☐ Unreinforced masonry
☐ Tilt-up concrete ☐ Reinforced masonry
☐ Concrete frame ☐ Other: _____

Primary Occupancy
☐ Dwelling ☐ Commercial ☐ Govt.
☐ Other residential ☐ Offices ☐ Historic
☐ Public Assembly ☐ Industrial ☐ School
☐ Emergency Services ☐ Other: _____

Evaluation

Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

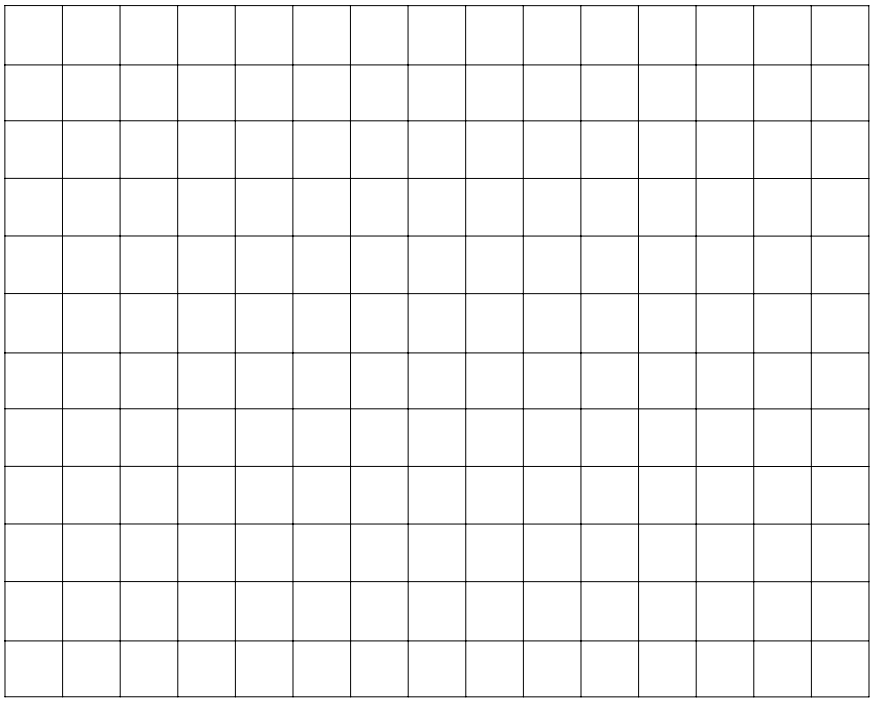
	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	☐	☐	☐	_____
Building or story leaning	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Structural hazards:				
Foundations	☐	☐	☐	_____
Roofs, floors, (vertical loads)	☐	☐	☐	_____
Columns, pilasters, corbels	☐	☐	☐	_____
Diaphragms, horizontal bracing	☐	☐	☐	_____
Walls, vertical bracing	☐	☐	☐	_____
Precast connections	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Nonstructural hazards:				
Parapets, ornamentation	☐	☐	☐	_____
Cladding, glazing	☐	☐	☐	_____
Ceilings, light fixtures	☐	☐	☐	_____
Interior walls, partitions	☐	☐	☐	_____
Elevators	☐	☐	☐	_____
Stairs, exits	☐	☐	☐	_____
Electric, gas	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Geotechnical hazards:				
Slope failure, debris	☐	☐	☐	_____
Ground movement, fissures	☐	☐	☐	_____
Other _____	☐	☐	☐	_____

General Comments: _____
_____

ATC-20 Detailed Evaluation Safety Assessment Form Page 2

Building name: _____ Inspector ID: _____

Sketch (optional)
Provide a sketch of the building or damage portions. Indicate damage points.



Estimated Building Damage
If requested by the jurisdiction, estimate building damage (repair cost ÷ replacement cost, excluding contents)

- ☐ None
- ☐ 0 - 1%
- ☐ 1 - 10%
- ☐ 10 - 30%
- ☐ 30 - 60%
- ☐ 60 - 100%
- ☐ 100%

Posting
If there is an existing posting from a previous evaluation, check the appropriate box. Previous posting:
☐ INSPECTED ☐ RESTRICTED USE ☐ UNSAFE Inspector ID: _____ Date: _____
If necessary, revise the posting based on the new evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an Unsafe posting. Local *Severe* and overall *Moderate* conditions may allow a Restricted Use posting. Indicate the current posting below and at the top of page one.
☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)
Record any use and entry restrictions exactly as written on placard: _____
_____
_____

Further Actions Check the boxes below only if further actions are needed.
☐ Barricades needed in the following areas: _____
_____
☐ Engineering Evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other: _____
☐ Other recommendations: _____
_____
_____
Comments: _____
_____
_____
_____
_____
_____

4.5 Engineering Evaluation

The Engineering Evaluation is the final and most comprehensive of the three levels of evaluation. This level of evaluation is not a part of the safety assessment process and is performed by a professional engineer or architect retained by the building owner. This evaluation can take anywhere from one to several days and will determine the cause of the damage and an appropriate repair program. This repair program is then submitted to the building department to make sure it complies with the jurisdiction's repair criteria. Once the jurisdiction agrees with the proposal, a building permit is issued and the repair work proceeds.

Notes:

(This page intentionally left blank)

UNIT 5 LIFELINE SYSTEMS AND FACILITIES

UNIT 5 – LIFELINE SYSTEMS AND FACILITIES

Overview

In this unit, we will use the process and procedures from Unit 2 show the participant how to fill out the evaluation forms for lifeline systems and facilities including: airports, bridges, geotechnical, pipelines, pumping plants, reservoirs, roads, wastewater treatment plants, and water treatment plants.

Training Goal

Participants will know how to use the evaluation forms in conducting safety evaluations of various lifeline facilities.

Objectives

Upon completion of this unit, participants will be able to: complete the evaluation forms and report their recommendations on the conditions of the lifeline system or facility.

5.0 Lifeline Systems and Facilities

The lifeline systems and facilities discussed in this unit form a critical part of a community's infrastructure. For that reason, **only detailed evaluations will be performed,** and evaluators who have professional training and/or experience in the design and operation of the systems will perform the assessment. It is well beyond the scope of the SAP to teach the concepts and philosophy that are utilized in design of these systems.

Because of the nature of the systems involved in these evaluations, the jurisdiction is encouraged to assign someone from Public Works, Police, or Fire to accompany the SAP team. Information on the condition of many of these systems needs to be conveyed to the proper authorities immediately so the appropriate actions can be taken. For example, a bridge on a main street through the jurisdiction that is deemed to be unsafe needs to be taken out of service immediately. Having a jurisdiction representative with the team allows the information to be transferred to the appropriate department rapidly.

In this class, we will familiarize you with the forms and how to fill them out. The American Society of Civil Engineers, Los Angeles Chapter developed these forms for use by the Governor's Office of Emergency Services in the late 1970s as the Safety Assessment Program was first being developed. These evaluations are not damage assessments and, like building evaluations, are intended to determine the safety of lifeline systems or facilities for continued use. The evaluations are sufficient to determine if a system of facility is safe enough to return to service (INSPECTED or "Green"); should be returned to service with some restrictions (RESTRICTED USE or "Yellow"); or taken out of service until repaired (UNSAFE or "Red").

Only one of these forms, the bridge assessment, has been used in an actual response. This was during Loma Prieta in the City of Santa Cruz. Therefore, as these forms are used in actual assessments, we can assume that they will go through an improvement process similar to the ATC-20 forms.

In Unit 2 we learned that in accordance with the ***Post-Disaster Safety Assessment Plan***, the goal of the Safety Assessment Program is:

- **to get as many people as possible back into their buildings as quickly and safely as possible.**

We must also look at **rapidly restoring vital services that will impact the public at large,** as well as the emergency response. In this unit, we will look at the evaluation forms that will be used for critical infrastructure aimed at rapidly restoring vital services and arteries for the movement of resources around the effected area.

The lifeline systems and facilities that are a part of the Safety Assessment Program include:

- Geotechnical Evaluation (applicable to all)
- Transportation Systems
  - Airports
  - Roads
  - Bridges

- Water/Wastewater Systems
  - ➢ Pipeline
  - ➢ Pump Station
  - ➢ Reservoir
  - ➢ Wastewater Treatment Plants
  - ➢ Water Treatment Plants

The evaluations that will be performed are classified as detailed evaluations and the placards are the same as the placards used for buildings. When posting placards, care must be taken to use the correct placard for the conditions noted. Posting of facilities will be discussed in detail at the end of the unit.

5.1 Assessment Form Heading

Assessment
Report No. _____

Facility Name: _____	SAP ID Nos. _____ _____
Address: _____	Other Reports _____
County/City _____	No. Photos _____ No. Sketches _____
Mo/Day/Yr _____/_____/_____ Time _____ (use 24 hr)	Ref. Dwgs. _____
Type of Disaster _____	Est. Damage %_____
	Facility Status [ ]

SAFETY INSTRUCTIONS: The possibility of the presence of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard. ALSO: The FAA is responsible for checking and evaluating damage to control tower equipment, lighting controls, communication systems, navigational aids, and approach light systems. Obtain permission from tower to enter runway. Permission obtained from _____

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	None O	Recommended:	Green O	Posted at this assessment:	Yes O
	Green O		Yellow O		No O
	Yellow O		Red O		
	Red O				

All of the lifeline systems forms use the same header, including the geotechnical report. Therefore, the discussion through Section A of the forms will be done once before going into details of each system form. As it does with the building evaluation forms, a line exists at the top of the page for "Assessment Report #." Evaluators will leave this line blank. The jurisdiction you are working with will fill this line in once the report form has been returned to them and they log it into the system. This report number is used by the jurisdiction to track the particular facility or system being evaluated.

"Facility Name," "Address," and "County/City" are self-explanatory. The facility name should be the name provided by the jurisdiction or used by the jurisdiction during day-to-day operations. "Address" is the street address as used by the jurisdiction. "County/City" should be the name of the county or the city depending on who has jurisdiction over the facility or system. "Mo/Day/Yr" refers to the date of the evaluation that is being performed and the "Time" is the time of day the evaluation was performed. Please note that time should be shown using the 24-hour clock. Finally, the "type of disaster" is a reference to the event that caused the need for the evaluation. For example, this could be an earthquake, flood, wildland fire, etc. The actual name of the event, if known, could be used.

To the right of the form is the section that identifies who did the evaluation and what supporting documentation was used to develop the assessment. On the first line, the evaluators would enter either their SAP identification number from their ID Card or their names. The jurisdiction responsible for the evaluation will establish their criteria in relation to using names or ID card numbers. As was discussed in Unit 1, originally this was a liability issue and, since liability has been resolved in multiple ways, there is no problem in using the evaluator's name. "Other Reports" relates to safety assessment evaluations or any other type of report that was used in the performance of your assessment. If no other reports were used, indicate "NONE." If other reports were used, indicate "OVER" in the available space and list the reports by title or assessment number.

"No. Photos" relates to the number of photographs that are a part of this evaluation. "No. Sketches" relates to the number of sketches you developed as a part of the assessment. If photographs were taken and/or sketches developed, they need to be stapled to this assessment report. If the photographs require developing, the film should be turned over to the jurisdiction. If the photographs are digital, they need to be downloaded into the jurisdiction's computer system.

"Ref. Dwgs." refers to any drawings that were used in the assessment. If none were used, indicate "NONE" in the available space. If drawings were used, note "OVER" and list the drawings by drawing number on the back of the form.

Unit 2 discusses providing estimates of the damage seen. If you are comfortable estimating the percentage of damage, you may enter it in the space marked "Est. Damage." As Evaluators, do not be overly concerned about providing precise estimates. This information is used by the jurisdiction to assist them in determining the impact of the disaster. These numbers are very preliminary and will change many times before the actual repair work is done.

The final block is "Facility Status." In the large box provided, simply indicate by color the recommended status of the facility as a result of this assessment.

The next two sections provide a safety reminder to the evaluator and a caution statement to the jurisdiction. The first part of the safety reminder applies to all evaluations, while the second portion of the reminder applies only to airports. The caution statement reminds the jurisdiction that the level of assessment you are performing is not sufficient to be used in countering any other engineering opinions that have been developed through more in-depth and thorough evaluations.

Section A of the evaluation is where you indicate what the existing condition of the facility or system was prior to your assessment (i.e., previous assessment where this is a re-evaluation). In the "EXISTING" section check the box that was the recommendation from the previous assessment. If there is no recommendation, or you do not know if another assessment had been performed, check the "NONE" box. The "Recommended" portion of the box is for noting the condition that you are recommending based on your assessment. Again, check the box with the appropriate placard color. The final box is simply a notation of whether or not you physically posted the facility or system following your assessment. In most cases, for these systems, you will not place a placard.

The first page of the form is intended to provide the jurisdiction with a quick overview of the condition of the facility or system. All pertinent information regarding the posting used is contained on the first page. In the remaining sections of this unit, we will look at each form beginning with Section B.

5.2 Geotechnical Evaluation

(Photograph by Robert A. Eplett, California OES)
Figure 5-1 – Surface Faulting - Landers/Big Bear Earthquake, 1992

Within this unit, the geotechnical evaluation is the only non-lifeline specific assessment. In this case, a geotechnical evaluation can be requested for any type of facility or assessment where damage has occurred or been exacerbated by soil conditions. Most geotechnical evaluations will be performed on facilities that have already had a facility specific evaluation. Where the forms do not explicitly note geotechnical conditions, it is hoped that the previous evaluation team has noted on their assessment forms the conditions that lead to their recommendation for a geotechnical assessment. This will give the new team a starting point to begin their assessment. The assessment begins at the site in question, and expands outward to determine if subsurface or surface soil conditions pose a threat to the continued use of the facility or system.

Geotechnical failures, particularly liquefaction and associated lateral spreading, have often caused the most severe damage to lifeline facilities. Pipelines, tanks, and foundations built in or on soil that liquefies move with the soils laterally, settle, or become buoyant. Movement results in severe damage. Liquefaction is most often found adjacent to water bodies where the groundwater table is high with unconsolidated soils. Settlement not related to liquefaction can also occur, although usually is not as severe. Landslides sometimes occur where there is steep topography.

(Photographs courtesy of San Francisco Dept. of Public Works)
Fig. 5-2 Slide near structures, San Francisco **Fig. 5-3 Toe of same slide, San Francisco**

This rock slide (in the previous photos) initially appears to endanger the high-rise apartments above it. However, the apartments were set back far enough to be unaffected by the slide. The building directly below the slide was damaged by it, which is out of view from these photos.

Fig. 5-4 Slope failure disrupting road, Sonoma County

This slope failure was caused by the "New Years Eve" Storm of December 2005 through January 2006. Excessive soil saturation led to slope failure.

A copy of the evaluation form can be found on the following page.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
GEOTECHNICAL EVALUATION

Assessment Report No. _____

Facility Name _____

Address _____

Co-City-Vic _____

Mo/Day/Yr _____/_____/_____ Time _____ use 24 hr.

Type of Disaster _____

SAP ID Nos. _____ _____

Other Reports _____

No. Photos _____ No. Sketches _____

Ref. Dwgs. _____

Est. Damage %_____

Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:		Recommended:		Posted at this assessment:	
	None O		Green O	Yes	O
	Green O		Yellow O	No	O
	Yellow O		Red O		
	Red O				

B. RECOMMENDATIONS

Monitor _____

Other _____

_____

_____

_____

_____

C. COMMENTS _____

_____

_____

_____

_____

DAMAGE OBSERVED (D.O.) Assessment Report # _____

Damage Scale:	0 None (0%)	1 Slight (1-10%)	2-3-4 Moderate (11 - 40%)	5 Severe (41 - 60%)	6 Total (over 60%)	NA Not Applicable	NO Not Observed

D. OBSERVED GEOTECHNICAL CONDITIONS WITH EFFECT ON FACILITY

Observed Condition	Extent of Condition D.O.	Effect of Condition D.O.	Observed Condition	Extent of Condition D.O.	Effect of Condition D.O.
Ash flows ……	_____	_____	Flooding …….	_____	_____
Avalanches ……..	_____	_____	Landslides/mudslides ..	_____	_____
Collapsed soils…….	_____	_____	Lava flows ……..	_____	_____
Cut……..…	_____	_____	Liquefaction ……	_____	_____
Differential settlement..	_____	_____	Lurching …….	_____	_____
Displacement……	_____	_____	New springs ……	_____	_____
Dried springs ……	_____	_____	Ponded water ……..	_____	_____
Erosion …….	_____	_____	Sand boils ……	_____	_____
Faulting ……	_____	_____	Tsunami/seiches …….....	_____	_____
Fill ……..……	_____	_____	Soil shear failure …….	_____	_____

E. CONTINUING HAZARDS TO LIFE/PROPERTY (Please describe)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

5.2.1 Filling Out the Geotechnical Evaluation Form

1. **Recommendations** – Often damages will be found that initially may not be significant enough to take the facility or system out of service. However, over time these damages can become more significant. In this section of the form, the evaluator will note the areas of the facility that need to be **monitored** on some regular basis. Ideally, the evaluator will indicate what needs to be monitored, why, and at what point the condition will cause a change in the posting or the need for another action. The second part of this section allows the evaluator to provide information about the posting decision that would be pertinent for the jurisdiction to know. This section can also be used to elaborate on monitoring requirements.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. If there is not enough room to write the necessary explanations, simply indicate "OVER" at the bottom of the form and continue on the back side of the form.

3. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

4. **Section D – Observed Geotechnical Conditions with Effect On Facility** – Utilizing the DO, the evaluator will look at all the conditions and describe the extent of the condition. This allows the jurisdiction to understand how bad the geotechnical conditions are at the site. The second part of the assessment describes the impact of that condition. Remember, the two evaluations can have significantly different assessments. For those areas that are not involved in the event (i.e., ash flow for an earthquake event) use the designation NA (Not Applicable).

5. **Section E – Continuing Hazards to Life/Property** – The evaluation team will use this section to verbally describe the conditions at the site that may be a hazard to life safety and to property. This narrative should go into some level of detail relating the geotechnical conditions to the original posting of the facility or structure. Remember, you are not performing an engineering evaluation, so your narrative needs to be commensurate with the assessment performed. Mapping the area that has liquefied showing the size of cracks, location of sand boils, and an estimate of lateral movement is useful, if time permits.

5.2.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting. If the facility has been posted with a placard, make sure you update the existing placard with the appropriate information. If your recommendation changes a posting from INSPECTED to RESTRICTED USE or UNSAFE, or from RESTRICTED USE to UNSAFE, change the placard and add the appropriate information explaining the change in condition. If the geotechnical conditions you observe do not have an impact on the site or facility, DO NOT change the existing placard. If there is a comment on the placard regarding the potential hazard from the geotechnical condition, make the appropriate change and add your names to the placard with the new date and time.

5.3 Airports

(Photograph from the Denali Collection)
Figure 5-5 – Airport Runway, Lateral Spreading

The large international airports will not be using the SAP to obtain evaluators to assess the safety of the airport for continued use. Because of the volume of traffic at these airports, they will utilize their own engineers to perform the evaluations within minutes following the occurrence of an event. Evaluators from the SAP will be used to evaluate the small, general aviation airports that are located within the community. These will become key facilities for the purpose of receiving and moving resources for the community. In some cases, these airports will also be used as staging areas for the people and equipment that will be assisting the community.

There has been a wide range of earthquake damage to airport facilities. Liquefaction and/or settlement have occurred on runways, rendering them inoperable. Control towers have been damaged because of the seismic amplification occurring between the ground and the roof. Roof structures on control rooms are often damaged because of the poor support provided by the glass walls. Emergency power is often not operable because of the failure of batteries required to start generators, and/or failure of other support systems required to operate the generator.

Fig. 5-6 Damage to Control Tower, Loma Prieta Earthquake

The glass was shattered from this airport control tower due to the earthquake.

5.3.1 Filling Out the Airport Evaluation Form

1. **Recommendations** – Many times, damage will be found that on the surface may not be significant enough to take the facility or system out of service. However, over time these damages can become more significant. A good example would be a cracked runway from an

earthquake. Additional aftershock activity may increase the size of the crack or, in the worse case, begin to separate vertically. In this section of the form, the evaluator will note the areas of the airport that need to be monitored on some regular basis. Ideally, the evaluator will indicate what needs to be monitored, why, and at what point the condition will cause a change in the posting. The second part of this section allows the evaluator to provide information about the posting decision that would be pertinent for the jurisdiction to know. This section can also be used to elaborate on monitoring requirements.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the airport may be posted RESTRICTED USE, it is in this section that the evaluator would note the restrictions. If the airport is to be posted UNSAFE, the reasons for that choice are provided here. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

3. **Surface Displacement** – This section is used to note the vertical and horizontal displacements of various portions of the paved areas of the airport. The first line is to indicate the level of damage using the damage scale. The second and third lines are to record the actual displacements at the time of the assessment. There are times when runways will cross over streets; these overpasses are considered as bridges, and the structure should be evaluated using the Bridge assessment form. The same would apply for pedestrian bridges or overpasses.

4. **Underground Utilities** – For each of the utilities listed, the evaluators will estimate the level of damage using the damage scale. Each of these utilities, if individually damaged, could be grounds for a recommendation of a RESTRICTED USE posting. For example, if the sanitary sewer has failed, the damage may not be sufficient to consider the airport unsafe. However, you do not want people using the restrooms until the sewer is fixed, especially if the airport is being used as a staging area. Your restriction in this case would be to close and lock all restrooms due to the sewer damage.

5. **Buildings** – For each of the buildings, either a Rapid Evaluation or Detailed Evaluation form should be filled out. The results of that assessment will provide the background information for determining the approximate level of damage here. Each building assessment form should be stapled to the airport evaluation form.

6. **Remarks** – This section lets you expand in some detail the results of the assessment of the various components. Further, this is a good place to cross-reference to either the bridge or building evaluation forms if used.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
AIRPORT

Assessment
Report No. _____

Facility Name: _____
Address: _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____ use 24 hr
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos ____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of the presence of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard. ALSO: The FAA is responsible for checking and evaluating damage to control tower equipment, lighting controls, communication systems, navigational aids, and approach light systems. Obtain permission from tower to enter runway. Permission obtained from _____

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will no render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	None O	Recommended:	Green O	Posted at this assessment:	Yes O
	Green O		Yellow O		No O
	Yellow O		Red O		
	Red O				

B. RECOMMENDATIONS:

Monitor _____

Other _____

_____

C. COMMENTS _____

_____

_____

_____

_____

Assessment Report # _____

DAMAGE OBSERVATIONS (D.O.)

Damage Scale:	0 None (0%)	1 Slight (1-10%)	2-3-4 Moderate (11 - 40%)	5 Severe (41 - 60%)	6 Total (over 60%)	NA Not Applicable	NO Not Observed

D. SURFACE DISPLACEMENT

	D.O.	Amount in inches Horiz.	Vert.
Runway pavement	_____	_____	_____
Taxiway pavement	_____	_____	_____
Aircraft aprons	_____	_____	_____
Car parking areas	_____	_____	_____
Access roadways	_____	_____	_____
Bridges	_____	_____	_____
Liquefaction	_____		

(Bridge Report Attached o Geotechnical Report Attached o)

E. UNDERGROUND UTILITIES

	D.O.
Water mains	_____
Water services	_____
Gas mains	_____
Sewer	_____
Collapsed o	
Displaced o	
Large storm drains	_____
Aircraft fueling systems	_____
Airfield lighting	_____
Underground electrical	_____

F. BUILDINGS

	D.O.
Control tower structure	_____
Passenger terminal buildings	
Structural	_____
Mechanical	_____
Electrical	_____
Utility plant buildings	
Equipment	_____
Piping	_____
Emergency generator building	
Equipment	_____
Fuel supply	_____

G. REMARKS _____

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

5.3.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting of the airport. Once determined, the team should report to the general manager of the airport and relay to them what their recommendations are. Remember that you do not have the authority to post the airport; all you can do is make a recommendation. When you return to whoever assigned you to assess the airport, provide them with your recommendations and as much detail as you can. When your recommendation is to post the airport UNSAFE, you must immediately contact the jurisdiction representative with your recommendation. If the airport does not have a general manager or someone in charge, the jurisdiction will notify the FAA, which will put out a general broadcast indicating the airport is closed.

5.4 Bridges

(Photograph courtesy of FEMA)

Figure 5-7 –Olympia, Washington, Nisqually Earthquake, 2001

The major bridges throughout the state are found on the highways and freeways, which are a part of the national highway system. CalTrans will evaluate these bridges immediately following the event. However, the SAP can be used to provide engineers to evaluate bridges that are not a part of the national highway system located within the jurisdiction. These bridges will be important to the jurisdiction for moving resources to where they are needed. SAP engineers evaluated bridges in the City of Santa Cruz following the Loma Prieta Earthquake. This has been the only experience with the forms to date.

Bridges are damaged when support columns (without adequate confinement steel) fail in shear, unable to transfer lateral loading to their foundation. Bridge spans fall off abutments and piers if the seat is too narrow, and they are not otherwise restrained. The most vulnerable bridges are those with multiple spans and those that are at an angle to the obstruction they cross. Bridge approaches sometimes settle, resulting in an offset at the abutment.

Fig. 5-8 Overpass column collapse, Northridge Earthquake

This overpass column was of nonductile concrete design, and failed in the Northridge Earthquake due to insufficient containment.

5.4.1 Filling Out the Bridge Evaluation Form

A copy of the evaluation form can be found on the following page.

1. **Recommendations** – This section shows the typical types of recommendations that would apply to bridges, though not necessarily the only ones. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the monitor box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If the shore and brace box is checked, you should note a location. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the bridge may be posted RESTRICTED USE, the evaluator would note the restrictions if they are not checked off in the recommendations section. If the bridge is to be posted UNSAFE, the reasons for that choice are provided here.

