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Introduction to Emergency Management

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An Introduction to Emergency Management

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1.0 INTRODUCTION

Emergency Management is an important concept to an engineer, yet most engineers do not realize it. It has become more organized over the years as industry has grown. Back when the New London explosion happened in 1937, it was handled in a manner that would make an emergency manager cringe in 2021.

When we think of the concept emergency management, we often think that it is a government function. Far from it, it often combines government at various levels, volunteering agencies, as well as private industry. Many chemical plants have their own emergency managers as well as response personnel. FEMA has developed a system, known as the Incident Command System, where everyone responding can speak the same language in preparing for or responding to a disaster.

FEMA has designed courses for the emergency manager, engineer, insurance agent, or emergency responder. There are a wide range of subjects because there are a wide range of issues to deal with in a disaster. There are also courses that firefighters and law enforcement officers are expected, and many times, required to take.

One thing to keep in mind is that there are generally no set qualifications for an emergency manager. Often the emergency manager is someone involved in an emergency support function on a daily basis. These functions will be discussed later on, but they are often public works and engineering or law enforcement.

In the State of Texas, county judges and mayors serve as the emergency management directors. This means that they have the responsibility to maintain an emergency management program within their respective jurisdictions. This is specified in Chapter 418 of the Texas Government Code.

As engineers, we are experienced in risk management, the use of codes and standards, and the reduction of risks. This makes the engineer well suited for positions in emergency management, whether at the plant level or at the governmental level. We may not think about it, but we are involved in risk management when we are designing for a classified location, Safety Instrumented Systems, or designing according to a code such as ASME.

Emergency Management will be defined, and then a presentation of some of the history of emergency management in response to disasters. Some major disasters will also be shown in a table. Of course, your perspective of a disaster depends on where you are and when it happened.

2.0 BACKGROUND

2.1 Emergency Management

We need to define Emergency Management. Emergency Management is a discipline that deals with risk and risk avoidance, or at least minimizing risk. It is not just about responding after a

disaster, but also things that can be done beforehand to minimize the effects of a hazard or disaster. For example, the engineer that designs for coastal protection is involved in mitigation, which is a phase of Emergency Management. The engineer may also be involved in the response phase of an emergency, such as determining if a building is structurally sound or safe for rescue personnel to enter. Safety Instrumented Systems are about minimizing risk.

2.2 History

Disasters and how to deal with them has been an issue almost as long as man has been around. Hieroglyphics depict the cavemen trying to deal with and understand disasters. The Bible discusses many disasters throughout early human history. Modern history has brought about organized efforts to deal with disasters.

The first example of the Federal government in the United States becoming involved in a local disaster was in 1803. A congressional act was passed to provide assistance to Portsmouth, New Hampshire, a city that had been devastated by fire in 1802. Large areas of the city's seaport were damaged in the fire, threatening commerce in the new nation. Congress provided relief to the Portsmouth merchants by suspending bond payments for several months.

The Chicago Fire of 1871 and the Johnstown, Pennsylvania Flood of 1889 revealed a further need for more federal involvement in the response to major disasters. The Federal Government played a role in the development of flood control systems after the Great Mississippi Flood of 1927. The Federal Government did not have a significant role in response operations during this time. However, it supported the Red Cross in its capacity or organize relief efforts in affected communities.

Greater use of the government to stimulate the economy occurred during the Roosevelt Administration in the 1930's. The Reconstruction Finance Corporation and the Bureau of Public Roads were given authority to make disaster loans for the repair and reconstruction of certain public facilities after a disaster. Part of these efforts were a response to the Great Depression that had gripped the country. The Tennessee Valley Authority 'TVA' was created in 1933 to produce hydroelectric power (primary purpose) for portions of several states, as well as to reduce flooding (secondary purpose).

The Flood Control Act of 1936 gave new authority to the US Army Corps of Engineers to design and build flood control projects. Some sources call this act the Flood Control Act of 1934, but this is incorrect. In fact, the Army Corps of Engineers eventually became the lead flood control agency. Today in Harris County, Texas, they control two reservoirs for flood control. They also maintain the Intracoastal Waterway near Galveston.

America's entry into World War II was not a total surprise. The Office of Civilian Defense 'OCD' was established by Executive Order 8757. President Roosevelt signed it on May 20, 1941. It had two branches, one for protective functions (i.e. blackouts and special fire protection) and the other for war service functions (i.e. child care, health, housing, and transportation). The Civil Air Patrol (CAP) was created on December 1, 1941 through the Office of Civilian Defense

Administrative Order 9 (published December 8, 1941). The OCD was eliminated on June 4, 1945 by Executive Order 9562. The Civil Air Patrol eventually became the official auxiliary of the United States Air Force. Texas and several other states created State Guards under the governor to respond to emergencies, since the National Guard was federalized and sent to fight in World War II. After World War II, little attention was paid to civil defense until the Soviet Union detonated their first nuclear weapon.

After World War II, the United States was in the Cold War with Russia. Emergency management during that time revolved around the prospect of a nuclear attack and radioactive fallout. The 1950's saw many civil defense programs and people built bomb shelters to protect their families from nuclear fallout. These types of civil defense programs existed into the 1970's and into the early 1980's. I myself remember having to get under the desk to duck and cover during disaster drills in elementary school. I was trained in radiological monitoring while I was in high school.

On December 1, 1950, President Truman signed Executive Order 10186, creating the Federal Civil Defense Administration 'FCDA'. It became an official government agency on January 12, 1951. It was established to coordinate state and federal efforts for the protection of civilians in case of war.

