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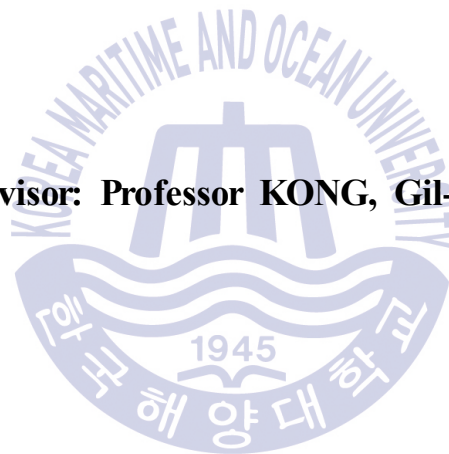
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# Implementation of a Maritime Disaster Management System in the Dominican Republic

- Focused on Search and Rescue -

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**February 2017**

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# Chapter I. INTRODUCTION

## 1.1 Background and objectives

### 1.1.1 Background

#### Maritime disasters

The oceans, covering 71% of the earth's surface, are the most used means to transport goods such as valuable resources of food and fossil fuels by ships and in a minor way as pleasure transportation. Of the 195 countries only 48 are land blocked, which means they do not have access to sea [1], the rest of them are highly dependent on the shipping industry to export or import goods, adding for some the offshore fossil fuel industry and the pleasure transportation.

Seaborne transport, shipping or commercial, leisure and military sea navigation are largely international activities by the very fact that ships are operating on the high seas between different countries and parts of the world. The international character is also emphasized by the disintegrated nature of shipping companies, where ownership, management, crewing and operations are located in different countries. Safety is also affected by unregulated and substandard employment.

[1] Matt Rosenberg *Landlocked Countries No Adjacent Access to the Ocean*

Many maritime disasters happen in peacetime and unrelated to war. All ships, including those of the military, are vulnerable to problems from weather conditions, unreliable design or human error.

In January 1945, during the World War II the Soviet submarine S-13 torpedoed and sunk the “MV Wilhelm Gustloff” which was transporting around 10,582 persons at the moment; the estimated loss was of about 9,400 people, remains the greatest maritime disaster ever [2].

In peacetime, the 1987 loss of the ferry “Doña Paz”, a Philippine-registered passenger ferry that sank after colliding with the oil tanker “MT Vector” on December 20, 1987 with an estimated 4,386 dead, is the largest non-military loss recorded, it is also called “The Asia’s Titanic” [3].



Figure 1. MV Doña Paz in Tacloban City, 1984 (Flickr)

[2] Prince, Cathryn J. “Death in the Baltic: The World War II Sinking of the Wilhelm Gustloff.”

[3] The Associated Press-The New York Times “1,500 ARE FEARED LOST AS 2 SHIPS COLLIDE AND SINK NEAR PHILIPPINES. December 21, 1987.”

One of the most famous maritime disaster is the sinking of the “RMS Titanic” which occurred on the night of 14 April through to the morning of 15 April 1912 in the north Atlantic Ocean, four days into the ship's maiden voyage from Southampton to New York City. The largest passenger liner in service at the time, Titanic had an estimated 2,224 people on board when she struck an iceberg at around 23:40 (ship's time) on Sunday, 14 April 1912. Her sinking two hours and forty minutes later at 02:20 (05:18 GMT) on 15 April resulted in the deaths of more than 1,500 people, which made it one of the deadliest peacetime maritime disasters in history.

Titanic received six warnings of sea ice on 14 April but was travelling near her maximum speed when her lookouts sighted the iceberg. Unable to turn quickly enough, the ship suffered a glancing blow that buckled her starboard (right) side and opened five of her sixteen compartments to the sea. Titanic had been designed to stay afloat with four of her forward compartments flooded but not more, and the crew soon realized that the ship would sink.

They used distress flares and radio (wireless) messages to attract help as the passengers were put into lifeboats. In accordance with existing practice, Titanic's lifeboat system was designed to ferry passengers to nearby rescue vessels, not to hold everyone on board simultaneously. With the ship sinking fast and help still hours away, there was no safe refuge for many of the passengers and crew. Compounding this, poor management of the evacuation meant many boats were launched before they were totally full.

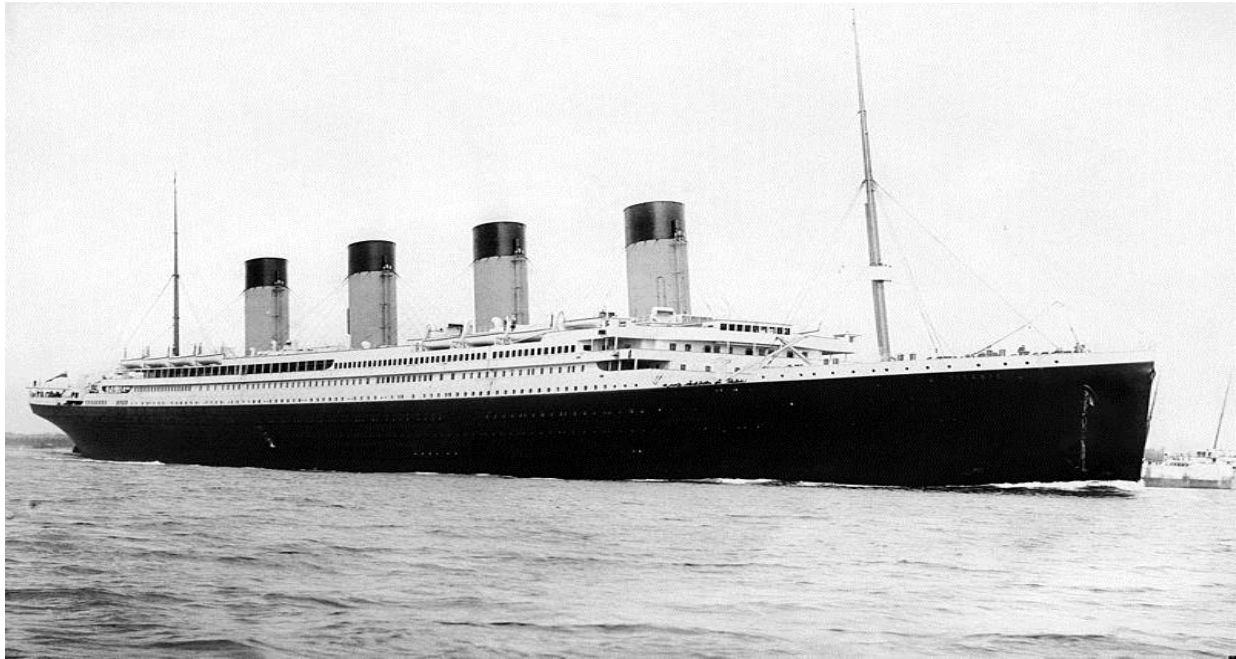


Figure 2. RMS Titanic departing Southampton on April 10, 1912. (F.G.O. Stuart)

A maritime disaster is not only limited to loss of life at sea but as well to pollution and oil spills, for example the Spanish oil tanker “*Castillo de Bellver*” was en route from the Persian Gulf to Spain transporting 250,000 t of light crude oil.

Around 80 km off Table Bay, South Africa, it exploded and proceeded to burn. The crew abandoned the ship, which proceeded to drift off the coast, eventually breaking in two at around 10 a.m. approximately 50,000–60,000 t of light crude was initially spilled into the sea, creating a flaming oil slick. [4]

Another of most iconic cases of oil spills is the “*Exxon Valdez*” oil spill occurred in Prince William Sound, Alaska, on Easter Sunday, March 24, 1989, when “*Exxon Valdez*”, an oil tanker bound for Long Beach, California, struck Prince William Sound's Bligh Reef and spilled 11 to 38 million US gallons of crude oil over the next few days. [5]

[4] Moldan, Anton (1997). *Response to the Apollo Sea Oil Spill, South Africa*.

[5] Skinner, Samuel K; Reilly, William K. (May 1989). *The Exxon Valdez Oil Spill: A Report to the President*.

### 1.1.2 Objectives

The purpose of this paper is to analyse emergency management in selected foreign countries focused on search and rescue (SAR), with the ultimate goal of contributing to its development in the Dominican Republic.

Also, it attempts to define the details of a Maritime Disaster Management System and to determine the proper procedures as well to appropriately prepare the Dominican Republic Navy maritime response in the event of a maritime emergency situation. The absence of a proper system and limited capacity can present a number of difficulties and may indicate a failure to properly respond to an emergency or disaster.

For this, we must first keep in mind the followings.

Does the Dominican Republic has appropriately prepared, developed and scaled maritime disaster responses legal basis in order to create effective response in SAR? Has the Dominican Republic Navy neglected to conduct accurate needs-based assessments and in turn responded efficiently to maritime disasters or emergencies?

It is appropriate to enumerate the bounds of the question itself by acknowledging that this paper will attempt to determine the effectiveness that the Dominican Republic Navy will respond to a maritime disaster.

I believe that by fully understanding the potential for an appropriately prepared, trained and scaled institution's assistance to disaster scenarios, military planners can find both more effective and appropriate responses that continue to reinforce Dominican Republic Navy role as a responsible maritime authority.



## **1.2 Scope and structure.**

This paper is divided into six chapters. Chapter 1 contains the background and objectives, scope and structure and for last the research methodology. Chapter 2 will define and show the difference between concepts. Also, will define the concept of a maritime disaster as well as its nature, types and causes and its essential elements. Chapter 3 will introduce the Dominican Republic and the navy as well as the current status of maritime disaster management system in the Dominican Republic. Chapter 4 will contain the overview and analysis of the maritime disaster management system in several countries focused on search and rescue. Chapter 5 will suggest the development of an effective system for the Dominican Republic. Chapter 6 contains the concluding remarks and recommendations.

## **1.3 Research methodology.**

Because of its nature, it is primarily a comparative analysis of systems of selected countries, which involves thorough synthesis of primary sources, including international maritime security conventions as well as other related instruments and other international sources that deal with the various aspects of this area. It is basically doctrinal and library based considering textbooks, journal articles, newspapers and internet sources. Based on the analysis and after reviewing the lessons learned will make suggestions.

## **Chapter II. FUNDAMENTAL THEORY OF MARITIME DISASTER MANAGEMENT SYSTEM**

### **2.1 General theory on maritime disaster.**

#### **2.1.1 Definitions.**

The words disaster, accident and incident may create confusion to people and in this chapter will intend to define and point the difference between these concepts. Also, the term casualty will be defined as well.

- Accident: An unexpected or undesirable event, especially one causing injury to a small number of individuals and/or modest damage to physical structures. These events can be handled by emergency organizations. The demands that are made on the community are within the scope of domain responsibility of the usual emergency organizations such as police, fire, medical and health personnel. Such accidents create needs (and damage) which are limited to the accident scene and so few other community facilities are damaged. Thus, the emergency response is delimited in both location and to the range of emergency activities. The primary burden of emergency response falls on those organizations that incorporate clearly deferred emergency responsibility into their domains. When the emergency tasks are completed, there are few vestiges of the accident or lasting effects on the community structure.[6]

- Incident: An occurrence or event, natural or human-caused that requires an emergency response to protect life or property. Incidents can, for example, include emergencies, terrorist attacks, terrorist threats, wildland and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, tropical storms, war-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response. An incident can be big or small, good or bad, intentional or unintentional.[7]

[6] Dynes, Russell R. 1998. "Coming to Terms with Community Disaster."

[7] Department of Homeland Security, National Infrastructure Plan 2006

- Disaster: The occurrence of a sudden or major misfortune which disrupts the basic fabric and normal functioning of a society (or community). An event or series of events which gives rise to casualties and/or damage or loss of property, infrastructure, essential services or means of livelihood on a scale which is beyond the normal capacity of the affected communities to cope with unaided. Disaster is sometimes also used to describe a catastrophic situation in which the normal patterns of life (or eco-systems) have been disrupted and extraordinary, emergency interventions are required to save and preserve human lives and/or the environment. Disasters are frequently categorized according to their perceived causes and speed of impact. A disaster occurs when a disruption reaches such proportions that there are injuries, deaths, or property damage, and when a disruption affects many or all of the community's essential functions, such as water supply, electrical power, roads, and hospitals. Also, people affected by a disaster may need assistance to alleviate their suffering.[8]

- Casualty: Any human accessing health or medical services, including mental health services and medical forensics/mortuary care (for fatalities), as a result of a hazard impact.

The difference between accident and incident is that accident leads to damage, injury or life loss and is more specific while an incident can be good or bad, not always leading to damage, injury or life loss and is more general. All accidents can ALSO be described as incidents – but NOT all incidents are accidents. Incidents and accidents if not managed properly can turn into disaster.

[8] Simeon Institute



### **2.1.2 Concept of maritime disaster**

A disaster, as defined before, is an event either natural or man-made that causes great distress or destruction and/or requires a response beyond the normal capacities of the agencies involved. In the marine context this will often be a multi-casualty incident or mass rescue operation that requires a multi-agency measure and response.

A marine disaster can be understood as any event, or sequence of events, other than a marine casualty, which has occurred directly in connection with the operations of a ship that endangered, or, if not corrected, would endanger the safety of the ship, its occupants or any other person or the environment resulting in multi-casualty, mass rescue operation and mass moving of resources as response.

### **2.1.3 The nature, types and causes of maritime disasters**

Svein Kristiansen in his book “Maritime Transportation: Safety Management and risk analysis” makes a wide mention on maritime accidents and its causes.

The maritime system, because of the nature of its activities, is exposed to unsafe situations and the risks of unwanted incidents and accidents. The basic requirement for an accident to happen is that the vessel is in some state of operation and thereby at risk in relation to one or a number of hazards. An initiating event, together with contributing factors of operational, environmental and technological aspects, constitutes the so-called network leading to an accident. There are several theories with many different insights as to why accidents happen, which some popular theories are:

- Carelessness
- Deviations
- “Act of God”
- New phenomena
- Hazardous activity

- Intoxicated pilot
- Accident-prone \*
- “Cowboy mentality”
- Improvising
- Lack of training

These factors may be in part present in some accidents, in addition to the factors listed above; the concept of human error, normally implying operator error is an often cited as one of the major causes and explanations of accidents.

Main casual factors for collisions and groundings [8]:

- External conditions: Poor weather reduced visual conditions, etc.
- Functional failure: Equipment, functions and systems failure or degradation.
- Less than adequate resources: Inadequate ergonomic conditions, planning, organizations and training.
- Navigational failure: Failure in maneuvering and operation poor understanding of the situation, etc.
- Negligence: Human failure, slips/lapses, and violations or deviation from routines, rules and instructions.
- Other ships: Errors made by other ships.

\* *Having or susceptible to having a greater than average number of accidents or mishaps. (Farlex free dictionary)*

### 2.1.4 Ships Losses and accidents

The safety and security of vessels is critical to the global economy as the International shipping transports approximately 80% of global trade by volume and over 70% of global trade by value. The maritime industry saw the number of total losses remain stable during 2015, declining slightly to 85; the lowest total for a decade and the second year in a row annual loss fell below 100.

Losses declined by 3% compared with 2014 (88). The 2015 accident year represents a significant improvement on the 10-year loss average (123). Large shipping losses have declined by 45% over the past decade, driven by an increasingly robust safety environment and self-regulation. More than a quarter of all losses occurred in the South China, Indochina, Indonesia and Philippines region (22, up three losses year-on-year). Total losses in the East Mediterranean and Black Sea regions declined year-on-year.

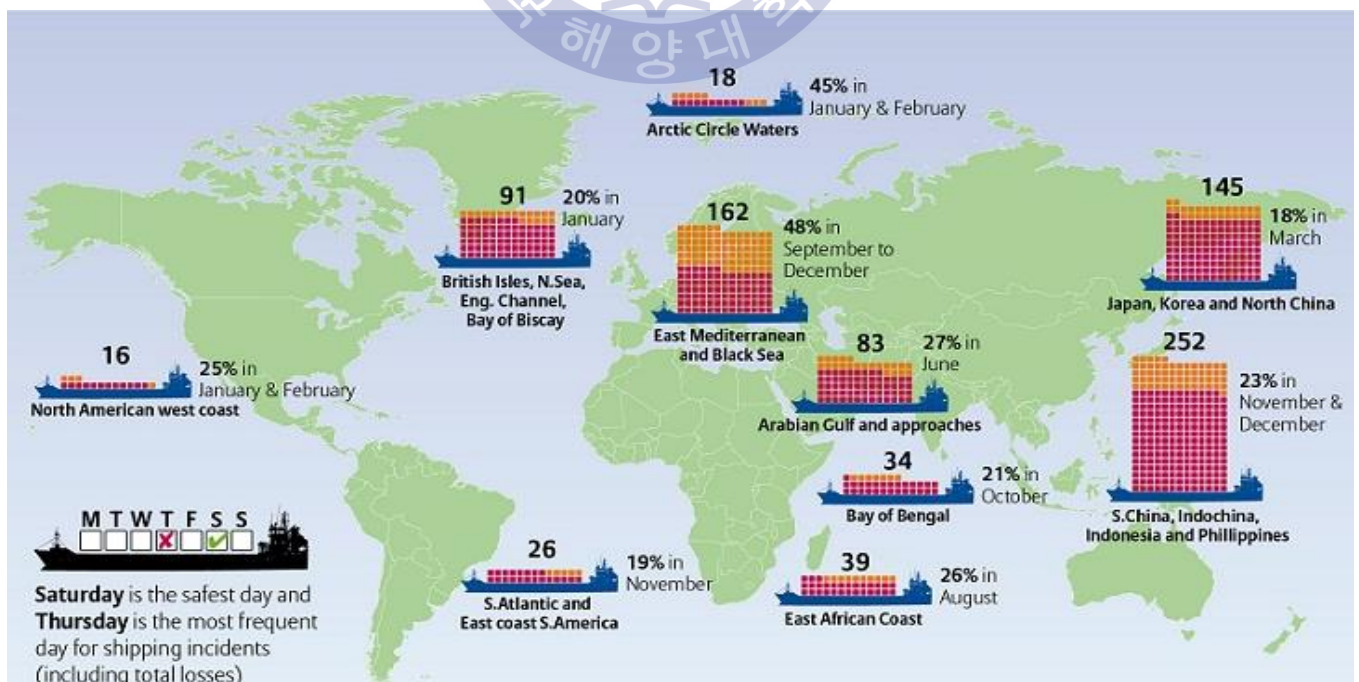


Figure 5. Ships Total losses 2006-2015. Safety and shipping review 2016, Alliance Global Corporation and specialty.