3. **Bridge Description** – In this section of the evaluation form, the evaluator will describe the structural system of the bridge, configuration of the bridge, and description of the foundation system. In the spaces where dimensions are requested, these should be either estimated or "paced." Do not take the time to physically measure by tape or chain all the dimensions requested.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
BRIDGE

Assessment
Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time
_____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing: None o Green o Yellow o Redo
Recommended: Green o Yellow o Red o
Posted at this assessment: Yes o No o

B. RECOMMENDATIONS

Monitor _____ O
Use for public transportation _____ O
Use for pedestrians _____ O
Use for two-way traffic _____ O
Use off-site detour _____ O
Use underpass only _____ O
Barricade _____ O
Use for emergency vehicles _____ O
Close to truck traffic _____ O
Use for private passenger vehicles only___ O
Use for one-way traffic _____ O
Use for on-site detour _____ O
Use overpass only _____ O
Shore and brace _____ O

C. COMMENTS _____

_____

_____

D. BRIDGE DESCRIPTION

Assessment Report # _____

1. Type — MATERIAL

	Concrete Prestr.	Concrete Reinf.	Steel	Composite	Timber
Arch	O	O	O	O	O
Box	O	O	O	O	O
Cantilever	O	O	O	O	O
Girder	O	O	O	O	O
Slab	O	O	O	O	O
Suspension	O	O	O	O	O
Truss	O	O	O	O	O
Other	O	O	O	O	O

2. Foundation: Caisson O Pile O Spread footings O

3. Internal support

	Number of spans One	Number of spans Two	Number of spans No.	Height (ft)
Bents (frames)	O	O	_____	_____
Columns	O	O	_____	_____
Piers	O	O	_____	_____

4. Abutments High _____ ft.
Low _____ ft.

5. Road Dimensions Length _____ ft.
Curb to curb _____ ft
Walks _____ft

DAMAGE OBSERVED (D.O.)

Damage Scale:	0 None (0%)	1 Slight (1-10%)	2-3-4 Moderate (11 - 40%)	5 Severe (41 - 60%)	6 Total (over 60%)	NA Not Applicable	NO Not Observed

E. FOUNDATION
D.O.
____ Earth movements/gaps
Piles at:
____ a) abutments
____ b) Piers
Spread footings at:
____ a) Abutments
____ b) Piers

F. ABUTMENTS
_____ Disturbance or erosion
_____ Wall movement (____in)
_____ Backfill settlement (____in)

G. WINGWALLS
_____ Damage
o Movement
o Separation

H. APPROACHES
D.O.
____ Damage
o Operational
o Roadway settled (___in)
o Off bridge seat

I. BEARINGS
____ Integral
____ Contact
____ Rocker
____ Elastomeric Pad

J. INTERMEDIATE SUPPORTS
____ Settlement
____ Damage
o Near top
o Near bottom
o Near middle
o Moment failure
o Shear failure
o Compression failure
o Support lost

K. SUPERSTRUCTURE
D.O.
____ Girder
o Shear cracks
o Moment cracks
____ Deck
o Long. joints enlarged
o Expansion joints
____ Truss
o Upper chord
o Lower chord
o Diagonals
____ Suspenders

L. GEOTECHNICAL
____ Liquefaction
____ Landslide
____ Faulting
____ Other

REMARKS _____

_____

_____

Damage Observation (DO) – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

4. **Sections E through L** – These are the individual components of the bridge structure and should be assessed in turn. For each component, estimate the level of damage using the damage scale. For areas not seen use the NO (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around, over, and under the bridge. Keep in mind safety – do not imperil yourself if the bridge is in imminent failure. In Section L, if any one of the noted conditions exists, a geotechnical evaluation should be requested. This can be noted in the remarks section.

5. **Remarks** – This section lets you expand in some detail the results of the assessment of the various components. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the back side of the form.

5.4.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting. If it is determined that the bridge is so seriously damaged that it needs to be posted UNSAFE and removed from service, the jurisdiction representative with you should be told immediately. They, in turn, will contact either Public Works or the local Police Department to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the bridge to you to report your findings and recommendations. In the case where recommendations are not time sensitive, wait until you return to your staging area to pass on your recommendations. Bridges, like most lifeline systems or facilities, will not be physically posted. The placards are too small for motorists to safely see and understand what the placard says. Barricades are the most likely method to be used for closing bridges.

5.5 Roads and Highways

(Photograph courtesy of FEMA)

Figure 5-9 – Road Settlement, Northridge Earthquake, 1994

Like bridges, you will be used to evaluate local streets. Freeways and highways that are a part of the national highway system are rapidly evaluated by CalTrans. Local streets are very important to the jurisdiction, as they are used to transport resources throughout the jurisdiction. As evaluators, remember that local law enforcement and fire are on the streets immediately following the event. Very quickly, they will determine what streets are useable and which are not. You could expect that streets and roads would be some of the last lifeline systems to be formally evaluated. A good example of the type of evaluation would be where the local law enforcement has closed a street and re-routed traffic around the area. As the emergency response period winds down, they need to open those streets as quickly as possible.

Roads can be made impassable (in addition to bridge collapse) as a result of geotechnical failure, or collapse/debris from buildings and bridge overpasses. Roads constructed on liquefiable material can

break up, particularly if lateral spreading occurs. Landslides can either cover roads with debris, or the road itself can move. Following the Kobe Earthquake in Japan, and the Coalinga Earthquake in California, debris from collapsed buildings limited emergency response, in particular their ability to respond to fires.

Roads can be greatly affected from storm and flood disasters. Roads along streams or with culvert crossings can be washed out, or in hilly country can fail due to slipouts or even activated slides. Roads with storm drains beneath them can fail if the storm drains blow out and wash out the road. Evaluators should use caution in approaching the edge of any washout, slide or slipout, as the edge could be very fragile and can give way if walked upon, leading to injury or death.

Fig. 5-10 Road slipout, Marin County, 2006

Fig. 5-11 Scarp damage, Marin Co., 2006

Fig. 5-12 Road washout, Hurricane Katrina, 2005

5.5.1 Filling out the Road and Highway Evaluation Form

A copy of the evaluation form can be found on the following page.

1. **Recommendations** – This section shows the typical types of recommendations that would apply to roads, though not necessarily the only ones. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the "Monitor" box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also include some form of threshold when another action should take place. If the "Traffic in danger due to adjacent unstable/unsound structure" box is marked, make sure you describe the condition in the comments section. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the road may be "posted" RESTRICTED USE, the evaluator would note the restrictions if they are not checked off in the recommendations section. If the road is to be "posted" UNSAFE, the reasons for that choice are provided here.

3. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

4. **Sections D through H** – These are the individual components of the road that should be assessed. For each component, estimate the level of damage using the damage scale. For areas not seen use the "NO" (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around and over the roadway. Work safely – do not get too close to the edges of slip-outs or other road section failures where a fall could cause injury.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
ROAD/HIGHWAY

Assessment
Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing: None O Recommended: Green O Posted at this assessment: Yes O
Green O Yellow O No O
Yellow O Red O
Red O

Existing barricades in position O

B. RECOMMENDATIONS

Monitor_____ O Ok for emergency vehicles_____ O
Ok for public transportation_____ O Ok for private vehicles_____ O
Ok for pedestrians_____ O Ok for one-way traffic_____O
Ok for two-way traffic_____ O Install barricades_____ O
Use detour(s)_____ O Aftershocks potentially dangerous to traffic_O
Traffic in danger due to adjacent unstable/unsound structure_____O

C. COMMENTS _____

_____

_____

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

D. ROADBED

D.O.		Location	Extent
_____	Fills	_____	_____
_____	Cuts	_____	_____
_____	Subgrade	_____	_____
_____	Slip-outs	_____	_____
_____	Slides	_____	_____
_____	Washouts		

E. PAVEMENTS

D.O.

_____ Longitudinal cracks

_____ Transverse cracks

_____ Vertical displacement

Amount _____

Side up (N, S, E, W) _____

Pavement type: o AC o PCC o Other

Describe _____

F. TRAFFIC CONTROL FACILITIES

D.O.

_____ Condition

o Operating

o Critical regulatory signs standing

Exceptions and conditions: _____

_____

_____

_____

G. UTILITIES

D.O.

_____ Drainage

_____ Gas lines

_____ Petroleum lines

_____ Underground power lines

_____ Aboveground power lines

_____ Sewers

_____ Water lines

_____ Other _____

H. OBSTRUCTION/HAZARDS

D.O.

_____ Bridges

_____ Buildings/structures

_____ Debris

_____ Joint poles

_____ Mud

_____ Power lines

_____ Rocks

_____ Trees

_____ Water

_____ Other _____

I. REMARKS _____

_____

_____

_____

_____

_____

_____

_____

5. **Section I – Remarks** – This section lets you expand in some detail the results of the assessment of the various components. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the back side of the form.

5.5.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended "posting." If it is determined that the road is so seriously damaged that it needs to be posted UNSAFE and removed from service, the jurisdiction representative with you should be told immediately. They, in turn, will contact either Public Works or the local Police Department to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the road to you to report your findings and recommendations. In the case where recommendations are not time sensitive, wait until you return to your staging area to pass on your recommendations. Roads, like most lifeline systems or facilities, will not be physically posted. The placards are too small for motorists to safely see and understand what the placard says. Barricades are the most likely method to be used to close a damaged road.

5.6 Pipeline

Figure 5-13 Streambed Crossing

Fig. 5-14 Water and Gas Main Damage, Northridge Earthquake, 1994

In the previous photo, seismic waves disrupted both water and natural gas mains. The natural gas found an ignition source and so was on fire above the pool of water from the broken water mains.

Pipelines can carry anything from fuel to water to sewage. For the purpose of post-disaster safety assessment, the pipelines most likely to be evaluated will be water and sewage, as they have the most significant impact on the recovery of the community. High and medium pressure natural gas pipelines and liquid fuel lines can have devastating impacts on communities if they explode or catch fire. These failures are usually very quickly identified and will be the responsibility of the pipeline owner to stabilize (isolate) and repair.

How pipelines are evaluated will be up to the jurisdiction. In most cases, the evaluation team will be given a segment of the system to look at. Therefore, the team should also be prepared to evaluate other facilities that are a part of the system, such as pump stations and reservoirs. The evaluation of buried pipelines will be problematic in that there is not much to see, and you will have to base your evaluation on surface conditions. For exposed pipelines, the evaluation becomes more straightforward. But, as in all of these evaluations, you will not be performing destructive investigations.

The most pipeline damage occurs to brittle pipelines (such as cast iron or vitreous clay) buried in liquefiable soils. Some damage will occur due to shaking. Pipelines constructed of ductile materials such as steel or polyethylene (such as for natural gas distribution) are more flexible and will have fewer failures. Pipelines can fail as a result of shear, joint damage or separation, or can simply burst. For water systems, depending on the number of pipeline failures, entire areas of the system may lose pressure and become non-functional. In many cases, failures of pressurized pipelines, such as those carrying water, will result in water boiling out of the ground.

(Photo courtesy of the San Francisco Dept. of Public Works)
Fig. 5-15 Washout at storm drain break, San Francisco

Most sewer pipelines operate by gravity (i.e. are not pressurized). Immediate damage will only be evident if the sewer collapses, causing backup (and possible overflow) of sewage. In liquefiable soils, sewers and manholes will become buoyant, changing their vertical alignment, making them hydraulically inoperable. Identification of these types of failures will only be possible using specialized equipment.

(Photo courtesy of San Francisco Dept. of Public Works)
Fig. 5-16 Water main break, Salinas St., San Francisco

A copy of the evaluation form can be found on the following page.

5.6.1 Filling out the Pipeline Evaluation Form

1. **Recommendations** – This section shows the typical types of recommendations that would apply to pipelines, though not necessarily the only ones. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the "Monitor" box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If the "Divert Flow" box is checked, you should provide an explanation. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the pipeline may be posted RESTRICTED USE, the evaluator would note the restrictions if they are not checked off in the recommendations section. If the pipeline is to be posted UNSAFE, the reasons for that choice are provided here.

3. **Pipeline Description** – In this section of the evaluation form, the evaluator will describe the construction and materials of the pipeline along with the material carried. In the spaces where dimensions are requested, these can be either estimated or measured with a measuring tape.

4. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

5. **Sections E through R** – These are typical conditions that show the pipeline is damaged. For each element estimate the level of damage using the damage scale. For areas not seen use the NO (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around, over, and under the pipeline. If the pipeline is buried, look for conditions on the surface that will indicate that these types of damage have occurred. If none is observed, mark the line with NO. In item Q, if leakage is found make your best estimate on the leakage rate. In Section R, the closest manhole can be estimated or paced. Make sure that you indicate somewhere the direction to the nearest manhole.

6. **Remarks** – This section lets you expand in some detail the results of the assessment. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the back side of the form.

5.6.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting. If it is determined that the pipeline is so seriously damaged that it needs to be removed from service, the jurisdiction representative working with you should be told immediately, who, in turn, will contact Public Works to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the pipeline to you to report your findings and recommendations. In the case where recommendations are not time sensitive, wait until you return to your staging area to pass on your recommendations.

A copy of the evaluation form can be found on the following page.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
PIPELINE

Assessment
Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	None O	Recommended:	Green O	Posted at this assessment:	Yes O
	Green O		Yellow O		No O
	Yellow O		Red O		
	Red O				

B. RECOMMENDATIONS

Monitor_____	O	Continue in service _____	O
Remove from service_____	O	Install temp. above-ground line____	O
Provide temporary alternate service___	O	Check water quality/safety _____	O
Unblock entrance _____	O	Divert flow_____	O
_____		_____	
_____		_____	
_____		_____	

C. COMMENTS _____

_____

_____

D. PIPELINE DESCRIPTION

Assessment Report # _____

1. Type of pipeline: Pressure O Gravity O Storm Drain O
   Water O San. Sewer O Other O _____

2. Pipe nominal diameter: _____ 3. Proximity to water/sewer/gas line: _____

	AC	CI	CMP	DI	PVC	RC	STEEL	VC	WI	Other	Unknown
Bell & Spigot											
Butt											
Caulked											
Comp. Ring											
Riveted											
Welded											
Unknown											

4. Describe the failure mode:
   - o Circumferential crack
   - o Burst pipe barrel
   - o Sheared pipe barrel
   - o Sheared service connection
   - o Pulled joint
   - o Broken joint
   - o Other _____
   - o Liquefaction Describe _____

   _____

   _____

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NA
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

SURFACE OBSERVATIONS

D.O.		D.O.	
E. ____	Ground surface disturbed	K. ____	Soffit damaged
F. ____	Visible leakage	L. ____	Invert displacement
G. ____	Service connection broken	M. ____	Horizontal displacement
H. ____	Headwall damaged	N. ____	Trash-rack blocked/damaged
I. ____	Endwall damaged	O. ____	Leakage at valves
J. ____	Manhole damaged	P. ____	Leakage continuing
		Q. ____	Leakage rates _____ _____

R. Nearest valve/MH (if less than 1/4 mile) _____

S. Remarks _____

5.7 Pump Station

Figure 5-17 Pump Station

Pump stations may or may not be assigned for evaluation separately. Many times, a segment of pipeline you are evaluating will include a pump station. Where the facility is located above ground in a building, also include a building evaluation to cover the structural and nonstructural components.

Pump stations are found with water, wastewater, natural gas (compressor stations), and liquid fuel pipelines. All but wastewater pump stations are usually at grade, and may have components as deep as 10 feet below grade. The most common type of damage will be loss of power, damage to the emergency power system, fallen electrical and control cabinets, and damage to piping. Building damage is less likely unless the structures are unreinforced masonry. Wastewater pump stations may be many tens of feet deep and are often founded in liquefiable soils. If the soils liquefy, the pump stations can become buoyant, breaking connecting piping.

5.7.1 Filling out the Pipeline Evaluation Form

A copy of the evaluation form can be found on the following page.

1. **Recommendations** – This section shows the typical types of recommendations that would apply to pump stations, though not necessarily the only ones. Blank space is provided to add recommendations that the assessment team feels are appropriate to the facility. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the "Monitor" box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If the "Brace Structure" box is checked, you should provide an explanation and location. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the backside.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the pump station may be posted RESTRICTED USE, the evaluator would note the restrictions if they are not checked off in the recommendations section. If the pump station is to be posted UNSAFE, the reasons for that choice are provided here. If the station is in an above-ground building, note that a building evaluation is a part of this overall assessment.

3. **Pump Station Description** – In this section the evaluator describes the type of pump, construction, and materials of the station.

4. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

STATE OF CALIFORNIA

SAFETY ASSESSMENT PROGRAM
PUMP STATION

Assessment
Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	None O	Recommended:	Green O	Posted at this assessment:	Yes O
	Green O		Yellow O		No O
	Yellow O		Red O		
	Red O				

B. RECOMMENDATIONS

Monitor_____	O	Continue in service_____	O
Remove from service_____	O	Check pump-motor alignment_____	O
Brace structure before using_____	O	Recheck after power restored_____	O
Check filter basket_____	O		
_____		_____	
_____		_____	
_____		_____	

C. COMMENTS _____

_____

_____

_____

D. PUMP STATION DESCRIPTION

Assessment Report # _____

O Water O Wastewater O Sewage O Other _____

O Wet Well

O Dry Well

	No. Motors			
	Elect	Gas	Gasoline	Diesel
Centrifugal				
Reciprocal				
Horizontal				
Vertical				

	No. Operable			
	Elect.	Gas	Gasoline	Diesel

Str. Type	Buried	Above Grade
Concrete		
Masonry		
Frame		
Other		

O Building (Building Evaluation Attached O)

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

E. STRUCTURE

D.O.

_____ Access
_____ Crane runway
_____ Fixed hoist
_____ Floor
_____ Fore bay
_____ Foundation
_____ Roof
_____ Walls
_____ Hatches

F. PUMPS

_____ Anchors
_____ Casing
_____ Connected piping
_____ Supports
_____ Valving

G. MOTORS/ENGINES

D.O.

_____ Anchors
_____ Connected piping
_____ Couplings to pumps
_____ Power supply
_____ Transformer(s)

H. CONTROLS

_____ Internal power
_____ Supports
_____ Wiring
_____ Valving

I. EXTERNAL POWER

D.O.

_____ Electrical continuity
_____ Fuel lines
_____ Fuel storage

J. AUXILIARY EQUIPMENT

_____ Charts
_____ Lighting, exterior
_____ Lighting, interior
_____ Meters & gauges
_____ Overhead crane
_____ Small diameter piping
_____ Electrical Cabinets

K. EXTERNAL PIPING

	Inlet	Outlet
Piping	____	___
Leaked	o	o
Leaking	o	o

Leakage rate, gpm _____

L. REMARKS _____

_____

_____

_____

_____

5. **Sections E through K** – These sections provide the assessment of the various components of the station. If the station is above ground and in a structure a small note in this section referencing the building assessment would be appropriate. For each element estimate the level of damage using the damage scale. For areas not seen use the "NO" (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around the station. In item K, if leakage is found, make your best estimate on the leakage rate.

6. **Section L – Remarks** – This section lets you expand in some detail the results of the assessment. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the backside of the form.

5.7.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting. If it is determined that the pump station is so seriously damaged that it needs to be removed from service, the jurisdiction representative working with you should be told immediately, who, in turn, will contact Public Works to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the pump station to you to report your findings and recommendations. In the case where recommendations are not time-sensitive, wait until you return to your staging area to pass on your recommendations. If the pump station is in an above-ground building and you have performed a building evaluation as well, make sure to post the building based on the recommendations of the building assessment. If the building is posted RESTRICTED USE, list the restrictions in the space provided on the placard. If the building is to be posted UNSAFE, note the conditions leading to the unsafe posting.

5.8 Reservoir (Tanks)

(Photograph from the Steinbrugge Collection)

Figure 5-18 – Water Tank, Elephant's Foot

This section refers to "tanks" typically constructed of steel or concrete, rather than impounded waters with dams. Many jurisdictions around the state use water tanks for storing domestic water supplies, and water tanks are highly susceptible to damage from earthquakes. The potential is there to use these evaluations following other types of events or situations, but it will be earthquakes where they are most often used. These become very important components of a jurisdiction's infrastructure in times of emergency, especially when their main water supply has been disrupted. The water that is in these tanks will be needed for firefighting operations as well as for drinking water. Unanchored steel tanks will uplift, breaking connecting piping. When uplift becomes more severe, the tank wall will wrinkle when the tank slams back down, commonly referred to as elephant's foot buckling. In severe cases, the wall-

floor seam can burst. Sloshing water can damage the roof, although this is not likely to result in loss of service. The most significant vulnerability to wire or cable-wrapped concrete tanks is failure of the wrapping as a result of corrosion of inadequate design. Older tanks can theoretically slide off their floor slab foundations, although this has never been documented. Roofs are also vulnerable.

5.8.1 Filling out the Reservoir Evaluation Form

Two types of reservoirs are included in this evaluation form: steel and prestressed concrete. The evaluation team should immediately define which type of reservoir you will be evaluating and discard the form for the other type. For any part of this form where you are unsure, either note the item as NO (Not Observed) or indicate unsure.

A copy of the evaluation form can be found on the following page.

Recommendations – This section shows the typical types of recommendations that would apply to pump stations, though not necessarily the only ones. Blank spaces are provided to add recommendations that the assessment team feels are appropriate to the facility. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the "Monitor" box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If the "Brace Structure" box is checked, you should provide an explanation and location. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
RESERVOIR

Assessment
Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing: None O Green O Yellow O Red O

Recommended: Green O Yellow O Red O

Posted at this assessment: Yes O No O

B. RECOMMENDATIONS

Monitor_____ O
Remove from service_____ O
Continue in service_____ O
.

Continue in service, repair ASAP_____ O
Drain and repair_____ O
Lower water level and continue service____ O
_____ ft

_____
_____
_____

_____
_____
_____

C. COMMENTS _____

_____

_____

STEEL RESERVOIR

Assessment Report # _____

D. RESERVOIR DESCRIPTION

Capacity _____ MG Wall Height _____ ft O/S Diameter _____ ft

Roof Type O Wood O Steel O Flat O Conical O Knuckled Edge

Shell O Welded O Bolted O Riveted

Floor support O Footing ring O Oiled sand O A.C. O Other _____

Footing O Concrete ring O Other _____ O None

Pipe connection O Rigid O Flexible

Anchorage to foundation _____ Dia. _____ Spacing

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

E. SHELL

D.O.

_____ Elephant's foot

a. Height _____ ft

b. Circumferential extent _____ft

_____ Other buckling

_____ Horizontal joints broken

_____ Vertical joints broken

_____ Plate split

_____ Seismic anchors

_____ Rocking of reservoir evidenced

_____ Sliding of reservoir evidenced

_____ Leaks evident. Rate _____ gpm

_____ Unexplained wet spots on adjacent ground

_____ Shell penetrations damaged

_____ Other attachments to shell damaged

_____ Pipe Connections to Tank

F. VALVE PIT

D.O.

_____ Access

_____ Control Piping

_____ Gauges

_____ Hatches

_____ Inlet-outlet piping

_____ Pit flooded

_____ Roof

_____ Walls

_____ Charts

_____ Valving

G. _____ Roof

H. _____ Footing

I. _____ Floor

J. _____ Aboveground Piping

K. _____ Underground Piping

L. REMARKS _____

_____

_____

_____

PRESTRESSED CONCRETE RESERVOIR

Assessment Report # _____

M. RESERVOIR DESCRIPTION:

Wire or Strand Wrapped	Buttress Type using individual Tendons, usually inside wall	Bar Tendons on Tank Surface
TENDONS:		
o 220 ksi - 0.142" or 0.172" dia o 270 ksi - 3/8" dia	o Strands o Wires o Bars	o Bars with prop. couplers
WALL CONSTRUCTION:		
o Cast-in-place o Shotcrete o Shotcrete w/ steel diaphragm o Precast o Precast w/ steel diaphragm	o Cast-in-place o Precast	o Cast-in-place o Shotcrete

TENDON PROTECTION SYSTEMS:
o Shotcrete o Corrosion inhibiting grease o Grout o Galvanizing protected by plastic sheath

Tank Restraints o Seismic cables o Curb (restraining sliding)
Capacity _____ MG Wall height _____ ft O/S diameter _____ ft
Roof Type: o Flat o Dome Exposed o Fill depth _____ Surface usage _____
o Yes o No

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

N. SHELL

D.O.
_____ Shell or shotcrete cracked
_____ Vertical cracks more than 2 feet long
_____ Unexplained excessive loss of contents
_____ Bulging observable
_____ Visible construction joints
_____ Wall leaking
_____ Wet spots
_____ Spouts
_____ Horizontal cracks more than 25% of perimeter
_____ Corrosion at horizontal cracks
_____ Shotcrete delaminated at cracks
_____ Attachments to shell loose
_____ Leaks @ rust stains
_____ Major leaks at shell/foundation joint
_____ Unexplained wet spots on adjacent ground
_____ Corrosion at manholes/other penetrations

Leakage rate _____ gpm

O. HORIZONTAL PRESTRESSING

D.O.
1. Wrapping:
   _____ Corrosion
   _____ Corrosion at horizontal cracks
2. Individual tendons:
   _____ Corrosion products
   _____ Leaks @ tendon locations
   _____ Leaks @ tendon anchorages
   _____ Tendon anchorage distressed
   _____ Tendon anchorage disrupted/loose
   _____ Cracking in vicinity of tendon anchorage
   _____ Tendon location visually observable
   _____ Discoloration of concrete in line w/tendons
3. Bar tendons on surface:
   _____ Tendons failed
   _____ Tendons sound loose
   _____ Evidence of rust

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

P. ROOF

D.O.