There was a civil defense director in almost every community and a most states had a representative from civil defense as part of the state government. Many of the civil defense representatives were retired military personnel that received little financial or political support from either the state or local governments. Often the civil defense responsibilities were in addition to other duties. That in some cases, has not changed. During this time period, emergency management was thought of as an extension of the civil defense movement.

In 1952, President Truman issued Executive Order 10427. This order emphasized that Federal disaster assistance was intended to supplement the resources of State, local, tribal, and private-sector organizations. This was based on the premise still held today that disasters are best managed at the lowest governmental level possible. Federal assistance is intended to support and not to direct these efforts.

In the period between 1803 and 1950, Congress passed 128 laws relating to disaster relief. There was a system that required Congress to pass a law after each disaster to provide Federal support to the relief effort.

The 1950's were a generally quiet decade when it came to large-scale natural disasters. There were a few notable hurricanes, such as Hurricane Hazel (1954), Hurricane Diane (1955), and Hurricane Audrey (1957). Most legislation that was passed dealt only with the specific disaster and did not figure in the bigger picture.

The end of the 1950s and the beginning of the 1960s brought change. The change started with a several natural disasters occurring in a short period of time. The Hebgen Lake earthquake, also known as the 1959 Yellowstone earthquake, occurred on August 19, 1959. It measured 7.2 on the Richter scale. Hurricane Donna hits Florida in September 1960. On September 11, 1961, Hurricane Carla strikes Texas. These occurred during and just after the 1960 election. The

incoming administration made a change to the federal approach to disasters. The Office of Emergency Preparedness was created as a result of the three 1959-1961 disasters. Then Office of Emergency Preparedness was created to respond to natural disasters leaving Civil Defense within the Department of Defense.

Changes in Emergency Management came in the 1960s with several natural disasters. These included Hurricane Donna, Hurricane Carla, and the Ash Wednesday Storm.

The Disaster Relief Act of 1974 was signed by President Nixon on May 22, 1974. This was an amendment of the 1970 version that expanded the assistance that the federal government could provide to states, local communities, and individuals after a disaster.

The Federal Emergency Management Agency (FEMA) was created in 1979. President Carter signed Executive Order 12127 effective April 1, 1979, establishing FEMA. A second Executive Order 12148 signed a few months later gave the agency the dual mission of emergency management and civil defense. This was a departure from keeping them under separate entities.

One of the most important pieces of legislation was the Stafford Act, passed in 1988. This legislation amended the Disaster Relief Act of 1974 and provided clear direction for emergency management. It also established the current statutory framework for disaster response and recovery through presidential disaster declarations requested by state governors.

The terrorist attacks of September 11, 2001 in New York, Pennsylvania, and the Pentagon led to major changes in emergency management. In November 2002, the Homeland Security Act of 2002 was signed by President Bush. This Act created the Department of Homeland Security ‘DHS’ and united FEMA and 21 other organizations on March 3, 2003 under one agency.

On August 29, 2005, Hurricane Katrina made landfall near Buras-Triumph, Louisiana as a category 3 hurricane. The storm caused devastation along the Gulf Coast. Some residents had evacuated to Houston, Texas and others to all 50 states. Many of the ones that ended up in Houston were housed at the Astrodome (a closed stadium) and then dispersed to hotels. Other residents were trapped when water from the storm breached the levees in New Orleans. The response to Hurricane Katrina was disastrous and led to passage of the Post-Katrina Emergency Management Reform Act of 2006. The Act established FEMA as a distinct agency within DHS and designed the FEMA Administrator as the principal advisor to the President for all matters relating to emergency management in the United States.

On October 29, 2012, Hurricane Sandy moved ashore near Brigantine, New Jersey. The storm left millions without power and caused billions in damage and became known as “Superstorm Sandy”. Congress passed the Sandy Recovery Improvement Act of 2013 to streamline the repair of public infrastructure and restore electrical services. The Act also allowed federally recognized tribes to directly request a Presidential disaster declaration.

The year 2017 brought a historic Atlantic Hurricane season and extreme wildfire disasters. Among the Hurricanes were Maria, Irma, and Hurricane Harvey that made Texas landfall twice. The first landfall of Hurricane Harvey was as a category 4 hurricane near Rockport, Texas. The first impact was wind damage and the second impact was historic flooding when the storm hit

the Houston, Texas area. This led to the Disaster Recovery Reform Act of 2018 that highlighted the federal government’s commitment to increasing investments in mitigation and building partner’s capabilities.

Some of the historical disasters and dates to note in Emergency Management are shown in the table below.

Date	Event	Comments
79 A.D.	Eruption of Mount Vesuvius destroyed ancient Pompeii	Estimated 1,044 dead
May 526 A.D.	Antioch Earthquake in Syria	250,000 dead
10/11/1138	Aleppo Earthquake in Syria	230,000 dead
1/23/1556	Shaanxi Earthquake in China	830,000 dead
8/29/1803	First Federal involvement in a local disaster	Portsmouth, New Hampshire fire of 1802.
12/15/1811	New Madrid Earthquakes began with a 7.5 magnitude earthquake	3,500 fatalities
11/25/1839	Coringa Cyclone strikes India at Coringa	300,000 dead
10/8/1871	Great Chicago Fire of 1871	100,000 residents left homeless and approximately 300 deaths
September 1887	Yellow River Flood in China	900,000-2,000,000 dead
5/31/1889	Johnstown, Pennsylvania Flood	2,208 dead and \$17 million damage (\$490 million in 2020 dollars)
9/8/1900	The 1900 Storm (hurricane) stroke Galveston, Texas	6,000-12,000 dead and \$35.4 million (\$1.097 billion in 2020 dollars)
4/18/1906	San Francisco Earthquake of 7.9 magnitude resulted in fires	3,000 fatalities
12/16/1920	Haiyun Earthquake in China	240,000 dead
Summer 1931	Yellow River Flood in China	1,000,000-4,000,000 dead
6/22/1936	Flood Control Act of 1936 signed into law	
3/18/1937	New London School explosion in New London, Texas	Estimated 295 deaths
5/20/1941	President Roosevelt signed Executive Order 8757, creating the Office of Civilian Defense (OCD).	
12/1/1941	Creation of the Civil Air Patrol	Administrative Order 9
12/7/1941	Attack on Pearl Harbor and the US entry into World War II	
8/14/1945	World War II ended with the surrender of Japan	VJ Day