For every year over the past decade foundered has been the most common cause of loss for large ships. According to “Lloyd’s List Intelligence Casualty Statistics” in 2015 it was the cause of almost 75% of total losses, often driven by bad weather, its highest proportion of all losses over the past decade. Such incidents were up 25% year-on year. There were significant reductions in the number of wreckings/strandings and fires/explosions year-on-year.

Foundered	63
Wrecked/stranded	12
Collision	3
Fire/explosion	3
Hull damage	2
Machinery damage/failure	2
Total	85

Table 1. Cause of total losses from January 1<sup>st</sup> to December 31<sup>st</sup> 2015. Lloyd’s List Intelligence Casualty Statistics.

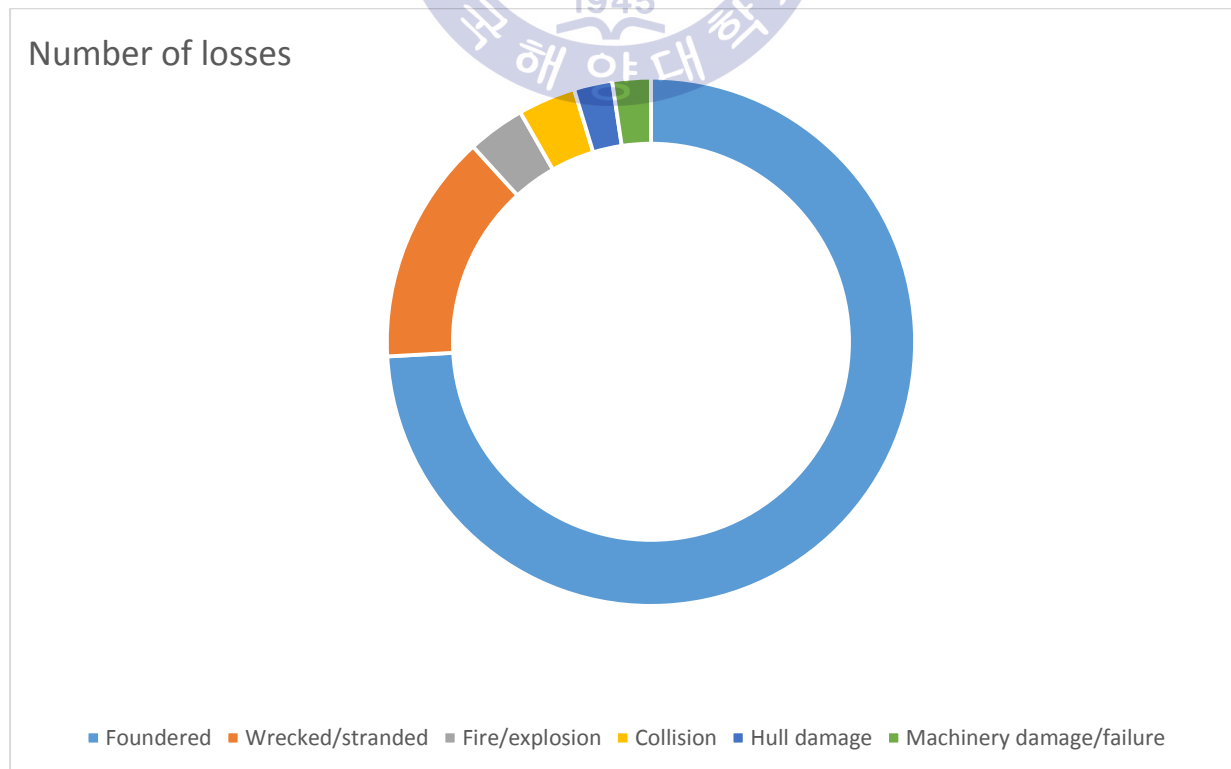


Figure 6. Lloyd’s List Intelligence Casualty Statistics.

In 2015 the representative of South Korea officially started his mandate at the start of 2016 and in his inaugural message underlined the importance of strengthened partnerships between developing and developed countries, governments and industry, and IMO member states and regions. For its part, the IMO's Maritime Safety Committee (MSC) is engaged on a continuous work program on improving ship safety. Along time concerns and issues remain top critical priorities to the maritime industry in order to improve these concerns and to reduce the causes and number of incidents worldwide in the maritime sector.

Seafarer shortage, fatigue and training issues: There has been an increase in fatigue-related insurance claims over the past decade. With crew numbers often at their lowest possible level, and with the industry anticipating a future staffing shortage, expectations are for longer shift patterns, which could exacerbate the issue. Meanwhile, training remains below par in some areas, such as with electronic navigational aids, which should not be seen as a panacea but as a tool.

Passenger ship safety: Significant concerns remain, particularly around non-international voyages. Some Asian routes are many years behind recognized international standards, as evidenced by a number of recent ferry losses in South East Asian waters. Frequent sailings and profit pressures mean scheduling necessary maintenance can prove challenging.

Superstorm ship sinking: Meteorological predictions anticipate more extreme weather conditions, bringing additional safety risks for shipping and potential disruption to supply chains.

Hurricanes and bad weather were contributing factors in at least three of the five largest vessels lost during 2015 including "SS El Faro", which departed Jacksonville, Florida, bound for Puerto Rico on the early morning of September 30, 2015, when then-Tropical Storm Joaquin (Cat. 3 next day) was several hundred miles to the east. The following morning the vessel likely encountered swells of 20 to 40 ft (6 to 12 m) and winds in excess 80 knots (150 km/h; 92 mph) as it sailed near the storm's eye.

Around 7:30 a.m. on October 1, the ship had taken on water and was listing 15 degrees. The last report from the captain, however, indicated that the crew had contained the flooding. Shortly thereafter, El Faro ceased all communications with shore. On October 2, the ship was declared missing and immediately began the search and rescue operation led by the United States Coast Guard, the United States Navy, the United States Air Force and the National Guard; this was the worst US commercial maritime disaster in decades.

It is also a major factor in South China, Indochina, Indonesia and Philippines being the global loss hotspot. Weather routing will continue to be a critical component to the safe navigation of vessels.

#### **2.1.5 Types of maritime accidents**

Activities have an important role in the business, trade and economy of most of the countries. Most important area of maritime activities include:

- 1- Maritime transport.
- 2- Fishing.
- 3- Marine farming.
- 4- Continental shelf operations.
- 5- Science and survey.

These activities despite having several positive attributions, there is a price for these benefits in terms of negative effects. Maritime accidents may lead to three kinds of consequences:

- Harm to human beings: injuries and casualties.
- Environmental pollution.
- Economic losses.

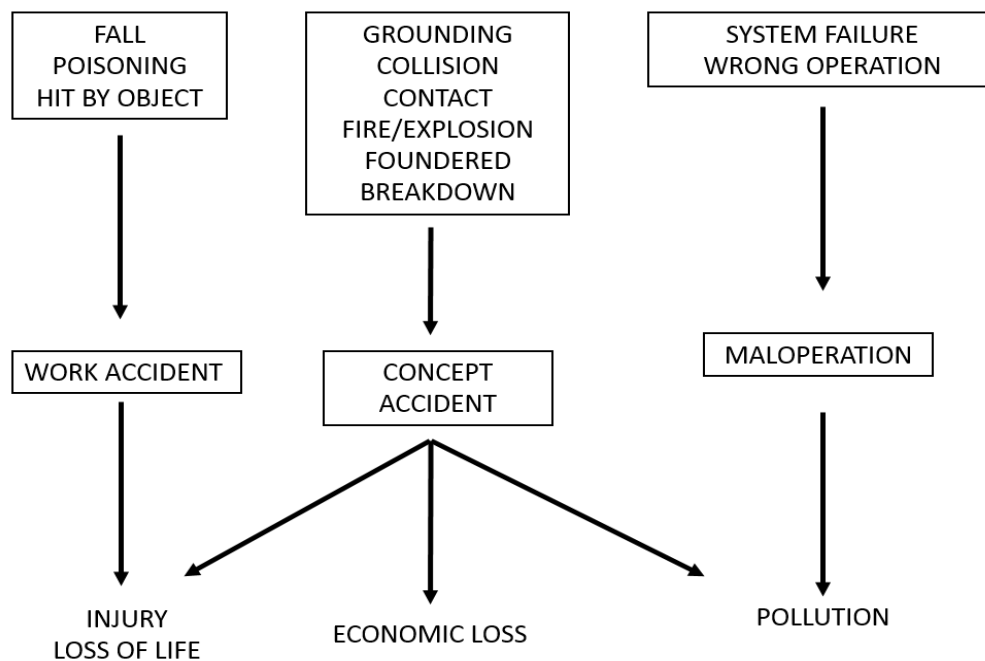


Figure 7. Maritime accident types and consequences.

As stated before, maritime activity in general has been for centuries the main way for trades between nations and regions and without it, there would not be economic prosperity and development. Among the favorable aspects of the maritime sector include, employments, production incentivation, creation of values, economic spread, etc, but as well negative effects also are involved in these activities.

Maritime Sector	Hazards
Shipping	Dangerous cargo: fire, explosion, poisoning, environmental damage. Ocean environment and weather. Substandard ships and substandard ship owners. Difficult to control safety due to its international character.
Fishing	Relatively small vessels with critical features. Ocean environment and weather. Operation in coastal waters – groundings and steep waves. Partly one person activities. Development of damage and flooding is fast. Lack of training.
Offshore	Many new kind of activities, limited experience and knowledge. High pace of development work and construction. Continuous development of technology and ways of operation. Large concentrations of energy resulting in high fire and explosion risk.



	High utilization of the space of\n platforms.
Diving	Increasing water depth (high pressures, difficult to control) Lack of knowledge about physiological factors) Ocean environment – splash zone risk. New work processes.

Table 2. Threats and Hazards in maritime activities. Svein Kristiansen

“The oceanic area is very vast and therefore the variations in accidents are also numerous. The effects of the occurrences of marine accidents include not just humans but also the marine creatures and the marine environment and ecosystem.” *Karan Chopra*.<sup>[9]</sup>

1. Offshore Oil Rig Mishaps: The recently occurred oil spill in the Gulf of Mexico is an offshore oil rig accident. Offshore oil rigs constitute great danger in terms of their heavy machinery and the complexities of the processes involved. Even a minor error by way of negligence of a simple process or overlooking in the working of a machinery part can lead to immense damaging consequences across the world.
2. Cruise Vessel Mishaps: Cruise vessels form a very important part in the vacation itinerary of people. However, a major type of maritime accident occurs in cruise vessels. Cruise vessels could capsize or face tough weather conditions causing the ship to develop major problems. Another important case of accidents in cruise ships is because of the negligence on the part of workers. As per statistical data nearly 75% of fires are caused because of a mere mistake by people working on the cruise ship.
3. Commercial Fishing Mishaps: Even fishing for commercial purposes can lead to fatal incidents being caused. Inexperienced and even experienced ones fishermen can fall overboard. Harsh weather conditions can also could severe damages to a commercial fishing expedition

[9] Marine Insight, 12 types of Maritime Accidents.



4. Accidents on Tugboats: Tugboats are those which help move huge ships to enter docks. They are small in nature but are powerful to ensure that the large vessels are handled safely. But sometimes because of the blockage of the visibility of tugboats by the larger vessels, maritime accidents occur. Also human error on the part of the pilot of the tugboat can also lead to unwanted and unexpected tugboat mishaps.
5. Accidents on Crude Oil Tankers and Cargo Ships: The major cause of accidents on cargo tankers is explosions. Since the very nature of the materials these tankers transport is dangerous and highly flammable, even the most minor of explosions can cause enormous losses. According to statistics, one of the main reasons for oil tanker accidents occurring is because of workers' negligence – nearly 84-88%.
6. Grounding of Ships: Ship grounding occurs when the bottom of the ship's hull scrapes through the ocean-bed. This type of maritime accident has a lot of impact on the ship's hull and more on the overall oceanic area where the grounding has started to occur and has finally culminated. The danger to workers aboard the ship is another important consequence because of the mishap.
7. Maritime Accident because of Drugs and alcohol: Drug or substance abuse is a major problem across the world. Even in the marine world, substance abuse can cause irreparable damage. If the workers of a particular ship engage in substance abuse or alcohol, the addiction-induced frenzy could cause the worker to behave erratically and thereby lead to an unwanted maritime accident on board ships.
8. Crane Mishaps: Just like crane operations on the land, marine crane operations on ports and on ship are also risky. The risk is further stressed because of the oceanic operations where the cranes are required. Because of faulty wires or winches, crane workers can lose their life or in a worst case scenario, be alive but with irreparable physical handicap.

Alternatively, accidents because of crane operations are also caused because of negligence and inexperience on the part of the worker.

9. Accidents in Shipyards: The shipyard is the place where the ship is assembled and constructed in its entirety. Fitting and welding accidents are common in the shipyard which could spare the worker his life but hamper the worker's overall working abilities. Similarly constant inhaling of poisonous fumes also becomes another shipyard accident cause.
10. Maritime Accidents on Diving Support Vessels: People who want to explore the mysteries of the deep sea use a diving support craft to take a plunge into the water. However if the diving support craft is unfit and if the crew also happens to be really unfit to oversee and maneuver the whole operation effectively, a major accident can be caused.
11. Accidents on Barges: Barge mishaps occur mainly because of the overall build of the barges themselves, which allows them limited movement on the water and because of the problems of the barge-towing equipment. These problems could be caused due to inexperience on the part of the person at the helm of the towing boats or due to usage of faulty towing cables.
12. Cargo Hauling Accidents: Cargo hauling maritime accidents are those accidents caused to workers who work as cargo haulers. However, according to several maritime accident investigations, it has been reported that cargo hauling workers overstate their cargo-hauling injuries. The maritime accident investigation, consequentially reports that because of this, this profession has one of the most severe rate of work-place absenteeism.

## 2.1.6 Examples of marine accidents

### MV Seagate - MV Timor Stream collision.

In the following example, we can clearly read the causes that led to the accident, with no extreme weather conditions, no restrictions on maneuvering, the only vessel in the area was the Motoryatch “Waterbull” at 8.5 Nautical miles at the moment of the collision. The report stated below from the “Maritime Accidents Investigation Branch” point the accident as negligence.



Figure 3. MV Seagate after collision (Left) and MV Timor Stream (Right) – MAIB.

On the morning of March 10, 2012, the British-flagged bulk carrier MV Seagate and the Liberian-flagged refrigerated-cargo ship MV Timor Stream collided while transiting open waters and in good visibility 24 nm north of the Dominican Republic. There were no injuries, but both ships were badly damaged and there was some minor pollution.

In the report, it says that poor watch-keeping standards, driven by complacency, led to the collision. The officer in charge of the navigational watch on both vessels failed to keep a proper lookout, did not assess the risk of, or take appropriate action to avoid collision, report says. In summary, it says, both officers failed to comply with some of the most fundamental elements of the International Regulations for Preventing Collisions at Sea 1972 (as amended) and the written navigational procedures issued by their respective company managers.

#### **Amoco Cadiz oil spill.**



*Figure 4. Amoco Cadiz Photo by NOAA*



The tanker AMOCO CADIZ ran aground off the coast of Brittany on 16<sup>th</sup> March 1978 following a steering gear failure.

Over a period of two weeks the entire cargo of 223,000 tonnes of light Iranian and Arabian crude oil and 4,000 tonnes of bunker fuel was released into heavy seas. Much of the oil quickly formed a viscous water-in-oil emulsion, increasing the volume of pollutant by up to five times. By the end of April oil and emulsion had contaminated 320km of the Brittany coastline, and had extended as far east as the Channel Islands. [10] The Amoco Cadiz incident caused by a combination of external conditions and functional failure.