Flat or conical

_____ Displaced with respect to wall
_____ Sagging
_____ Cracked at edges
_____ Cracked at interior supports
_____ Supporting column spalled

Dome Shell

o Shotcrete o CIP concrete
o Precast concrete

_____ Construction joints
_____ Cracks
o Show reinforcement/corrosion
o Increasing with time
_____ Delaminating
_____ Misalignment of surface
_____ Rust lines @ top of soffit over rebars
_____ Dome Ring
_____ Corrosion
_____ Distress @ shell/ring juncture
_____ Shotcrete loose/hollow-sounding
_____ Vertical cracks
_____ Wire (strand) exposed/corroded

D.O.

Q. _____ FOOTING

R. _____ FLOOR

S. _____ ABOVEGROUND PIPING

T. VALVE PIT

_____ Access
_____ Control piping
_____ Gauges
_____ Hatches (equipment)
_____ Inlet-outlet piping
_____ Pit flooded (depth _____ ft)
_____ Roof
_____ Walls
_____ Charts
_____ Valving

U. REMARKS _____

_____

_____

_____

_____

_____

_____

_____

_____

1. **Comments** – This space is used to provide explanation on any part of the assessment that the evaluator believes needs to be explained. In the case where the pump station may be posted RESTRICTED USE, the evaluator would note the restrictions, if they are not checked off in the recommendations section. If the pump station is to be posted UNSAFE, the reasons for that choice are provided here. If the station is in an above-ground building, note that a building evaluation is a part of this overall assessment.

2. **Section D – Description** – This section is used only if the reservoir is of steel construction. In this section the evaluator describes in a fair amount of detail the construction of the steel reservoir. The capacity, height, and diameter should be estimated.

3. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

4. **Sections E through K** – These sections provide the assessment of the various components of the reservoir. Areas where rocking or sliding are noted with direction and distance should be provided in the remarks section. For each element, estimate the level of damage using the damage scale. For areas not seen, use the NO (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around the station. At the bottom of the page, estimate the leakage rate.

5. **Section L – Remarks** – This section lets you expand in some detail the results of the assessment. As with the comments section, if there is not enough room, simply mark OVER at the bottom and continue on the backside of the form.

6. **Section M – Description** – This part of the form is used only if the reservoir is of precast concrete construction. In this section the evaluator describes in a fair amount of detail the construction of the reservoir. The capacity, height, and diameter should be estimated. For the size and strength of the tendons provide the information only if you know. This information can be obtained from drawings if they are available.

7. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluator's use of the scales is based strictly on their professional judgment.

8. **Sections N through T** – These sections provide the assessment of the various components of the reservoir. Areas where displacement is noted should be discussed in the remarks section. For each element, estimate the level of damage using the damage scale. For areas not seen, use the NO (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around the station. At the bottom of the page estimate the leakage rate.

9. **Section U – Remarks** – This section lets you expand in some detail the results of the assessment. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the back side of the form.

5.8.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended posting. If it is determined that the reservoir is so seriously damaged that it needs to be removed from service, the jurisdiction representative working with you should be told immediately, who, in turn, will contact Public Works to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the reservoir to you to report your findings and recommendations. In the case where recommendations are not time-sensitive, wait until you return to your staging area to pass on your recommendations.

5.9 Wastewater Treatment Plants

(Photo courtesy of San Francisco Dept. of Public Works)
Fig. 5-19 Oceanside Wastewater Treatment Plant, San Francisco

Wastewater treatment plants are complex systems made up of many components and systems. Components include buried and above grade pipe, cast-in-placed concrete basins and utilidores (galleries), buildings, chemical, gas, piping, and electrical systems. You should be prepared with building evaluation forms to do a complete assessment of the facility. In evaluating the operation of the treatment plant, it will become easy to forget that you are doing a detailed evaluation, not an engineering evaluation. You will not be doing any destructive investigation. Your goal is to recommend whether or not the facility should remain in operation. The operators will perform any testing of materials or addition of chemicals in accordance with their standard operating procedures and/or state and local standards.

Each category of components has their own damage mechanisms. All types of components have been damaged as a result of liquefaction, settlement, and lateral spreading. Sewer lines have broken off and concrete basins and buildings settled. Expansion joints in concrete basins have failed, allowing sewage to drain into utilidores. Utilidores have flooded as a result of broken piping, also causing secondary damage when electrical equipment is submerged. Baffles in large basins have broken as a result of sloshing sewage. Treatment plant chemical storage and piping systems have been damaged, with gaseous chlorine being potentially the most dangerous chemical. Sludge digesters contain sludge and sludge gas that is explosive. Guides have broken off floating digester roofs, allowing gas to escape. Buildings can be damaged, and unanchored electrical equipment can overturn.

From a systems perspective, the goal is to keep as much of the plant in operation as possible. For example, it would be desirable as a minimum to maintain operation of the headworks, primary sedimentation basins, and chlorine disinfection system, even if the secondary or tertiary systems were heavily damaged and not operational.

5.9.1 Filling out the Wastewater Treatment Plant Evaluation Form

A copy of the evaluation form can be found on the following page.

1. **Recommendations** – This section shows the typical types of recommendations that would apply to wastewater treatment plants, though not necessarily the only ones. Blank spaces are provided to add recommendations that the assessment team feels are appropriate to the facility. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the "Monitor" box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If you check the "Chlorinate and by-pass" or "Check effluent quality/safety" boxes, you are sending a message to the operator that you are recommending this be done. Remember, this is only a recommendation, and the operators will follow their standard procedures. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

2. **Comments** – This space is used to provide explanation on any part of the assessment that the team believes needs to be explained. In the case where the plant may be posted RESTRICTED USE, the team will note the restrictions if they are not checked off in the recommendations section. If the plant is to be posted UNSAFE, the reasons for that choice are provided here.

3. **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluators' use of the scales is based strictly on their professional judgment.

4. **Sections D through E** – These sections provide the assessment of the various structural, mechanical, and electrical components of the plant. For each element estimate the level of damage using the damage scale. For areas not seen use the "NO" (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around the plant. Provide the information for Section E only if you have access to the information. If you have no access to the information, note that the information is Not Available. Do not note "NA" as that states the section is Not Applicable.

5. **Section F** - **Tributary Gravity Sewer System** – This section allows the team to summarize their assessment of the condition of the gravity sewer system. This should be a brief statement, as you are not performing an engineering evaluation. However, you can note in this section information you have observed about the system.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
TREATMENT PLANT (WASTEWATER)

Assessment Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____ use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	None	O	Recommended:	Green	O	Posted at this assessment: Yes	O
	Green	O		Yellow	O	No	O
	Yellow	O		Red	O		
	Red	O					

B. RECOMMENDATIONS

Monitor_____ O
Remove from service_____ O
Chlorinate and by-pass_____ O
_____
_____

Continue in service_____ O
Check effluent quality/safety_____ O
_____
_____

C. COMMENTS:

_____
_____
_____
_____

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

D. PROCESS COMPONENT (D.O.)

	Structural	Mechanical	Electrical
Screening/grinding	_____	_____	_____
Influent pumping	_____	_____	_____
Grit removal	_____	_____	_____
Primary treatment	_____	_____	_____
Secondary treatment	_____	_____	_____
Tertiary treatment	_____	_____	_____
Quaternary treatment	_____	_____	_____
Effluent disinfection	_____	_____	_____
Solids digestion	_____	_____	_____
Solids dewatering	_____	_____	_____
Solids disposal	_____	_____	_____

E. TRIBUTARY PUMPING PLANTS/FORCE MAINS

Pumping Plant Name			
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

F. TRIBUTARY GRAVITY SEWER SYSTEM

Briefly summarize your assessment of the condition of the gravity sewer system (recognizing the limitations of time and resources during this initial inspection period).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Assessment Report # _____

Check:

Electrical power (control panel, emergency generator)
Telemetry
Disinfection process (chemical containers, feeder, piping)
Broken pipes, flooding, leaking
Chemical feed (spills)
Unit Processes

OBSERVATIONS

RAW SEWAGE _____

SCREENING/GRINDING _____

INFLUENT PUMPING _____

GRIT REMOVAL _____

PRIMARY TREATMENT _____

SECONDARY TREATMENT _____

TERTIARY TREATMENT _____

QUATERNARY TREATMENT _____

EFFLUENT DISINFECTION _____

SOLIDS DIGESTION _____

SOLIDS DEWATERING _____

SOLIDS DISPOSAL _____

6. **Last Page** – This section records your observations regarding overall plant operation in dealing with these processes. At the top of the page is a checklist to help you in performing the evaluation.

5.9.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended "posting." If it is determined that the plant is so seriously damaged that it needs to be posted UNSAFE and removed from service, the jurisdiction representative with you should be told immediately. They, in turn, will contact either Public Works or notify the plant operator to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the wastewater treatment plant to you to report your findings and recommendations. In the case where recommendations are not time sensitive, wait until you return to your staging area to pass on your recommendations.

If you have performed building evaluations at the facility, make sure to post the buildings based on the recommendations of the building assessment. You should have a building assessment form for each building evaluated. If the building(s) is posted RESTRICTED USE, list the restrictions in the space provided on the placard. If the building(s) is to be posted UNSAFE, note the conditions leading to the unsafe posting.

5.10 Water Treatment Plants

The evaluation of water treatment plants will be similar to that of wastewater treatment plants. You should be prepared with building evaluation forms to do a complete assessment of the facility. In evaluating the operation of the treatment plant it will become easy to forget that you are doing a detailed evaluation, not an engineering evaluation. You will not be doing any destructive investigation. Your goal is to recommend whether or not the facility should remain in operation. The operators will perform any testing of materials or addition of chemicals in accordance with their standard operating procedures and/or state and local standards.

The type of damage that has been experienced by water treatment plants is similar to wastewater plants, although less severe. Water treatment plants tend to be constructed on higher ground, away from liquefiable soil. Damage to baffles due to sloshing water inside basins is common. Unanchored equipment will slide and/or topple. The treatment plant concrete basins, if founded on competent soils, are robust, so limited damage is expected. Water treatment plants also have many treatment chemicals, although many have eliminated gaseous chlorine because it is so dangerous. Of course, unanchored equipment is vulnerable to damage from lateral forces.

5.10.1 Filling out the Water Treatment Plant Evaluation Form

A copy of the evaluation form can be found on the following page.

5 **Recommendations** – This section shows the typical types of recommendations that would apply to wastewater treatment plants, though not necessarily the only ones. Blank spaces are provided to add recommendations that the assessment team feels are appropriate to the facility. Upon completion of the assessment, your overall recommendations are noted here by checking the appropriate boxes. If the monitor box is checked, make sure that you note in the comments the conditions that need to be monitored and the criteria. Also, include some form of threshold when another action should take place. For the other boxes, add information in the comments section when appropriate. If you check the "Chlorinate and by-pass" or "Check effluent quality/safety" boxes, you are sending a message to the operator that you are recommending this be done. Remember, this is only a recommendation and the operators will follow their standard

procedures. If there is not enough room for all the comments, simply note "OVER" at the bottom of the form and continue on the back side.

6 **Comments** – This space is used to provide explanation on any part of the assessment that the team believes needs to be explained. In the case where the plant may be posted RESTRICTED USE, the team will note the restrictions if they are not checked off in the "Recommendations" section. If the plant is to be posted UNSAFE, the reasons for that choice are provided here.

7 **Damage Observation (DO)** – The damage scale is a scale from 0 to 6 used to rate the damages that are found. It will be used in the assessment of the various components of the facility. The damage scale gives the evaluator and the jurisdiction a tool to indicate the level of damage. However, the evaluators' use of the scales is based strictly on their professional judgment.

8 **Sections D through J** – These are the individual components of the plant that should be assessed. For each component estimate the level of damage using the damage scale. For areas not seen use the "NO" (Not Observed) rating. Remember, as with buildings, you are not to perform destructive investigation. You will rate only what you can see by walking around the plant.

9 **Section K – Remarks** - This section lets you expand in some detail the results of the assessment of the various components. As with the comments section, if there is not enough room, simply mark "OVER" at the bottom and continue on the back side of the form.

10 **Last Page** – This section records your observations regarding overall plant operation in dealing with these processes. At the top of the page is a checklist to help you in performing the evaluation.

5.10.2 Posting

Upon completion of the assessment, the team will arrive at a decision on the recommended "posting." If it is determined that the plant is so seriously damaged that it needs to be posted UNSAFE and removed from service, the jurisdiction representative with you should be told immediately. They, in turn, will contact either Public Works or notify the plant operator to ensure the proper actions are taken. If you do not have a jurisdiction representative with you, use the list of contact numbers provided to you, and call the individual who assigned the water treatment plant to you to report your findings and recommendations. In the case where recommendations are not time sensitive, wait until you return to your staging area to pass on your recommendations.

If you have performed building evaluations at the facility, make sure to post the buildings based on the recommendations of the building assessment. You should have a building assessment form for each building evaluated. If the building(s) is posted RESTRICTED USE, list the restrictions in the space provided on the placard. If the building(s) is to be posted UNSAFE, note the conditions leading to the unsafe posting.

STATE OF CALIFORNIA
SAFETY ASSESSMENT PROGRAM
TREATMENT PLANT (WATER)

Assessment Report No. _____

Facility Name _____
Address _____
Co-City-Vic _____
Mo/Day/Yr _____/_____/_____ Time _____
use 24 hr.
Type of Disaster _____

SAP ID Nos. _____ _____
Other Reports _____
No. Photos _____ No. Sketches _____
Ref. Dwgs. _____
Est. Damage %_____
Facility Status

SAFETY INSTRUCTIONS: The possibility of toxic gases in confined spaces or of fuel leaks should be recognized as a potential hazard.

CAUTION: The primary purpose of the report is to advise of the condition of the facility for immediate continued use/occupancy. REINSPECTION OF THE FACILITY IS RECOMMENDED. AFTERSHOCKS MAY CAUSE DAMAGE THAT REQUIRES REINSPECTION. The conclusions reached by engineers who re-examine the facility later should take precedence. The assessment team will not render further advice in the event of conflict of engineering recommendations.

A. CONDITION:

Existing:	Recommended:	Posted at this assessment:
None o	Green o	Yes o
Green o	Yellow o	No o
Yellow o	Red o	
Red o		

B. RECOMMENDATIONS

Monitor_____ o
Remove from service_____ o
Chlorinate and by-pass_____ o
_____
_____

Continue in service_____ o
Check effluent quality/safety_____ o
_____
_____

C. COMMENTS:

_____
_____
_____
_____
_____
_____

Assessment Report # _____

DAMAGE OBSERVED (D.O.)

	0	1	2-3-4	5	6	NA	NO
Damage Scale:	None (0%)	Slight (1-10%)	Moderate (11 - 40%)	Severe (41 - 60%)	Total (over 60%)	Not Applicable	Not Observed

D. PRETREATMENT

D.O.

_____ Raw water channels
_____ Aerators
_____ Rapid mix
_____ Flocculation
  _____ basins
  _____ baffles
  _____ paddles
  _____ scrapers
_____ Sedimentation
  _____ basin
  _____ troughs
  _____ scrapers

E. FILTRATION

_____ Structure
_____ Troughs
_____ Beds
_____ Backwash system
_____ Surface wash system

F. CHEMICAL TREATMENT

_____ Chlorine piping
_____ Chlorine cylinders
_____ Chlorine feeders
_____ Other chemical piping
_____ Other chemical feeders
_____ Other chemical storage

G. CONTROL SYSTEMS

_____ Mechanical
_____ Electrical
_____ Pneumatic
_____ Hydraulic
_____ Manual
_____ Automatic

H. HEAD HOUSE

D.O.

_____ Bearing walls
_____ Nonbearing walls
_____ Frame (general condition)
_____ Structural members
_____ Structural connections
_____ Roof
_____ Floors
_____ Stairs
_____ Elevators
_____ Glass
_____ Mechanical equipment
_____ Electrical equipment
_____ Filter gallery
_____ Piping
_____ Pipe gallery

I. CLEARWALL

_____ Tank-type (use Reservoir Assessment Form)
_____ Containment structure
_____ Influent piping
_____ Effluent piping

J. WASHWATER RECLAMATION

_____ Settling basin
_____ Mechanical equipment
_____ Electrical equipment
_____ Piping
_____ Detention basin
_____ Sludge discharge

K. REMARKS _____

_____
_____
_____
_____
_____
_____
_____

Assessment Report # _____

Check:

Electrical power (control panel, emergency generator)
Telemetry
Disinfection process (chemical containers, feeder, piping)
Broken pipes, flooding, leaking
Chemical feed (spills)
Unit Processes

OBSERVATIONS

RAW WATER _____

_____

PRECHLORINATION _____

_____

AERATION _____

_____

RAPID MIX _____

_____

FLOCCULATION _____

_____

SEDIMENTATION _____

_____

FILTRATION _____

_____

DISINFECTION _____

_____

FLUORIDATION _____

_____

CLEARWELL _____

_____

DISTRIBUTION SYSTEM _____

_____

(This page intentionally left blank.)

UNIT 6 OTHER HAZARDS

Unit 6 Training Guidance

Overview

The Safety Assessment Program can be activated for hazards other than earthquake. The potential exists for activation following high wind events (hurricane, tornado, and windstorm), flood events, fires, and explosions. In this unit, we will look at these other hazards and how the buildings would be posted.

Training Goal

Participants will know how to conduct evaluations for other types of hazards. Primarily, this unit will look at using safety assessment personnel to evaluate damaged buildings following high wind events, floods, fires, and explosions.

Objectives

Upon completion of this unit, participants will be able to:

- Respond effectively to non-earthquake types of disasters or emergencies.

6.0 Other Hazards

The Safety Assessment Program was originally developed to provide additional support to local government following earthquakes, as this is the hazard that usually needs the most assistance. To this end, the Applied Technology Council developed the process and procedures for evaluating buildings based on an earthquake disaster. Since being published and presented in 1989, the ATC-20 procedures have been used on numerous earthquake disasters around the world.

Earthquakes are not the only events that have the potential for damaging buildings, nor are they the only hazard that will use large numbers of evaluators to determine the safety of structures. Therefore, the procedures of ATC-20 are being expanded to cover other hazards such as high winds (including hurricane and tornado), flood, fires, and explosions.

The evaluation process for these other hazards is, in many respects, easier than working in the earthquake environment. With earthquakes, we need to deal with aftershocks and how they affect already damaged buildings. We look at the ability of the damaged structure to be able to withstand another event of similar size within a short period of time. With these other hazards, once the event is over, there is a much smaller likelihood that the damaged structure will have to survive another event before it can be repaired or stabilized.

6.1 High Wind (Hurricane and Tornado)

When responding to a hurricane, the evaluator must consider the two hazards of high winds and floods. Over the past few years, there have been many examples of hurricane disasters that include flooding. Hurricane winds significantly impact the lateral force resisting system within a building, the roof structure from uplift, and the doors and windows. If the windows and doors on the windward face of the building are blown out or broken from flying debris, the lateral force resisting system will have a sudden change in the forces imposed. Instead of constant force on the windward side of the building and suction on the leeward side, there will suddenly be increased pressure on the interior of the building, with a combination of direct force, suction, and uplift. Many older buildings can resist the direct forces while the windows are intact, but fail when the windows are blown out. However, the major damage resulting from a hurricane is usually a result of the accompanying flood or storm surge. A flooding condition occurs when the severe amounts of rainfall from a hurricane cause the normal flood control systems to be overwhelmed , and this can occur far inland of where the hurricane made landfall. Storm surge, on the other hand, results from a combination of ocean-related effects, and affects coastal communities rather than the interior. The ocean is pulled upward by the interior drop in pressure in a hurricane, and is dragged along onto the land as the hurricane makes landfall. The ocean is also driven at the surface by the powerful winds and mounts up in front of the hurricane, ending up pushed in front of it as the hurricane comes ashore. The storm surge from the 2005 Hurricane Katrina reached about 40 feet high in St. Bernard Parish, the most exposed area in Louisiana to the initial landfall.

Tornados, on the other hand, severely damage buildings as a result of the explosive internal pressures generated by the storm's pressure drop. Structures close to the storm will have a much higher internal pressure than the area around the storm, causing windows to blow out. Additional severe hazards that occur with tornados are projectiles. Large pieces of wood can be driven through substantial walls like a missile. Heavy rains accompany tornados, but usually do not result in heavy flooding. They can cause some local flooding conditions. Where damages associated with hurricanes come from the flooding, damage from tornados come from the very high winds.

Wind storms in California are far more common and troublesome than either California's hurricanes or tornados. Hurricane force winds are produced by the powerful Pacific storms, forcing building standards in some locations to require that buildings be able to withstand 80+ mph winds. Even storms of tropical storm strength can wreak havoc, knocking trees into structures and downing power poles.

When evaluating structures that have been damaged as a result of high winds, we follow similar procedures as with earthquakes (from Unit 2).

1. **Survey of the building exterior.**

   - Determine structural system.
   - Examine exterior for damage.
   - New damage to foundations.

2. **Examine the site for geotechnical hazards.**

   - This step need only be employed if the storm was accompanied by heavy rains and flooding. In this case, you are looking for signs of settlement as a result of saturated soils or undermining of the footings.

3. **Inspect structural system from inside building** – enter the building only if you need to and you have determined that is safe to do so.

   - Do not enter obviously unsafe buildings.
   - Do not perform destructive investigation.
   - Look in areas where the structural system is exposed.
   - Identify and examine vertical load system.
   - Identify and examine lateral load system.
   - Inspect basements. Usually this only needs to be done if there has been some flooding. In this case you are looking to see if the basement is flooded. If it has been flooded and the water has receded, proceed with your evaluation to determine the condition of framing.
   - Examine every floor, including the roof and penthouse(s).

4. **Inspect for nonstructural hazards.**

   - Look for damage to nonstructural systems. If there has been significant flooding, the ceilings on the lower levels could be saturated and pose a falling hazard.
   - Look for damage to equipment and equipment supports.

5. **Inspect for other hazards.**

   - Spills or leaks in stored chemicals or other hazardous materials.

6. **Complete forms and post buildings.**

(Photograph courtesy of FEMA)

Figure 6-1 – Virgin Islands, Hurricane Lenny, 1999

We see that there is substantial damage to the roof. This is one of the more common forms of damage from high winds, especially in single or two-story residential structures. With the roof damaged in this manner, there is a significant amount of damage to the interior from the accompanying rains. From a safety assessment standpoint, there is significant damage to both the vertical and lateral force-resisting systems. However, since the storm is over, the likelihood of another storm occurring before the building can be stabilized or repaired is usually pretty low. This building could be posted as RESTRICTED USE to allow free access for possession retrieval and repair. Without seeing the interior we don't know if there is a falling hazard with all or portions of the ceiling. If that were in fact the condition, then possibly portions of the home could be posted UNSAFE until the falling hazard is removed. The overall posting of the home would be RESTRICTED USE with portions UNSAFE.

In this photo, we see a reinforced concrete building that nevertheless suffered some wind damage due to the high winds from Hurricane Katrina.

Figure 6-2 – Damaged concrete column, Hurricane Katrina, 2005

The high winds from Hurricane Katrina tore off part of the roof and the back of this wood-frame house. The wall of the house is noticeably leaning, indicating that the structure is no longer stable.

Figure 6-3 – Damaged house, Hurricane Katrina, 2005

(Photograph courtesy of FEMA)

Figure 6-4 – Virginia, Hurricane Floyd, 1999

In this case, we see the force of the wind has blown in the windward side of the building. Once this building was opened like this, the wind blew through the building and the leeward wall was under a suction force as well as a direct force. This could have lead to a failure of the leeward wall and a collapse or partial collapse of the structure. We can assume from the picture that there was no partial collapse. However, the wall framing on the leeward wall could be permanently deformed and bowed. Since light, steel-framed buildings use moment frames and not bearing walls, deformed wall framing is not a significant hazard to occupants. This building could be posted as RESTRICTED USE for possession and stock retrieval and free access for contractors to make the necessary repairs.

(Photograph courtesy of FEMA)

Figure 6-5 – Kansas Tornado, 2001

Damage from tornados can be more severe than that from hurricanes but it is usually limited to a small area. As tornados move through a community, the extreme damage is on either side of the storm and can absolutely devastate one block of homes and leave the next block with no damage at all, with shades of damage between. The safety assessment process is rather simplified as most structures in the path will be destroyed and the entire area can be posted as AREA UNSAFE as seen in this photograph. By posting the area as UNSAFE, the jurisdiction has a means of controlling access into the area. For example, with identification showing residence or business address the property owner or tenant could have free access to look for and retrieve whatever possessions they can find.

This unreinforced masonry building was practically demolished by Hurricane Katrina. Water filled the building up to about 10 feet, and the structure above the water caught fire. The roof is gone, and most of the structure has been reduced to rubble. It is interesting that the door appears unscathed and likely still works.

Figure 6-6 – Destroyed URM commercial building, Hurricane Katrina, 2005

This four-story URM had debilitating damage to it from hurricane-force winds. It is interesting to observe how bricks were stripped away by the powerful winds.

Figure 6-7 – Damaged four story brick building, Hurricane Katrina, 2005

This is a condition that is quite common with tornados and most likely would be posted as UNSAFE as there has been a partial collapse. However, one could make a reasonable argument that the structure is safe enough to allow the owners inside to retrieve possessions. In this case the structure would be posted as RESTRICTED USE for possession retrieval only.

(Photograph courtesy of FEMA)

Figure 6-8 – Cordell, Oklahoma Tornado, 2001

(Photograph courtesy of FEMA)

Figure 6-9 – Kansas Tornado, 2001

Smaller tornados with lower Fujita ratings usually do not cause full collapse of structures, but they can cause significant roof damage as can be seen in this school auditorium. It is very likely that the damage shown here would not have been found without entering the building. In this case, there are significant falling hazards and the particular room would be posted UNSAFE pending the removal of the damaged and hanging framing and ceiling. If this were the only room damaged, the room is posted UNSAFE while the building is posted RESTRICTED USE with no general access to the auditorium.