4/16/1947	The Texas City Disaster in Texas City, Texas	405 identified dead and 63 unidentified. 113 identified as missing. 5000 injured and 500 homes destroyed. \$100 million damage (\$4.58 billion in 2019 dollars)
12/1/1950	President Truman signed Executive Order 10186, creating the Federal Civil Defense Administration (FCDA) and it became an official government agency the next month	
10/15/1954	Hurricane Hazel stroke near Calabash, North Carolina	95 deaths and \$281 million (1954 dollars or \$2.9 billion 2022 dollars) in the US
8/17/1955	Hurricane Diane caused landfall near Wilmington, North Carolina	At least 184 deaths and damage was \$831.7 million (1955 dollars or \$8.6 billion 2022 dollars).
6/27/1957	Hurricane Audrey caused landfall near Cameron, Louisiana	At least 431 dead and \$150 million (1957 dollars or \$1.5 billion 2022 dollars)
8/17/1959	Hebgen Lake earthquake in Montana	At least 28 killed
9/10/1960	Hurricane Donna hit Florida on the Southwest Coast and headed to the Atlantic	439 killed total and \$980 million in damage (1960 dollars)
9/11/1961	Hurricane Carla caused landfall near Port O'Connor, Texas	43 direct fatalities and \$325 million in damage
3/7/1962	Ash Wednesday Storm (extra tropical Northeaster) stroke the middle Atlantic states	40 dead, 100 injured
11/11/1970	Bhola Cyclone strikes present day Bangladesh	500,000-1,000,000 dead
5/22/1974	President Nixon signed the Disaster Relief Act of 1974	
7/28/1976	Tangshan Earthquake in China	242,000 dead
6/19/1978	President Carter sent the Reorganization Plan Number 3 to Congress	
3/28/1979	Three Mile Island nuclear facility in Harrisburg, Pennsylvania had near meltdown	
4/1/1979	President Carter signed Executive Order 12127, establishing FEMA	
4/26/1986	Cherobyl nuclear accident in Ukraine	Fewer than 100 direct deaths and displaced the population of Pripyat in Ukraine (previously USSR)
11/23/1988	Robert T. Stafford Act signed into law	
10/17/1989	Loma Prieta Earthquake stroke near Santa Cruz, California during the World Series	63 killed and 3,757 injured. \$6 billion in damage (approx. \$12 billion in 2022)
10/19-22/1991	Oakland Firestorm	20 fatalities and 3,000 structures destroyed

8/24/1992	Hurricane Andrew caused landfall in Florida	250,000 left homeless and \$25.5 billion in damage
2/26/1993	World Trade Center Bombing	6 dead and 1000 injured
4/19/1995	Oklahoma City Bombing destroyed the Murrah Federal Building	168 dead and 700 injured
9/11/2001	911 Terrorist Attacks on World Trade Center and Pentagon	nearly 3,000 dead
11/25/2002	Homeland Security Act of 2002	
12/26/2004	Indian Ocean Earthquake and Tsunami	230,000 dead
8/29/2005	Hurricane Katrina caused landfall on the Louisiana coast	1,836 dead and \$125 billion in damage
10/4/2006	Post-Katrina Emergency Management Reform Act of 2006	
9/13/2008	Hurricane Ike stroke the Houston-Galveston area of the Gulf Coast of Texas	214 deaths and \$38 billion in damage
3/11/2011	Fukushima nuclear disaster that was triggered by the Tohoku earthquake and tsunami	1 cancer death and 16 physical injuries due to hydrogen explosions
5/22/2011	EF-5 Tornado devastated the city of Joplin, Missouri	157 fatalities
10/29/2012	Hurricane Sandy came ashore near Brigantine, New Jersey	233 deaths and \$68.7 billion (2012 dollars) in damage
3/22/2014	Oso Landslide near Oso, Washington buried homes and other structures	43 fatalities
8/26/2017	Hurricane Harvey made landfall east of Rockport, Texas. It went back into the Gulf of Mexico and caused record flooding in the Houston area after causing landfall a second time.	68 direct and 39 indirect fatalities and \$125 billion in damage
9/10/2017	Hurricane Irma caused landfall as a category 4 hurricane near Cudjoe Key, Florida	52 direct and \$77.16 billion (2017 dollars) in damage
9/19/2017	Hurricane Maria stroke Southeast Puerto Rico as a category 4 hurricane	3,059 fatalities and \$91.61 billion (2017 dollars) in damage

Figure 1 Important historic disasters and dates

3.0 PHASES OF EMERGENCY MANAGEMENT

There are four phases of emergency management: Mitigation, Preparedness, Response, and Recovery. These phases represent a cycle, where all communities are in at least one phase at any one time.

The Mitigation Phase are actions taken to reduce the impact or consequences of a disaster. An example is building a seawall to reduce the impact of the storm surge in a hurricane. Other

methods of mitigation can include buying flood or fire insurance policies or tying down homes with ground anchors to reduce wind damage in a storm.

The Preparedness Phase includes activities such as planning, training, and planning for events or items that cannot be mitigated. Examples may include evacuation plans (if leaving) or a supply list (if staying).