### **2.1.7 Large scale accidents**

Large scale maritime accidents, especially those involving fatalities and environmental pollution, get considerable media and public attention, and are often followed by debate about maritime safety, political discussions regarding the maritime safety regime, and occasionally governmental actions and international regulatory initiatives. Large scale accidents normally represent a rather small part of accident occurrences and their contribution to the total risk picture may be relatively low. There is no generally accepted definition of the term “large scale accident”, mainly because what is regarded as “large scale” may vary between different activities and the fact that we all have subjective perception of accident consequences.

[10] *International Tanker Owners Pollution Federation.*

### **MV Estonia as a large-scale accident.**

**MS Estonia**, was a cruise ferry built in 1979/80 at the German shipyard Meyer Werft in Papenburg. The ship sank in 1994 in the Baltic Sea in one of the worst maritime disasters of the 20th century. It is the deadliest European shipwreck disaster to have occurred in peacetime, costing 852 lives. According to the reports the cause of the accident is pointed in poor cargo distribution and severe weather.

The wreck was examined and videotaped by remotely operated underwater vehicles and by divers from a Norwegian company, contracted for the investigation work. The official report indicated that the locks on the bow door had failed from the strain of the waves and the door had separated from the rest of the vessel, pulling ajar the ramp behind it. The bow visor and ramp had been torn off at points that would not trigger an "open" or "unlatched" warning on the bridge, as is the case in normal operation or failure of the latches. The bridge was also situated too far back on the ferry for the visor to be seen from there. While there was video monitoring of the inner ramp, the monitor on the bridge was not visible from the conning station. The bow visor was under-designed for the conditions *Estonia* was operating in (the ferry was designed for coastal waters, not open regions like the Baltic Sea), and the visor's overhang focused the impact on a small area.

The first metallic bang was believed to have been the sound of the visor's lower locking mechanism failing, and subsequent noises were the visor 'flapping' against the hull as the other locks failed, before tearing free and exposing the bow ramp. The subsequent failure of the bow ramp allowed water into the vehicle deck, which was identified as the main cause of the capsizing and sinking: RORO ferries with their wide vehicle decks are particularly vulnerable to capsizing if the car deck is even slightly flooded because of free surface effect: the fluid's swilling motion across such a large area hampers the boat's ability to right itself after rolling with a wave.

Search and rescue followed arrangements set up under the 1979 International Convention on Maritime Search and Rescue (the SAR Convention) and the nearest Maritime Rescue Coordination Centre MRCC Turku coordinated the effort in accordance with Finland's plans. The Baltic is one of the world's busiest shipping areas with 2,000 vessels at sea at any time and these plans assumed the ship's own boats and nearby ferries would provide immediate help and helicopters could be airborne after an hour. This scheme had worked for the relatively small number of accidents involving sinkings (3 in 2006), particularly as most ships have few people on board.

*Mariella*, the first of five ferries to reach the scene of the accident, arrived at 02:12. Maritime Rescue Coordination Centre Turku failed to acknowledge the Mayday immediately and *Mariella's* report was relayed by Helsinki Radio as the less urgent pan-pan message.

A full-scale emergency was only declared at 02:30. *Mariella* winched open life rafts into the sea onto which 13 people on *Estonia's* rafts successfully transferred, and reported the location of other rafts to Swedish and Finnish rescue helicopters, the first of which arrived at 03:05. [11] The former took survivors to shore, while the latter—Finnish border guard helicopters Super Puma *OH-HVG* and Agusta Bell 412 *OH-HVD*—chose the riskier option of landing on the ferries. The pilot of *OH-HVG* stated that landing on the ferries was the most difficult part of the whole rescue operation; despite that, this single helicopter rescued 44 people, more than all the ferries. *Isabella* saved 16 survivors with her rescue slide.

[11] Soomer, H.; Ranta, H.; Penttilä, A. (2001). "Identification of victims from the M/S Estonia". *International Journal of Legal Medicine*



Figure 8. MS Estonia as Viking Sally from the Viking Line Company in the 80's. (Photo by Mark Markefelt)

## 2.2 Maritime disaster management system

### 2.2.1 Concept

Disaster Management defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters. A phase of disaster model is normally made to help officers involved in disaster and emergency situations to prepare for and respond to a disaster, also known as the 'life cycle' of comprehensive emergency management. The four phases of disaster: 1) Mitigation; 2) Preparedness; 3) Response; and 4) Recovery.

The model helps frame issues related to disaster preparedness as well as recovery after a disaster. Each phase has particular needs, requires distinct tools, strategies, and resources and faces different challenges.



Incidents are managed by aiming towards specific objectives. Objectives are ranked by priority; should be as specific as possible; must be attainable; and if possible given a working time-frame. Objectives are accomplished by first outlining strategies (general plans of action), then determining appropriate tactics (how the strategy will be executed) for the chosen strategy.

### **2.2.2 Purpose of a maritime disaster management system**

Emergency planning should aim to prevent disasters from occurring, and failing that, should develop a good action plan to mitigate the results and effects of any emergencies. As time goes on, and more data becomes available, usually through the study of emergencies as they occur, a plan should evolve. The development of emergency plans is a cyclical process, common to many risk management disciplines, such as Business Continuity and Security Risk Management, as set out below:

- Recognition or identification of risks
- Ranking or evaluation of risks
  - Responding to significant risks
    - Tolerate
    - Treat
    - Transfer
    - Terminate
- Resourcing controls
- Reaction Planning
- Reporting & monitoring risk performance
- Reviewing the Risk Management framework

There are a number of guidelines and publications regarding Emergency Planning, published by various professional organizations.

There are very few Emergency Management specific standards and emergency management as a discipline tends to fall under business resilience standards.

In order to avoid, or reduce significant losses to a business, emergency managers should work to identify and anticipate potential risks, hopefully to reduce their probability of occurring. In the event that an emergency does occur, managers should have a plan prepared to mitigate the effects of that emergency, as well as to ensure Business Continuity of critical operations post-incident. It is essential for an organization to include procedures for determining whether an emergency situation has occurred and at what point an emergency management plan should be activated.

An emergency plan must be regularly maintained, in a structured and methodical manner, to ensure it is up-to-date in the event of an emergency. Emergency managers generally follow a common process to anticipate, assess, prevent, prepare, respond and recover from an incident.

Emergency management plans and procedures should include the identification of appropriately trained staff members responsible for decision-making when an emergency occurs. Training plans should include internal people, contractors and civil protection partners, and should state the nature and frequency of training and testing.

Testing of a plan's effectiveness should occur regularly. In instances where several business or organizations occupy the same space, joint emergency plans, formally agreed to by all parties, should be put into place.

When it comes to the maritime area, a maritime disaster management system sets arrangements and principles for the management of maritime emergencies, as well to provide comprehensive response to maritime environmental emergencies regardless of costs that

might be attributed. The maritime disaster management system applies to incidents that have or may occur include, but are certainly not limited to the following:

- Maritime accidents involving large passenger vessels incidents including groundings, collisions, capsize or sinking maritime casualties, fire at sea or in port, chemical spills, etc.
- Any potential and actual pollution of the sea or harm to the marine environment by any hazardous and noxious substance.
- Maritime casualties requiring salvage and intervention, emergency towage and requests for a place of refuge.
- Aircraft emergency landing or crash at sea or in tidal area.
- Land disaster requiring maritime evacuation.

Some factors must be considered when determining the scope.

- Size and seriousness of the impacted area.
- Range of special needs and skills needed.
- Damage to the operative's agencies units involved.
- Number of external partners interested in collaboration.
- Potential political and media interest.

The scale and scope of an incident will eventually influence the amount of resources that a disaster/incident management system will need to effectively respond.

Communication is one of the key issues during any emergency, pre-planning of communications is critical. Miscommunication can easily result in emergency events escalating unnecessarily. Once an emergency has been identified a comprehensive assessment evaluating the level of impact and its financial implications should be undertaken. Following assessment, the appropriate plan or response to be activated will depend on a

specific pre-set criteria within the emergency plan. The steps necessary should be prioritized to ensure critical functions are operational as soon as possible.

### **2.2.3 Essential elements on Disaster management**

Disasters causing damage to human life, property, infrastructure and economy has emerged as a global challenge. Requisite safety measures have to be provided for natural hazards. Prevention is better than cure. Once disaster occurred, it is very difficult to handle and control it. Hence proper planning shall always handle and mitigate the various kinds of disasters effectively, for which open, transparent and efficient systems have to be followed.

#### **Policies**

Policies are the basic guideline which dictates the thinking style as well as the actions to achieve the desired goals /objectives.

1. Principles, rules/norms have to be adopted by the management.
2. Target, authorities, norms and standards have to set.
3. Formation and functioning of safety committees. Safety personnel, scope and responsibilities to provide: A) suitable base for coordination of safety activities in the various levels. B) Cogent, coherent and distinct objectives of goals. C) Fruitful cooperation to translate safety activities into action at all levels. D) Effective platform for initiation and motivation in the field of safety E) Provide a course of action, which can ensure the accepted norms of safety are not violated. F) Identification and Prediction of Hazards that has the potential for injury or damage to the property.

## Life cycle of a disaster

There is a need for systematic identification, preparation, prediction, assessment, evaluation of disaster events and incorporation of mitigate measures. A substantial reduction in the impact of natural disasters will be achieved through emphasis on pre-disaster activities including planning, prevention/ disaster mitigation and emergency preparedness while sustaining and further improving post disaster relief and management capabilities. Figure XX shows the life cycle of a disaster.

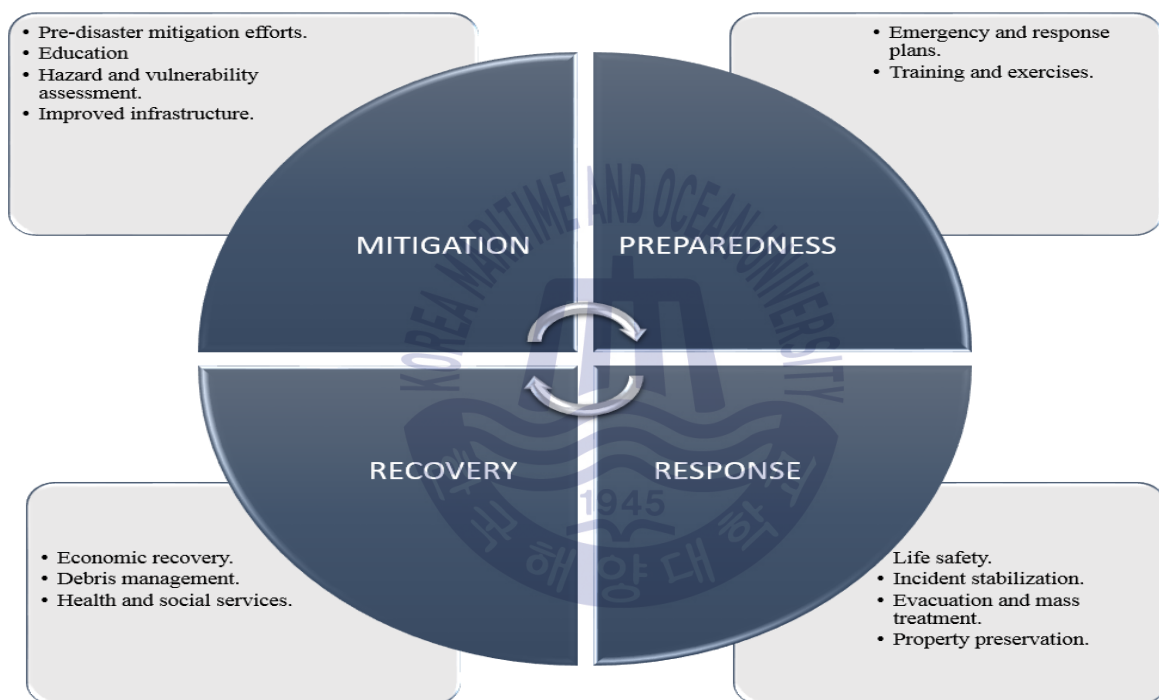


Figure 9. Life cycle of a disaster

- **Mitigation** - Mitigation activities actually eliminate or reduce the probability of disaster occurrence, or reduce the effects of unavoidable disasters. Mitigation measures include building codes; vulnerability analyses updates; zoning and land use management; building use regulations and safety codes; preventive health care; and public education.

- Preparedness - The goal of emergency preparedness programs is to achieve a satisfactory level of readiness to respond to any emergency situation through programs that strengthen the technical and managerial capacity of governments, organizations, and communities. These measures can be described as logistical readiness to deal with disasters and can be enhanced by having response mechanisms and procedures, rehearsals, developing long-term and short-term strategies, public education and building early warning systems. Preparedness can also take the form of ensuring that strategic reserves of food, equipment, water, medicines and other essentials are maintained in cases of national or local catastrophes.
- Response - The aim of emergency response is to provide immediate assistance to maintain life, improve health and support the morale of the affected population. Such assistance may range from providing specific but limited aid, such as assisting refugees with transport, temporary shelter, and food, to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found.
- Recovery - As the emergency is brought under control, the affected population is capable of undertaking a growing number of activities aimed at restoring their lives and the infrastructure that supports them. There is no distinct point at which immediate relief changes into recovery and then into long-term sustainable development. There will be many opportunities during the recovery period to enhance prevention and increase preparedness, thus reducing vulnerability. Ideally, there should be a smooth transition from recovery to on-going development.

## Organization

A key objective for any counter-disaster organization is that it should be capable of intervening rapidly and effectively in disaster situations. The following factors are fundamental to determining organizational structures and need to be considered as a first step.

- The physical and geographical nature of the country. For instance, distance alone can be an important factor, as can the multi-island configuration of a country.
- The nature, extent, and severity of the disaster threat, and the broad requirements which these pose in disaster management terms.
- Any formal directions that may have been issued by government concerning disaster management; for instance, legislation or policy statements.
- A broad concept of the scope of activity to be covered by the organizational structure needs to be defined; for instance, whether it is to cover all aspects of the disaster management cycle or only certain parts of it.
- Similarly, a general definition needs to be made of the levels of government structure that will constitute major segments of the structure.
- A general assessment should also be made of the need for and the value and practicability of decentralization. For instance, effective decentralization is a valuable asset if major parts of the organizational structure are put out of action by disaster impact.

## Resources

Most disaster management organizations need to hold various categories of emergency equipment and supplies. These will vary according to individual requirements but usually the following need to be stored and maintained:

- Transportation (vehicles, aircraft, ships)
- Emergency equipment such as generators, emergency lighting sets, blankets, tents, and communications equipment.
- Facilities are needed to house emergency operations centers, communications sections, conference/briefing rooms, offices, equipment stores and so on. In many countries, a dual-purpose approach is taken toward this aspect.
- Training equipment.

### 2.3 Milestones in Maritime safety.

In response to the sinking of the “*RMS Titanic*”, the first version of Safety of life at sea convention (SOLAS) was passed in 1914. It prescribed numbers of lifeboats and other emergency equipment along with safety procedures, including continuous radio watches. [12]

As at March 2016, SOLAS 1974 has 162 contracting States, which flag about 99% of merchant ships around the world in terms of gross tonnage. The 1914 treaty never entered into force due to the outbreak of the First World War. Newer version was adopted since 1929 to this day.

The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety.

[12] Text of the Convention for the Safety of Life at Sea, Signed at London, January 20, 1914.



Flag States are responsible for ensuring that ships under their flag comply with its requirements, and a number of certificates are prescribed in the Convention as proof that this has been done. Control provisions also allow Contracting Governments to inspect ships of other Contracting States if there are clear grounds for believing that the ship and its equipment do not substantially comply with the requirements of the Convention - this procedure is known as PSC (Port State control.)

The current SOLAS Convention includes articles setting out general obligations, amendment procedure and so on, followed by an Annex divided into 14 Chapters. [13]

To address the maritime pollution either by accident or intentional the International Convention for the Prevention of Pollution (MARPOL 73/78) was created. In 1973, IMO adopted the International Convention for the Prevention of Pollution from Ships which has been amended by the Protocols of 1978 and 1997 and kept updated with relevant amendments.

The MARPOL Convention addresses pollution from ships by oil; by noxious liquid substances carried in bulk; harmful substances carried by sea in packaged form; sewage, garbage; and the prevention of air pollution from ships. MARPOL 73/78 is one of the most important international marine environmental conventions. It was developed by the International Maritime Organization in an effort to minimize pollution of the oceans and seas. The objective of this convention is to preserve the marine environment in an attempt to completely eliminate pollution by oil and other harmful substances and to minimize accidental spillage of contaminating substances. [14]

[13] IMO International Convention for the Safety of Life at Sea (SOLAS), 1974

[14] IMO MARPOL73-78: Brief history - list of amendments to date and where to find them.

The Convention includes regulations aimed at preventing and minimizing pollution from ships - both accidental pollution and that from routine operations - and currently includes six technical Annexes. Special Areas with strict controls on operational discharges.

The control of safety is primarily based on conventions and resolutions given by the International Maritime Organization. The regulations of safety are based on a set of international rules that is adopted by the legislative assembly. The rules and regulations are written or translated by the responsible government branch.