It should be pointed out that roof failures such as this are also a common condition with windstorms that are not hurricanes or tornados.

6.2 Floods

Floods fall into two general categories, these being the slow moving inundation type, and the fast moving flash flood type. The slow moving inundation type of flood is the most common within the United States. From a safety assessment perspective, there is plenty of time to mobilize evaluators, as assessments cannot be performed until such a time as the water level recedes. In some cases this can take weeks before buildings become accessible. In this type of flood, the damage that occurs is from the submersion in water and is primarily contents related. When the floor is underwater, the likelihood is that the sub-floor or diaphragm will need to be replaced along with all or a portion of the floor framing.

In the case of fast moving water, the damage is more catastrophic as there is a significant amount of force behind the wall of water. Fast moving floods can also cause scour around the foundations leading to damage to the foundation and walls. Typical types of damage from this type of flooding are collapse, partial collapse, or moving the structure off its foundation. A fast moving wall of water can result in inundation for a period of time, or it can run off quickly allowing for a rapid mobilization of evaluators.

Flood events also present additional hazards to the evaluator that are not necessarily common with other hazards. Entering an inundated structure where the water is above the line of the wall outlets and the electrical power has not been turned off is a quick way to electrocution. This is the primary reason that people are not allowed in flooded structures until such a time as the power has been turned off. In cases where the power is off over a large area because of the storm, care must be taken to ensure that power is turned off at the building also to protect against electrocution. Another serious hazard to consider is "black mold." This is especially a problem where the structure has been inundated for a number of days before the water recedes. Black mold is a fungus that can cause severe respiratory problems.

The evaluation procedures for floods are the same as for earthquakes and wind, except that the

evaluator does not have to consider geotechnical problems beyond scour, settlement, or saturated ground. Also, evaluation of floors above the flood line can be rapid as the likelihood of damage at these levels is remote.

(Photograph courtesy of FEMA)
Figure 6-10 – Louisiana, Tropical Storm Alison, 2001

Much can be told by looking at the exterior of a structure before you enter. In this case, the water line can be seen at the top of the windows. This will tell you that the home was inundated and there will be significant content damage. From the structural standpoint, the floor framing and diaphragm will most likely have to be replaced due to warping as the materials dry out. Does this constitute reason to post the building UNSAFE? No, that is a condition of repair. In most cases, homes subjected to a slow moving flood will be posted as INSPECTED or possibly RESTRICTED USE. If ceiling materials have been soaked, they do represent a potential falling hazard. This would be sufficient to cause a RESTRICTED USE posting with a caution that ceilings have been soaked and could fall.

This photo shows the widespread damage that often results from flooding. The storm surge from a major hurricane is similar in many ways to other fast-moving floods, in that buildings and debris are left scattered about in its wake. In this photo, homes are left sitting in the road, nestled up against trees, and half-buried in debris. This photo was taken after the roads were cleared, which previously were covered by debris.

Figure 6-11 – Damaged neighborhood, Hurricane Katrina, 2005

Here is a relatively mild case of mold in a completely inundated house. Mold spores are hazardous to SAP evaluators and other potential visitors to such properties, and caution must be exercised to be protected against them.

Figure 6-12 – Mold growth, Hurricane Katrina, 2005

This photo shows how much work is involved when a wood-frame building becomes inundated with toxic flood waters and must be repaired. The drywall or plaster, the insulation, and the electrical system was completely removed, and the wood framing cleaned, before the wall could be restored.

Figure 6-13 – Wood frame wall under cleanup, Hurricane Katrina, 2005

Figure 6-14 – Common house installation, Hurricane Katrina, 2005

You can see in this photo how some homes in the Katrina-ravaged area were installed. The tie straps provide tension restraint; they are imbedded in a perimeter footing. The house is supported by the masonry piers.

This photo shows the results of such a structure after storm surge worked its way on it. The house has now pulled out of its tension strap connections, and drifted off its masonry piers to come to rest on the ground, a few feet from its original moorings. This has resulted in damage to the structure from falling on foundation elements that no longer support it.

Figure 6-15 – House off its foundation, Hurricane Katrina, 2005

(Photograph courtesy of FEMA)
Figure 6-16 – Louisiana, Tropical Storm Allison, 2001

In this case, the structure has been raised and portions of the foundation wall have been left open to allow for airflow during non-flood conditions, and to allow the water to flow through when flooded. Looking at the picture, we see that the water level did not reach the first floor level. Therefore, evaluation of this property would be primarily around the foundations to ensure that all are sound; there has been no settlement; and no scouring around the corners of the foundation walls. This building could be posted as INSPECTED. You would also look for the high water mark to determine if the framing could have been soaked. Again, wet framing is not grounds for a RESTRICTED USE or UNSAFE posting. However a comment about potential warping of the framing in the Comments box on the placard and evaluation form would be appropriate.

(Photograph courtesy of FEMA)
Figure 6-17 – West Virginia Flood, 2001

This picture is a good example of the lack of structural damage as a result of slow moving floods. The arrow shows the water line at the time of maximum flood depth. Certainly the finishes will need to be repaired by either cleaning or replacing as necessary, and there is a significant amount of mud and debris on the floor. In this case, the floor is a concrete slab on grade; so warping does not present a problem as it dries out. This building would be posted INSPECTED.

(Photograph courtesy of FEMA)
Figure 6-18 – West Virginia Flood, 2001

Another hazard that accompanies floods and must be considered in a safety evaluation is mud and debris that can block openings, denying access to buildings. In this picture, we see mud and debris covering approximately half the door height. This type of debris build-up precludes access to the building from a strictly practical standpoint. Once the debris is removed, access is fully available. If evaluations were performed prior to the debris removal, the most likely posting for this structure would be RESTRICTED USE, with no access until debris is removed.

Fast moving floods, such as flash floods or flooding in swift streams, can and often do cause structural damage to structures. These types of floods are extremely hazardous to structures that are not anchored to their foundations or have unbraced cripple walls. With earthquakes, these types of buildings often slide on their foundations, or the cripple walls collapse. The same thing can happen with fast moving floods. The force of the water striking an unanchored structure will not only move it off its foundation, but will float it, causing the structure to be swept away with the stream.

(Photograph courtesy of FEMA)
Figure 6-19 – West Virginia Flood, 2001

In this picture, we see a garage that most likely did not have a foundation and was just sitting on the ground. As the floodwaters struck the building, it floated and was deposited downstream onto this fence. This building should be posted UNSAFE, as it is a collapse hazard. The difficulty in filling out the evaluation form and the placard is trying to ascertain the address. This is not uncommon with outbuildings.

(Photograph courtesy of FEMA)
Figure 6-20 – Hurricane Floyd, North Carolina

Even structures that are connected to their foundations will not always withstand the pressure of fast moving water. These structures are moved off their foundation and move with the water until they come to rest, are destroyed by the flow, or the water level drops, depositing them in some unknown location. In this case, the home was deposited on top of a vehicle. However, vehicles will be swept away much faster than buildings, so we don't know if this vehicle belongs with the structure. For safety evaluation, there is no doubt that this would be posted as UNSAFE. Again, the problem comes in tying it to an address. Unless you are familiar with the structure, there is no way you can indicate an address. On the evaluation form, it would be best to simply describe where the building is sitting, using some local landmark or reference point. Use of a global positioning satellite (GPS) device would also be a good idea.

Figure 6-22 & 6-23 – Post-tension slab home, Hurricane Katrina, 2005

These photos show a post-tensioned concrete slab foundation home that were swept out of its location in St. Bernard Parish and moved by the storm surge, slab foundation and all. The photo on the right is a close-up view of the left photo.

6.3 Fires

Fires are a hazard that will usually not require activation of the Safety Assessment Program to evaluate buildings. However, the program was used in Oakland following the 1991 Oakland Hills Fire. In this case, structural engineers from the Bay Area were used to evaluate foundations on destroyed homes. The purpose of the evaluation was to rapidly determine which foundations could be re-used during reconstruction of the homes.

Another instance of safety evaluations being performed following fires was during the Civil Unrest in Los Angeles in 1992. Building inspectors from the City of Los Angeles were evaluating the safety of buildings almost as soon as the fires were put out. In some cases, the building inspectors had to have police escorts to make sure they did not take any sniper gunfire. This is an extreme case, and most likely the program would not be activated.

Local building departments usually will evaluate the safety of a building that has burned. This is done primarily to determine if the burned structure is a hazard to people and property if it is left standing until it can be repaired. These types of inspections are not safety evaluations for the purpose of determining if the structure can be re-occupied. In some cases, private engineers are retained by the owners or insurance companies to determine the appropriate method of repair.

The potential does exist that the Safety Assessment Program could be activated following a major urban-wildfire such as the 1991Oakland Hills or the Southern California Fire Storms of 1993. Since the fires usually burn the structures to the ground, the evaluations would be to rapidly determine the safety of standing structures such as walls, and possibly to determine if foundations could be re-used. The latter condition would be the case where the responsible jurisdiction was preparing their requirements for reconstruction. They may wish to know how many foundations potentially could be re-used.

(Photograph by Robert A. Eplett, California OES)
Figure 6-24 – Southern California Fire Storms 1993, Malibu

As can be seen in this picture, entire neighborhoods were burned to the ground. With the hot debris lying on the slabs, there is a question regarding the potential for re-using these foundations. Should the Safety Assessment Program be activated for this type of evaluation, the determinations would not be final. If the evaluations showed that foundations potentially could be re-used, the homeowner would need to retain an engineer to fully evaluate the footings for heat damage before the foundation could be re-used.

The extreme heat generated by urban-wildland fires can cause serious damage to the concrete or masonry in the footings. The expansion of the material from the heat can cause serious cracking and spalling. However, if firefighters were on scene when the structure began to burn and were able to keep the surrounding area cool, there is a possibility that the foundation may be able to be re-used.

If the program were activated, the responding evaluators would report to the Fire Department staging area where they would wait for assignment. As with other hazards, the evaluators would be under the direction of the building department with jurisdiction over the area. Overall, this will not be a hazard that will likely result in the activation of the Safety Assessment Program.

6.4 Explosions

Most explosions historically have been accidental in nature, either occurring due to a domestic gas leak or boiler mishap, or in an industrial setting in the routine storage or use of dangerous chemicals. A few, especially in recent times, have been caused by terrorists and other criminals, bent on political or financial gain. Regardless of how explosions may occur, the effects are similar.

Large explosions in urban settings may cause lateral forces to rack buildings at some distance from the center of the explosion. Structures that are not completely destroyed at the explosion center (ground zero) may be very unstable, being unsafe for anyone to be near and subject to imminent collapse. Projectiles can cause damage to other structures and set fires at great distances from the initial blast. In addition, powerful explosions can generate seismic shock waves, and if set off in a body of water, can create tsunamis that can spread damage at a distance from the blast center. It is quite likely that there will be much to do for SAP evaluators after a disaster involving a powerful explosion.

This pictures shows a granary that was destroyed in an explosion. Flammable dusts present their own hazard as to explosions; a fine dispersal of baking flour can explode if exposed to sparks or flames, as can other clouds of flammable dusts, as well as dusts made of certain metals.

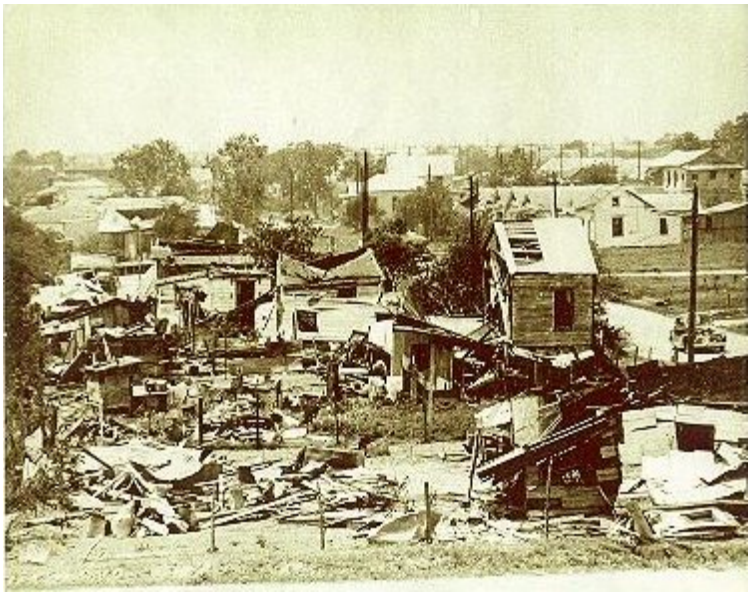
Figure 6-25 – Granary damaged in an explosion

In 1947, a ship carrying 2,300 tons of ammonium nitrate fertilizer caught fire and exploded in the harbor at Texas City, TX. The official death toll was just under 600, and about 100 of the missing were never found. This explosion in the harbor caused a tsunami that swept other ships inland and caused additional damage. Fiery debris rained down and set off fires in the community. This was the largest explosion disaster in U.S history prior to the September 11, 2001 terrorist attack in New York, NY.

Figure 6-26 - Explosion and fire, Texas City, TX, 1947

The 1947 Texas City ammonium nitrate explosion destroyed or damaged much of that small community. These photos only show small pieces of the incredible overall picture. In this photo, the parapet of this particular building was smashed by the force of the blast. Notice the debris on the sidewalk. This photo was taken after the streets were cleared of debris.

Figure 6-27 – Damaged parapet, Texas City explosion, 1947



This photo shows part of the heavily damaged community in Texas City. Note the building on the right side of the picture that is lying on its side on another building. Several buildings in the foreground are flattened.

Figure 6-28 – Damaged or destroyed homes, Texas City, 1947

Figure 6-29 - Destroyed fire engine

This photo shows the wreckage of a fire engine twisted together with the remnants of a nearby ship. This was near the explosion ground zero.

Figure 6-30 – Car projectiles, Texas City explosion, 1947

Finally, this photo shows the extent of the projectile issue in Texas City. It takes between 6 psi and 8 psi of blast force to lift an automobile. These particular cars are shown having no regard for the 'no parking' sign in the foreground.

UNIT 7 SAFETY

Unit 7 Training Guidance

Overview

Safety evaluators need to know how to conduct their evaluations safely. This includes basic field safety when entering damaged buildings, taking care of yourself mentally and emotionally while in the disaster area, and being able to identify hazardous materials that are in the area.

Training Goal

Participants will know how to conduct themselves safely while they complete their work. Additionally, participants will be better able to protect themselves from exposure to hazardous materials.

Objectives

Upon completion of this unit, participants will be able to:

- Take appropriate steps to protect themselves and their team members from potential hazards within and around a damaged structure;
- Read the hazardous materials placards; and
- Be able to request additional evaluations for hazardous materials, and what that evaluation may mean to the building owner.

7.0 Safety

The topic of personnel safety is one of the most important topics that will be discussed in conjunction with post-disaster safety assessment. When not on a response and in a secure setting such as a classroom, many of the ideas and requirements of a sound safety program probably appear to be obvious. However, during a response we all tend to get "caught-up" in the action and excitement of the time and forget these basic safety rules. At the end of this unit you will find the "Building Assessment Safety Checklist." We have provided two copies: one to remain in the student manuals; and one that has been reduced to a size that can be added to your ATC-20-1 Field Manual and easily referred to during a response.

7.1 During Inspections

There was not a single serious injury related to the safety assessment process between the inception of the program in 1978 to mid-1992. Although the individual injured was not a safety assessment volunteer, the injury occurred during an assessment of a damaged building. In this particular case, an assessment team entered a YELLOW tagged home on an unstable hillside and proceeded out onto a patio deck overlooking a small ravine behind the home. Before they went on the deck they did not verify the current conditions. While on the deck, it collapsed and one of the individuals suffered a broken back. We cannot emphasize enough the importance of being aware of your surroundings and determining whether it is safe to enter a building or portion of a building before doing so.

There are general safety rules that apply at all times while performing safety assessments. They are:

- **Be aware and cautious.** Be aware of where you are and what is in the area around you. You can easily be impacted by conditions around the site in which you are working. This is also important should you need emergency assistance. Most likely you will be working in an area that you are not familiar with, and when you call for assistance it will be necessary to provide at least the cross streets where you are working.

- **Always work in teams of at least two individuals.** Evaluation teams will always be established with at least two individuals. Never split up in order to cover the area more quickly. Keep together so you always know where the other member(s) of your team is. For Detailed Evaluation teams, where it is required to enter buildings, evaluation teams will be composed of three individuals whenever possible so that one can remain outside the building while the other two enter. If you are on a team composed of two individuals such as a Rapid Evaluation team, do not enter buildings unless you absolutely have to, and then only if it is safe to do so.

- **Always wear a hard hat.** There is a hazard from falling items any time you are working in or around a damaged or potentially damaged building. Hard hats are also a protection from low-hanging exposed electrical wires. Individuals without hard hats will not be assigned to an evaluation team.

As you begin your safety assessment work, realize that many times you will be the first individuals around or in most of the buildings that you evaluate. Consequently, you have no idea of the magnitude of the hazards you will encounter. Assume the worst and be prepared.

- **Do not enter obviously unsafe buildings.** For the most part, obviously unsafe buildings are those that have suffered full or partial collapse. However, there are other conditions that fall into this category. For example, any building that is leaning or significantly out of plumb should automatically be considered unsafe to enter, not only for the occupants but for the evaluation team as well. From the exterior, look for indications of separation between walls and framing

before entering. If you determine that such separations are localized, and decide to enter the building, do not enter the rooms where the separation has occurred.

- **Do not enter buildings, or access appendages of buildings, located on potentially unstable slopes.** If a slope has become unstable as a result of an earthquake, there is no way of determining when, or if, the slope will fail. This condition becomes more hazardous if the slope is continuing to move after the event. As the slope moves, the support conditions for the building or its appendages can change. What was deemed relatively safe 10 minutes earlier might be unsafe now. If entry or access is deemed necessary, make sure that the structure will support the added weight of the evaluation team. If you cannot make such a determination, do not enter the building or any part of the building.

- **Do not enter buildings where falling hazards exist that can block exits.** Falling hazards can take many forms. Loose bricks represent a degree of hazard similar to that of a parapet or ceiling. However, the condition where the hazard falls while you are in the building and blocks your safe exit from the building is a real concern. Individual bricks or ornaments falling represent a hazard to the individual's safety but usually do not block an exit. Be aware of all falling hazard potentials while entering or exiting a building.

- **If the building to be evaluated is leaning excessively or is significantly out-of-plumb, do not enter**. Stay on the side of the building away from the direction it is leaning. This condition definitely represents an obviously unsafe building. However, the concept of "leaning excessively" or "significantly out-of-plumb" cannot be quantified. This is left up to the judgment of the evaluation team. It is important to recognize the potential for collapse of a leaning building. Even if you determine that you can enter the building to complete your evaluation, minimize your exposure to the hazard. Whenever possible, stay on the high side of the building and be aware of the potential hazard.

- **Before entering any building, make sure exit doors are fully operable. Make sure that exit pathways are clear and there are no falling hazards that could obstruct the pathway**. While you are in a building, if it becomes necessary to rapidly evacuate the building and the exit door is stuck, you have exposed yourself to an unnecessary hazard. Before you enter the building, make sure that all the exit doors are fully operable. Also, make sure there is nothing on the interior that can fall and block access to the exit. When you enter a building, make sure that you stay within fairly direct access to those exits that are fully operable.

- **Be aware of hanging or exposed electrical wires.** Always assume that electrical wires are fully charged. Don't touch wires unless you absolutely must. There should be virtually no case in which you would need to move an electrical wire.

After the initial round of evaluations there may be a need for subsequent assessments. These assessments may be Detailed Evaluations, or evaluations needed because of aftershock activity. While the safety rules we have already discussed are still valid, some additional ones must be considered.

If an unsafe building must be entered that has not been braced, shored or otherwise stabilized, take the following steps:

- **Visually assess the damage from the exterior and evaluate the potential for collapse.** Again, the basic concept is, do not enter an unsafe building. However, conditions may arise that might overrule this concept. In that case, it is very important to first satisfy yourself that the building is not in a condition of imminent collapse. No matter the reason, evaluation teams

should never enter a building that is in an imminent collapse condition. Once you have determined that you can enter the building, stay away from open areas and rooms. If at all possible, perform the necessary work from near an interior partition where, if a collapse were to occur, there would be a good chance of voids being formed.

- **One member of the team is to remain outside to monitor the building while the other members are inside.** Only Detailed Evaluations require the team to enter buildings. Before team members enter the building, the individual who will remain outside should know exactly where the team members are. While in the building, if the strategies need to change, the person outside must be told immediately. This way, if assistance is needed, the individual outside will be able to secure the necessary assistance and be able to tell the rescuers where the individuals are within the building.

- **To the extent possible, verify stability of every room or part of the structure before entering.** This allows you to determine those portions of the building you can enter. If there is any indication of instability that represents an imminent collapse potential, do not enter that portion of the building. Once you are inside, verify the stability of each room before you enter. Again, if there is any indication that there is an imminent collapse potential for any portion of that room, do not enter.

- **Do not enter a building in which a hazardous material spill or release has occurred.** Since you are not hazardous materials experts, this may be hard to do. Before you enter a building, particularly in an industrial area, look around the exterior for a warning placard of hazardous materials being stored on the premises. The next section of this unit will discuss the warning placards. If you find the colored, diamond-shaped placard, be aware of the potential of a spill. If you see suspicious liquids on the floor or smell anything unusual when you enter a building, consider the potential before you continue. Any building that smells of gas should be vacated immediately. Also be aware of the potential for asbestos, especially in older buildings.

These safety rules are basic and simple common sense rules. However, during a response, we become so concerned with the concept of helping people we forget the basic and obvious rules. Insert this checklist into your field manual and refer to it frequently while you perform your duties.

Beware of disease-carrying flies, mosquitoes and other vermin! In many disasters, there are a great many dead animal and even fish carcasses, and the flies can multiply out of control. Be sure to bring and use insect repellant, and to be careful about hygiene. There may be other types of population explosions in the local animal species that creates problems after a disaster; stay informed on local conditions, and be prepared.

Figure 7-1 – Flies, Hurricane Katrina, 2005

Be careful on how you inspect unstable or precariously perched structures!

Figure 7-2 – Shed on fence, Hurricane Katrina, 2005

Figure 7-3 & 7-4 – Stranded vehicles on roofs, Hurricane Katrina, 2005

Avoid walking under stranded vehicles also! The eaves, roofs and walls of these homes are not designed for these types of loads, so safety would be a serious question upon entering them to do evaluations. Avoid the walls that these vehicles are now imparting loads to!

Be careful about what you are sitting under. It is easy to assume that all will go well, and this time it did. It doesn't always work that way!

Figure 7-5 – Roof fragment, Hurricane Katrina, 2005

Many disasters create breathing hazards. The terrorist attack on the World Trade Center in 2001 put many harmful chemicals in the air. Floods will promote the growth of mold, causing spore concentrations inside buildings. The proper breathing equipment must be used for such conditions; in cases where mold is rampant, a medical-grade air filter is appropriate.

Figure 7-6 – Mold damage, Hurricane Katrina, 2005

Always be careful where you step! Floods will leave thick layers of muck and silt, sometimes laden with pollutants. Severe injuries can occur from slipping and falling. Likewise, earthquakes can leave sharp pieces of brick, boards with nails, and other impalement implements. Inside structures, earthquakes can cause shelves and files to fall over, spilling books and papers, and creating a slippery surface to walk on. Avoid stepping onto any and all dangerous surfaces.

Figure 7-7 – Mud slipping hazard, Hurricane Katrina, 2005

7.2 Critical Incident Stress Disorder

Critical Incident Stress Disorder is something that affects many emergency workers after working long hours over a number of days. To help combat the effects of stress on safety assessment personnel, the program limits the time the evaluators will be on site to 3 days. However, the building department personnel you will be working with have been at it since the event. Knowing the causes and symptoms will help you to better understand what they are feeling and possible recognize it in yourself.

Critical Incident Stress Disorder is usually caused by:

- Long hours - working 12 to 14 hour or longer shifts or performing heavy manual work for long periods.
- Emotional turbulence - all around you people are frightened, exhibiting high emotional states, and within yourself are the same high level of emotions.
- Loss - a sense of loss as you look around the area and take stock of the damage. Will the community ever recover?
- Destruction - the sense of utter devastation associated with large events like an earthquake.
- Injuries and death - working and dealing with a large number of injured or dead is a constant reminder of the incident. This can lead to feelings of futility, guilt, and frustration.
- Lack of sleep or food - probably the most common cause of CISD. As we get involved in the operation we forget to eat. At the end of the shift we are still keyed up and it is difficult to sleep.
- Separation from family and subjugation of one's own needs - The subjugation of one's needs is probably more prevalent in municipal emergency workers or those involved directly with care and sheltering. However, separation from one's family could be applicable to your recovery operations. This would most likely occur if you were unable to travel to home at the end of your shift and had to stay on site.

7.2.1 Symptoms

CISD will manifest itself in any one of the following ways and quite possibly in more than one:

- Inability to make decisions - individuals are looking to you to make a decision and tell them what to do and where to go. Your mind is "blank," and you simply don't know what to do.
- Slowness of thought and confusion - information comes to you and you don't have a clue what it is. All you see are words, and you really don't know what to do with the information.
- Inability to express one's self - you know what you want to say but you can't put it into words. This leads to frustration.
- Depression, irritability, and anxiety - can result in the feeling of futility. Why am I doing this? What difference does it make anyway?