The Response Phase happens during an emergency and in the immediate aftermath of a disaster. Search and rescue missions are a good example of a response activity. Other activities could include boiling water that could be contaminated by flooding. The Response phase continues until normal operations and activities resume.

The Recovery Phase is after an emergency where normal operations and activities resume, while restoration activities are occurring. This could be rebuilding a structure or home. If you are building based on what is learned from the disaster, you are entering the Mitigation Phase for the next disaster.

4.0 INCIDENT COMMAND SYSTEM AND NATIONAL INCIDENT MANAGEMENT SYSTEM

The Incident Command System ‘ICS’ is part of the National Incident Management System ‘NIMS’. NIMS, the foundation of ICS, describes the management principles and concepts.

The Incident Command System ‘ICS’ is a standardized way to approach emergency management. It can be used for large or small incidents or events. It not only can be used for emergencies, but can also be used for a planned event, for example a sports event such as a football game or a concert.

Let’s think of a small event, such as an officer responding to an accident between two vehicles. The responding officer becomes the Incident Commander. The Incident Commander is responsible for the overall management of the incident and is the only position that is always staffed in the Incident Command System.

Let’s look at the previous example. Say the accident was between a car and a truck carrying Anhydrous Ammonia. The first responding officer is the Incident Commander until someone more experienced takes over. Let’s say it is the fire department hazardous materials response. An example of this change of Incident Commander will be given later.

The ICS enables a coordinated response among various jurisdictions and agencies. It also allows for integration of resources within a common organizational structure. ICS uses the Whole Community approach to ensure that the solutions are implemented that serve the entire community.

ICS is a component of National Incident Management System. NIMS is a systematic approach to guide all levels of government, nongovernmental organizations, and the private sector to work together. This involves working together to prevent, protect against, mitigate, respond to, and

recover from incidents. There are three major components of NIMS: Resource Management, Command and Coordination (using the ICS), and Communications and Information Management.

ICS is based on 14 management characteristics that have been proven under the National Incident Management System. Each of these characteristics make a contribution to the strength and efficiency of the overall system. These characteristics are:

4.1 Common Terminology

The ICS uses a common terminology. This allows diverse incident management and support organizations to work together efficiently. The common terminology covers Organizational Functions, Resource Descriptions, and Incident Facilities. The major functions and functional units (Organizational Functions) are defined, and remain standard and consistent. The major resources (Resource Descriptions) including personnel, equipment, teams, and facilities are given common names and are categorized according to their capabilities. A common terminology used to describe the facilities in the area of the incident is Incident Facilities. A key point in the use of the common terminology during an incident is during communications to use common terms and avoid the use of radio codes (i.e. 10 codes), agency specific codes, or other jargon.

4.2 Modular Organization

The organizational structure used by the ICS is a modular organizational structure that develops based on the size and complexity of the incident. The modular organization is designed to expand and contract based on the needs of the incident as dictated by the Incident Commander. This allows for optimal span of control.

4.3 Management by Objectives

Management by Objectives is a specific style where the Incident Commander establishes incident objectives that drive incident operations. This includes establishing specific and measurable incident objectives. It also includes identifying strategies, tactics, tasks and activities to achieve the incident objectives. Management by Objectives also issuing assignments, plans, procedures, and protocols to accomplish identified tasks. Objectives are established by the priorities of First: Life Safety, Second: Incident Stabilization, and Third: Property Preservation. Documentation of the results for the incident objectives is also important to understand what went right and what went wrong.

Effective objectives must be SMART. SMART means Specific, Measureable, Attainable, Relevant, and Time-bound. Specific means to state what is to be accomplished. Measurable means that there must be a way of quantifying. Attainable means that it is attainable or realistic.

Relevant means it is within the scope of the authority. Time-bound means you are time-period to complete the objective

4.4 Incident Action Planning

Incident Action Planning ‘IAP’ guides effective incident management activities. The IAP is a mean of capturing and communicating the overall incident priorities, objectives, strategies, tactics, and assignments for both operational and support activities for an operational period. The IAP covers the What, Who, How and the What-if during an operational period. What is to be accomplished? Who is responsible for accomplishing? How will information be communicated? What-if someone is injured and what should be done in that case?

There are several qualities that are part of an effective IAP. These qualities are:

- a) Cover a specified timeframe
- b) Be proactive
- c) Specify the incident objectives
- d) State the activities to be completed
- e) Assign responsibilities
- f) Identify resources needed
- g) Specify communication protocols

Hazardous materials incidents require the use of a written Incident Action Plan. Smaller and/or less complex can otherwise have an oral or written IAP.

4.5 Manageable Span of Control

In the Incident Command System, each individual reports to one supervisor who should have a manageable span of control. The span of control is the number of individuals and/or resources that one supervisor can manage effectively. The optimal span of control is having one supervisor assigned to five subordinates. This is a guideline and real-world challenges may require a ratio that deviates from the optimal.

4.6 Incident Facilities and Locations

The incident support facilities will depend on the size and complexity of the incident. These facilities are established by Incident Command and typically include:

- a) Incident Command Post ‘ICP’
- b) Incident base, staging areas, and camps
- c) Mass casualty triage areas
- d) Points of distribution
- e) Emergency shelters

4.7 Comprehensive Resource Management

Comprehensive Resource Management describes the standard method to identify requirements, order/acquire, mobilize, track and report, and demobilize resources. It also describes the mechanism to reimburse and restock resources such as personnel, teams, facilities, equipment and supplies.

4.8 Integrated Communications

Communications during an incident is facilitated by using a common communications plan and interoperable communication processes and systems, including voice and data links. Integrated Communications are a necessity to maintain connectivity, achieve situational awareness, and facilitate information sharing. This area is where using a common terminology is especially important.