International Convention on Maritime Search and Rescue (SAR) adopted in 1979 at a Conference in Hamburg was aimed at developing an international SAR plan, so that, no matter where an accident occurs, the rescue of persons in distress at sea will be coordinated by a SAR organization and, when necessary, by co-operation between neighboring SAR organizations. [15]

Although the obligation of ships to go to the assistance of vessels in distress was enshrined both in tradition and in international treaties (such as the International Convention for the Safety of Life at Sea SOLAS, 1974), there was, until the adoption of the SAR Convention, no international system covering search and rescue operations. In some areas there was a well-established organization able to provide assistance promptly and efficiently, in others there was nothing at all.

The technical requirements of the SAR Convention are contained in an Annex, which was divided into five Chapters. Parties to the Convention are required to ensure that arrangements are made for the provision of adequate SAR services in their coastal waters.

[15] IMO International Convention on Maritime Search and Rescue (SAR) 1985

Parties are encouraged to enter into SAR agreements with neighboring States involving the establishment of SAR regions, the pooling of facilities, establishment of common procedures, training and liaison visits. The Convention states that Parties should take measures to expedite entry into its territorial waters of rescue units from other Parties.

The Convention then goes on to establish preparatory measures which should be taken, including the establishment of rescue co-ordination centers and sub-centers. It outlines operating procedures to be followed in the event of emergencies or alerts and during SAR operations. This includes the designation of an on-scene commander and his duties. Following the adoption of the 1979 SAR Convention, IMO's Maritime Safety Committee divided the world's oceans into 13 search and rescue areas, in each of which the countries concerned have delimited search and rescue regions for which they are responsible. A revised Annex to the SAR Convention was adopted in May 1998 and entered into force in January 2000. The revised technical Annex of the SAR Convention clarifies the responsibilities of Governments and puts greater emphasis on the regional approach and co-ordination between maritime and aeronautical SAR operations.

The Maritime Administration will ensure that the regulations are followed by the ship owners through proper control and certification that is termed Flag State Control.

We should keep in mind that a number of factors have an impact of safety such as: Flag State Control, IMO, Classification societies, Insurance companies, charterer and cargo owner. When speaking and using the term safety, it will cover:

- Safety and health of persons.
- Environmental aspects.

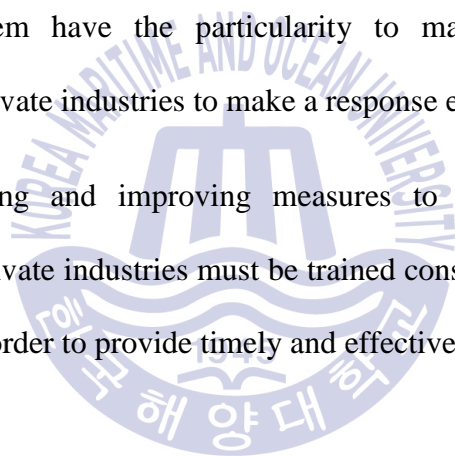
Many countries have developed a series of measures and system in order to protect the lives of those working in these areas, and to protect and preserve the marine environment.

These measures have the obligation to cover all maritime emergency situations such as Search and Rescue, survivor care and pollution contingency.

According to the Marine Department, Malaysia, 2009 approximately 60% of the main causes of maritime accidents were caused by human error; the Maritime Information for injured workers appoint from 76% to 96% of marine casualties to human followed by equipment failure, weather and hazardous/dangerous goods. In the European Union marine casualties from 2011 to 2013 raised from 1199 to 2550 as stated in the report “Annual Overview of Marine Casualties and Incidents 2014” by the European Maritime Safety Agency.

Measures and system have the particularity to make joint response between government agencies and private industries to make a response effective and efficiently.

Constantly developing and improving measures to give an adequate response government agencies and private industries must be trained constantly and make sure to have the necessary equipment in order to provide timely and effective response in any emergency.



### **Chapter III. THE CURRENT STATUS AND PROBLEMS OF MARITIME DISASTER MANAGEMENT SYSTEM IN THE DOMINICAN REPUBLIC**

The Dominican Republic is located on the island of Hispaniola, part of the Greater Antilles archipelago in the Caribbean region. The western three-eighths of the island is occupied by the nation of Haiti, making Hispaniola one of two Caribbean islands, along with Saint Martin, that are shared by two countries. Both by area and population, the Dominican Republic is the second largest Caribbean nation (after Cuba), with 48,445 square kilometers (18,705 sq. mi) and an estimated 10 million people, one million of which live in the capital city, Santo Domingo.

#### **3.1 International treaties.**

The Dominican Republic is signatory of conventions and protocols relatives to the protection of the marine environment, safety and protection of ships and ports.

Among the conventions and protocols the Dominican Republic is signatory of: IMO convention 48, MARPOL 73/78, SOLAS, Convention of the High Seas, COLREG 72, FAL 65 Load Lines convention 66, Facilitation convention 65, London convention 72, Intervention convention 69, International Convention on Civil Liability for Oil Pollution Damage convention 69 and Protocol 92, International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage Protocol 92, Suppression of Unlawful Acts against the Safety of Maritime Navigation convention 88 and 2005, SUA Protocol 2005 and International Ship and Port Facility Security (ISPS) Code.

## **3.2 Maritime Disaster Management System in the Dominican Republic**

Because of its nature of an island, the Dominican Republic requires the sea for its economy in general; the country is not free of the occurrence of a maritime disaster either by ship or aircraft. The country beside the commercial ships that enters its ports, also relies on tourism, receiving around the 20% of all the tourist in the Caribbean with around 7 million tourists per year and increasing every year.

### **3.2.1 Legal system.**

In 2000 the IDB and the Secretary of the Presidency of the Dominican Republic began investing close to US\$12 million to develop a more comprehensive disaster management system in the country, with a specific focus on mitigation and prevention activities. Prior to this effort, disaster management fell exclusively under the control of the military-based civil defense organization. [16]

The Dominican Republic law 147-02 about Risk Management, given in the Dominican Republic congress in year 2002, has for objective to protect human life and national properties in the event of danger or disasters as well as describe the phases of disaster. Also, it appoints the organizations who will manage emergencies. But, regarding specific laws or plans, the Dominican Republic at this moment does not count with specific laws or acts regarding SAR and oil pollution that defines the terms, issues and the general considerations of maritime emergencies and thus, lacks of a Maritime Disaster Management System and its procedures to effectively respond and conduct recovery operations on its own.

[16] World bank institute distance learning, Natural Disaster Risk management Program.

### **3.2.2 Competent authorities.**

#### **Dominican Republic Navy**

##### **Overview**

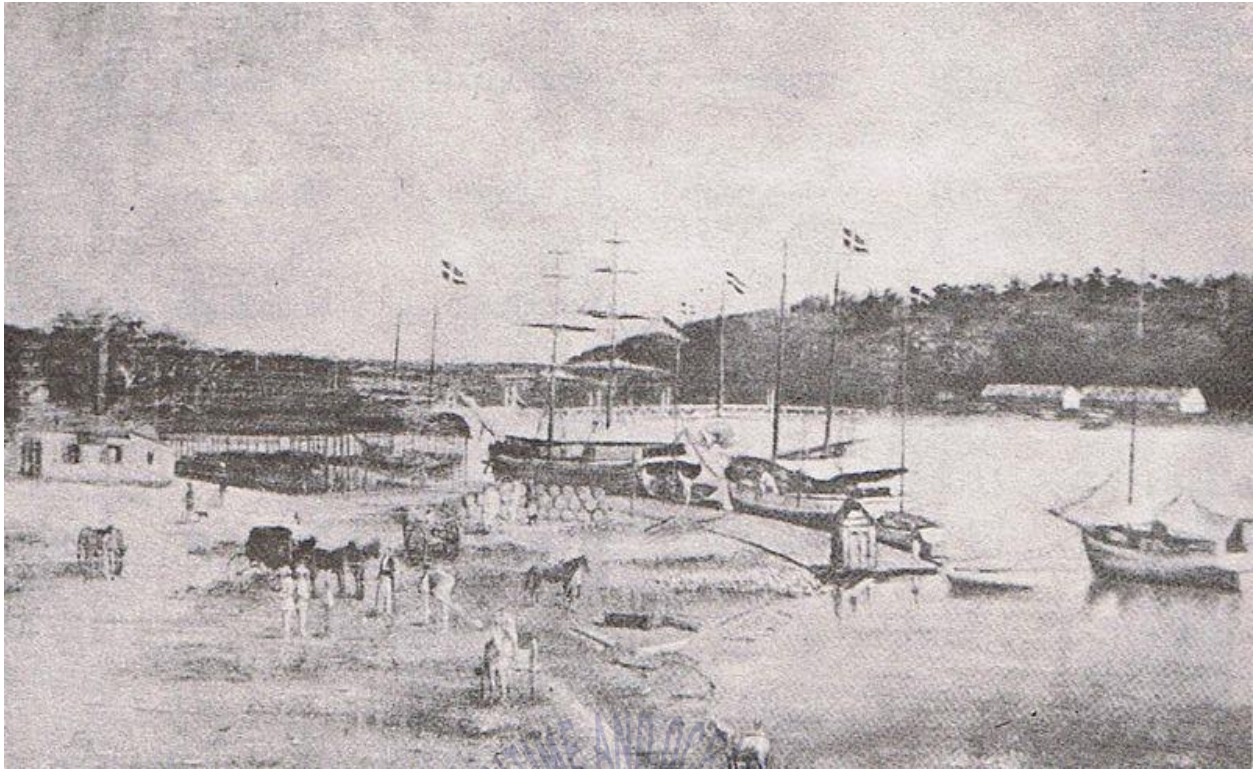
The Dominican Republic Navy by law 3003 is the maritime authority in the country, as part of the country's founders to build the country, was created on the year of the declaration of independence from Haiti. After gaining its independence on February 27<sup>th</sup> of 1844, three schooners were commissioned, the "Separación Dominicana"(flagship), the "Maria Chica" and the "Leonor" creating this way the Dominican Navy.

These were the original three Dominican vessels which were incorporated in the newly created Dominican Navy as authorized by the Government Central Board with the Naval Act of 1844 on April 23, 1844, the same day the Navy was created.

During independence campaign, from 1844 to 1956, the naval fleet gave fire support to the Dominican army along the coastline also by transporting personnel and supplies to the southern theater of the campaign.

In 1893 the navy went into a restructuring by creating the Dominican Naval Academy with instructors of Engineering, Artillery and navigation from Spain.





*Figure 10. Part of the Dominican fleet in Santo Domingo Port circa 1850. Picture by Franco Pichardo History of the Dominican people.*

Through the years the active personnel of the navy were decreasing causing the navy to serve as a detachment of the National Guard. After the incorporation of three patrol boats and the construction of the “27 Febrero” Naval base the Navy was restored in 1944.

By 1947 this time the navy active ships included one frigate, one corvette, one schooner training ship, 10 patrol boats and 3 auxiliary ships.

From the end of the 1940’s and during the decade of the 1950 the under the regime of president Rafael L. Trujillo, the Dominican Navy became to the most powerful navy in the Caribbean, the fleet which consisted in in several destroyers, frigates, corvettes, minelayers, patrol boats and auxiliary vessels. By the decade of 1980’s the Armed Forces had economic limitations and the navy suffered these effects, the fleet was decreased in active ships to a single frigate and several patrol boats.

## **Mission**

The Dominican Republic Navy, whose mission is to defend the integrity, sovereignty and independence of the nation at sea, ensuring compliance with the Constitution, laws and international agreements and legal protection of traffic and maritime industries, for the purpose of safeguard the interests of the Dominican State to ensure national development and peace.

As a secondary mission is our responsibility to maintain law and order on our shores and territorial waters, protect our marine environment, protect the legal industry and maritime traffic, fight piracy, drug trafficking and contraventions laws and regulations on navigation, maritime trade and fishing force in the country, as well as the laws and provisions of international treaties to which we are signatories.

## **Vision**

Being recognized as the institution of the Dominican Armed Forces with the highest levels of professionalism, morale and efficiency in fulfilling its mission. Personnel management is one of the most important functions performed in the Dominican Republic Navy, because they have to coordinate skills and behavior of different individuals to work together towards achieving the goals set by our naval institution.

## **Actual situation**





The Dominican Navy lacks of offensive assets such as destroyers and frigates thus does not possess advanced weaponry, which limits its operations to combat new threats such as anti-narcotics operations, illegal immigration, border protection Search and Rescue (SAR), natural resources protection and the as the nation's maritime authority, it is the Navy's responsibility to enforce laws and decrees of international treaties to which the country is signatory.

## Equipment

The Dominican Navy operates around 15 patrol boats along with 10 interceptor boats and auxiliary ships. The Navy also relies on the Naval Auxiliary Corps which is composed of civilians that own and uses their resources to assist the navy in non-military or law-enforcement operations such as search and Rescue (SAR), environmental protection and aid to navigation duties. The Navy also possesses small riverine and go-fast crafts and one fixed wing aircraft, a Piper PA-34 Seneca.

<p>(1) Seagoing Buoy Tender 180' Cactus Class A - PA-301 Almirante Didiez Burgos</p>	 A large blue and white seagoing buoy tender with the number 301 on its side, sailing on the open sea under a clear sky.
<p>(2) Coastal Buoy Tender 133' White Class - PM-203 "Tortuguero" - PM-204 "Capotillo"</p>	 A white coastal buoy tender with a blue and white flag, sailing on the open sea.
<p>(1) Patrol Boat Swiftships 115' Class - GC-112 "Altair"</p>	 A grey patrol boat with the number 112 on its side, sailing on the water with several crew members visible on deck.



<p>(2) Patrol Boat Swiftships 110' Class</p> <ul style="list-style-type: none"> <li>- GC-107 "Canopus"</li> <li>- GC-109 "Orión"</li> </ul>	
<p>(4) Patrol Boat 85' Seaward Class</p> <ul style="list-style-type: none"> <li>- GC-103 "Procion"</li> <li>- GC-104 "Aldebarán"</li> <li>- GC-106 "Bellatrix"</li> <li>- GC-108 "Capella"</li> </ul>	
<p>(2) Patrol Boat 82' Point Class</p> <p>GC-105 "Antares"</p> <p>GC-110 "Sirius"</p>	
<p>(3) Patrol Boat Damen Stan Patrol 1500 Class</p> <ul style="list-style-type: none"> <li>- LR-151 "Hamal"</li> <li>- LR-153 "Deneb"</li> <li>- LR-154 "Acamar"</li> </ul>	

(11) 32' Defender Class Boston Whaler

Justice Speedboat

- LI-158 "Shaula"
- LI-159 "Enif"
- LI-161 "Elnath"
- LI-162 "Polaris"
- LI-163 "Nunki"
- LI-164 "Dubhe"
- LI-165 "Denebola"
- LI-166 "Regulus"
- LI-167 "Acrux"
- LI-168 "Algenib"
- LI-169 "Castor"



(2) Damen Stan Tug 2608 Class

- RM-2 "Guarionex"
- RM-3 "Guaroa"



(1) Oceangoing Tug

- RM-5 "Tamayo"



(1) Landing Craft Utility LCU-1600 Class'  
- LD-31 "Neyba"



Table 3. Dominican Navy fleet.



Figure 11. 1954 Naval Mission to Spain. Midshipmen onboard D-101 "Presidente Trujillo" destroyer.

### **Dominican Naval Auxiliary.**

Is a uniformed auxiliary component, formed by civilians, that voluntarily supports the Dominican Republic Navy in Search and Rescue missions, protection of maritime environment and promote maritime safety for leisure boats operators. This component operates 265 boats (Yachts, fishing vessels, speed boats, etc) and 7 fixed wing and rotary aircraft.





*Figure 12. Vice-admiral Cesar DeWindt Lavandier Naval Academy, Dominican Navy.*

### **National Authority for Maritime Affairs**

With the promulgation of law 66-07 that declares the Dominican Republic as an Archipelago State, it creates the National Authority for Maritime Affairs, a body of public law whose main function is to ensure the research, conservation and exploitation of the living and non-living resources of the sea, the seabed, and the subsoil of the seabed. It has as function to assist the state with the technical, scientific and juridical knowledge for the policy creation for conservation and rational exploitation of the living and non-living resources of the sea, to procure a correct administration and promoting the maritime sector development.



## **Dominican Ports Authority**

The Dominican Ports Authority, created by law 70-70, has as function to establish administrations in Dominican ports and constitute its facilities extending all ports, docks and its terrain as well as the anchorages of the country as well as to aid in the traffic of vessels while entering or departing ports and anchorages.

### **3.2.3 Current situation and problems**

Although maritime accidents around the Dominican Republic is a rare occurrence but as long as the maritime shipping, maritime leisure activities and flights continues the need for a Maritime disaster management system focused on Search and Rescue and its procedures are vital to conduct effective rescue operations.

The Dominican Republic had suffered two large scale air-maritime accidents, which will be described below.

1- The Dominicana de Aviación Santo Domingo DC-9 air disaster occurred on February 15, 1970 when a Dominicana de Aviación (Dominican Airlines) McDonnell Douglas DC-9-32 twin-engine jet airliner crashed two to three minutes after taking off from Santo Domingo, Dominican Republic en route to San Juan, Puerto Rico. The crash killed all 102 passengers and crew on board. An official report on the causes was never made but some non-official reports indicate that the fuel was contaminated with water which affects the engines right after starting them.