- Exhaustion, loss of energy - The stress generated can take its toll physically as well as mentally. You physically feel ill, you have no energy to do anything. It is an effort to force yourself to continue with your duties. There is no desire to eat; the thought of food is almost too much. In many cases, it becomes difficult to sleep. All you can think about is sleep, yet when you try you are wide-awake, thinking and worrying about the operation.

Since your operations are going to be more focused on evaluating buildings and will only be working for 3 days, you will be less likely to suffer drastic affects of CISD. However, working long hours, not eating regularly, and lack of exercise can have an affect on you.

7.2.2 Stress Relieving Measures

There are several simple steps that you can take to protect yourself from suffering the effects of CISD. Some are a simple repeat of basic safety measures that were discussed in the previous section. The following are some of the measures that you can take:

- Take frequent breaks – pace yourself so you work at a constant level.

- Eat good meals at regular times – stay away from the junk food and eat well. Schedule time for several good meals a day.

- Drink plenty of fluids – keep yourself hydrated. You might even consider carrying a canteen or water jug with you.

- Freely talk about your experiences – after your shift, join with your co-workers and freely discuss what you have seen and how you feel about it. In turn, be a good listener.

- Get plenty of sleep – don't stay up all night talking. Set a time for sleep and keep to it. Minimize the intake of alcohol.

Awareness is one of the key preventative measures for yourself as well as your co-workers. Watch for the signs and then take action to minimize the impact. If you see one of your co-workers exhibiting the symptoms of CISD, take him or her aside and take a break. Try and get them to talk about their feelings.

7.3 Hazardous Materials

We live surrounded by hazardous materials that are more or less restrained or contained properly. Disasters have the potential of releasing these materials into the environment, exposing disaster workers and the populace at large to their dangerous effects. Floods can carry toxins and corrosives in solution for great distances, while earthquakes, fires, and explosions can disable containment and cause a release in that manner. Moreover, hazardous materials can react together once released in ways never intended by their users. Your awareness of these risks can truly improve your safety profile.

In this section, we will look at some basic information regarding the posting of hazardous materials that you can use to increase your safety while evaluating damaged buildings. The purpose of this information is strictly for your safety. You should never be asked to identify hazardous materials. By understanding the placarding system for both the building and the individual containers, you will have a better ideal of what kinds of materials you are dealing with from a very general sense. One of the first rules to remember is, don't necessarily believe what the placards are telling you. In other words, leave containers well enough alone. What these placards do not tell you is what can happen if the stored

materials become mixed. The level of hazard can significantly change when containers are leaking and the materials come together.

Ideally, hazardous materials will be labeled to disclose their identity and associated hazards. However, this will not always be the case, since labels are not always required for containers with hazardous materials, labels may not be properly placed, and hazardous materials labeling regulations may not always be enforced. Mislabeling also may occur, so be cautions of even benignly labeled substances.

There are more hazardous materials labeling conventions in use than can be presented within the scope of this chapter. We will look at three labeling systems that are commonly used throughout the United States. They are: 1) the National Fire Protection Association 704M system used for materials within facilities that manufacture, process, use, or store hazardous materials; 2) the Department of Transportation system used to label hazardous materials during transport; and 3) the National Paint and Coatings Association system used to label hazardous materials within manufacturing plants and facilities.

The *Emergency Response Guidebook,* which covers the hazardous material designations used throughout North America, can be downloaded from the website:
http://hazmat.dot.gov/pubs/erg/gydebook.htm

7.3.1 National Fire Protection Association System

This system is intended to provide basic information to fire fighting, emergency, and other personnel, enabling them to make decisions whether to evacuate an area or commence emergency control procedures. This system of placarding is voluntary unless it is adopted into local codes.

The NFPA system identifies materials by their health hazard, fire hazard, reactivity, and specific hazard. The placard that is used is shown in Figure 6-1 on the following page. The color-coding on the placard is consistent and does not relate to the particular level of hazard. "Blue" denotes the health hazard, "red" denotes the fire hazard or flammability hazard, "yellow" denotes the reactivity of the materials, and "white" denotes the specific hazard. All but the specific hazard are rated by a numerical system of 0 to 4, with 4 being the worst hazard, and the level of hazard decreasing as the number decreases.

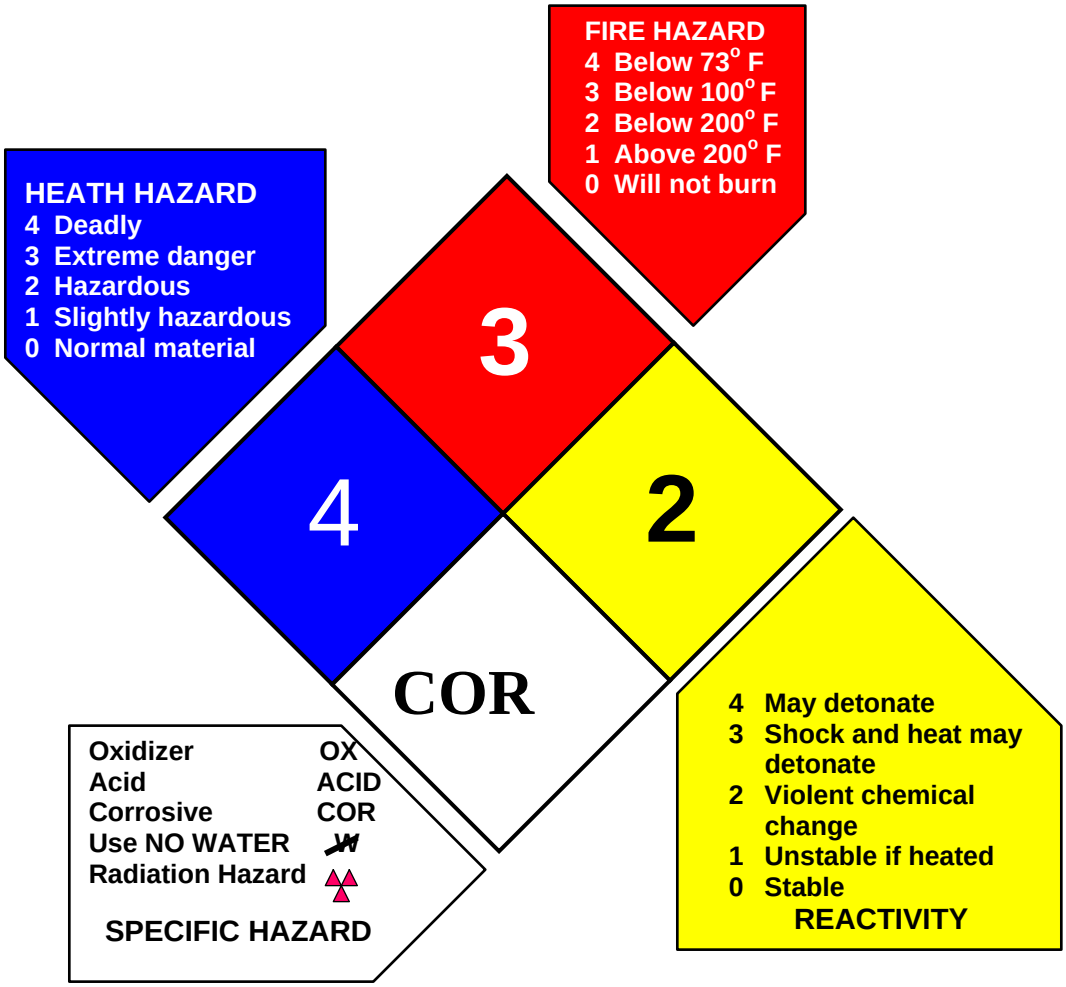


Figure 7-8 – NFPA Hazardous Materials Classification

7.3.2 Department of Transportation System

DoT regulations define a hazardous material as "*a substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated*."

The DoT system is primarily used for labeling containers of hazardous materials that are transported. The placards are classified by hazard class names, hazard class numbers, associated color, identifying pictographs and an identification number. Figure 6-2 on page 6-8 outlines these categories and Figure 6-3, also on page 6-8 is an example of the placard. The pictographs are commonly used symbols for various hazards; for example, flames indicate fire hazard, a skull and crossbones indicates poisonous material. The identification number on the placards indicates the primary hazard class of the hazardous material contained.

HAZARD CLASS NAME	HAZARD CLASS NUMBER	COLOR
Explosives	1	Orange
Poisonous gases	2	White
Compressed gases	2	Green
Flammable gas	2	Red
Flammable liquids	3	Red
Flammable solids (dangerous when wet)	4	Blue/red/white
Oxidizers	5	Yellow
Poison liquids	6	White
Radioactive substances	7	Yellow/white
Corrosives	8	Black/white
Miscellaneous hazardous materials	9	

Figure 7-9 - Department Of Transportation Hazardous Materials Classification

Figure 7-10 - Examples of DoT Placards

This figure provides some examples of the placards used in the DoT system. Additionally, containers with materials that have multiple classifications would have a placard for each classification. As with the building placards, remember that these placards indicate what is supposed to be in the container. Just because a placard indicates some rather benign materials, you cannot guarantee that the container actually contains that particular material.

7.3.3 National Paint and Coatings Association System

The National Paint and Coatings Association has developed a Hazardous Materials Information System (HMIS) for employers to use to comply with the California hazard communication system. The labels are divided into four: health, flammability, reactivity, and personal protection. Figure 6-4 on the following page shows what the placard looks like and includes OSHA's designation for a potentially infectious material.

Figure 7-11 – National Paint and Coatings Association HMIS and OSHA Placards

7.4 US&R Marking System

Urban Search and Rescue (US&R, aka USAR) teams are generally on site prior to safety assessment evaluations being initiated. As a result, SAP Evaluators may encounter markings on buildings that were placed by USAR teams. In order to be familiar with such markings, they are being presented here. SAP Evaluators are not to place such marking on buildings.

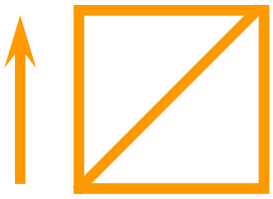
7.4.1 Structure / Hazards Mark

The structural and hazardous material specialists make a 2' x 2' box on the building adjacent to accessible entry. This is done after the USAR team completes hazard assessment and fills out the Structure/Hazards Evaluation form. Generally, the box is sprayed painted in international orange color.

This box represents a relatively safe structure.

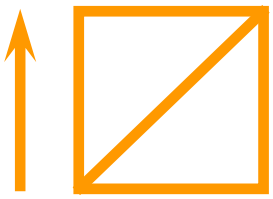
This box shows that the structure has been significantly damaged. While some areas may be safe, others may need shoring, bracing, removal and/or monitoring of hazards.

This box indicates that the structure is not safe and may suddenly collapse.



An arrow next to the marking box indicates the direction of the safest entry into the structure.

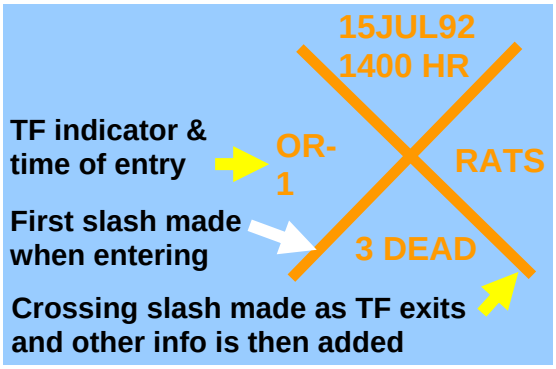
The HM indicates a hazardous material condition in or adjacent to the structure.



These markings indicate that entry is forbidden until the gas has been turned off. When this has been done the HM will be lined out and a new date will be added.

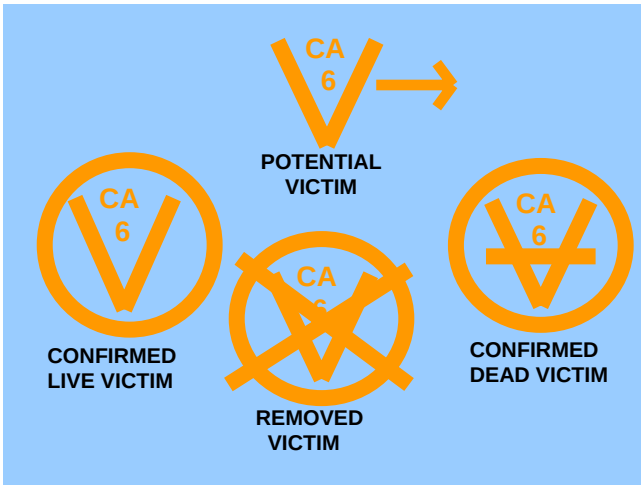
7.4.2 Search Assessment Marking

During a search and rescue operations, the following markings shown below may be found near each entry. This provides information regarding any hazards found and if there were victims inside the structure.



7.4.3 Victim Location Marking

In order to provide a quick status of the victims in a particular structure, the following markings are used markings may be found.



7.5 BUILDING ASSESSMENT SAFETY CHECKLIST

General

- ☐ Be aware and cautious.
- ☐ Always work in teams of at least 2 individuals.
- ☐ Always wear a hard hat.

Initial Assessment of Building That Is Not Posted

- ☐ Do not enter obviously unsafe buildings.
- ☐ Do not enter buildings or access appendages of buildings located on potentially unstable slopes.
- ☐ Do not enter buildings where falling hazards exist that could block exits from the building.
- ☐ If the building is leaning or out-of-plumb, do not enter unless it is absolutely necessary to determine the appropriate posting. When inside or outside try to stay on the side of the building away from the direction it is leaning.
- ☐ Before entering any building make sure exit doors are fully operable.
- ☐ Make sure that exits are clear and there are no falling hazards that could obstruct the pathway.
- ☐ Be aware of hanging or exposed electrical wires.

Subsequent Assessments

- ☐ If an unsafe building must be entered which has not been stabilized, take the following steps:
  - Visually assess the damage from the exterior and evaluate the potential for collapse.
  - One member of the team is to remain outside to monitor the building while other team members are inside.
  - To the extent possible, verify stability of every room or part of the structure before entering.
- ☐ Do not enter a building where a hazardous materials spill or release has occurred.
- ☐ Do not enter buildings, or access any appendage of a building, located on a hillside known to be moving or where slide potential exists.

BUILDING ASSESSMENT SAFETY CHECKLIST

GENERAL

- ☐ Be aware and cautious.
- ☐ Always work in teams of at least 2 individuals.
- ☐ Always wear a hard hat.

INITIAL ASSESSMENT OF BUILDING, WHICH IS NOT POSTED

- ☐ Do not enter obviously unsafe buildings.
- ☐ Do not enter buildings or access appendages of buildings located on potentially unstable slopes.
- ☐ Do not enter buildings where falling hazards exist that could block exits.
- ☐ If the building is leaning or out-of-plumb, do not enter unless it is absolutely necessary to determine the appropriate posting. When inside or outside try to stay on the side of the building away from the direction it is leaning.
- ☐ Before entering any building make sure exit doors are fully operable.
- ☐ Make sure that exits are clear and there are no falling hazards, which could obstruct the pathway.
- ☐ Be aware of hanging or exposed electrical wires.

SUBSEQUENT ASSESSMENTS

- ☐ If an unsafe building must be entered which has not been stabilized, take the following steps:

  1. Visually assess the damage from the exterior and evaluate the potential for collapse.
  2. One member of the team is to remain outside to monitor the building while other team members are inside.
  3. To the extent possible, verify stability of every room or part of the structure before entering.

- ☐ Do not enter a building where a hazardous materials spill or release has occurred.
- ☐ Do not enter buildings, or access any appendage of a building, located on a hillside known to be moving or where slide potential exists.

7.6 JOB AID - Safety Assessment Program Coordinator

PLANNING FOR SAP DISASTER RESPONSE

- ❑ Review of Safety Assessment Program **Emergency Plan**.
- ❑ Confirm that **all legal authorities exist** locally for the Safety Assessment Program work to move forward if needed.
- ❑ Determine method for **per diem reimbursement for Evaluators**, whether predetermined arrangements will be made with hotels and restaurants, or whether a travel expense claim form will be used.
- ❑ Make **back-up plans** in case hotels are not available post-disaster, such as tents, cots, food arrangements, or other alternative arrangements.
- ❑ Determine what sort of **transportation arrangements** will be made for the Evaluators in the field, e.g., local government vehicles w/drivers and radios or cell phones, their own personal vehicles, rented vehicles, etc. Include emergency arrangements for fuel and the methods for SAP Evaluators to obtain fuel, such as identification, credit cards, etc.
- ❑ Identify **staging or reporting locations** for Evaluators to report to.
- ❑ Determine what the local government policy will be on **deputizing Evaluators** and method for providing local identification if necessary.
- ❑ **Formal adoption** of official placards, and other ordinances affecting this program.
- ❑ Arrange for multiple responsible individuals to have **Coordinator training** so adequate coverage of this position occurs during a disaster.

PREPARING FOR SAP DISASTER RESPONSE

- ❑ **Prepare for the staging area the following items** in a safe location (as with the other SAP supplies):
  - ❑ Laptop computer w/ wireless access to Internet.
  - ❑ Television set w/ video or DVD player.
  - ❑ White board or chalk board to post assignments.
  - ❑ Large map of jurisdiction that can be highlighted as the work progresses.
- ❑ Prepare **mapped sections** on cards of your jurisdiction (map cards) to send Evaluator teams into, preferably with addresses, such as from the Assessor's office or from GIS overlays. Try to keep the number of buildings to 100 or less per map card.

- ❑ **Place in multiple locations the official placards**, **forms, and supplies** (such as inspector's vehicles, and/or outbuilding storage, away from potentially collapsing buildings; or remote digital storage of placards and forms, with an arrangement for remote printing in the event of disaster.)

- ❑ Prepare a suitable number of **Evaluator briefing packets**, to include the following:

  - ❑ **Phone numbers**, either a single contact (e.g, EOC), or a list of departments that deal with hazardous materials, media inquiries, road closures, local law enforcement, fire department, hazardous material response, animal control, and the Building Official or other local authority in charge of Safety Assessment.

  - ❑ Travel expense claim **reimbursement forms** and instructions, if these are to be used instead of direct billing.

  - ❑ General **map** of local jurisdiction.

- ❑ Stockpiling of adequate Evaluator **field supplies**:

  - ❑ Official green, yellow, and red placards (approx. 70:15:15 ratio for earthquakes, 15:70:15 for inundation flooding; plan per the most likely disaster in your community). Consider acquiring placards printed on peel and stick paper.

  - ❑ Rapid and Detailed Assessment forms (80:20 ratio).

  - ❑ Rolls of caution tape.

  - ❑ Duct tape and/or staple guns w/staples to attach placards to buildings, if peel and stick placards are not used.

DURING DISASTER RESPONSE

- ❑ Start daily **written log** of events.

- ❑ **Perform windshield survey** of jurisdiction as soon as safely possible, counting the total number of buildings obviously likely to be damaged.

- ❑ **Estimate number of SAP Evaluators needed** based on windshield survey: for example, in an earthquake, if 1000 buildings look damaged (likely to be red or yellow tagged), then the likely estimate of total buildings to be evaluated is 1000/0.3 = 3,333. Then, the Evaluators can look at 13 buildings per day, and a common period for completion is 12 days, so 3,333/13/12 = 22 Evaluators, or 11 two-person teams. However, in an inundation flood, the ratios could change to 15% green, 70% yellow, and 15% red, so in that case count just the heavily damaged buildings (red tag) and divide that by 0.15 to arrive at the total buildings to be evaluated.) (1000/0.15 = 6,667) Use 40 buildings per inspector per day, and to complete work in 12 days, 6,667/40/12 = 14, or 7 two-person teams.

- ❑ **Request SAP Evaluators from CA OES** through the Operational Area (County) Emergency Operations Center, or State Regional Emergency Operations Center, identifying the staging area they are to report to.

- ❑ Concurrent with request to CA OES for assistance through SEMS, **begin using local inspectors to evaluate your essential facilities** (those facilities needed most to respond to and recover from the disaster), then the community at large, using the map cards.

- ❑ **Prepare the staging area for the incoming Evaluators.**

- ❑ Obtain in response from CA OES the **names** of the individuals responding to your request, their cell phone numbers, and when they will arrive.

- ❑ Make **final arrangements** for covering SAP Evaluator room and board expenses, whether by direct billing or by travel expense claim form.

- ❑ **When Evaluators arrive:**

  - ❑ Have them sign in at the staging area.

  - ❑ Hand out briefing packets.

  - ❑ Brief them on the nature and extent of the disaster, and any hazards or other issues they should be aware of.

  - ❑ Show them the SAP Evaluator refresher video or DVD.

  - ❑ Deputize them as representatives of your jurisdiction.

  - ❑ Assign them into teams of at least two, usually one building inspector and at least one architect or engineer.

  - ❑ Assign a helper who knows the area to drive them, if this is your preferred arrangement.

  - ❑ Assign the teams their evaluation assignments (map cards or lists of properties) for the day. Be sure there is enough work for a team to have a full day of work.

  - ❑ Issue Evaluator placards, forms, and other supplies to evaluators.

  - ❑ Instruct them to return for team debriefings at the end of the day, otherwise, search and rescue teams may be deployed to find them.

  - ❑ Send SAP Evaluators to the field.

- ❑ Report back to CA OES the names of who signed in, so CA OES knows which Evaluators made it safely to each jurisdiction.

- ❑ **During the day**, coordinate responses to issues as they arise related to the Safety Assessment work.

- ❑ **At the end of the work day,** Evaluators return to the staging area to:

- ❑ Meet with each team to review Assessment Forms for completeness.
- ❑ Discuss any unusual issues that came up with the team.
- ❑ Use the information to improve local arrangements and/or processes.
- ❑ Gather fully completed forms from team.
- ❑ Highlight teams' progress on a large map.
- ❑ Inform them if they will need to report the next day.
- ❑ Have them sign out at the staging area.

❑ Turn over completed Assessment forms to office staff for entering into spreadsheet forms (see CA OES-provided forms).

❑ Repeat process of daily signing in Evaluators, issuing supplies, assigning map cards, and debriefing/signing out Evaluators at the end of day until work is complete.

❑ Dismiss Evaluators who complete their tour, and request replacement Evaluators in a timely fashion so as to continue the work smoothly.

AFTER THE DISASTER RESPONSE (After Action / Lessons Learned)

❑ Dismiss the Evaluators:

- ❑ Collect all unused supplies and equipment from them.
- ❑ Discuss any final issues with them regarding their deployment.
- ❑ Thank them for their assistance, and have them sign out.

❑ Have the office staff update the SAP Information spreadsheet with final set of Assessment Forms.

❑ Forward the completed SAP Information spreadsheet to the CA OES SAP Coordinator via email.

❑ Fax or email the completed Evaluator daily sign-in sheets to the CA OES SAP Coordinator.

❑ Receive bills for mutual aid Evaluator work from assisting local governments:

- ❑ Pay these, and retain the records for potential compensation through OES via the Project Worksheet or Damage Survey Report process.

❑ Receive travel expense claims from Evaluators:

- ❑ Review them for compliance with your local travel expense rules.
- ❑ Pay at once the eligible travel expenses of the Evaluators.

- ❑ Retain records of these payments for reimbursement through OES via the Project Worksheet or Damage Survey Report process.

- ❑ Participate in After Action Report preparation using notes from daily written log. Discuss with OES SAP Coordinator any unusual issues that came up in the Safety Assessment requiring a response, or any success stories or innovations that arose out of the local effort or that you became aware of.

- ❑ Restock Evaluator placards, forms, and supplies in preparation for next disaster.

APPENDIX A EVALUATION FORMS

(This page intentionally left blank.)

ATC-20 Rapid Evaluation Safety Assessment Form

Inspection

Inspector ID:_____ Inspection date and time _____ ☐ AM ☐ PM

Affiliation:_____ Areas inspected: ☐ Ext. only ☐ Exterior and interior

Building Description

Building Name: _____

Address: _____

_____

Building contact/phone: _____

Number of stories above ground:___ below ground:___

Approx. "Footprint area" (square feet) _____

Number of residential units: _____

Number of residential units not habitable:_____

Type of Construction

☐ Wood frame ☐ Concrete shear wall

☐ Steel frame ☐ Unreinforced masonry

☐ Tilt-up concrete ☐ Reinforced masonry

Primary Occupancy

☐ Dwelling ☐ Commercial ☐ Govt.

☐ Other residential ☐ Offices ☐ Historic

☐ Public assembly ☐ Industrial ☐ School

☐ Emergency Services ☐ Other:_____

Evaluation

Investigate the building for the conditions below and check the appropriate column.

Observed Conditions:	Minor/None	Moderate	Severe
Collapse, partial collapse, or building off foundation	☐	☐	☐
Building or story leaning	☐	☐	☐
Racking damage to walls, other structural damage	☐	☐	☐
Chimney, parapet, or other falling hazard	☐	☐	☐
Ground slope movement or cracking	☐	☐	☐
Other (specify) _____	☐	☐	☐

Estimated Building Damage (excluding contents)

☐ None

☐ 0 - 1%

☐ 1 - 10%

☐ 10 - 30%

☐ 30 - 60%

☐ 60 - 100%

☐ 100%

Comments: _____

_____

Posting

Choose a posting based on the evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an UNSAFE posting. Localized *Severe* and overall *Moderate* conditions may allow a RESTRICTED USE posting. Post INSPECTED placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.

☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)

Record any use and entry restrictions exactly as written on placard _____

_____

_____

Further Actions Check the boxes below only if further actions are needed.