4.9 Establishment and Transfer of Command

There is an Incident Commander throughout the entire incident. The Incident Commander is designated by the jurisdiction or organization with primary responsibility. A transfer of command may occur during the course of an incident. This will often occur when an incident extends into multiple operational periods. When command is transferred, the transfer process should include a briefing that conveys all essential information to allow for continuing safe and effective operations.

4.10 Unified Command

There may be situations where there is no single jurisdiction, agency, or organization has the resources or authority to manage the incident on its own. One of the reasons for using Unified Command is an incident that crosses jurisdictional boundaries or functional responsibility. In a Unified Command there is no single Incident Commander. Instead, the Unified Command manages the incident through objectives and strategies that have been jointly approved and operate under a single Incident Action Plan, so one set of objectives and strategies is developed for the entire incident. Unified Command is a team effort approach using a single, integrated incident organization. Using Unified Command allows agencies with different legal, functional, and/or geographic responsibilities to work together without compromising the authority, responsibility, or accountability of the individual agency. All of the agencies involved have an understanding of joint priorities and restrictions as well as those of one another. This situation provides for improved information flow and coordination among all responders involved in the incident. Duplication of efforts is reduced or eliminated. The organization and staffing is integrated.

Incidents that may involve the use of Unified Command vary in type. The first may involve an incident that has affected more than one jurisdiction. For instance, neighboring counties may

have been affected by storm. Another use for Unified Command would be when multiple agencies within the same jurisdiction are involved. This may be the fire department for response, police department for evacuation as well as area security, and public works for clean-up operations, like in a hazardous materials response. Some incidents can impact several jurisdictions and functional agencies. The crash of a commercial airliner would bring this type of response, where law enforcement, fire, EMS, the FAA, and the NTSB become involved immediately. It could also be an incident that has impacted several levels of government.

In the Unified Command incident, the organization and facilities are shared. Essential functions should be collocated and a single Incident Command Post established. Also as stated before, there is a single planning process and Incident Action Plan. The Incident Commanders will hold a command meeting, which will be used as a bases for the Incident Action Planning meetings.

When using Unified Command, training should be conducted as a team just as if it were an actual incident. Like the old saying ‘train like you fight’.

4.11 Chain of Command / Unity of Command

The chain of command is an orderly line that details the flow of authority through the hierarchy of the organization. The chain of command allows the Incident Commander to direct and control the actions of all personnel on the incident and avoids confusion by requiring that orders flow from supervisors. The chain of command represents an orderly line of authority.

Related to the Chain of Command is Unity of Command. Unity of Command means that all individuals have a single designated supervisor and receive all work assignments from that supervisor. When you are assigned to an incident you report to the supervisor for that incident and no longer report to your normal supervisor, for the while working the incident.

4.12 Accountability

Accountability is essential in the Incident Command System. This means abiding by agency guidelines and policies, and any laws or regulations. There are several principles involved that need to be adhered to, as they are all a part of accountability:

- a) Check-In / Check-Out: all responders in ac ICS incident must report in to receive and assignment. Checking-out at the end is just as important as checking-in at the beginning.
- b) Incident Action Planning: all response operations must be coordinated as outlined in the Incident Action Plan.
- c) Unity of Command: each individual will have only one assigned supervisor.
- d) Personal responsibility: each individual takes personal accountability for his or her own actions.
- e) Span of Control: all supervisors must be able to adequately supervise and control subordinates, and communicate with and manage all resources under their control.

- f) Resource Tracking: all supervisors must report and record resource status changes. Accountability starts as soon as a resource is requested (mobilized) until that resources returns to their home base safely (demobilized).

4.13 Dispatch / Deployment

Resources are only deployed when requested or when dispatched by an appropriate authority. Use an established resource management system. Refrain from self-dispatching when not requested as this can overburden incident command.

4.14 Information and Intelligence Management

One of the most important areas of the Incident Command System ‘ICS’ is Information and Intelligence. Management must establish a process for gathering, analyzing, assessing, and sharing information and intelligence related to the incident. Intelligence in NIMS refers to threat related information typically developed by an investigative or law enforcement organization.

5.0 ICS FUNCTIONAL AREAS

Every incident or event requires certain functional areas. This could be a planned or unplanned event/incident. Not every functional area will be implemented for every event. Each event is unique. During an incident or event, the problem must be identified an assessed, a plan developed and implemented, and resources acquired and paid for, regardless of the size of the event.

The Incident Command System has five major functional areas:

5.1.1. Incident Command

Incident Command defines the objectives, strategies and priorities for the incident. Overall responsibility for the incident is with Incident Command. The National Incident Management System ‘NIMS’ defines command as the act of ordering, directing, or controlling by virtue of statutory, regulatory, or delegated authority.

When using the Incident Command System, an Incident Commander is assigned. The Incident Commander is the only position that is always staffed and responsible for overall management of the incident. The Incident Commander is the one that has the authority to establish objectives, make assignments, and order resources to establish the objectives also to approve the Incident Action Plan. In a small incident, the Incident Commander may be responsible for all management functions. A large incident may require command staff assignments to support the management of the incident.

The Incident Commander has the overall responsibility for the management of the incident or event. This responsibility also includes incident safety. It also includes providing information to internal and external stakeholders, such as senior officials or survivors. Another responsibility of the Incident Commander is to establish and maintain a liaison with other agencies participating in the event. These functions can be accomplished by appointing a deputy.

Command is defined by the jurisdiction or organization with primary responsibility for the incident. The command function should be defined at the beginning of the incident and command may change as the incident expands or contracts. When there is a transfer of command, there should be a briefing to convey all of the essential information for safe and effective operations. All incident staff should be notified when there is a transfer of command.