2- Birgenair Flight 301 was a flight chartered by Turkish-managed Birgenair partner Alas Nacionales from Puerto Plata in the Dominican Republic to Frankfurt, Germany, via Gander, Canada, and Berlin, Germany. On 6 February 1996, the Boeing 757-225 operating the route crashed shortly after take-off from Puerto Plata's Gregorio Luperón International Airport.

There were no survivors. The cause was a pilot tube that investigators believe was blocked by a wasp nest that was built inside it.

The Dominican Navy eventually worked on the rescue efforts of both accidents casualties and debris, with the assistance of the United States Coast Guard. Besides these two accidents, minor accidents related to small recreational boats and illegal immigration bound to Puerto Rico.

The Dominican Republic is vulnerable to natural disaster, specially hurricanes, storms and flooding because its location in the path of hurricanes but despite not having major maritime accidents, although receiving millions of tourists via cruise ships and having a charter ferry between Santo Domingo and Puerto Rico, the country is still very vulnerable to ship accident and could face a mass-rescue operation. Even though having a law that it is aimed to protect life and property, defines the terms related to emergencies and disasters, sets the levels or emergencies and responsibilities and roles, the Dominican Republic lacks of a law, plan or act to meet the requirements, the protocols, organization to face large scale maritime disasters.

### **Problems**

- 1- Legislation: The country, as mentioned before, has a law regarding Risk Management that stipulates the issues of major disasters but of specific frameworks or plans addressed to Search and Rescue at seas.
- 2- Resources: Since the 1980s the country has focused on law enforcement, illegal substance interdiction and to counter illegal immigration thus assets such as large ships were slowly being retired for smaller and faster boats, as well as the Air Force doesn't have proper helicopter for SAR missions but utility helicopters. The Armed Forces also faces budget restrictions that makes them unavailable to better equip its forces.

3- Multi-agency cooperation: It is known globally, that in an event of a maritime disaster, interoperability is one of the most important things to consider because first responders need to be able to communicate during this wide-scale emergency. This is one of the fundamental factors the Dominican Republic may face in the event of a large scale search and rescue operation.

4- Continuous training: While the Dominican navy participates in annual international exercises with other Coast Guards and Navies such as Tradewinds, Panamax, UNITAS, etc. But locally the country neglects on SAR training continuously that in most cases is a resultant from the limited resources.

5- Drills: This goes by hand with training, in order to minimize the impact, it is necessary that every person in this specific situation knows what to do and for this it is required continuous and repeated drills. These drills must be based on the experience of real scenarios. The drills have to be performed frequently to ensure that no one forgets the processes.

### **3.3 Summary and issues to be solved**

In this chapter we described the actual situation and problems that face the Dominican Republic related to a maritime system to effectively respond to maritime disaster, focused in Search and Rescue. While the Dominican Republic Navy has training in SAR operations it lacks the proper tools to address a mass-rescue operation.

We revised the legal system, which has a law to address Risk Management in general, as well as definition of terms and the assignment of responsibilities and roles. We saw the three authorities related to the maritime area and their function to the country and government.

The issues related to this matter to be solved in the country shall start elaboration of a Search and Rescue law or decree. But no before, defining the short and long term issues that

can affect the legal maritime industries, in this particular case leisure and transportation. Moreover, to increase the equipment for Search and Rescue operations to the institutions that are at this moment and will be by appointed responsible by law in case it is created.

In short, the issues to be solved are: Legal basis along with the plans and protocols and provisions of resources in general.



## **Chapter IV. MARITIME DISASTER MANAGEMENT SYSTEMS IN FOREIGN COUNTRIES**

### **4.1 The United States of America.**

#### **4.1.1 Homeland Security Act .**

In November 25<sup>th</sup> 2002 by Public Law 107-296 also known as the Homeland Security Act, the United States Department of Homeland Security (DHS) is created as a cabinet department of the United States federal government with responsibilities in public security.

The Homeland Security Act defines the concepts and terms related to public security, although in the United States, the term disaster was defined in the Public law 100-707 also known as the Stafford Act.

The mission for the Department of Homeland Security: *“carry out all functions of entities transferred to the Department, including by acting as a focal point regarding natural and manmade crises and emergency planning.”* [17] Other missions involve antiterrorism, border security, immigration and customs, cybersecurity, and disaster prevention and management.

As part of the National Strategy for Homeland Security, and an essential component of the National Preparedness System mandated in Presidential Policy Directive (PPD) 8: National Preparedness which is aimed at strengthening the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to the security of the Nation the National Response Framework was elaborated.

[17] Title I – Department of Homeland Security Sec. 101 Executive Department; mission. Public law 107-296

**Department of Homeland Security organization.**

**U.S. Department of Homeland Security**

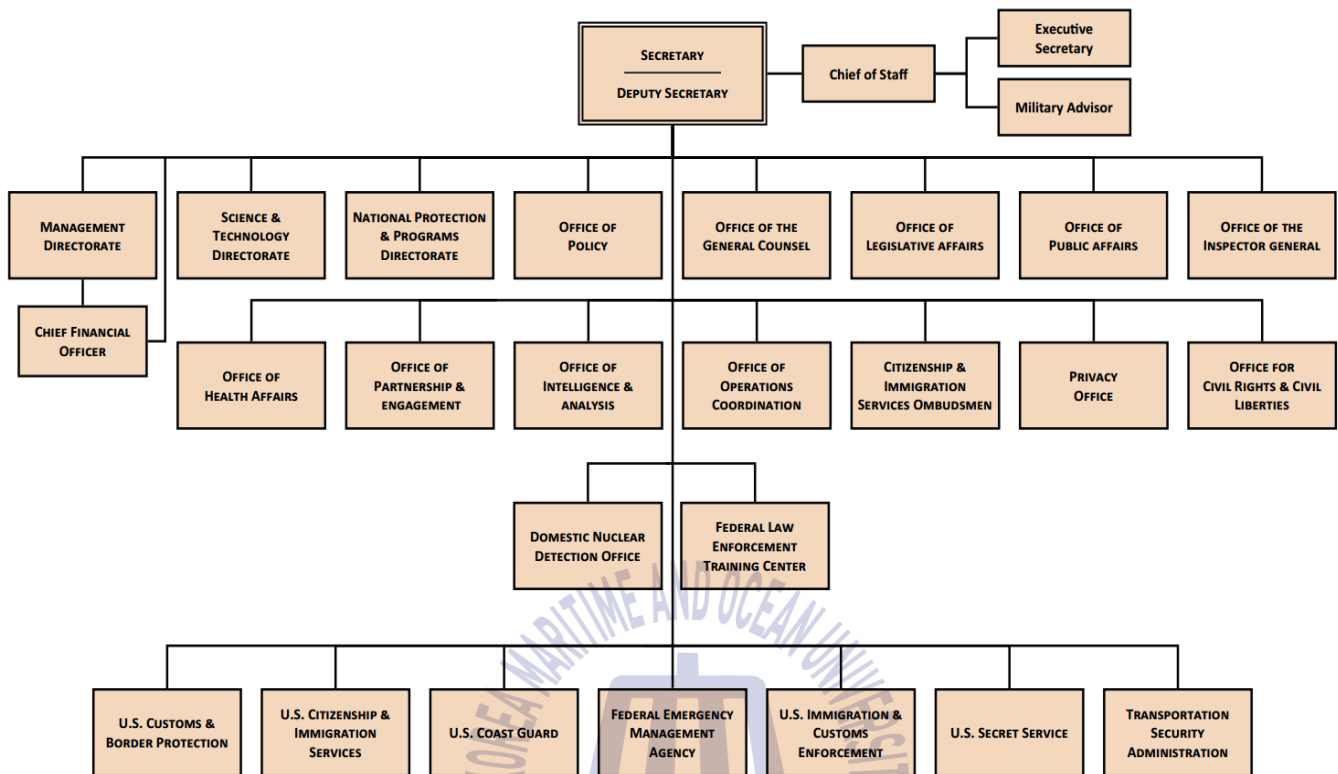


Figure 13. DHS organizational chart

**4.1.2 Federal Emergency Management Agency (FEMA)**

An agency of the United States Department of Homeland Security, initially created by Presidential Reorganization Plan No. 3 of 1978 and implemented by two Executive Orders on April 1, 1979. FEMA’s purpose is to support our citizens and first responders to ensure that as a nation to work together to build, sustain and improve our capability to prepare for, protect against, respond to, recover from and mitigate all hazards.[18]

The governor of the state in which the disaster occurs must declare a state of emergency and formally request from the president that FEMA and the federal government respond to the disaster.

[18] Executive Order 12127--Federal Emergency Management Agency". Federation of American Scientists.



FEMA also provides these services for territories of the United States. Following the September 11, 2001, attacks, Congress passed the Homeland Security Act of 2002, which created the Department of Homeland Security (DHS) to better coordinate among the different federal agencies that deal with law enforcement, disaster preparedness and recovery, border protection and civil defense. FEMA was absorbed into DHS effective March 1, 2003. As a result, FEMA became part of the Emergency Preparedness and Response Directorate of Department of Homeland Security

#### **4.1.3 National Response Framework (NRF)**

In 2003, in compliance with Homeland Security Presidential Directive/HSPD-5 Management of Domestic Incidents, the newly established DHS published the National Response Plan (NRP) as the first national plan integrating all levels of government, the private sector and NGOs into a common incident management framework. With continued maturation of the NRF and the requirements set forth in the 2011 Presidential Policy Directive/PPD-8: National Preparedness, the mandate for integrated whole community plans across five mission areas of Prevention, Protection, Response, recovery and mitigation is stronger.

The United States has developed the National Response Framework as a guide to how the nation will respond to all types of disasters and emergencies. It is built on scalable, flexible, and adaptable concepts identified in the *National Incident Management System (NIMS)* to align key roles and responsibilities across the Nation. This Framework describes specific authorities and best practices for managing incidents that range from the serious but purely local to large-scale terrorist attacks or catastrophic natural disasters.

The National Response Framework describes the principles, roles and responsibilities, and coordinating structures for delivering the core capabilities required to respond to an

incident and further describes how response efforts integrate with those of the other mission areas.

The NRF sets the doctrine for how the Nation builds, sustains, and delivers the response core capabilities identified in the National Preparedness Goal (the Goal). The Goal establishes the capabilities and outcomes the Nation must accomplish across all five mission areas in order to be secure and resilient.

NRF mission areas:

**Prevention:** The capabilities necessary to avoid, prevent, or stop a threatened or actual act of terrorism. As defined by PPD-8, the term “prevention” refers to preventing imminent threats.

**Protection:** The capabilities necessary to secure the homeland against acts of terrorism and manmade or natural disasters.

**Mitigation:** The capabilities necessary to reduce loss of life and property by lessening the impact of disasters.

**Response:** The capabilities necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred.

**Recovery:** The capabilities necessary to assist communities affected by an incident to recover effectively.

The Response mission area focuses on ensuring that the Nation is able to respond effectively to all types of incidents. The objectives of the Response mission area define the capabilities necessary to save lives, protect property and the environment, meet basic human needs, stabilize the incident, restore basic services and community functionality, and establish a safe and secure environment moving toward the transition to recovery.

The Response mission area includes 14 core capabilities: planning, public information and warning, operational coordination, critical transportation, environmental response/health and safety, fatality management services, infrastructure systems, mass care services, mass

search and rescue operations, on-scene security and protection, operational communications, public and private services and resources, public health and medical services, and situational assessment.

The response protocols and structures described in the NRF align with NIMS. NIMS provide the incident management basis for the NRF and defines standard command and management structures. Standardizing national response doctrine on NIMS provides a consistent, nationwide template to enable the whole community to work together to prevent, protect against, mitigate, respond to, and recover from the effects of incidents regardless of cause, size, location, or complexity.

The NIMS concepts of multi-agency coordination and unified command are described in the command and management component of NIMS. These two concepts are essential to effective response operations because they address the importance of:

- Developing a single set of objectives.
- Using a collective, strategic approach.
- Improving information flow and coordination.
- Creating a common understanding of joint priorities and limitations.
- Ensuring that no agency's legal authorities are compromised or neglected.
- Optimizing the combined efforts of all participants under a single plan.

#### **4.1.4 Incident Command System**

A systematic tool used for the command, control, and coordination of emergency response. ICS allows agencies to work together using common terminology and operating procedures controlling personnel, facilities, equipment, and communications at a single incident scene.

It facilitates a consistent response to any highway incident by employing a common organizational structure that can be expanded and contracted in a logical manner based on the level of required response.

ICS was originally developed in the 1970s during massive wildfire suppression efforts in California and following a series of catastrophic wildfires in California's urban interface. ICS was designed to improve the overall response management effectiveness and is now used across North America and many other countries.

ICS was initially developed to address problems of inter-agency responses to wildfires in California and Arizona but is now a component of the National Incident Management System (NIMS) in the US, where it has evolved into use in All-Hazards situations, ranging from active shootings to HazMat scenes. In addition, ICS has acted as a pattern for similar approaches internationally.

ICS is flexible and expandable to deal with different types and levels of emergencies and is fully interchangeable. ICS promotes a "manageable span of control" while ensuring that all important functions are covered.

The typical ICS Structure is a single Incident Commander (IC) or Incident Manager (IM) who sets the objectives and priorities and has overall responsibility for the incident on-scene. The IC should be backed up, if necessary with additional manpower to cover Operations, Planning, Logistics and Finance/Administration if required, especially for a major incident.

### **Incident Command System organization.**

The ICS organization is built around five major components: Command, Planning, Operations, Logistics, and Finance/Administration.

These five major components are the foundation upon which the ICS organization develops. They apply during a routine emergency, when preparing for a major event, or when managing a response to a major disaster. In small-scale incidents, all of the components may be managed by one person, the Incident Commander. Large-scale incidents usually require that each component, or section, is set up separately. Each of the primary ICS sections may be divided into smaller functions as needed. The ICS organization has the capability to expand or contract to meet the needs of the incident, but all incidents, regardless of size or complexity, will have an Incident Commander.

A basic ICS operating guideline is that the Incident Commander is responsible for on-scene management until command authority is transferred to another person, who then becomes the Incident Commander.

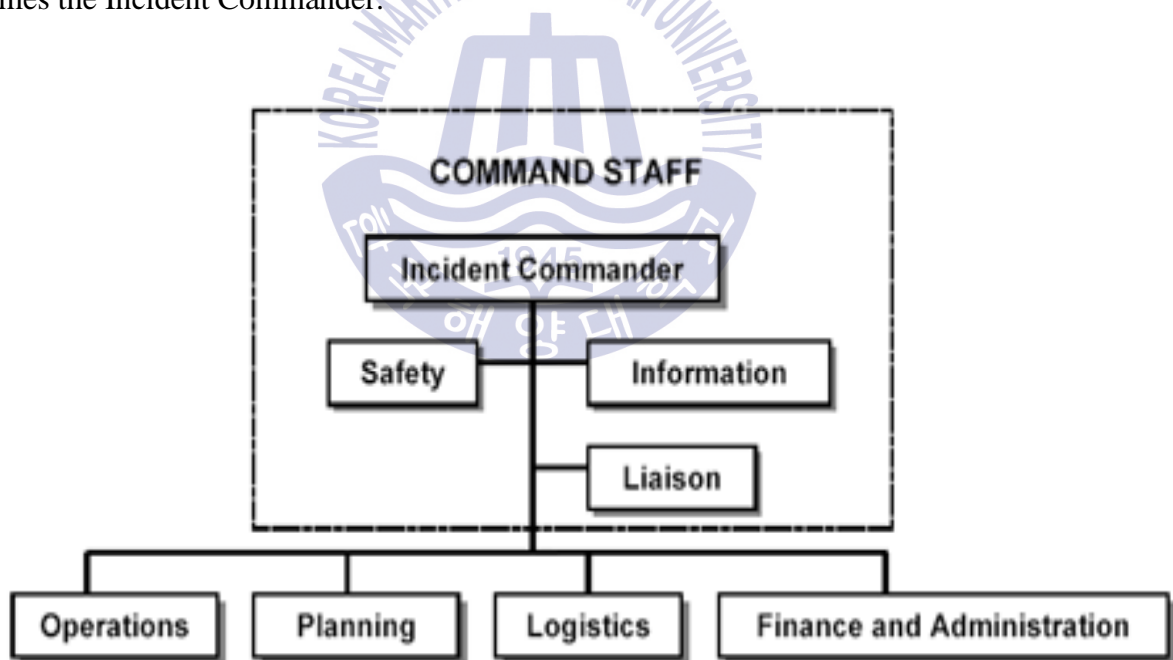


Figure 17. Incident Command System structure.

### Command.

The command function is directed by the Incident Commander, who is the person in charge at the incident, and who must be fully qualified to manage the response.

Once on scene all agencies and units assisting will report to the Incident commander who will update the lead agency regularly.

The Incident Commander will be responsible for:

- Performing command activities, such as establishing command and establishing the Incident Command Post.
- Protecting life and property.
- Controlling personnel and equipment re-sources.
- Maintaining accountability for responder and public safety, as well as for task accomplishment.
- Establishing and maintaining an effective liaison with outside agencies and organizations, including the EOC, when it is activated.