☐ Barricades needed in the following areas: _____

_____

☐ Detailed evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other: _____

☐ Other recommendations: _____

Comments: _____

_____

_____

Assessment Report No. _____

ATC-20 FIXED EQUIPMENT CHECKLIST

Facility:	**INSPECTOR:**
Name: _____	Inspector ID _____
_____	Affiliation _____
Address: _____	**INSPECTION DATE:**
_____	Mo/day/year _____
_____	Time _____ am pm

CHECKLIST:		**Equipment Damaged**		
General Items:	No	Yes Operable	Yes Inoperable	Comments
Main boilers	☐	☐	☐	_____
Chillers	☐	☐	☐	_____
Emergency generators	☐	☐	☐	_____
Fuel tanks	☐	☐	☐	_____
Battery racks	☐	☐	☐	_____
Fire pumps	☐	☐	☐	_____
On-site water storage	☐	☐	☐	_____
Communications equipment	☐	☐	☐	_____
Main transformers	☐	☐	☐	_____
Main electrical panels	☐	☐	☐	_____
Elevators (traction)	☐	☐	☐	_____
Other fixed equipment:				
_____	☐	☐	☐	_____
_____	☐	☐	☐	_____
_____	☐	☐	☐	_____
_____	☐	☐	☐	_____
_____	☐	☐	☐	_____
Special Concerns for Hospitals and Other Health Care Facilities:				
Radiation equipment	☐	☐	☐	_____
Toxic chemical storage	☐	☐	☐	_____
_____	☐	☐	☐	_____
_____	☐	☐	☐	_____
Liquid Oxygen tanks	☐	☐	☐	_____
Other: _____	☐	☐	☐	_____
_____	☐	☐	☐	_____

RECOMMENDATIONS: _____

_____

_____

_____

__

ATC-20 Detailed Evaluation Safety Assessment Form

Inspection

Inspector ID: _____

Affiliation: _____

Inspection date and time: _____ ☐ AM ☐ PM

Final Posting from page 2

☐ Inspected

☐ Restricted Use

☐ Unsafe

Building Description

Building Name: _____

Address: _____

_____

Building contact / phone: _____

Number of stores above ground ___ below ground ____

Approx. "Footprint area" (square feet)_____

Number of residential units: _____

Number of residential units not habitable: _____

Type of Construction

☐ Wood frame ☐ Concrete shear wall

☐ Steel frame ☐ Unreinforced masonry

☐ Tilt-up concrete ☐ Reinforced masonry

☐ Concrete frame ☐ Other: _____

Primary Occupancy

☐ Dwelling ☐ Commercial ☐ Govt.

☐ Other residential ☐ Offices ☐ Historic

☐ Public Assembly ☐ Industrial ☐ School

☐ Emergency Services ☐ Other: _____

Evaluation

Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	☐	☐	☐	_____
Building or story leaning	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Structural hazards:				
Foundations	☐	☐	☐	_____
Roofs, floors, (vertical loads)	☐	☐	☐	_____
Columns, pilasters, corbels	☐	☐	☐	_____
Diaphragms, horizontal bracing	☐	☐	☐	_____
Walls, vertical bracing	☐	☐	☐	_____
Precast connections	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Nonstructural hazards:				
Parapets, ornamentation	☐	☐	☐	_____
Cladding, glazing	☐	☐	☐	_____
Ceilings, light fixtures	☐	☐	☐	_____
Interior walls, partitions	☐	☐	☐	_____
Elevators	☐	☐	☐	_____
Stairs, exits	☐	☐	☐	_____
Electric, gas	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Geotechnical hazards:				
Slope failure, debris	☐	☐	☐	_____
Ground movement, fissures	☐	☐	☐	_____
Other _____	☐	☐	☐	_____

General Comments: _____

_____

_____

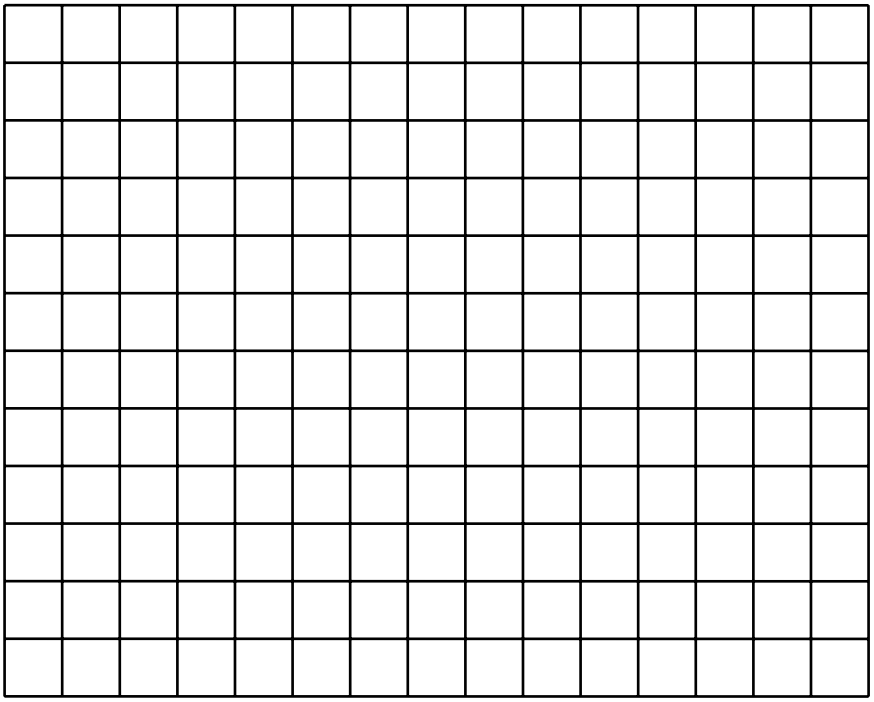
_____

Continued on page 2

ATC-20 Detailed Evaluation Safety Assessment Form Page 2

Building name: _____ Inspector ID: _____

Sketch (optional)
Provide a sketch of the building or damage portions. Indicate damage points.



Estimated Building Damage
If requested by the jurisdiction, estimate building damage (repair cost ÷ replacement cost, excluding contents)

- ☐ None
- ☐ 0 - 1%
- ☐ 1 - 10%
- ☐ 10 - 30%
- ☐ 30 - 60%
- ☐ 60 - 100%
- ☐ 100%

Posting

If there is an existing posting from a previous evaluation, check the appropriate box. Previous posting:

☐ INSPECTED ☐ RESTRICTED USE ☐ UNSAFE Inspector ID: _____ Date: _____

If necessary, revise the posting based on the new evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an Unsafe posting. Local *Severe* and overall *Moderate* conditions may allow a Restricted Use posting. Indicate the current posting below and at the top of page one.

☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)

Record any use and entry restrictions exactly as written on placard: _____

_____

_____

Further Actions: Check the boxes below only if further actions are needed.

☐ Barricades needed in the following areas: _____

_____

☐ Engineering Evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other: _____

☐ Other recommendations: _____

_____

_____

Comments: _____

_____

_____

_____

_____

SAP Evaluator Tracking Form

Jurisdiction: _____

Address: _____

Contact Name: _____ **Phone #:** _____

E-mail: _____ **Fax #:** _____

Name	Specialty	Professional Organization	SAP ID#	Date	Time Signed in	Time Signed out

Safety Assessment Information

Jurisdiction____________________________ **Phone #**___________________________________

Address____________________________ **Fax #**___________________________________

Contact Name____________________________ **E-mail address**___________________________________

Type (Res=R, Comm =C)	**Street Address**	**City**	**Bldg Damage Description**	**Posted Placard**	**Comments**	**% Estimated Loss**

APPENDIX B MODEL DISASTER PLAN

CALIFORNIA STATE BUILDING OFFICIALS
MODEL DISASTER PLAN

DEPARTMENT OF BUILDING AND SAFETY

STANDARD OPERATING PROCEDURES
for
EMERGENCY OPERATIONS

TABLE OF CONTENTS

TABLE OF CONTENTS

Safety Assessment Reference Forms

DEFINITIONS

AMERICAN CONSTRUCTION INSPECTORS ASSOCIATION (ACIA): A statewide association that provides building inspectors as a part of the private sector resources to assist local jurisdictions with safety assessment. Registered by the State of California as specialized construction inspectors. Part of the State resource pool, registered and activated by the Office of Emergency Services.

AMERICAN INSTITUTE OF ARCHITECTS (AIA): A statewide association that provides architects as a part of the private sector resources to assist local jurisdictions with safety assessment. Part of the State resource pool, registered and activated by the Office of Emergency Services.

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE): A statewide association that provides engineers as a part of the private sector resources to assist local jurisdictions with safety assessment. Part of the State resource pool, registered and activated by the Office of Emergency Services.

APPLIED TECHNOLOGY COUNCIL (ATC): Private, non-profit organization and publisher of ATC-20 and ATC-20-1 reference materials for post-earthquake safety assessment of buildings.

BUILDING DEPARTMENT DOC DIRECTOR: The person designated within a jurisdiction to be responsible for damage assessment and building safety inspections (usually the building official).

CALIFORNIA BUILDING OFFICIALS (CALBO): A statewide organization dedicated to the development of better building construction and greater safety to the public through uniformity in building laws. . Individuals who are part of the local resource pool for Safety Assessment, registered and activated through the Operational Area.

DAMAGE ASSESSMENT: Readily available, accurate information regarding the extent of disaster damage to include building and structural safety, financial losses and economic impact.

DAMAGE ASSESSMENT INSPECTORS: Personnel who perform field inspections, comprised of local, neighboring, and volunteer certified building inspectors, engineers, architects, or contractors.

DEPUTIES: Shall be those people who have been appointed by the building official for the duration of the emergency.

DISASTER: The occurrence, or imminent threat, of widespread or severe damage or loss of property or life resulting from any cause.

DISASTER RECOVERY CENTER (DRC): A center established by state or federal authority that serves as a one-stop information center for disaster assistance.

EMERGENCY OPERATIONS CENTER (EOC): A facility for the centralized direction and control of the emergency organization and the general public at a local, county, state, or federal level. The coordination of all official decisions and actions would also take place at the EOC.

EMERGENCY RESPONSE: The actions taken to mitigate or alleviate the results of any natural or man-made emergency.

EMERGENCY SHELTER: Temporary housing facility for the care of displaced persons during an emergency.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA): Federal level agency responsible for coordinating federal assistance to state and local jurisdictions.

INCIDENT MANAGER (IM): Official, at local level, in charge of all operations during an emergency (usually a city manager or county chief administrative officer).

INITIAL SITUATION REPORT: Report required in first few hours following emergency by city or county Emergency Management Division and the state OES, advising of a potential or actual disaster and mutual aid and equipment requested.

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO): An organization comprised of local (city and county) jurisdictions and represented by building officials employed at various levels of government.

MUTUAL AID AGREEMENT: Two or more parties agree to furnish resources and to render services to each party of the agreement in their response to any proclaimed emergency. Access is through the Operational Area and State OES.

OFFICE OF EMERGENCY SERVICES (OES): State level agency responsible for coordinating assistance to include mutual aid, Safety Assessment Program resources, etc.

OFFICE OF EMERGNCY SERVICES – DAMAGE ASSESSMENT REPORT: Detailed information required by city or county Emergency Management Division and state OES to obtain state and/or federal disaster declaration and assistance as applicable. This report should be periodically submitted, as new information is available after initial situation report has been filed.

PROCLAIMED EMERGENCY: A proclamation made at the local or State level requesting mutual aid assistance; defining the nature of the disaster and outlining special assistance needed. This designation differs from a federal disaster declaration: only the President of the United States can **declare** a disaster.

SAFETY ASSESSMENT: Determining the condition of a structure or lifeline for continued occupancy or use.

STRUCTURAL ENGINEERS ASSOCIATION OF CALIFORNIA (SEAOC): A statewide association that provides engineers as a part of the private sector resources to assist local jurisdictions with safety assessment. Part of the State resource pool, registered and activated by the Office of Emergency Services.

STRUCTURE-BY-STRUCTURE SURVEY: A detailed survey in which damage assessment inspectors inspect each damaged structure individually to determine whether it is safe for occupancy and to obtain a more accurate estimate.

WINDSHIELD SURVEY: A drive-through survey in which inspectors drive or walk through a disaster-stricken area to obtain general information and initial financial estimates of the damage inflicted.

CALIFORNIA STATE BUILDING OFFICIALS
DEPARTMENT OF BUILDING AND SAFETY - STANDARD OPERATING PROCEDURES

Standard Operating Procedures
Administrative

CALIFORNIA STATE BUILDING OFFICIALS
DEPARTMENT OF BUILDING AND SAFETY
STANDARD OPERATING PROCEDURES

ADMINISTRATION

I. PURPOSE

The purpose of this document is to establish an operational structure that will allow the department to respond to an emergency situation while maintaining day-to-day department functions, though potentially at a reduced level. This Standard Operating Procedure (SOP) will provide the staff assigned to the Building and Safety Department procedures, organizational structure, and assignments for the emergency period.

II. OPERATIONAL DEFINITIONS

A. The department will function as a field command during any emergency operation that involves buildings and structures and the potential safety of those buildings and structures for continued occupancy.

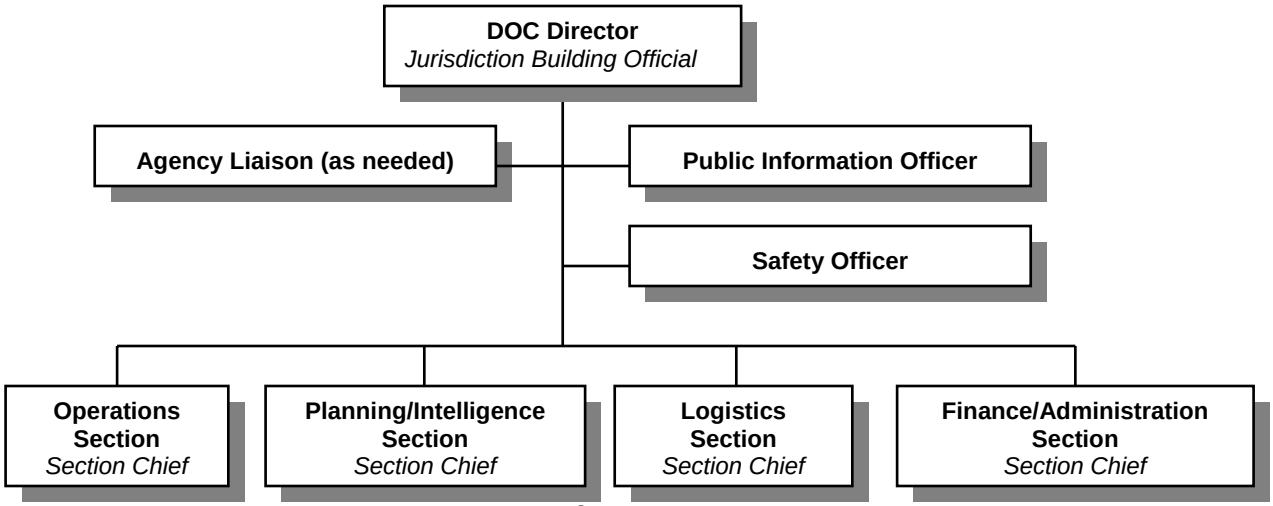
B. The Building and Safety Department Operations Center (DOC) will remain in contact with the jurisdiction's EOC providing regular updates on damage, resource needs, logistical support requirements, and any other information as requested.

III. ORGANIZATIONAL STRUCTURE

A. For all emergency operations involving Building and Safety, the Director, or his/her appointed representative will fill the role of DOC Director.

B. In accordance with the jurisdiction's Emergency Plan, the Department of Building and Safety will begin emergency operations for any event, natural, technological, or "manmade" which impacts buildings and structures. Under such emergency operations, the department will assume the following organizational structure:

1. **Management Staff and Position Descriptions** (The position descriptions are general and need to be developed by the Department into specific job duties.)



ADMINISTRATION

DOC Director is responsible for incident activities including the development and implementation of strategic decisions for approving the ordering and release of resources. Upon notification from the appropriate jurisdictional authority, he/she shall enact the ***Emergency Building Inspection Plan***. Responsibilities include:

- Alert Supervisors.
- Report to the Emergency Operations Center.
- Obtain all available information from the EOC.
- Determine and establish a communication system.
- If requested by police and fire, determine assistance needed to inspect essential buildings and designated shelters.
- Determine degree of mobilization (number of staff needed) and where they will be needed.
- Identify priority of assignments.
    - Supplemental assistance to police and fire as requested,
    - Inspection of essential buildings,
    - Start rapid assessment of damaged areas, and
    - Start detailed assessment by inspection zones.
- Coordinate plans and actions with EOC as required.
- In cooperation with supervisors, coordinate field and office response and equipment.
- Provide information for news releases as required in coordination with the IM and the Public Information Officer.

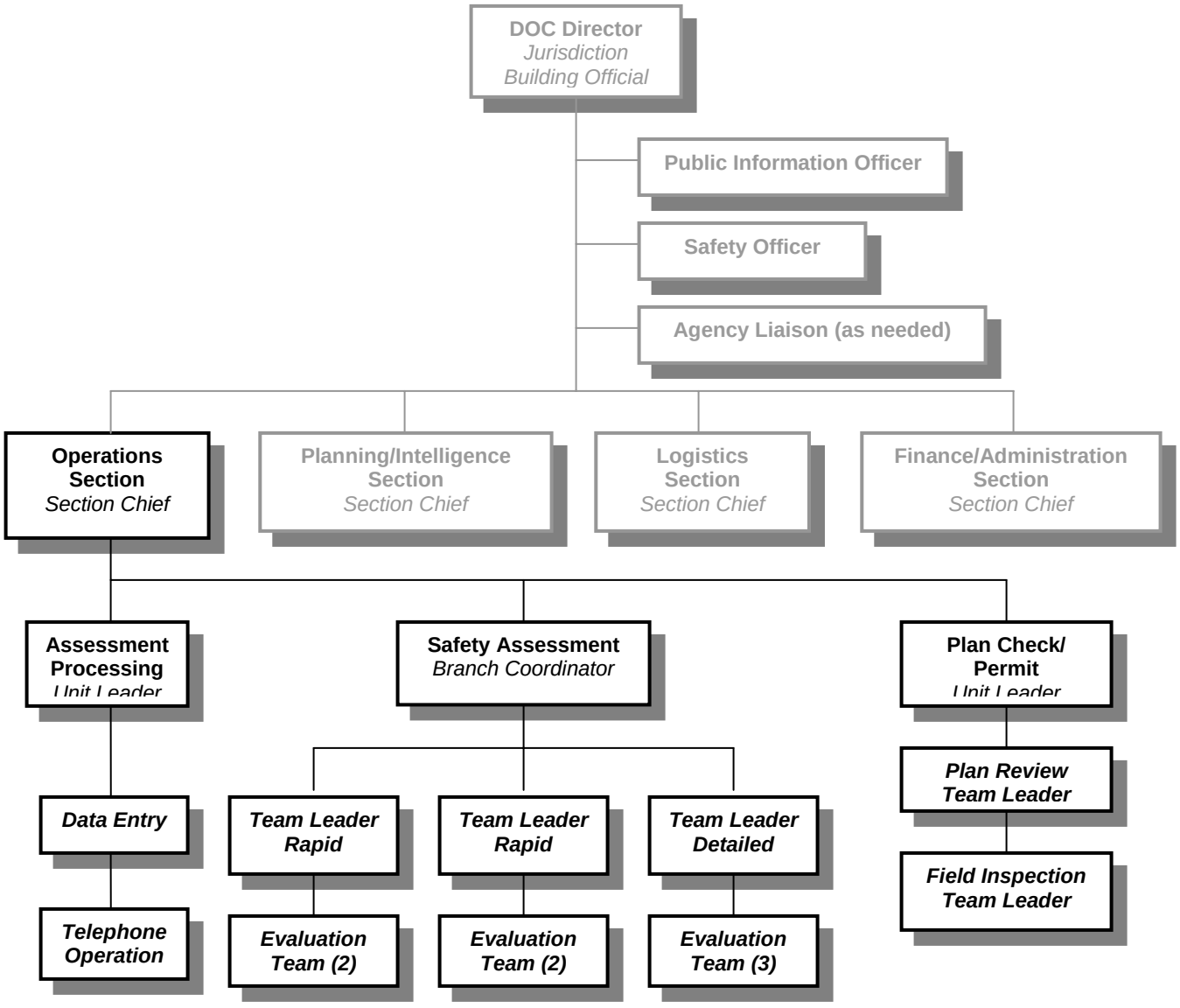
Safety Officer is responsible for monitoring and assessing hazardous and unsafe situations and developing measures for assuring personnel safety. The Safety Officer will correct unsafe acts or conditions through the regular line of authority, although the Officer may exercise emergency authority to stop or prevent unsafe acts when immediate action is required. The Officer maintains awareness of active and developing situations, approves the medical plan and includes safety messages in each incident action plan.

ADMINISTRATION

Public Information Officer is responsible for the formulation and release of information about the incident to the news media and other appropriate agencies and organizations.

Liaison Officer is the point of contact for assisting and cooperating Agency Representatives. This includes Agency Representatives from other agencies, *i.e.*, Red Cross, law enforcement, public works, engineering organizations, etc.

2. **Operations Section and Position Descriptions** (The position descriptions are general and need to be developed by the Department into specific job duties.)



ADMINISTRATION

Operations Section Chief is responsible for the management of all operations directly applicable to the primary mission. The Operations Section Chief: activates and supervises organization elements in accordance with the incident action plan; directs its execution; requests and releases resources; makes expedient changes to the incident action plan as necessary; and reports such to the DOC Director. Responsibilities include:

- Report to office or designated location as determined by the DOC Director.
- Notify all necessary staff to report to the Disaster Center.
- As directed by the DOC Director, coordinate the field inspection operations.
- As directed by the DOC Director, organize and supervise the following:
  - Supplemental emergency assistance to Police and Fire.
  - Survey/inspect essential facilities (hospitals, schools, etc.)
  - Conduct rapid assessment inspections.
  - Conduct detailed assessment inspections.
- With building inspection staff:
  - Provide for the inspection of essential facilities as soon as possible.
  - Designate areas to be inspected.
  - Prepare and log all duty rosters and assignment sheets.
- Ensure accurate record keeping (including man-hours, assignments, and equipment used.)
- Arrange with the Logistics Section Chief for transportation for field staff as necessary.
- Brief staff on nature of emergency, assignments, and safety procedures.
- Coordinate with the Logistics Section Chief for distribution of necessary equipment, placards, and field guides for inspection of buildings.
- Report to the DOC Director upon the completion of major phases of the assessment or changes in field conditions.
- Maintain communication with field staff.
- Report to the DOC Director any buildings requiring immediate shoring or demolition permits.

ADMINISTRATION

- Ensure accurate and complete record keeping by disaster inspectors.

Assessment Processing Unit Leader is responsible for implementation of the portion of the incident action plan that relates to office support activities. The office support activities for the Operations Section are in direct support of the Safety Assessment Unit. Responsibilities include:

- Report to designated command as directed by the Operations Section Chief.
- Notify all necessary staff (to the extent possible).
- As directed by the Operations Section Chief, coordinate the office response.
- Organize and supervise clerical and counter response to phones (if operable).
- Prepare office duty rosters and assignments.
- Brief office staff on emergency and assignments.
- Assist Field Unit Coordinator as needed.
- Make assignments to additional staff not delegated to emergency.
- Document all assigned tasks, staff and man-hours delegated to the emergency.
- Document and refer public's reports of damaged buildings to the Field Unit Coordinator and the Operations Section Chief.
- Distribute pertinent information to the public via the Operations Section Chief, DOC Director, EOC, and Public Information Officer.
    - Explanation of building placard postings.
    - Citizen assistance phone numbers.

Safety Assessment Unit Leader is responsible for implementation of the portion of the incident action plan that relates specifically to safety assessment operations and managing the staff. Responsibilities include:

- Report to designated command as directed by the Operations Section Chief.
- Notify all necessary staff (to the extent possible).
- As directed by the Operations Section Chief, coordinate the field response.
- Organize and supervise field teams of safety assessment inspectors.

ADMINISTRATION

- Prepare duty rosters and assignments.
- Brief field staff on emergency and assignments.
- Make assignments to additional staff not delegated to emergency.
- Document all assigned tasks, staff and man-hours delegated to the emergency.
- Receive from Assessment Processing Unit Coordinator all reports from the public of damaged buildings.
- Distribute pertinent information to the public via the Operations Section Chief, DOC Director, EOC, and Public Information Officer.

Safety Assessment Inspectors shall make field inspections as directed. Responsibilities include:

- Report as directed to the staff supervisor at an assigned location.
- Ensure personal safety before conducting inspections or providing emergency assistance.
- Provide supplemental emergency assistance to police and fire as directed by Field Unit Coordinator.
- Inspect essential facilities (hospitals, schools, police, fire, and designated shelter areas, etc.).
- Conduct rapid assessment survey as directed:
  - Drive or walk through, street-by-street, the area designated by supervisor.
  - Estimate the amount of damage (by square footage determination).
  - Forward information to Field Coordinator.
- Conduct structure-by-structure detailed assessment survey:
  - Inspect each damaged building in designated area (exterior and interior).
  - Report without delay to the Field Unit Coordinator all buildings that require immediate shoring or demolition.
  - Post signs to indicate status of inspected buildings in conspicuous locations at all identifiable entrances. Signs must also be visible from streets and driveways. Determination of building safety and usability shall be the best judgment of the situation by the inspector based on guidance contained in ATC-20.

ADMINISTRATION

- Refer all inquires concerning federal financial assistance or shelter assistance to the appropriate Disaster Assistance Center or designated citizen assistance telephone number.

- Communicate with Field Unit Coordinator as directed.

- Maintain complete and accurate records.

Specialty Teams are likely to be engineers, building inspectors, electrical inspectors, and mechanical inspectors. The members form a team of inspectors from which the Operations Section Chief and Safety Assessment Unit Coordinator can choose to inspect unique situations that develop. The Specialty Inspector's responsibility shall be the following:

- Report to assigned location as directed.