The Incident Commander can create sections as needed to delegate incident management responsibilities. These sections can include Operations, Planning, Logistics, and Finance/Administration.

In addition to sections, the Incident Commander may also designate a command staff (as needed) to include a Public Information Officer 'PIO', a Safety Officer, and a Liaison Officer. These command staff members report directly to the Incident Commander. The Public Information Officer is the one that interacts with the public (including other agencies needing incident related information) and the media. The Safety Officer monitors incident operations to advise the Incident Commander of safety related issues, to include the health and safety of incident management personnel. The Liaison Officer serves as the Incident Commander's contact point for representatives for organizations and governments. In addition to a Command Staff, a General Staff performs functions in four areas. These areas (Sections) are Operations, Planning, Logistics, and Finance/Administration are established to maintain a manageable span of control and shifting the burden from the Incident Commander.

5.1.2. Operations Section

Operations conducts operations activities to reach incident objectives. Operations establishes the tactics and directs all operational resources. The Operations Section is the first one established in an expanding incident. All other sections are established as necessary to support operations. If an Operations Section is established, an Operations Section Chief will be designated to head the section. Additional staffing for the Operations Section is the decision of the Operations Section Chief. This will typically be one of the first assigned to an incident.

The Operations Section develops the tactics and strategies to carry out the incident objectives. The section also directs the management of all tactical operations on behalf of the Incident Commander. The Operations Sections supports the development of an Incident Action Plan (IAP) and ensure it accurately reflects the current operations. The section is also responsible for the management tactical response resources.

The Operations Section may have a Staging Area, where unassigned resources can wait for a tactical assignment. When there is a Staging Area, there may be a Staging Area Manager, who will report to the Operations Section Chief.

5.2 Planning Section

Planning supports the incident action planning process, collecting and analyzing information, and maintaining documentation for the incident. The Planning Section is established if the Incident Commander determines a need and then he designates a Planning Section Chief.

The Planning Section's activities include the preparing and documenting of the Incident Action Plan 'IAP', managing information and documentation for the incident and maintaining situational awareness for the incident. The Planning Section also tracks the resources assigned to the incident, as well as the status of each resource. The section is also responsible for developing plans for demobilization. One of the most important functions of the Planning Section is to anticipate potential problems in future operational periods.

Technical Specialists (advisors) will typically be located in the Planning Section. It may also have units under it, if needed, such as Resources Unit, Situation Unit, Demobilization Unit, and Documentation Unit.

5.3 Logistics Section

The Logistics function supports the incident by arranging for resources and services to support the achievement of the incident objectives. The resources can include personnel and teams, along with equipment, supplies, and facilities. A Logistics Section Chief is designated after the Incident Commander determines the need for a Logistics Section.

The Logistics Section is responsible for all service and support needs. These are wide ranging needs. This includes ordering, obtaining, maintaining, and accounting for essential personnel, equipment, and supplies. It also provides communications resources and planning. Food services for responders are set up by the Logistics Section. Set up and maintenance of incident facilities are also provided by this section. Support transportation and medical services to incident personnel are provided.

5.4 Finance/Administration Section

The Finance/Administration function monitors the costs related to the incident. This includes providing accounting, procurement, time recording, and cost analysis. A Finance/Administration Chief is designated after the Incident Commander determines the need for a Finance/Administration Section.

The Finance/Administration Section is used in any incident that requires financial management specific to the incident. Some of the activities of this section include contract negotiation and monitoring, timekeeping, and cost analysis. The Finance/Administration Section deals with

injury or damage to property and documentation for reimbursement. Reimbursement can include mutual aid agreements or assistance agreements when resources are shared.

The Finance/Administration Section may have a Time Unit, Procurement Unit, Compensation Claims Unit, and Cost Unit, depending on the size of the incident.

6.0 COMMAND AND COORDINATION

Effective incident management consists of four overarching areas of responsibility that are accomplished through the use of the Incident Command System. The objective areas include, directing tactical response, incident support, policy guidance, and outreach and communication. Two of types coordination centers are the Emergency Operations Center ‘EOC’ and the Joint Information Center ‘JIC’.

6.1.1. Emergency Operations Center

The Emergency Operations Center ‘EOC’ is used by jurisdictions across the nation as an element of their emergency management programs. The EOC is essentially home base for the operations, where all of the decision making is done. The purpose is to support the on-scene response. The EOC is either a physical or a virtual location where members from multiple agencies come together to coordinate the response to an incident or an event. It is staffed with trained personnel in various disciplines. It is equipped for communication with the incident site. The EOC obtains resources in support of the incident response. The EOC can be used by any level of government in response to an incident.

6.1.2. Joint Information Center

The Joint Information Center ‘JIC’ may be established in an incident to coordinate all incident related public information activities. When established, it serves as the point of contact for all news media, when possible. A JIC may be established at various levels of government and at incident sites. Personnel involved in the response should direct organization needing information to the JIC.

7.0 INITIAL ICS STRUCTURE

The Incident Command System is designed to conform to the needs of the incident or event. The initial structure will not necessarily be the structure throughout the incident. As the incident expands, so does the structure. These are called expanding incidents. One of the reasons for expansion is to maintain an optimal span of control.

As an incident expands, a Branch may be added under a Section. A Unit may be added under a Branch. The specifics of the incident will determine as the incident expands. This works well, because one of the guiding principles of NIMS is flexibility. The organizational structure will depend on the type and the size of the incident, as well as incident needs and objectives. Only the

necessary function should be activated and should have a person in charge. Many organizational elements can be activated without activating the Section Chief, leaving supervision with the Incident Commander.