On arrival on scene the Incident Commander will set up an incident center with all available kind of communications, nautical charts, maps and the logistics needed for the incident management.

The initial plan, SAR or pollution contingency, will be forwarded to the Incident Commander by the lead agency operations department with the list of resources participating. Based on the meetings listed above, the Incident Commander will continuously update the plan and advise lead agency accordingly. The Incident Commander will consult with the lead and other partner agencies management daily on the ongoing operation. Additional resources required will be requested by the Incident Commander, and organized by lead agency.

During a prolonged incident, the Incident Commander may be relieved or temporarily released by the lead agency, advising all participating units in the operation.



## **Planning.**

In smaller events, the Incident Commander is responsible for planning, but when the incident is of larger scale, the Incident Commander establishes the Planning Section. The Planning Section's function includes the collection, evaluation, dissemination, and use of information about the development of the incident and status of re-sources. This section's responsibilities can also include creation of the Incident Action Plan (IAP), which defines the response activities and resource utilization for a specified time period.

## **Operations.**

The Operations Section is responsible for carrying out the response activities described in the Incident Action Plan. The Operations Section Chief coordinates Operations Section activities and has primary responsibility for receiving and implementing the Incident Action Plan. The Operations Section Chief reports to the Incident Commander and determines the required resources and organizational structure within the Operations Section. The Operations Section Chief's main responsibilities are to:

- Direct and coordinate all operations, ensuring the safety of Operations Section personnel.
- Assist the Incident Commander in developing response goals and objectives for the incident.
- Implement the Incident Action Plan.
- Request (or release) resources through the Incident Commander.
- Keep the Incident Commander informed of situation and resource status within operations.

### **Logistics.**

The Logistics Section is responsible for providing facilities, services, and materials, including personnel to operate the requested equipment for the incident. This section takes on great significance in long-term or extended operations.

It is important to note that the Logistics Section functions are geared to support the incident responders. For example, the Medical Unit in the Logistics Section provides care for the incident responders not civilian victims.

### **Finance/Administration.**

Though sometimes overlooked, the Finance/Administration Section is critical for tracking incident costs and reimbursement accounting. Unless costs and financial operations are carefully recorded and justified, reimbursement of costs is difficult, if not impossible. The Finance/Administration Section is especially important when the incident is of a magnitude that may result in a Presidential Declaration. Each of these functional areas can be expanded into additional organizational units with further delegation of authority. They also may be contracted as the incident deescalates.

The Incident Command System operates according to basic principles to ensure quick and effective resource commitment and to minimize disruption of usual operating policies and procedures of responding organizations. These principles include:

- Common terminology, which ensures that all responders use terms that are standard and consistent.
- A modular organization, which enables the ICS structure to expand or contract to meet the needs of the incident.
- Integrated communications, which establishes a common communications plan, standard operating procedures, clear text, common frequencies, and common terminology.
- Unity of command, where each person within an organization reports to only one designated person.

- A unified command structure, which allows all agencies with responsibility for the incident, either geographic or functional, to manage an incident by establishing a common set of incident objectives and strategies.
- Consolidated IAPs, which describe response goals, operational objectives, and support activities..
- A manageable span of control, which limits the number of resources that any supervisor may control to between three and seven, with five being optimal.
- Designated incident facilities, which include an ICP and may include Staging Areas.
- Other incident facilities may be designated depending on the requirements of the incident.
- Comprehensive resource management, which maximizes resource use, consolidates control of single resources, reduces the communications load, provides accountability, reduces freelancing, and ensures personnel safety.

These principles should be used for all types of incidents, both small and large. At larger or more complex incidents, the ICS structure in the field will work with personnel in the EOC (which also may be organized under ICS principles).

The Incident Command and the EOC function together and work toward the same goals, but their responsibilities are at different levels. The Incident Command operation is responsible for on-scene response activities, and the EOC is responsible for communitywide resource management.

Based on the size and complexity of incidents, NIMS divides them into five types (see figure). The scale and scope of an incident influences the amount of resources an Incident Commander will need to effectively respond.

NIMS Type 1 – 5 scope and scale.

- Type 5: Initial
- Type 4: Routine
- Type 3: Non-routine (Local interest)
- Type 2: Very Complex (Regional or national interest)
- Type 1: Highly complex (National or international interest)

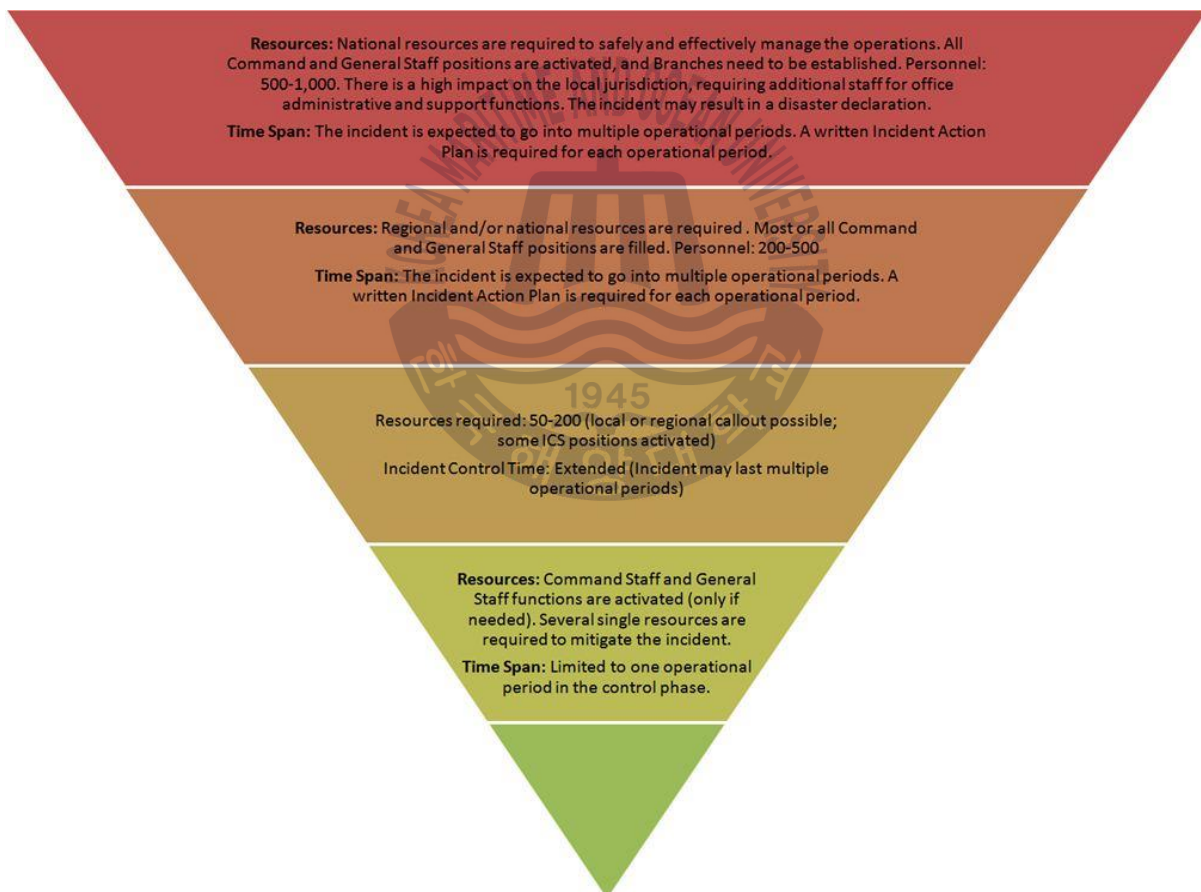


Figure 18. NIMS type 1 – 5 incidents.

#### **4.1.5 National Search and Rescue plan of the United States of America.**

It is the policy of the signatory federal agencies to provide a National Search and Rescue Plan for the United States for coordinating search and rescue (SAR) services to meet domestic needs and international commitments. Implementing guidance for the Plan is provided in the International Aeronautical and Maritime Search and Rescue Manual, the National Search and Rescue Supplement (NSS)\*, and other relevant directives of the Participants to this Plan.

The NSS provides guidance to federal agencies concerning implementation of this Plan, builds upon the baseline established in the IAMSAR Manual and encourages each SAR agency to develop an addendum to the NSS that provides agency specific direction and guidance for implementing the NSS and IAMSAR Manuals.

It also defines the terms related to Search and Rescue in the United States as well as it has for objective to provide expeditious and effective Search and Rescue services and most important to support lifesaving provisions of the IMO's International Convention on maritime SAR and other international agreements to which the USA is signatory. It also provides overall plan for coordination in SAR operations, effective use of available resources, mutual assistance and efforts to improve them, coordination for including civil SAR resources. Responsibilities to all agencies involved, and appoints the agencies that will represent the USA internationally, it also sets the requisites the SAR agreements made by the agencies or organizations locally and internationally that may be of practical value.

\*The NSS provides guidance to federal agencies concerning implementation of this Plan, builds upon the baseline established in the IAMSAR Manual and encourages each SAR agency to develop an addendum to the NSS that provides agency specific direction and guidance for implementing the NSS and IAMSAR Manuals.

The United States Coast Guard as a Department of Homeland Security agency, is designated in this plan as the aeronautical and maritime SAR coordinator for the waters over the USA has jurisdiction. The SAR plan establishes the National SAR Committee that is responsible for the provisions of the plan consistent with applicable laws and executive orders, and coordinates and provides guidance for its implementation.

Other SAR coordinators and support for the USCG, that can also establish Rescue Coordination Centers are the United States Air Force and the United States Pacific Command, both recognized coordinators in the plan. United States maritime and aeronautical SRRs are established in accordance with the relevant IMO and ICAO Conventions and with the guidance of the IAMSAR Manual.

Other participants in this plan are: Department of Transportation, Department of Defense, Department of Commerce, Federal Communications Commission, National Aeronautics and Space administration and the Department of the interior National Park Service.

### **Search and Rescue Organization**

Rescue Coordination Center (RCC) is internationally recognized as the designation of a facility with the responsibility to promote efficient organization of SAR services and to coordinate the conduct of SAR operations within a search and rescue region (SRR). For the Coast Guard, this is one of the primary functions performed at the Area and District level command centers and includes all aeronautical and maritime incidents within its maritime SRR; the Coast Guard operates Joint Rescue Coordination Centers (JRCC) because of both aeronautical and maritime SAR responsibilities.

Rescue Sub-Center (RSC) is internationally recognized as the designation of a facility established where the RCC cannot exercise direct and effective control over SAR facilities in remote areas, or where local facilities can be directed only through local authorities.

The Command Center at the Sector level is an internal Coast Guard designation. Sector Command Centers are subordinate to the RCCs. Sector Command Centers, while performing many of the SAR duties, are not designated as RCCs or RSCs. The Sector Command Center is responsible for SAR mission coordination and tactical control of search and rescue units (SRUs) in its AOR, which is within the SRR of the RCC.

### Search and Rescue Organization

The Search and Rescue Mission Commander within the Coast Guard operates within the SAR chain of command as the person assigned to carry out all aspects of planning, coordinating and managing the response to a SAR incident. The SMC must be assigned at the appropriate level within the SAR organization, so as to provide effective SAR incident oversight and supervision, as well as ensuring proper SAR mission execution.

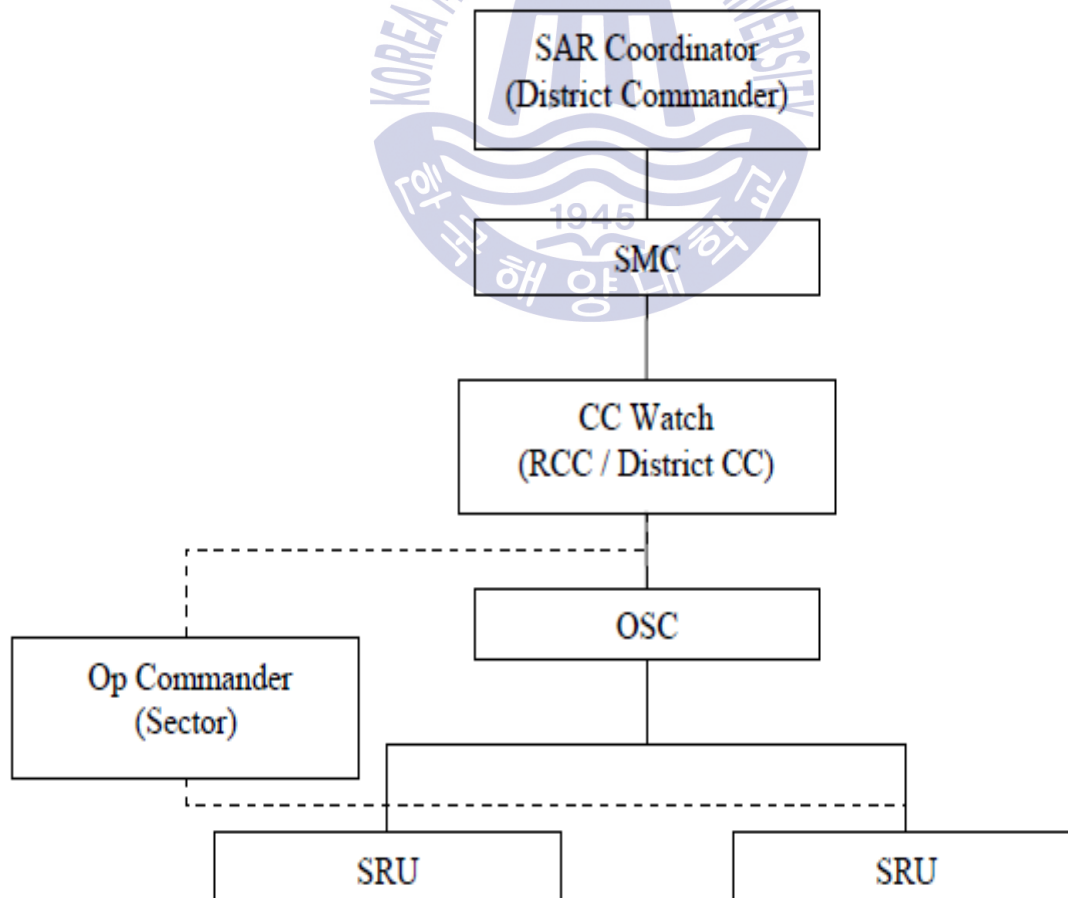


Figure 15. SAR Chain of Command with SMC at the District Level



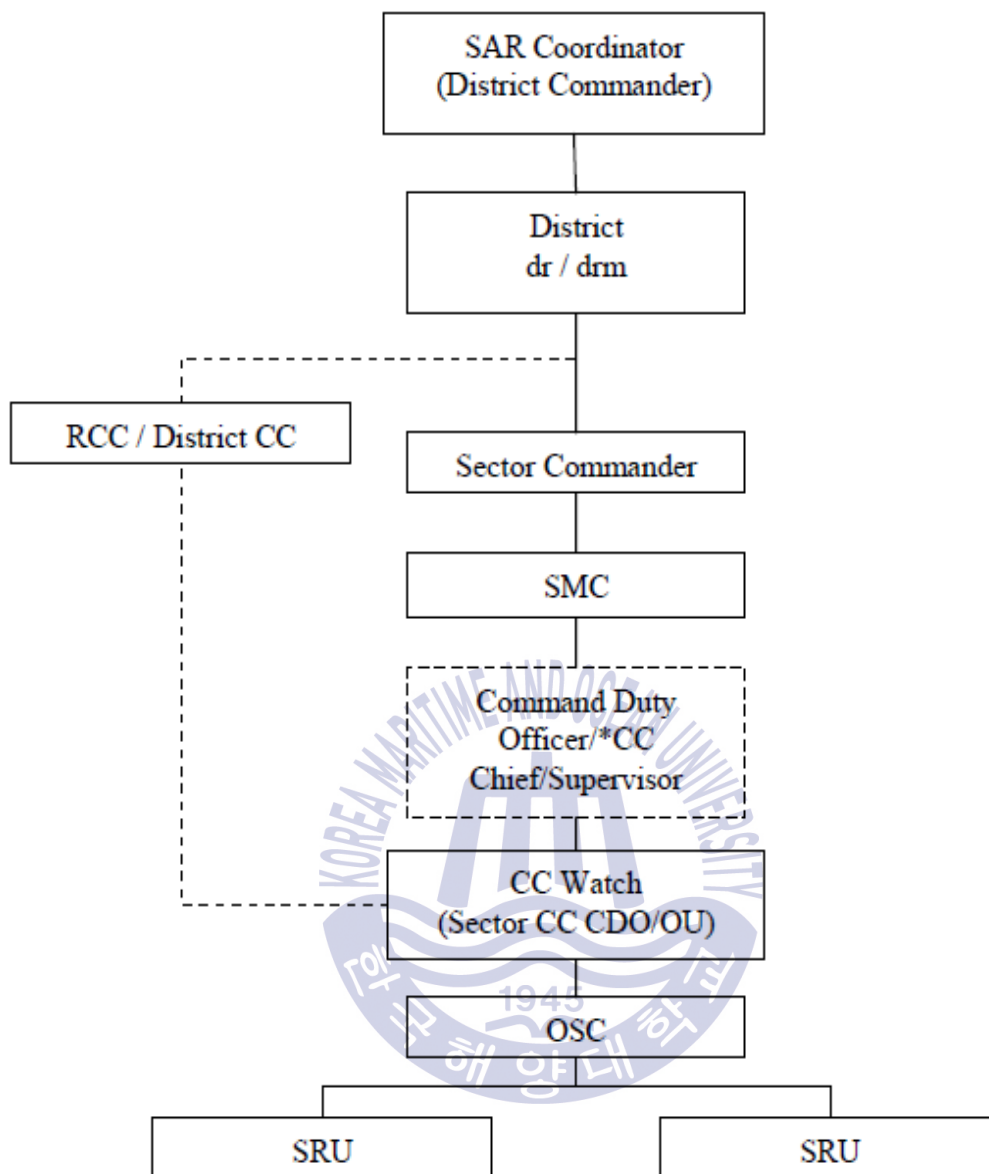


Figure 16. SAR Chain of Command with SMC at the Sector Level

#### **4.1.6 United States Coast Guard.**

The United States Coast Guard (USCG) is a branch of the United States Armed Forces and one of the country's seven uniformed services. The Coast Guard is a maritime, military, multi-mission service unique among the U.S. military branches for having a maritime law enforcement mission (with jurisdiction in both domestic and international waters) and a federal regulatory agency mission as part of its mission set.