- Assist in all assigned tasks.

- Conduct all assigned inspections.

- Supervise appointed individuals.

- Maintain complete and accurate records.

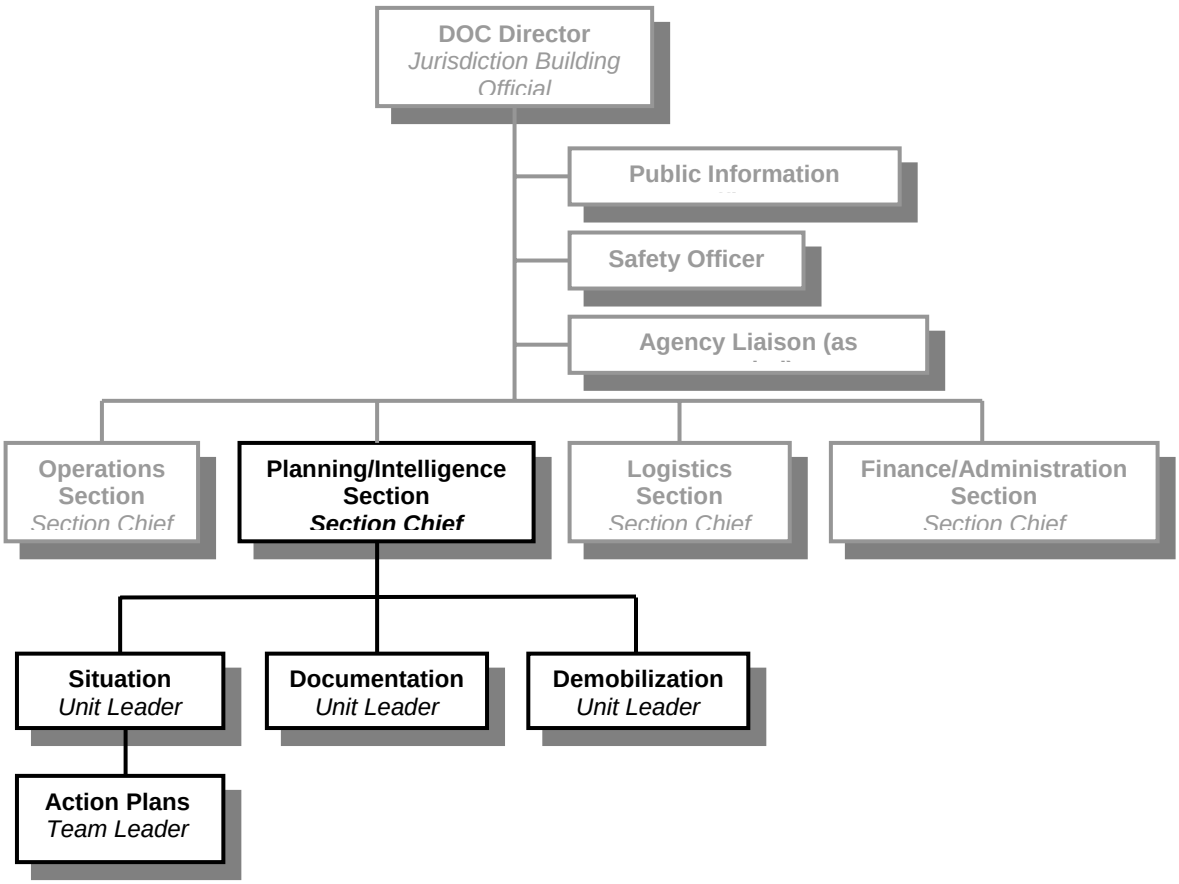
Plan Check and Permitting Unit Leader is responsible for the day-to-day workload of the Department while staff is re-directed to the Safety Assessment Operation. Duties will include management of the staff, develop change of placard procedures; develop repair criteria.

3. **Planning and Intelligence Section and Position Descriptions** (The position descriptions are general and need to be developed by the Department into specific job duties.)

Planning/Intelligence Section Chief is responsible for the collection, evaluation, dissemination and use of information about the development of the incident and status of resources. Information is needed to: 1) understand the current situation, 2) predict probable course of incident events, and 3) prepare alternative strategies and control operations for the incident.

Situation Unit Leader is responsible for the collection and organization of incident status and situation information and evaluation, analysis, and display of that information for use by all the staff. Additionally, responsible for conducting the incident action planning meetings at the end of each operational period and developing the incident action plan which shows all objectives of all sections for the next operational period.

ADMINISTRATION

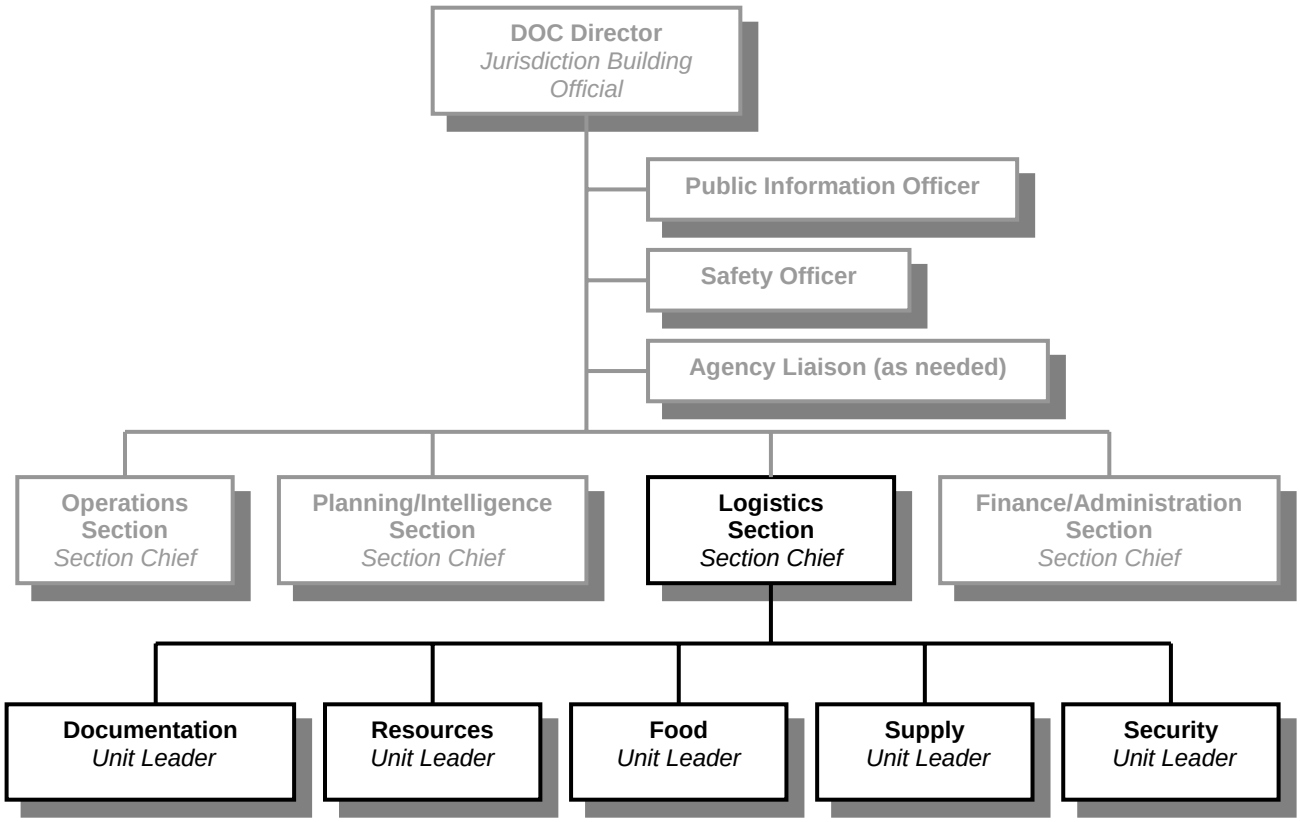


Documentation Unit Leader is responsible for: 1) maintaining accurate and complete incident files; 2) providing duplication services to incident personnel; and 3) packing and storing incident files for legal, analytical, and historical purposes.

Demobilization Unit Leader is responsible for the preparation of the demobilization plan and assisting incident sections and units in ensuring that an orderly, safe, and cost effective movement of personnel and equipment is accomplished from the incident.

ADMINISTRATION

4. **Logistics Section and Position Descriptions** (The position descriptions are general and need to be developed by the Department into specific job duties.)



Logistics Section Chief is responsible for providing facilities, services, and material in support of the incident. The Logistics Chief participates in development and implementation of the incident action plan and activates and supervises the branches and units of the Logistics Section. Responsibilities include:

- Report to office or designated location as determined by the DOC Director.
- Notify all necessary staff to report to the Disaster Center.
- As directed by the DOC Director coordinate all support functions for field and office operations.
- Coordinate the obtaining, provision, and accounting for transportation for field staff, equipment required by field staff, and supplies and equipment for office staff.
- Brief staff on nature of emergency, assignments, and safety procedures.
- Ensure accurate and complete record keeping by logistics staff.

ADMINISTRATION

Communications Unit Leader is responsible for developing plans for the effective use of incident communications equipment and facilities; installing and testing of communications equipment; supervision of the incident communications center; distribution of communications equipment to incident personnel; and the maintenance and repair of communications equipment.

Resources Unit Leader is responsible for: 1) establishing all incident check-in activities; 2) the preparation and processing of resource status change information; 3) the preparation and maintenance of displays, charts, and lists which reflect the current status and location of resources, transportation, and support vehicles; and 4) to maintain a master check-in list of resources assigned to the incident.

Food Unit Leader is responsible for determining feeding requirements at all incident facilities; menu planning; determining cooking facilities required; food preparation; serving; providing potable water; and general maintenance of the food service areas.

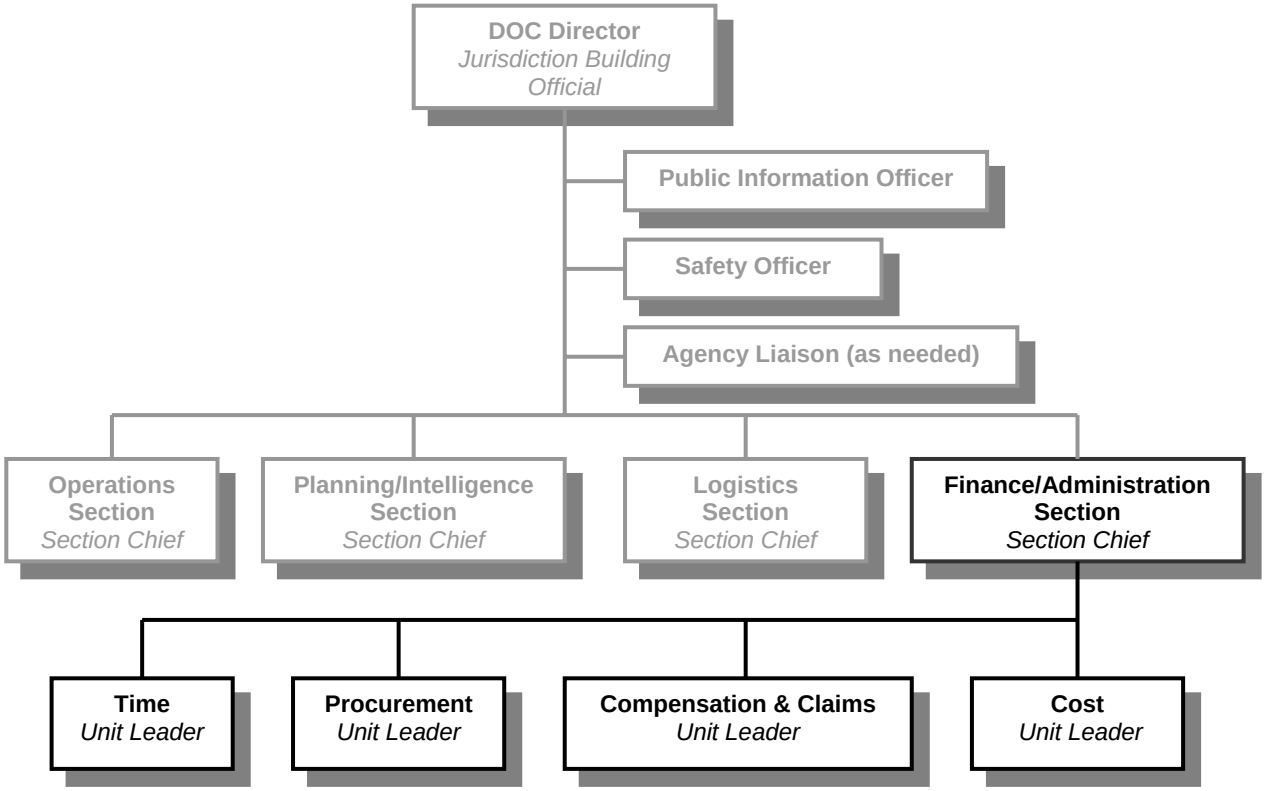
Supply Unit Leader is primarily responsible for ordering personnel, equipment, and supplies; receiving, and storing all supplies for the incident; maintaining an inventory of supplies; and servicing non-expendable supplies and equipment. Responsibilities include:

- Supervise issuance of emergency supplies and forms.
- Obtain additional supplies as needed.
- Issue I.D. cards as instructed.
- Maintain records of supplies and forms used and acquired during the disaster.
- Coordinate the transportation of supplies to field command posts.
- Arrange for the transportation of necessary staff.
- Arrange for meal distribution to staff as needed.

Security Unit Leader is responsible for the provision of safeguards needed to protect personnel and property from loss or damage.

ADMINISTRATION

5. **Finance and Administration Section and Position Descriptions** (The position descriptions are general and need to be developed by the Department into specific job duties).



Finance/Administration Section Chief is responsible for all financial and cost analysis aspects of the incident and for supervising members of the Finance and Administration Section.

Time Unit Leader is responsible for equipment and personnel time recording and for managing the commissary operation.

Procurement Unit Leader is responsible for administering all financial matters pertaining to vendor contracts.

Compensation and Claims Unit Leader is responsible for the overall management and direction of all Compensation for Injury Specialists and Claims Specialists assigned to the incident.

Cost Unit Leader is responsible for collecting all cost data, performing cost effectiveness analyses and providing cost estimates and cost saving recommendations for the incident.

Standard Operating Procedures
Phase - 1 Initial Operations

CALIFORNIA STATE BUILDING OFFICIALS
DEPARTMENT OF BUILDING AND SAFETY
STANDARD OPERATING PROCEDURES

PHASE - 1

I. PURPOSE

The purpose of this document is to provide the Staff/Workers assigned to the Building and Safety Department with a Standard Operating Procedure (SOP) for the first 48-hours of an emergency. This SOP will use the basic procedures of ATC-20 safety assessment documents with changes designed to better fulfill the needs of the jurisdiction and the Building and Safety Department.

II. NOTIFICATION

When an emergency is proclaimed by the City Council of a Jurisdiction, the following Department personnel should respond to the Building and Safety Department and assume their pre-assigned positions. (See page 15 for sample notification list.)

III. OPERATIONS

A. During the First Phase (48-hours) all responding department personnel of the Building and Safety Department will engage in what will be referred to as "WINDSHEILD SURVERY and RAPID SAFETY EVALUATION" procedures. This will involve key areas of the City that are known hazards or are vital to emergency disaster recovery operations. These areas are as follows:

1. City Hall and offices
2. Police and "911" operations
3. Fire Stations
4. Hospitals
5. Nursing homes
6. Schools
7. Community Center
8. Main Street business district
9. All other buildings

B. To assist this operation, forms should be located within disaster boxes in all department vehicles. (A suggested list of equipment within each vehicle is listed on page 16).

C. When assigned areas have been completed for phase one, all "Windshield Survey and Rapid Evaluation" forms should be turned over to the Safety Assessment Unit Leader who will deliver all reports to the Operations Section Chief.

D. Each jurisdiction should be divided into Zones, Sections, or Areas for better control of the evaluations from the "Windshield Survey and Rapid Evaluation" operations.

E. Assigned areas for "Windshield Survey and Rapid Evaluation" inspections:

Zone – 1
Zone – 2

PHASE - 1

Zone – 3
Zone – 4
Zone – 5
Zone – 6
Zone – 7

F. At this point, the First Phase plan for the emergency is completed. All personnel assigned to the Building and Safety Department will respond to the Building Department Operations Center located at:

_____ _____

and begin Phase 2 of the Emergency Operations Plan.

SAMPLE PHONE LIST
BUILDING AND SAFETY DEPARTMENT

PERSONNEL	OFFICE	HOME	CELLULAR	PAGER
DOC DIRECTOR				
OPERATIONS SECTION CHIEF				
PLANNING/INTELLIGENCE SECTION CHIEF				
LOGISTICS SECTION CHIEF				
FINANCE/ADMINISTRATION SECTION CHIEF				

PHASE - 1

DISASTER EMERGENCY VEHICLE EQUIPMENT BOX

100	Rapid Evaluation Safety Assessment Forms
50	Detailed Evaluation Safety Assessment Forms
50	Damage Summary Forms
50	Windshield Survey Summary Forms
25	Windshield Survey Tally Sheets
100	"INSPECTED" Placards (green)
50	"RESTRICTED USE (or LIMITED ENTRY)" Placards (yellow)
50	"UNSAFE" Placards (red)
1	ATC-20-1 Field Manual
1	ATC-45 Field Manual
1	City map
1	Clipboard
1	Copy of Building and Safety SOP
1	Roll yellow barrier tape
1	T-50 stapler and staples
1	Roll duct tape

Standard Operating Procedures
Phase - 2 Operations Plan

CALIFORNIA STATE BUILDING OFFICIALS
DEPARTMENT OF BUILDING AND SAFETY
STANDARD OPERATING PROCEDURES

PHASE - 2

I. **Initial Actions** - The Second Phase of the emergency procedures for a Jurisdiction will be establishing a "**Department Operations Center**" for the Building and Safety Department to complete a detailed assessment of the emergency and record all operations as to the following:

A. Buildings inspected:

1. Windshield Surveys
2. Rapid Evaluations (Safety Assessment)
3. Detailed Evaluations (Safety Assessment)
4. Engineering Reports of Damaged Buildings

B. Damage levels of emergency

C. Control of additional Safety Assessment Evaluators assigned to the Building and Safety Department for safety assessment.

D. Equipment used during operations

E. Number of outside workers that assisted in response operations

F. Registration of Safety Assessment Evaluators, if needed, and time worked

G. Summary of response operations costs to Building Department

H. Summary of activities during response operations

I. Daily activity reports

J. Daily safety assessment reports

K. List of safety assessment inspections

L. Equipment checkout - check-in reports

M. Inventory of equipment damaged and received

PHASE - 2

II. REGISTRATION – Safety Assessment Evaluators

A. All disaster workers for the Building and Safety Department will be registered as Disaster Service Workers and given a loyalty oath if they have not been previously registered. They also will be issued a "Disaster Operations" identification tag and holder and deputized as a Deputy Building Inspector. Registration, if needed, applies to all non-jurisdiction persons working in any capacity for a Building and Safety Department Emergency Response Operation.

B. Registration forms

1. Limited access to all areas involving operations to be used for all City employees or Volunteers who are assigned to response functions within the Building and Safety response operations.

2. Unlimited Access—Field Operations: shall be used for all Post-Disaster Safety Assessment Evaluators assigned to Safety Assessment inspections. These inspectors will have unlimited access to field areas assigned ONLY and should only be assigned inspection areas.

3. Unlimited Access—All Areas: shall be issued to the following Post-Disaster Safety Assessment Evaluators:

   a. Engineers
   b. Architects
   c. State Office of Emergency Services (OES)
   d. Federal Emergency Management Agency (FEMA)
   e. Building and Safety Department, City of _____
   f. Post-Disaster Safety Assessment evaluation team members

C. Registration Materials List

1. Disaster Service Worker registration and Loyalty Oath sheet

2. Identification Card with plastic holder

3. Vehicle window I.D. card

4. Equipment tag

5. Identification number control tag

PHASE - 2

D. Registration Identification Number

1. Every worker assigned to the Building and Safety Emergency Response Operation will be issued an identification number, which will be recorded on the following materials:

   a. Disaster operation identification nametag
   b. Disaster operations vehicle window tag
   c. Equipment control tag
   d. Disaster worker registration tag
   e. Disaster worker registration form if they have not been previously registered

E. The identification number will be as follows:

93 - 07 22 - 01 - 02

Year	Month	Day	Daily Team	Number of Days Working

III. DISASTER WORKER'S BRIEFING

A. During the Second Phase operations, and after Mutual Aid personnel are in place, a daily briefing for all Safety Assessment Evaluators, Operations, and support personnel will be conducted covering the following:

1. Inspections
   a. Zone Area of coverage
   b. Special Assessment areas

2. Equipment

3. Special Services
   a. Aid Groups and organizations
   b. Phone numbers
   c. locations

4. Questions - Answers
   a. Field conditions
   b. Operation conditions
   c. Media relations/referrals

B. When possible, and information is provided by Incident Command, a list of all Support Agencies and Operations will be provided as a handout publication for Post-Disaster Safety Assessment Evaluators to hand out in the field.

PHASE - 2

IV. EVALUATORS INSTRUCTION SHEET

A. "Inspection teams" of at least two (2) people will conduct inspections.

B. Inspections will only be conducted during daylight hours. (Depending on the time of year 0900 - 1630 hrs.)

C. All forms, placards, and maps will be turned in at the end of each day completed, relating to work assigned:

1. Detailed Evaluation Safety Assessment Sheets
2. Rapid Evaluation Safety Assessment Sheets
3. Structure-by-Structure Tally Sheets
4. "INSPECTED" placards
5. "RESTRICTED USE (or LIMITED ENTRY)" placards
6. "UNSAFE" placards
7. Windshield Survey Tally Sheets

V. DISASTER OPERATIONS LAYOUT AND SET-UP

A. During the Second Phase of a disaster, it is essential that a proper flow of necessary operations be established to minimize the amount of time spent on registration, equipment checkout, check-in, record keeping, and general disbursement of information. Listed below is a way this could be handled depending on the location of the Department Operations Center for the Building and Safety Department.

1. Registration (1-table, 2-personnel)

a. Registration and Loyalty Oath if individuals have not been registered previously.

b. Identification Number assignment

1) Registration sheet
2) Identification card
3) Vehicle Window Tag
4) Equipment control tag
5) Identification number control tag

2. Inspection Team Materials (2-tables, 2-personnel)

a. See Equipment List on page 22 of this manual.

PHASE - 2

b. This area will serve two (2) functions during a disaster operation

1) Check out of materials and equipment
2) Checking in of reports and equipment

B. All tables and areas for these functions should not be set up end-to-end. Registration should be one area, and inspection team materials in a separate area to allow for a more efficient operation.

SAMPLE LIST OF PUBLIC AGENCY PHONE NUMBERS

EMERGENCY TELEPHONE NUMBERS

POLICE	911
FIRE DEPARTMENT	911
PUBLIC SERVICE DEPARTMENT	
BUILDING AND SAFETY DEPARTMENT	
CITY HALL BUILDINGS	
ELECTRIC COMPANY	
GAS COMPANY	
WATER COMPANY	
TELEPHONE COMPANY	
HOUSING AUTHORITY	
LEGAL AID ASSISTANCE	
AREA FOOD BANK AND ASSISTANCE	
AMERICAN RED CROSS	
SMALL BUSINESS ADMINISTRATION	1-800-462-9029 1-800-462-7585 (TTY)
FEMA (For homeowners and renters)	1-800-621-FEMA (1-800-621-3362)

PHASE - 2

BUILDING AND SAFETY DEPARTMENT EMERGENCY RESPONSE FORMS LIST

Windshield Survey, Summary Form

Windshield Survey, Tally Sheet

Earthquake Assessment Form

Daily Log of Safety Assessment Evaluators

Structure-By-Structure Tally Sheet

Disaster Service Worker Registration And Loyalty Oath Forms

Detailed Evaluation Form (Safety Assessment)

Rapid Evaluation Form (Safety Assessment)

Equipment Checkout Form

The following is a list of equipment that should be issued to each team (2 inspectors) for the amount of time (days) they are registered to work:

1. Clipboard
2. T-50 staple gun
3. T-50 staples (1-box)
4. Duct tape (1-roll)
5. 100 - Rapid Evaluation Forms (Safety Assessment)
6. 50 - Detailed Evaluation Forms (Safety Assessment)
7. 100 - INSPECTED placards (green)
8. 50 - RESTRICTED USE (or LIMITED ENTRY) placards (yellow)
9. 50 - UNSAFE placards (red)
10. 1 - set Assigned area maps
11. 10 - Earthquake assessment tally sheets
12. City map
13. 1 - set red, yellow, green, black markers
14. 2 - #2 pencils
15. 2 - black ball point pens
16. 1 - roll barrier tape (yellow w/ black letters)
17. Hard hats for team (if needed)

PHASE - 2

EQUIPMENT CHECKOUT FORM

The equipment listed on this form is the property of the Jurisdiction Building and Safety Department Disaster Operations. This equipment is for use during disaster operations by authorized personnel only, and no equipment will be issued without a signature of the recipient receiving listed equipment. The person signing for equipment issued will be responsible for the care and use of this equipment and if damaged (other than normal use) or not returned, replacement costs will be charged and collected.