8.0 RESOURCE MANAGEMENT

A critical component in incident management is maintaining an accurate and up-to-date picture of resource utilization. Resource Management is a key component of the National Incident Management System to assist all levels of government when the local capability is overwhelmed. The resource management process consists of identifying requirements, ordering and acquiring, mobilizing, tracking and reporting, demobilizing, and restocking and reimbursing. As with many aspects of emergency management, this is a cycle.

Resources are placed into categories, which is called Resource Typing. In the Incident Command System, resources are categorized by Capability, Category, Kind, and Type. Capability is the Core Capability for which the resource is the most useful. The Category is the function for which it is the most useful. Kind is a description of what the resource is (i.e. Personnel, facilities, equipment, etc.). Type is the resource's minimum capability to perform its function.

Resource typing is important as to get the right resources for the task. With this in mind, FEMA has where a resource can be typed from Type I, which is the most capable, to Type IV, which is the least capable. FEMA has an online tool for resource typing known as the Resource Typing Library Tool located at <https://rtlt.preptoolkit.fema.gov/Public>.

Additional resource terminology to be familiar includes Task Force, Strike Team, and Single Resource. A Single Resource is a piece of equipment (to include operating crew), individual, or a team of individuals. A Task Force is a combination of mixed resources with common communications operating under the supervision of a Task Force Leader. One example of a Task Force is the Gulf Coast Violent Offenders Task Force run by the United States Marshals Service that brings together members of local police agencies to locate and arrest violent felons. A Strike Team is a set number of like resources under common communications operation under a Strike Team Leader. We can see that the main difference between them is that a Task Force uses mixed resources and a Strike Team uses like resources.

9.0 INCIDENT TYPING

In the National Incident Management System 'NIMS' incidents are also typed. Incidents are put into categories in a similar manner as resources are. Incidents are categorized based on complexity that range from Type 5 (least complex) to Type 1 (most complex). Incident typing helps in making decisions about resource requirements for an incident. The incident type is based on the number of resources required as well as the anticipated duration of the incident. Most incidents range in the Type 3 to Type 5 range.

A Type 5 incident is the simplest type of incident. A Type 5 incident usually involves one or two single resources with up to six personnel involved. The Command and General Staff positions are not activated, other than the Incident Commander. A Type 5 incident is contained within a single operational period. No written Incident Action Plan is required. An example of a Type 5 incident is a police traffic stop.

A Type 4 incident is also limited to one operational period to bring under control. The Command Staff and General Staff are activated only if they are needed. This type of incident will require several single resources. No written Incident Action Plan is required, unless the incident involves hazardous materials. An operational briefing is conducted as well as documented. An example may be a vehicle fire that also requires police response for traffic control.

A Type 3 incident is characterized by the capabilities exceed the initial response. Some or all of the Command Staff and General Staff positions will be activated as well as other positions. The positions activated will depend on the complexity of the incident. This type of incident may extend past the first operational period, which is a marked difference from the Type 5 and Type 4 incident. Another difference is that a written Incident Action Plan may be required for each operational period.

As local capabilities become insufficient, regional and national resources may be required to safely and efficiently manage the response. This type of incident is a Type 2 incident. In this type of incident, most of the Command Staff and General Staff positions are activated. The number of operations personnel typically do not exceed 200 in an operational period with the total number not exceeding 500. This type of incident extends into multiple operational periods and a written Incident Action Plan is required for each operational period.

The most complex type of incident is the Type 1 incident. It requires the use of national resources to safely and effectively manage operations. All Command Staff and General Staff positions are activated and Branches established. The number of operations personnel will often exceed 500 per operational period and the total number of personnel usually exceeds 1000. This type of incident may result in a disaster declaration. A Type 1 Incident is expected to go into multiple operational periods. A written Incident Action Plan will be required for each operational period.

10.0 EXAMPLE

This example is based on an actual law enforcement operation that occurred in Harris County, Texas.

SITUATION. ACTUAL LAW ENFORCEMENT OPERATION WHERE A PRISONER ESCAPED FROM THE HARRIS COUNTY JAIL IN DOWNTOWN HOUSTON. THIS WAS AN ACTUAL RESPONSE THAT WAS TAKEN OVER BY THE US MARSHALS SERVICE GULF COAST VIOLENT OFFENDERS TASK FORCE (GCVOTF) THAT USES THE ICS SYSTEM TO CONDUCT LAW ENFORCEMENT OPERATIONS. THIS WAS A MULTI-AGENCY RESPONSE THAT WAS CONDUCTED TO BRING AN ESCAPED PRISONER

BACK INTO CUSTODY. THIS WAS AN EXPANDING INCIDENT THAT BEGAN WITH THE HARRIS COUNTY SHERIFF’S OFFICE AND WAS TAKEN OVER BY THE GCVOTF. THE PRISONER WAS TAKEN BACK INTO CUSTODY WITHIN A SINGLE OPERATIONAL PERIOD.

The activities demonstrate that the use of the Incident Command System (ICS) standard approach is ideal to the law enforcement mission. Law Enforcement agencies have long required their officers to have knowledge of ICS and the National Incident Management System (NIMS) and required NIMS courses for their personnel. The following also used some of the more advance ICS concepts that are developed in the ICS-300 in-residence course for expanding incidents, where the organizational structure expands and personnel change roles as the needs of the incident dictate. This Type 4 incident involved City, County, and Federal officers using Multi-agency Coordination Systems, but mostly local resources. As per the National Incident Management System (NIMS), an Emergency Operations Center (EOC) was established.

There was a communication between the Criminal Warrants Office and GCVOTF Office. Both elements are an integration of incident information and public affairs across ICSs, a characteristic of a Joint Information System (JIS).