It operates under the U.S. Department of Homeland Security during peacetime, and can be transferred to the U.S. Department of the Navy by the U.S. President at any time, or by the U.S. Congress during times of war.

The Coast Guard's legal authority differs from the other four armed services, as it operates simultaneously under Title 10 of the U.S. Code (Title 10 of the United States Code outlines the role of armed forces in the United States ) and its other organic authorities, such as Titles 6, 14, 19, 33, and 46. Because of its legal authority, the Coast Guard can conduct military operations under the U.S. Department of Defense or directly for the President in accordance with Title 14 USC 1–3. The Coast Guard's enduring roles are maritime safety, security, and stewardship. To carry out those roles, it has 11 statutory missions as defined in 6 U.S. Code (Title 6 of the United States Code governs Domestic Security in the United States), which include enforcing U.S. law in the world's largest exclusive economic zone of 8,800,000 km<sup>2</sup>. One of the fundamental elements of incident managements described in NIMS is the Incident Command System, adopted by the USCG over two decades ago..

The National Search and Rescue Plan or National SAR Plan designates the Coast Guard as the federal agency responsible for maritime SAR operations.

United States Coast Guard organization

**U. S. Coast Guard**

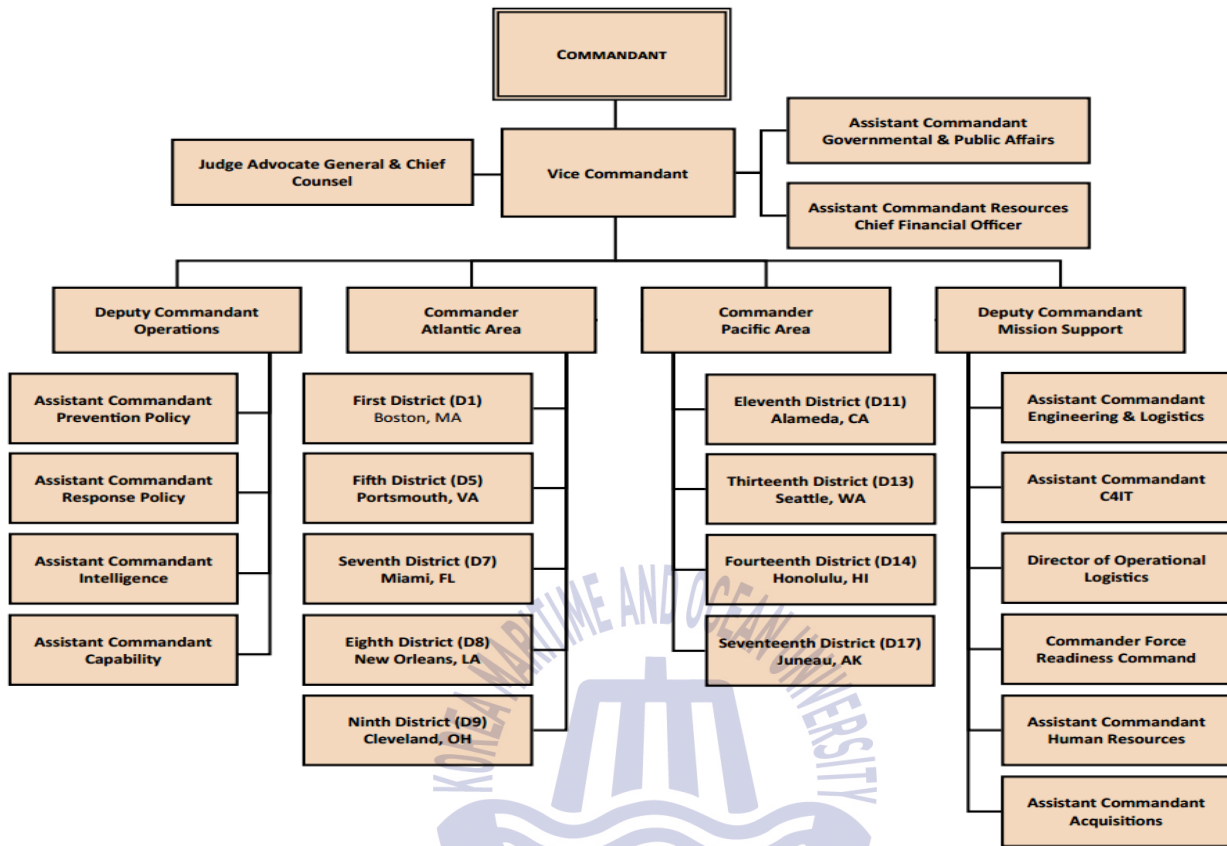


Figure 14. USCG organizational chart

## 4.2 The United Kingdom

### 4.2.1 Civil Contingencies Act 2004.

It is an Act of the Parliament of the United Kingdom, created in 18 November 2004, establishes a coherent framework for emergency planning and response ranging from local to national level. It also replaces former Civil Defense and Emergency Powers legislation of the 20th century. The Civil Contingencies Act is composed of three parts.

- Part 1 LOCAL ARRANGEMENTS FOR CIVIL PROTECTION: defines the obligations of certain organizations to prepare for various types of emergencies.
- Part 2 EMERGENCY POWERS: provides additional powers for the government to use in the event of a large scale emergency.
  - Part 3 GENERAL: provides supplementary legislation in support of the first two parts.

The core changes that were brought by the establishment of CCA can be described as: defining the term emergency; identifying the clear boundaries, roles, and responsibilities of all involved organizations and parties in depth; exploring new duties of local and governmental agencies; replacing outdated system of emergency powers; and, in general, giving UK government ranging powers in an emergency (O'Brien & Read 2005).

*Levels of Emergency Management:* In addition to local emergencies or incidents – such as road accidents, small impact flood events, etc., (which are mainly handled by local authorities and first responders as police, fire, health organizations) – the engagement and response provision of UK central government is based on three different levels of emergencies. The specific functions and activation of government of department and ministers are done based on seriousness of disaster.

In general, Level 3 is regarded as catastrophic emergency, Level 2 as serious emergency, and Level 1 as significant emergency level (Cabinet Office 2005).

Level 3 – (National coverage) level of catastrophic emergency or disaster: is any disaster that has high widespread impact and requires immediate involvement of central government.

Level 2 – (Cross-region) level of serious emergency or disaster: is any disaster that has wide and prolonged impact. Any disaster with level 2 requires support and coordination of government and other departments.

Level 1 – (Regional coverage) level of significant emergency: is any disaster with small impact which requires narrow focus.

Any emergency with level 1 impact does not necessarily require activation of COBR. Developed administrations are also actively responding agencies. The advice of CCS is provided if it is necessary (Cabinet Office 2005; Civil Contingencies Secretariat 2009a).

#### **4.2.2 Civil Contingencies Committee**

British cabinet committee chaired by the Home Secretary. It is intended to deal with major crises such as terrorism or natural disasters. It is supported by the Civil Contingencies Secretariat, which is part of the Cabinet Office, created in July 2001, is the department of the British cabinet office responsible for emergency planning in the UK . The role of the secretariat is to ensure the United Kingdom's resilience against disruptive challenge, and to do this by working with others to anticipate, assess, prevent, prepare, respond and recover. Until its creation in 2001, emergency planning in Britain was the responsibility of the Home Office.

**Interagency command - National Crisis Management and Coordination structure (Arbuthnot 2005)**

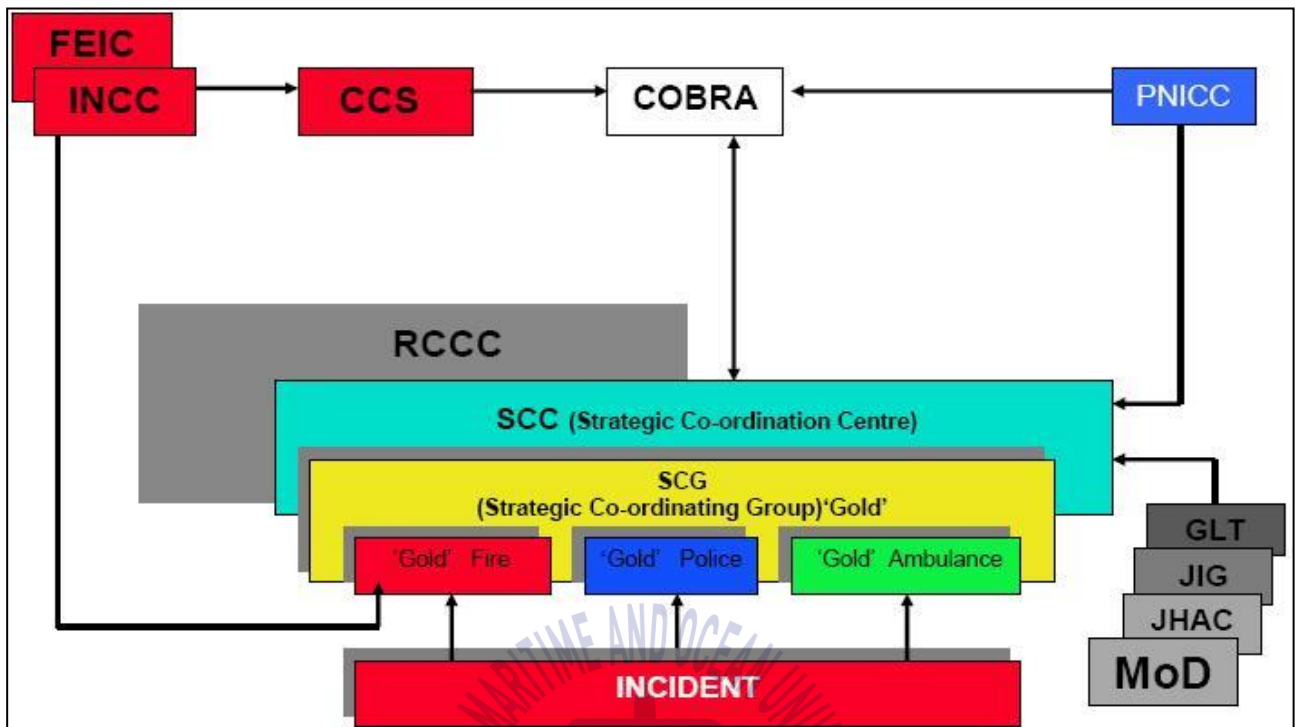


Figure 19. COBRA organizational chart

Acronyms.

COBR/COBRA – Cabinet Office Briefing Room; CSS – Civil Contingencies Secretariat; SCC – Strategic Coordination Centre; SCG – Strategic Coordination Group; PNICC – Police National Information and Coordination Center; JIG – Joint Intelligence Group; JHAC – Joint Health Advisory Cell; MoD – Ministry of Defense; and RCCC – Regional Civil Contingencies Committee.

## Civil Contingencies Secretariat Organization

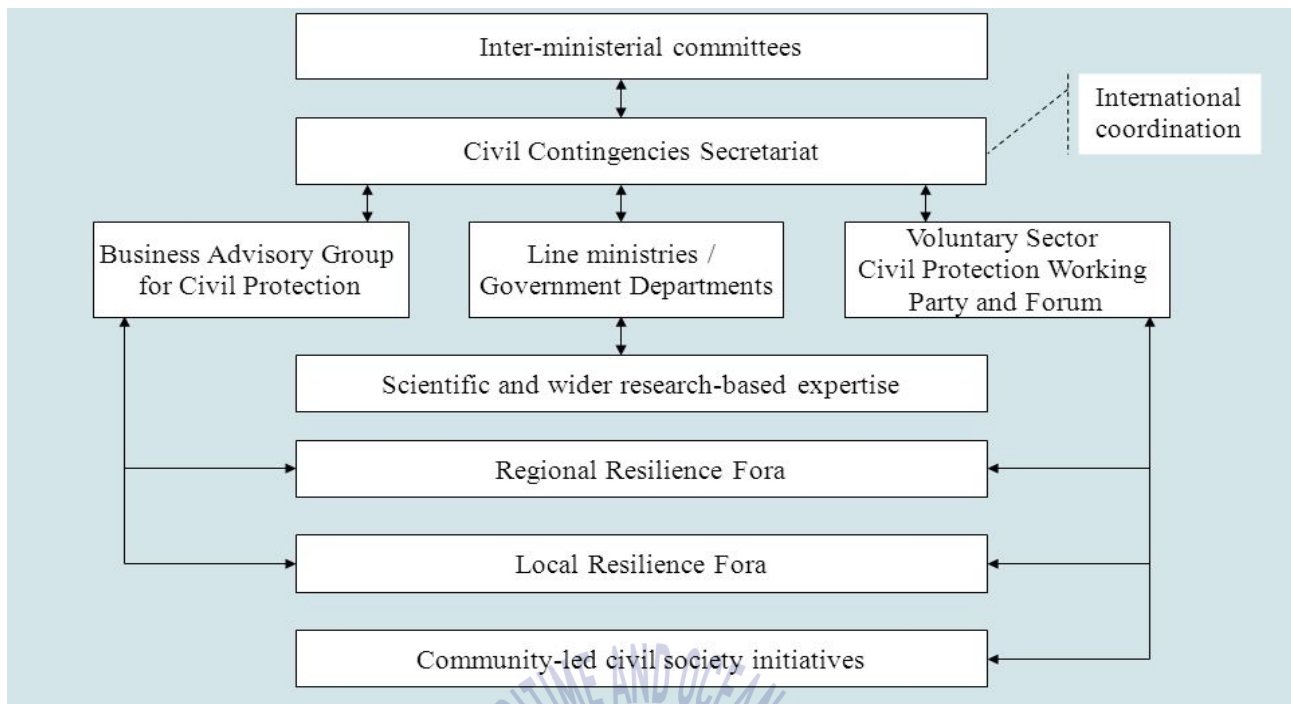


Figure 20. Civil Contingencies Secretariat organizational chart

### 4.2.3 United Kingdom Emergency response and recovery.

United Kingdom Emergency response and recovery [19] is designed to complement Emergency preparedness, which sets out how the duties under the Civil Contingencies Act (CCA) — 2004 and its supporting regulations should be implemented.

‘Emergency response and recovery’ is designed to complement Emergency preparedness, which sets out how the duties under the Civil Contingencies Act (CCA) — 2004 and its supporting regulations should be implemented.

The guidance aims to further develop:

- Shared understanding of the multi-agency framework for emergency response and recovery at the local level, and the roles and responsibilities of individual organizations.

[19] United Kingdom government official website.



- Shared understanding of the role of local, sub-national and national levels in emergency response, and how they will work together
- A common frame of reference, especially concepts and language, for those involved in responding to emergencies

### **Principles of effective response and recovery**

Emergency response and recovery arrangements should be flexible and tailored to reflect circumstances, but will follow a common set of underpinning principles. These principles guide the response and recovery effort at all levels — from local to national.

There are 8 guiding principles.

#### **Anticipation**

Ongoing risk identification and analysis is essential to the anticipation and management of the direct, indirect and interdependent consequences of emergencies.

#### **Preparedness**

All organizations and individuals that might have a role to play in emergency response and recovery should be properly prepared and be clear about their roles and responsibilities.

#### **Subsidiary**

Decisions should be taken at the lowest appropriate level, with co-ordination at the highest necessary level. Local agencies are the building blocks of the response to and recovery from an emergency of any scale.

#### **Direction**

Clarity of purpose comes from a strategic aim and supporting objectives that are agreed, understood and sustained by all involved. This will enable the prioritization and focus of the response and recovery effort.

## **Information**

Information is critical to emergency response and recovery and the collation, assessment, verification and dissemination of information must be underpinned by appropriate information management systems. These systems need to support single and multi-agency decision making and the external provision of information that will allow members of the public to make informed decisions to ensure their safety.