1. INSPECTION FORMS
   a. Rapid Assessment forms……._____
   b. Detailed Assessment forms……._____
   c. Windshield Survey forms…… _____
   d. Structure-by-Structure forms…… _____
   e. Area maps…… _____
   f. Earthquake assessment tally sheets……._____
2. PLACARDS
   a. Green……._____
   b. Yellow…….. _____
   c. Red…….. _____
3. CLIPBOARD……._____
4. FLASH LIGHT…… _____
5. FLASH LIGHT BATTERIES…… _____
6. BARRIER TAPE W/BLACK MARKING…… _____
7. STAPLE GUN (T-50)…… _____
8. STAPLES (T-50)…… _____
9. DUCT TAPE…….. _____
10. MASKING TAPE…….. _____
11. CITY MAP…… _____
12. MARKERS (RED, YELLOW, GREEN, BLACK)…… _____

ISSUED TO DIASTER WORKER EVALUATORS

The undersigned has received items checked or quantities listed, and will return equipment and materials at the end of my working assignment.

_____ _____

Logistics Evaluator

(This page intentionally left blank.)

Standard Operating Procedures
Safety Assessment

SAFETY ASSESSMENT

I. PURPOSE

The purpose of this document is to provide the Jurisdiction and the Building and Safety Department a response plan to be used in establishing procedures for safety assessment, reporting, inspections, and issuance of permits during a disaster. The objectives of this plan are to:

A. Ensure that safety assessment information can be compiled, assembled, and reported in an acceptable manner to local, state and federal agencies.

B. Establish procedures for the inspection of all structures within the disaster stricken area and the posting of all structures that have been inspected.

C. Provide a reporting procedure for financial losses of public and private facilities and property. To provide the Jurisdiction a disaster economic impact report.

D. Provide the Jurisdiction a basic organization and procedures plan to accomplish the above with the least possible delay. When Department staffing is inadequate, additional personnel will be acquired from other City Departments or requested from outside jurisdictions through mutual aid, or from county, state, and federal agencies.

II. NOTIFICATION

A. Whenever a disaster occurs, it is vitally important that the Jurisdiction Building and Safety Department be capable of contacting all employees. Therefore, all employees shall make every effort to contact their supervisor or be available for contact.

B. The public telephone system will be used for notification of personnel whenever possible. Department personnel will keep the enclosed list of personnel and numbers. Upon notification by the OES, the Building and Safety Department Disaster Coordinator will notify all necessary staff for field and administrative operations.

C. If the disaster hinders the ability to use telephone service, the staff will respond in accordance with the enclosed call and response list to a designated location. Assignments may also be made through emergency radio broadcasts, C.B. radio, cellular phone, handi-talkies, etc.

SAFETY ASSESSMENT

D. Notification And Mobilization

1. Table 1 - SUGGESTED NOTIFICATION PROCEDURE

DURING WORKING HOURS

	Phones in Service	Phones NOT in service
Bldg. Dept. DOC Director	Telephone OESC	Report to DOC
Section Chiefs, Office & Field Unit Coordinators	a. Telephone BDC b. Telephone OESC	a. Report to office b. Report to designated location c. Report to Police or Fire Dept.
Staff in office	Check with Supervisor	Check with Supervisor
Staff in field	Check with Supervisor	a. Radio Communication b. Drive to office c. Contact Police/Fire d. Report t designated location

2. Table 2 - SUGGESTED NOTIFICATION PROCEDURE

DURING NON-WORKING HOURS

	Phones in Service	Phones NOT in service
Bldg. Dept. DOC Director	Telephone OESC	Report to DOC
Section Chiefs, Office & Field Unit Coordinators	a. Telephone BDC b. Telephone OESC	a. Report to office b. Report to designated location c. Contact Police or Fire Dept.
All other staff	a. Phone office b. Wait by phone c. Contact _____	a. Report to office b. Report to designated location c. Listen to local radio

SAFETY ASSESSMENT

3. Table 3 - NOTIFICATION PROCEDURE

DURING WORKING HOURS

Personnel	Office Phone	Pager	Cellular
BUILDING DEPARTMENT DOC DIRECTOR			
OPERATIONS SECTION CHIEF			
OFFICE UNIT COORDINATOR			
FIELD UNIT COORDINATOR			
LOGISTICS SECTION CHIEF			
PLANS/INTELLIGENCE SECTION CHIEF			
FINANCE/ADMINISTRATION SECTION CHIEF			
DEPARTMENT PERSONNEL			

III. RESOURCE REQUEST CHECKLIST

A. Prior to requesting additional resources, the following conditions must be satisfied:

1. A local emergency must be proclaimed. Contact the jurisdiction's emergency services coordinator for procedures.

2. All local resources must be committed.

B. Checklist for requesting and implementing resource requests:

1. Activate system through the Jurisdiction EOC, Operations Section, Construction & Engineering Branch.

a. Advise EOC how many safety assessment evaluators are needed, supplies they should bring, where they are needed and approximately for how long.

b. Logistics Section will then contact the Operational Area.

SAFETY ASSESSMENT

c. The Operational Area will locate resources from other building departments, state, and federal agencies through the Governor's Office of Emergency Services Regional Emergency Operations Center (REOC).

d. Operational Area will then contact the requesting jurisdiction (through their respective EOC, Logistics Section) and inform them of the resources obtained and conditions thereof.

e. EOC, Construction & Engineering Branch will contact the Building Department Safety Assessment Unit Coordinator and inform him/her of the resources obtained and when and where they will report.

2. Inform field supervisors when and where safety assessment evaluators will arrive and what supplies they will need.

3. Verify that safety assessment evaluators are registered as disaster service workers. If not:

   a. Complete registration forms.

   b. Issue identification cards.

   c. Maintain log of registered "mutual aid" evaluators.

4. Coordination with Logistics Section for facilities for safety assessment evaluators as needed.

   a. Sleeping and eating;

   b. Transportation; and

   c. Equipment.

5. Inform field supervisors of accommodations.

IV. EMERGENCY RESPONSE LEVELS

Emergency assistance may be activated at three different levels based on the severity and scope of the incident. The levels are:

LEVEL I

Description	1.	A minor incident
	2.	Few structures are damaged in scattered areas.
	3.	Local resources are adequate.
	4.	A local emergency may or may not be proclaimed.

==========

SAFETY ASSESSMENT

Examples	1.	Localized storm water or high tide damage.
	2.	Localized wind damage.
	3.	Localized damage due to minor earthquake.

==========

Response	1.	No immediate disturbance of day-to-day workload.
	2.	Inspectors drive through disaster area enroute to scheduled inspection, then call in to report damage or request any specialty inspections.
	3.	Damaged buildings reported by public will be inspected by an appointed assessment team.

==========

LEVEL II

Description	1.	A moderate disaster.
	2.	Damage is not inflicted in a densely populated area.
	3.	Damage is concentrated in one central area.
	4.	Many structures are damaged.
	5.	A local emergency shall be proclaimed.
	6.	A State of Emergency may be proclaimed.

==========

Examples	1.	Heavy fire damage in widespread, populated rural area.
	2.	Explosion and fire in urban area.
	3.	Airplane crash in urban area.

==========

Response	1.	Determine affected area.
	2.	Although not all staff may be allocated to the emergency, service levels will be diminished.
	3.	Some mutual aid may be requested.
	4.	Windshield survey may be conducted in affected areas.

==========

LEVEL III

Description	1.	A major disaster.
	2.	Damage is widespread throughout densely populated areas.
	3.	Extensive state or federal assistance is required.
	4.	Local emergency has been proclaimed.
	5.	State of Emergency has been proclaimed.
	6.	Presidential declaration of an emergency or major disaster will be requested.

SAFETY ASSESSMENT

Example	1.	Large scale earthquake with widespread damage.
	2.	Heavy flooding throughout several urban areas.

==========

Response	1.	Determine affected areas.
	2.	Total shutdown of routine service.
	3.	Mutual aid will be requested.
	4.	May aid in emergency search and rescue if requested by police and/or fire.
	5.	Windshield survey will be conducted.
	6.	Structure-by-structure survey will be conducted.

V. PRE-EMERGENCY RESPONSIBILITIES FOR LOCAL JURISDICTION

A. Maintain a list of all personnel available for damage assessment with current addresses and home numbers.

B. Maintain a list of jurisdiction vehicles available for damage assessment, and keep spare set of keys in the department's office to be utilized if the person assigned to a particular vehicle cannot respond.

C. Establish procedures for notification of staff during on- and off-duty hours.

D. Provide at least one direct telephone line with an unlisted number to allow incoming and outgoing calls if the department's system is overloaded with calls during an emergency.

E. Notify telephone company of lines that should receive priority service during an emergency (*e.g.,* department lines, key personnel, etc.)

F. Formally adopt placards. Pre-print placards in secondary languages (such as Spanish) as required.

G. Obtain safety assessment forms for immediate (basic) and detailed structure-by-structure surveys.

H. Obtain other required record-keeping forms.

I. Prepare a list of essential buildings and their addresses.

J. Obtain radios to establish an alternate means of communication in case the telephone system goes down. Mobilization of a response unit of amateur HAM radio operators may be used to supplement the Jurisdiction's communications system.

K. Obtain wall maps of Jurisdiction showing streets, lots, and census tract information. Plastic overlays are also recommended.

L. Prepare an inter-jurisdictional map of key staging areas.

M. Maintain a sufficient amount of office supplies and equipment on hand to manage operations during an emergency, including supplies for mutual aid evaluators.

N. Pre-arrange transportation and sleeping facilities for disaster and mutual aid evaluators.

O. Train staff on implementation of the Emergency Building Inspections Plan and train evaluators on the contents of ATC-20.

P. Periodically (at least annually) conduct simulation tests of the Emergency Building Inspections Plan.

Q. Establish procedures for issuing permits for reconstruction after the emergency.

R. Keep plan updated.

SAFETY ASSESSMENT

OPERATIONS INVENTORY - Based on Jurisdiction of 25,000 Population

FORMS-CARDS-SIGNS

500 Windshield Survey Summary Sheets
300 Windshield Survey Tally sheets
300 Earthquake Assessment forms
500 Daily Log of Disaster Inspectors
500 Structure-by-Structure Tally sheets
1100 Disaster Service Worker Registration and Loyalty Forms
300 White sheets
500 Yellow sheets
300 Red sheets
1000 Detailed Evaluation Safety Assessment forms
4000 Rapid Evaluation Safety Assessment forms
200 Equipment Checkout forms
100 Inspection Team Assignment forms

Building Placards

5000 Green "INSPECTED"
3000 Yellow "RESTRICTED USE (OR LIMITED ENTRY)"
2000 Red "UNSAFE"

4 "Registration" signs
2 "Check-out" signs
2 "Check-in" signs
4 "Origination" signs

TOOLS

14 #T-50 Staple Guns
14 boxes T-50 Staples
9 Claw Hammers
8 8" Wire Cutters
6 10" Crescent Wrenches
6 12" Channel Lock Pliers
6 12" Pipe Wrenches
6 25' Steel Tapes
6 100' Steel Tapes
6 Torpedo Levels
6 Vise Grips
6 4-1 Screw Drivers
12 Flash lights (D cell)
6 Plastic toolboxes
4 Plastic Storage Boxes (large)
2 Plastic Storage Boxes (medium)
4 Plastic File Boxes (small)

SAFETY ASSESSMENT

EQUIPMENT

5	First-aid Boxes
2	Electric calculators w/tape and 110-v adapter
4	Binoculars w/case
6	Electric Testers
24	Hard hats (white)
25	Clip boards
12	Rolls of Silver Duct Tape
12	Rolls of 1" Masking Tape

SUPPLIES

250 ea.	Plastic I.D. Tag Holders w/clip
6 ea.	Desk Staples
25 boxes	Thumb tacks
36 ea.	Red Felt Markers
36 ea.	Yellow Felt Markers
36 ea.	Green Felt Markers
36 ea.	Black Felt Markers
24 dz.	#2 Pencils
12 dz.	Black Pens
6 boxes	Paper clips
6 boxes	Staples
25 ea.	#25973 Pressboard Binders
4 ea.	Polaroid Cameras
8 ea.	Polaroid Film
48 ea.	Legal size Yellow Pads
4 ea.	Storage cabinets (30x72)
4 ea.	Cellular Phones w/ Belt Case, 12-v Car adapter, Extra Battery

Safety Assessment Reference Forms

OES CALIFORNIA
Governor's Office of Emergency Services

SAFETY ASSESSMENT PROGRAM EVALUATOR REGISTRATION FORM

(Please Print)

PHOTOGRAPH IDENTIFICATION NUMBER_____

TRAINING DATE	TYPE OF REGISTRATION (*CHOOSE ONE DSW ONLY*)	SPECIALTY
	DSW – State ☐ Caltrans ☐ DOC ☐ DGS ☐ DWR ☐ HCD ☐ OSHPD ☐ State Parks ☐ UC/CSU ☐ Other Agency_____	☐ Building Inspector ☐ Architect ☐ Civil Engineer ☐ Geologist ☐ Geotechnical Engineer ☐ Structural Engineer ☐ Engineering Geologist ☐ General Contractor ☐ Other _____
PREVIOUS DSW SAP REGISTRATION? Yes ☐ No ☐	**DSW – Local** ☐ CALBO (Local Government only) Jurisdiction _____	
	DSW – Volunteer ☐ SEA ☐ ASCE ☐ AIA ☐ ACIA ☐ CELSOC ☐ Other _____	

PROFESSIONAL LICENSE/CERTIFICATE	LICENSE/CERTIFICATE EXPIRATION DATE	SAP
# ☐ None		☐ Evaluator Trainer

NAME (AS YOU WANT IT TO APPEAR ON THE CARD. "MI" WILL NOT BE ON THE CARD.)

Mr. Ms. Last First MI

MAILING ADDRESS				
Number Street	City	County	State	Zip

TELEPHONE NUMBERS		
Residence	Business	Other (Pager, Cell, etc.)

EMAIL ADDRESS

GOVERNMENT CODE §3108-§3109:

Every person who, while taking and subscribing to the oath or affirmation required by this chapter, states as true any material matter which he knows to be false, is guilty of perjury, and is punishable by imprisonment in the state prison not less than one nor more than 14 years. Every person having taken and subscribed to the oath or affirmation required by this chapter, who while in the employ of, or service with, the state or any county, city, city and county, state agency, public district, or disaster council or emergency organization advocates or becomes a member of any party or organization, political or otherwise, that advocates the overthrow of the government of the United States by force or violence or other unlawful means, is guilty of a felony and is punishable by imprisonment in the state prison.

LOYALTY OATH OR AFFIRMATION (GOVERNMENT CODE §3102)

I, _____, do solemnly swear (or affirm) that I will support and defend the Constitution of
PRINT LEGAL NAME
the United States and the Constitution of the State of California against all enemies, foreign and domestic; that I will bear true faith and allegiance to the Constitution of the United States and the Constitution of the State of California; that I take this obligation freely, without any mental reservation or purpose of evasion; that I will well and faithfully discharge the duties upon which I am about to enter. I certify under penalty of perjury that the foregoing is true and correct.

DATE _____ SIGNATURE _____ AUTHORIZED STATE OES EMPLOYEE _____

TO BE COMPLETED BY THE INSTRUCTOR

THIS INDIVIDUAL PARTICIPATED IN THE SAFETY ASSESSMENT PROGRAM EVALUATOR TRAINING, UTILIZING STATE-CERTIFIED TRAINING MATERIALS AND PRESENTATIONS, AND MEETS CURRENT PROGRAM STANDARDS ESTABLISHED BY THE GOVERNOR'S OFFICE OF EMERGENCY SERVICES.

INSTRUCTOR'S SIGNATURE _____

FOR OES USE ONLY

DATE RECEIVED	_____	DATE LETTER SENT	_____
LICENSE/CERTIFICATE VERIFIED	☐ _____	DATABASE UPDATED	☐ _____
CERTIFICATE ISSUED	☐ _____	DATE COMPLETED	_____
CARD NUMBER SAP	_____		
CARD EXPIRATION	_____	CERTIFIED TRAINER:	EVALUATOR ☐ COORDINATOR ☐

OES 220 (8/04)

SAMPLE NEWS RELEASE

FOR IMMEDIATE RELEASE

The (Jurisdiction) advises all contractors wishing to engage in repairs or reconstruction work necessitated by our recent disaster to obtain permits and copies of disaster damage inspection forms before proceeding with any work. In addition, all contractors must be State Licensed and have a local business license before permits may be issued.

All citizens and residents of (jurisdiction), please be informed that the purpose of these requirements is to screen out possible opportunists from taking advantage of the current situation. Furthermore, residents are cautioned and warned not to sign blank contracts, agree to have work performed without first seeing the contractor's current State and local licenses, nor allow work or alterations not authorized by the (jurisdiction) Building Department.

_____
Signature

_____
Title

_____
Phone Number

_____
Date

Coordinator _____

SAP Evaluator Tracking Form

Jurisdiction:

Address:

Contact Name: **Phone #:**

Fax #: **E-mail:**

Name	Specialty	Professional Organization	SAP ID#	Date	Time Signed in	Time Signed out

WINDSHIELD SURVEY

Tally Sheet

Area covered by this Tally sheet:

_____

Include street/highway boundary)

_____

Date: _____ Assessed by: _____

STRUCTURE CATEGORIES	DESTROYED	MAJOR DAMAGE	MINOR DAMAGE
1) Low-Cost Homes below $100,000 (approx. value)			
2) Medium-Cost Homes between $100,000 - $200,000 (approx. value)			
3) High-Cost Homes above $200,000 (approx. value)			
4) Mobile Homes			
5) Rental Units (Apartments)			
6) Farm Homes			
7) Businesses			

All Residential Units
Minor Damage - 10% or less damaged
Major Damage - 10% - 80% damaged
Destroyed - 80% or more damaged

EARTHQUAKE ASSESSMENT

No. Street	Amount	Habitable	
		Yes	No

SUMMARY OF DAILY ACTIVITY REPORTS

Applicant _____ Category _____
Facility (Major)
_____

Report Date	Site or Location Number	Labor $	Equipment $	Material $	Total $

SAFETY ASSESSMENT EVALUATORS
TEAM ASSIGNMENTS

Team Number	Name of Evaluator	SAP Identification Number

ATC-20 Rapid Evaluation Safety Assessment Form

Inspection

Inspector ID:_____ Inspection date and time _____ ☐ AM ☐ PM
Affiliation:_____ Areas inspected: ☐ Ext. only ☐ Exterior and interior

Building Description

Building Name: _____
Address: _____
_____
Building contact/phone: _____
Number of stories above ground:___ below ground:___
Approx. "Footprint area" (square feet) _____
Number of residential units: _____
Number of residential units not habitable:_____

Type of Construction

☐ Wood frame ☐ Concrete shear wall
☐ Steel frame ☐ Unreinforced masonry
☐ Tilt-up concrete ☐ Reinforced masonry

Primary Occupancy

☐ Dwelling ☐ Commercial ☐ Govt.
☐ Other residential ☐ Offices ☐ Historic
☐ Public assembly ☐ Industrial ☐ School
☐ Emergency Services ☐ Other:_____

Evaluation

Investigate the building for the conditions below and check the appropriate column.

Observed Conditions:	Minor/None	Moderate	Severe
Collapse, partial collapse, or building off foundation	☐	☐	☐
Building or story leaning	☐	☐	☐
Racking damage to walls, other structural damage	☐	☐	☐
Chimney, parapet, or other falling hazard	☐	☐	☐
Ground slope movement or cracking	☐	☐	☐
Other (specify) _____	☐	☐	☐

Estimated Building Damage (excluding contents)

☐ None
☐ 0 - 1%
☐ 1 - 10%
☐ 10 - 30%
☐ 30 - 60%
☐ 60 - 100%
☐ 100%

Comments: _____
_____

Posting

Choose a posting based on the evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an UNSAFE posting. Localized *Severe* and overall *Moderate* conditions may allow a RESTRICTED USE posting. Post INSPECTED placard at main entrance. Post RESTRICTED USE and UNSAFE placards at all entrances.

☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)

Record any use and entry restrictions exactly as written on placard _____
_____
_____

Further Actions: Check the boxes below only if further actions are needed.

☐ Barricades needed in the following areas: _____
_____

- Detailed evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other:
  _____
- Other recommendations:
  _____

Comments: _____
_____
_____
_____

(This page intentionally left blank.)

ATC-20 Detailed Evaluation Safety Assessment Form

Inspection
Inspector ID: _____
Affiliation: _____
Inspection date and time: _____ ☐ AM ☐ PM

Final Posting from page 2
☐ Inspected
☐ Restricted Use
☐ Unsafe

Building Description
Building Name: _____
Address: _____
_____
Building contact / phone: _____
Number of stores above ground _____ below ground _____
Approx. "Footprint area" (square feet)_____
Number of residential units: _____
Number of residential units not habitable: _____

Type of Construction
☐ Wood frame ☐ Concrete shear wall
☐ Steel frame ☐ Unreinforced masonry
☐ Tilt-up concrete ☐ Reinforced masonry
☐ Concrete frame ☐ Other: _____

Primary Occupancy
☐ Dwelling ☐ Commercial ☐ Govt.
☐ Other residential ☐ Offices ☐ Historic
☐ Public Assembly ☐ Industrial ☐ School
☐ Emergency Services ☐ Other: _____

Evaluation

Investigate the building for the conditions below and check the appropriate column. There is room on the second page for a sketch.

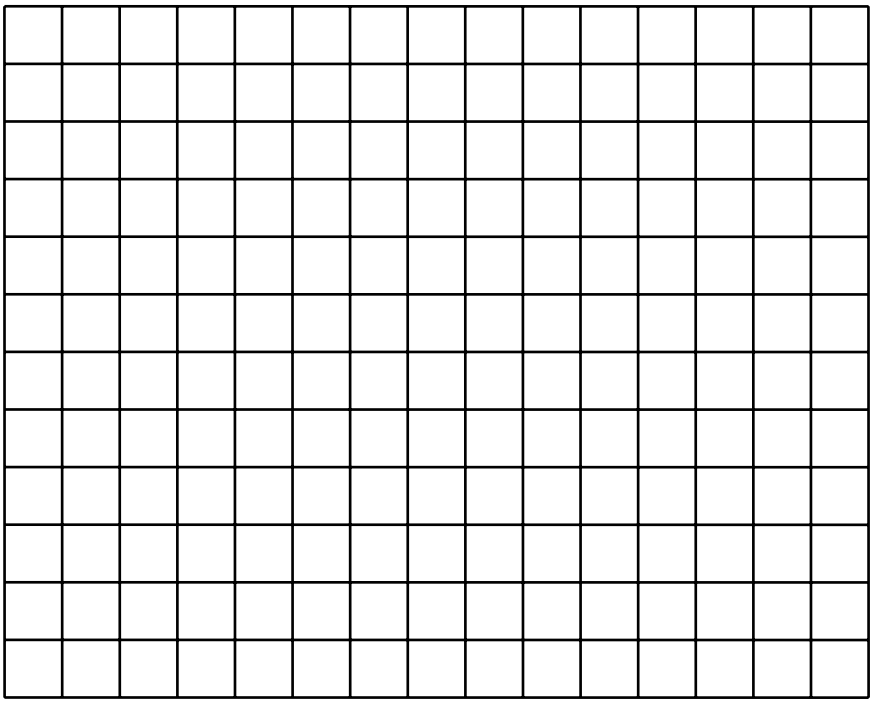
	Minor/None	Moderate	Severe	Comments
Overall hazards:				
Collapse or partial collapse	☐	☐	☐	_____
Building or story leaning	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Structural hazards:				
Foundations	☐	☐	☐	_____
Roofs, floors, (vertical loads)	☐	☐	☐	_____
Columns, pilasters, corbels	☐	☐	☐	_____
Diaphragms, horizontal bracing	☐	☐	☐	_____
Walls, vertical bracing	☐	☐	☐	_____
Precast connections	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Nonstructural hazards:				
Parapets, ornamentation	☐	☐	☐	_____
Cladding, glazing	☐	☐	☐	_____
Ceilings, light fixtures	☐	☐	☐	_____
Interior walls, partitions	☐	☐	☐	_____
Elevators	☐	☐	☐	_____
Stairs, exits	☐	☐	☐	_____
Electric, gas	☐	☐	☐	_____
Other _____	☐	☐	☐	_____
Geotechnical hazards:				
Slope failure, debris	☐	☐	☐	_____
Ground movement, fissures	☐	☐	☐	_____
Other _____	☐	☐	☐	_____

General Comments: _____
_____

ATC-20 Detailed Evaluation Safety Assessment Form Page 2

Building name: _____ Inspector ID: _____

Sketch (optional)
Provide a sketch of the building or damage portions. Indicate damage points.



Estimated Building Damage
If requested by the jurisdiction, estimate building damage (repair cost ÷ replacement cost, excluding contents)

- ☐ None
- ☐ 0 - 1%
- ☐ 1 - 10%
- ☐ 10 - 30%
- ☐ 30 - 60%
- ☐ 60 - 100%
- ☐ 100%

Posting
If there is an existing posting from a previous evaluation, check the appropriate box. Previous posting:
☐ INSPECTED ☐ RESTRICTED USE ☐ UNSAFE Inspector ID: _____ Date: _____
If necessary, revise the posting based on the new evaluation and team judgment. *Severe* conditions endangering the overall building are grounds for an Unsafe posting. Local *Severe* and overall *Moderate* conditions may allow a Restricted Use posting. Indicate the current posting below and at the top of page one.
☐ INSPECTED (Green placard) ☐ RESTRICTED USE (Yellow placard) ☐ UNSAFE (Red placard)
Record any use and entry restrictions exactly as written on placard: _____
_____
_____

Further Actions Check the boxes below only if further actions are needed.

- Barricades needed in the following areas:
  _____
  _____
- Engineering Evaluation recommended: ☐ Structural ☐ Geotechnical ☐ Other:
  _____

☐ Other recommendations: _____
_____
_____

Comments: _____
_____
_____
_____

APPENDIX C - SLIDE HANDOUTS