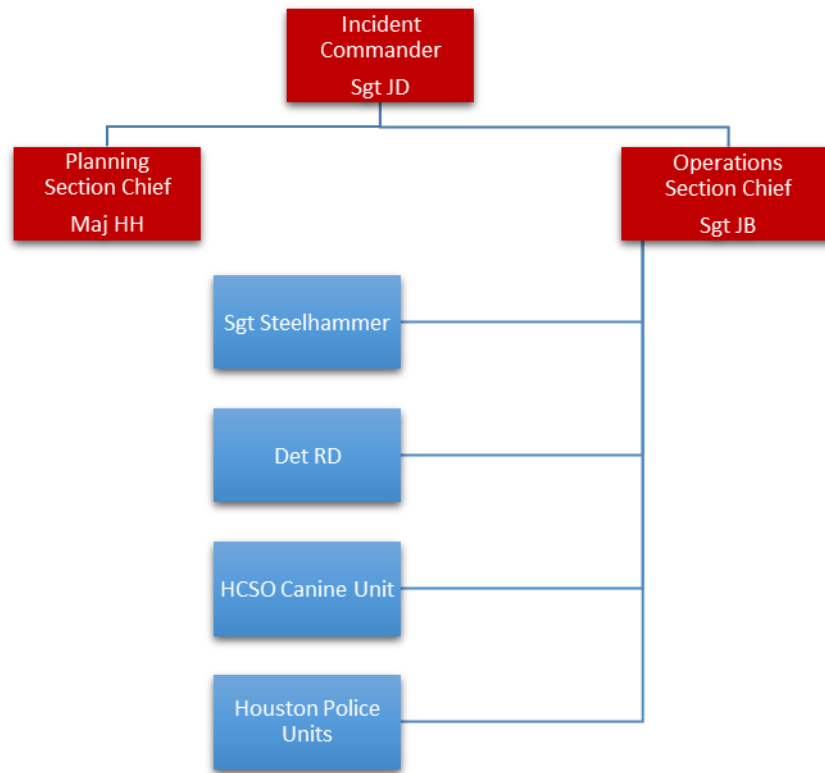


Figure 2 ICS Structure used during incident of a jail escape in Harris County, Texas

Incident Commander – Sgt JD (HCSO/GCVOTF):

Incident Commander (IC) is responsible for managing the incident, for appointments required Command and General Staff to support the incident command function. IC is responsible for safety and communication between different groups participating in the exercise.

Operations Section Chief – Sgt JB (HCSO):

Operations Chief is responsible for mobilization, demobilization, overall operations, tactical management, and training for the Engineers.

Planning Section Chief – Maj HH (HCSO):

Planning Section Chief is responsible for the collection, evaluation, and dissemination of operational information related to the incident. In this Type 4 incident, the intelligence and investigative functions are accomplished in the Planning Section.

10.1 Law Enforcement activities

Sergeant. R. Steelhammer of the Harris County Sheriff's Office (HCSO) was supervising a team of reserve deputies conducting warrant operations in Harris County, Texas. They were conducting operations in Southwest Houston serving felony warrants. Sergeant Steelhammer was in uniform in a marked HCSO unit and was supervising two detectives in an unmarked unit. They were contacted by the Criminal Warrants Office that an escape from the Harris County Jail had just occurred. The Criminal Warrants Division is responsible for investigation of a jail escape. Sergeant Steelhammer, being the senior deputy involved at this point was the Operations Section Chief receiving instructions from Detective M (HCSO) in the Criminal Warrants Office, who at this point was the Incident Commander (IC). The Criminal Warrants office became the Incident Command Post (ICP). Detective M sent Sergeant Steelhammer to an address near Memorial City Mall, which was subject's last known address.

Major HH heard of the escape and went downtown to take over the investigation and became the IC until Sergeant JB arrived to take over as IC, while Major HH continued the investigation as Planning Section Chief. Detective M was demobilized and resumed his regular duties as soon as Major HH took over as IC.

While setting up an unmarked surveillance on subject's last known address, Sergeant Steelhammer was directed by Sergeant JD of the Gulf Coast Violent Offender's Task Force (GCVOTF), who was now the IC, to an address off Almeda Road to look for associated vehicle and meet with Detective RD from the Gulf Coast Violent Offenders Task Force who was now the Operations Section Chief. The associated vehicle was registered to an apartment that Detective RD and Sergeant Steelhammer approached and made contact. Sergeant JD ordered all personnel to use recorded radio channels instead of cell phones to ensure a proper record of formal communications. Detective RD spoke with the occupant of the apartment while Sergeant Steelhammer searched for the wanted subject inside the apartment. After they spoke with the occupant they identified a moving truck that the subject had rented that noise was coming from.

Sergeant Steelhammer parked his vehicle behind the truck while awaiting backup. Sergeant JB showed up on scene and took over as Operations Section Chief. Several units from the Houston Police Department (HPD) showed up and took up a position. Sergeant JB directed that the officers open the door to the truck. Subject was extracted from the vehicle and handed down to the Houston Police Officers and HCSO Canine Unit. He was placed into Sergeant Steelhammer's patrol car.

Sergeant JB instructed Sergeant Steelhammer to take him to Gulf Coast Violent Offender's Office for debrief. Sergeant Steelhammer took subject to the Gulf Coast Violent Offender's Office (which was then off San Jacinto) followed by Detective RD. Subject was debriefed by Sergeant JD, who then instructed Sergeant Steelhammer to take him to the Harris County Jail and write a supplement to the report. Sergeant Steelhammer took him to the Harris County jail, where he was met by Major HH with the booking paperwork. Sergeant Steelhammer completed a supplement to the offense report as a part of the After-Action-Report for the United States Marshals Service which operates the multi-agency Gulf Coast Violent Offender's Task Force.

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