## **Integration**

Effective co-ordination should be exercised between and within organizations and levels (i.e. local and national) in order to produce a coherent, integrated effort.

## **Co-operation**

Flexibility and effectiveness depends on positive engagement and information sharing between all agencies and at all levels.

## **Continuity**

Emergency response and recovery should be grounded in the existing functions of organizations and familiar ways of working, albeit on a larger scale, to a faster tempo and in more testing circumstances.

### **4.2.4 Merchant Shipping Act 1995**

The Merchant Shipping Act 1995 is an Act of Parliament passed in the United Kingdom in 1995. It consolidated much of the UK's maritime legislation, repealing several Acts\* in their entirety and provisions in many more, some dating back to the mid-nineteenth century. It appoints several officers of Admiralty Jurisdiction such as the Receiver of Wreck. The Act of 1995 updates the prior Merchant Shipping Act 1894. The lead part on British ships was impacted by the outcome of the Factortame case, as the Merchant Shipping Act 1988 was impugned by the Common Fisheries Policy. [20]

[20] UK legislation official website.

\* Merchant Shipping and Maritime Security Act 1997: Amends the Merchant Shipping Act 1995 to extend the powers of fire authorities and equipment at sea and to make further provision about the protection of wrecks. Amends the Aviation and Maritime Security Act 1990 to make provisions about piracy. Provides for the continuing application to the International Oil Pollution Compensation Fund of the International Organizations Act 1968. Makes provisions about the International Tribunal for the Law of the Sea.

Marine Safety Act 2003: An Act to make provision about the giving of directions in respect of ships for purposes relating to safety or pollution and about the taking of action to enforce, in connection with, or in lieu of, directions; to make provision about fire-fighting in connection with marine incidents; and for connected purposes.

#### **4.2.5 Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland**

The organization for Search and Rescue (SAR) in the United Kingdom of Great Britain and Northern Ireland (UK) is an amalgam of separate Government Departments, the emergency services and other organizations. These authorities and organizations are committed to a cohesive and co-operative partnership, the aim of which is the continued provision of an effective national SAR capability.

The purpose of the framework, therefore, is to provide a management framework within which the responsible parties can work together to meet this aim and deliver their responsibilities as required by the Civil Contingencies Act 2004 where required. In doing so the UK SAR organization provides a vital component of the UK's emergency response arrangements in accordance with the Civil Contingencies Act 2004.

*UK SAR Strategic Committee* is an inter-agency national forum with responsibility for advising on the structure, scope and framework of the organization of UK SAR. Membership of the Committee, who shall meet twice per year, shall be confined to those with strategic and

policy responsibilities within those organizations which contribute significantly to UK SAR and shall consist of member of the Department of transportation, Ministry of Defense, Home Office, Dept. for Communities and Local Government, Maritime and Coast Guard Agency, Association of Chief Police Officers England, Wales and Northern Ireland, ACPO Scotland, Chief Fire Officers Ass., Ambulance Service Ass., Royal National Lifeboat Institution, Cabinet Office.

*UK SAR Operators group* acting under the aegis of the UK SAR Strategic Committee, the objectives of the UK SAR Operators group are: a) To develop a program of work to implement the tasks set by the UKSARSC; b) To consider reports and recommendations from associated SAR Working Groups; c) To consider the views of the UK Maritime and Aviation SAR, and Inland SAR Consultative Committees; d) To advise and make recommendations to the UKSARSC on a National SAR Framework to ensure efficient and effective co-operation between SAR agencies and those concerned with civil SAR; e) To determine the terms of reference and issue other guidance as appropriate to SAR Working Groups and Consultative Committees.

Some SAR incidents require a fully integrated emergency response under the guidelines provided in the Cabinet Office publication *Emergency Response and Recovery* and the Scottish Executive publication *Emergency Preparedness and Preparing Scotland* together with any guidance relating to this document currently pertaining

The key functions of UK SAR are to co-ordinate: a) maritime SAR in offshore, inshore and shoreline areas b) aeronautical SAR over land and sea c) inland.

These functions are undertaken through the ability of the various authorities and organizations to: a) receive details of persons, vessels and aircraft in distress b) communicate between SAR units and the coordinating authority c) communicate between SAR units d) communicate between coordinating authorities e) maintain declared SAR units as appropriate to: I) provide assistance to persons, vessels and aircraft in distress II) deliver survivors to a place of safety or where further assistance can be rendered.

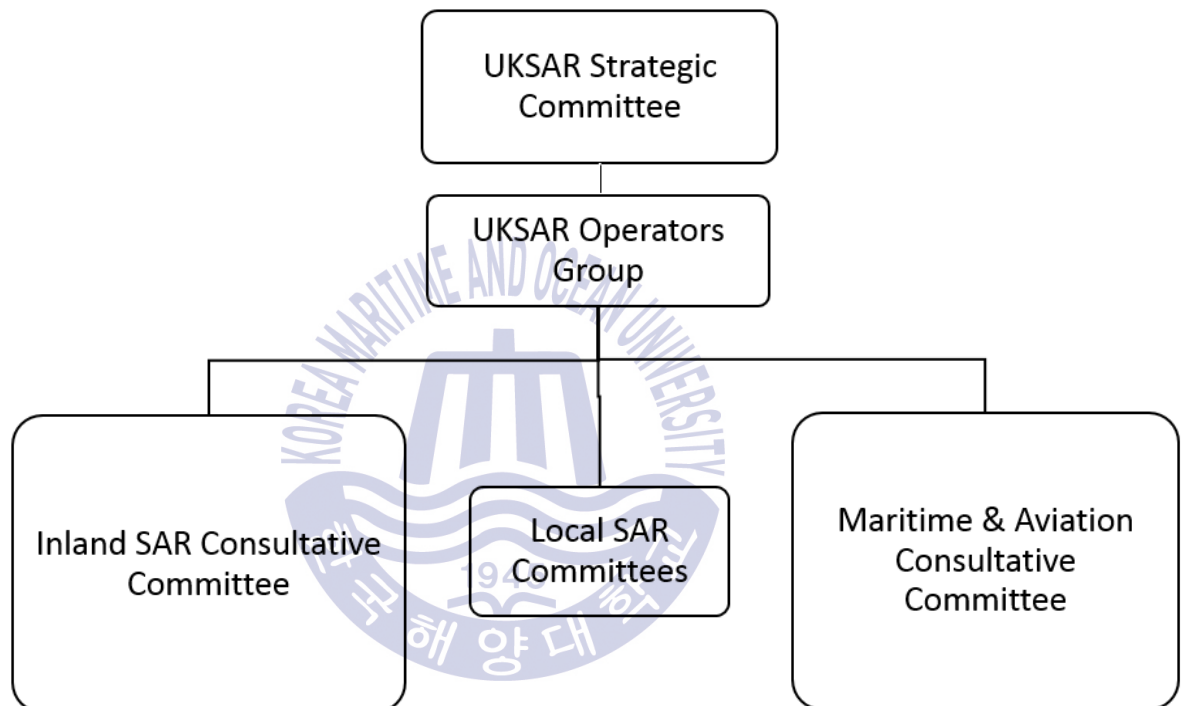


Figure 21. UKSAR COMMITTEE STRUCTURE

## **Organization**

Responsibility for civil aeronautical and maritime SAR policy rests with the Department for Transport, (DfT). As such, the DfT is responsible, through the UK SAR Strategic Committee, for assessing the adequacy of UK civil aeronautical and maritime SAR resources, response and co-ordination.

The Agencies and Branches of the DfT have broad responsibilities in maritime and aeronautical safety. The Maritime and Coastguard Agency (MCA), described below, provides a response and co-ordination service for maritime SAR, counter pollution and salvage. The SAR role is undertaken by HM Coastguard, which is responsible for the initiation and co-ordination of civil maritime SAR. This includes the mobilization, organization and tasking of adequate resources to respond to persons either in distress at sea, or on those inland waters.

Other organizations included in this framework who also have responsibilities for SAR and supporting the DfT are the Aviation Airspace Division (AAD), the Ministry of Defense, Police Service, Fire and Rescue Service, Ambulance Service, Royal National Lifeboat Institution.

### **4.2.6 United Kingdom Maritime and Coastguard Agency (MCA).**

The MCA is the country executive agency in charge of prevention of the loss of lives at sea, responsible for implementing British and International maritime law and safety policy and to develop promote and enforce high standards of marine safety. The term "executive" may be read a number of ways, where a truly executive organization would (for example) be on top of the latest research, dare we say leading the charge. But in truth their operatives are content for others to undertake cutting edge research aimed at navigation safety.

The MCA, as a Category 1 Responder stated in the Civil Contingencies Act 2004, undertakes its duty to plan for emergencies under the Act by maintaining a set of emergency plans, which are developed in conjunction with other Civil Contingencies Act responders, to ensure their overall effectiveness. The relevant plans are the Major Incident Plans, the Search and Rescue Framework for the UK of Great Britain and Northern Ireland and the National Contingency Plan for Marine Pollution from Shipping and Offshore Installations. The MCA fulfils its duty to co-operate, share information and prepare to respond, by acting as the UK's competent authority for dealing with pollution at sea, and providing assistance, training and advice to local authorities with shore responsibilities.

The MCA thus concentrate on coordinating search and rescue (SAR) at sea through Her Majesty's Coastguard (HMCG), a SAR coordinator, ensuring that ships meet international and UK safety standards, monitoring and preventing coastal water pollution and testing and issuing Merchant Navy Certificates of Competency (licenses) for ships' officers and crew to STCW requirements. Also, including the mobilization, organization and tasking of adequate resources to respond to persons either in distress at sea, or those inland waters. The HMCG is responsible for requesting and tasking its own SAR assets and those made available by other emergency services, authorities and organizations and coordinating the subsequent SAR operations unless the operations are formally handed over or delegated to another SAR coordinator.

The MCA has three distinct "outward facing" elements - provision of search and rescue and prevention activity through Her Majesty's Coastguard, port and flag state control of shipping through a network of Marine Offices and the development of international standards and policy for shipping through the International Maritime Organization.



HMCG is organized into 9 SAR Areas where each Area contains a pair of Maritime Rescue Co-ordination Centers (MRCC). These MRCC pairs share common command, control and communications systems enabling either MRCC to assume control of the Area and to provide mutual support during emergency response operations. Each Area is divided into 3 or more Sectors and each Sector contains 2 or more Coastguard Rescue Teams (CRT). The organization is based upon a continuous communications watch on radio, satellite communications and Automatic Identification System (AIS)

### **Secretary of State's Representative (SOSREP)**

In accordance with Article 20 of Directive 2002/59/EC, the Secretary of State's Representative (SOSREP) for Maritime Salvage and Intervention, has been designated as the UK competent authority to take independent decisions concerning the accommodation of ships in need of assistance. The MCA provides to support the SOSREP in this decision making process.

In 1996, after the SEA EMPRESS oil spill in Milford Have, Wales, Lord Donaldson was instructed by the United Kingdom government to review how they should respond to maritime emergencies. In this review, Lord Donaldson observed that Salvage by Committee", which was the system that the UK had for maritime emergencies, was ineffective and inefficient. He concluded that in such emergencies "a single voice" was needed able to make and enforce the decisions on behalf of the government, from this idea was developed the SOSREP. The acronym SOSREP stands for Secretary of State's Representative. SOSREP is a civil servant, responsible to the government for his actions, free to act on his own initiative, without having to refer matters to his political masters.

Not only does this mean that decisions can be taken quickly, it means that such decisions are generally taken on the basis of facts, logic and reason, rather than on the basis of political and emotional considerations. SOSREP has the final and decisive voice, the ultimate control and the ultimate responsibility.

Pursuant to several pieces of UK legislation, SOSREP has wide authority. Insofar as ships are concerned, the SOSREP can step in and issue directions to any ship, ship-owner or operator, for the purpose of preventing or reducing pollution, or for safety purposes. In relation to pollution prevention or reduction, his authority extends for 200 nautical miles, or the international median line, whichever is the less. In relation to safety issues, his authority extends only to UK territorial waters – 12 nautical miles. Within these areas, his powers are wide. SOSREP can give instructions to anyone involved in a marine emergency. Most obviously, this will be the ship-owner, but it could be a salvor, a harbormaster, or, in the context of an exclusion zone established around a ship which is wrecked, damaged or in distress, other ships in the area. He can order a ship-owner to enter into a salvage contract, or he can order a harbormaster to grant a place of safety to a vessel in distress.

SOSREP overriding responsibility is to act in the wider public interest. If SOSREP does not take any such action, it is usually because he is satisfied with the steps being taken to deal with the incident. SOSREP's powers also apply to all offshore installations within the UK continental shelf. He can give directions to the operators or managers of any installation within this area. As with ships in distress, he can establish an exclusion zone around an installation which is wrecked, damaged or in distress. While not a part of the Maritime and Coastguard agency (MCA), but is often physically located within the MCA, the SOSREP team is comprised of a deputy and an administrative assistant. He works very closely with them and will usually utilize the people in the Counter-Pollution and Response branch, their

contacts and knowledge. In any particular case, SOSREP may also choose to appoint his own advisers. These may be salvage experts, pollution experts, environmental experts, tug brokers, etc. In addition, there are four Emergency Towing Vehicles (ETVs), which are on contract to the MCA on a year-round basis and which are based at strategic locations around the UK. These can be utilized if commercial salvage assistance is, for any reason, unable to perform the services required. There are four areas on which SOSREP focuses: search and rescue, salvage and avoidance or containment of any pollution, clean-up of any pollution and the media interest. As stated above, SOSREP will be assisted and advised by the MCA and outside experts in some or all of these areas, but his is the final and deciding voice.

### SOSREP Organization

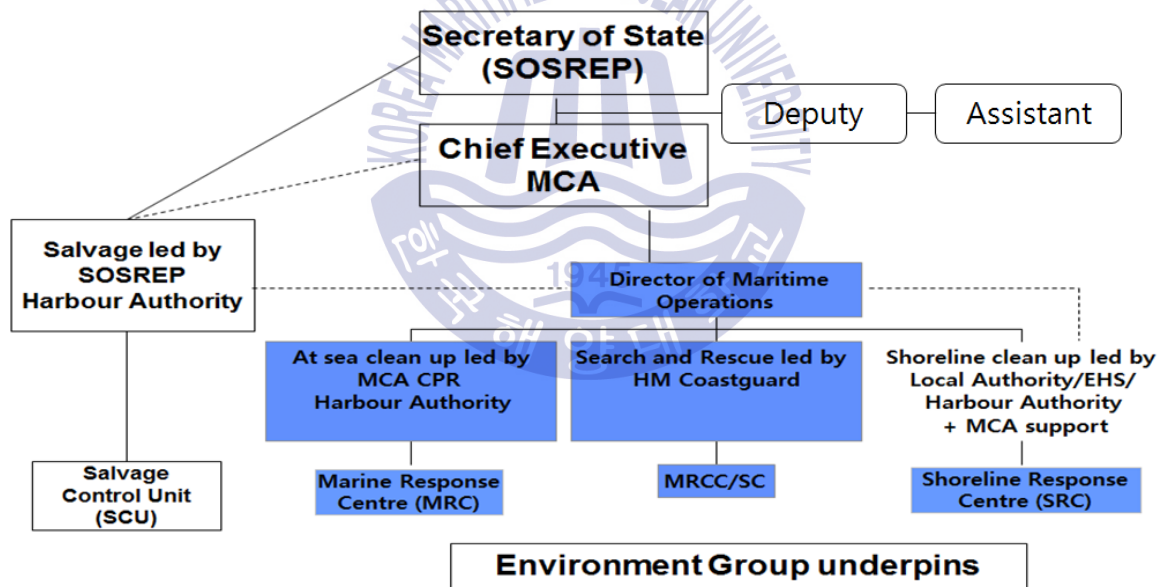


Figure 22. SOSREP organizational chart

## 4.3 REPUBLIC OF KOREA

### 4.3.1 FRAMEWORK ACT ON MANAGEMENT OF DISASTERS AND SAFETY

The Framework Act on Management of Disasters and Safety was enforced to establish disaster and safety control systems of South Korea and to prescribe matters necessary for the phases of disaster, activities for safety culture as well for disaster and safety control aimed to preserve South Korea's national land and protect citizens' lives and property.

This framework act also defines all terms and concepts related to disaster and safety as well as the plans, preventive measures, preparation and response for disasters. The act appoints the committees to elaborate plans, projects and policies regarding safety management. (Chapter II Section 1 Safety Management Organizations and functions) and the Central Countermeasure Headquarters under the jurisdiction of the Ministry of Public Safety and Security and the Minister being the head of the HQ, to exercise general overall control, management from large-scale disaster and take the necessary measures,. In case of an overseas disaster\*, the Minister of Foreign Affairs will be appointed as the head of the HQ.

The Enforcement Decree of the Framework Act on Management of Disasters and Safety set to prescribe matters delegated by the Framework Act on Management of Disasters and Safety. The enforcement decree defines the scope of disasters and safety standards as well as other meanings that are not entirely specified in the Framework Act on Management of Disasters and Safety related to the agencies that have general responsibilities on disasters.

\* The term "overseas disaster": A disaster that actually causes or is likely to cause any harm to the lives, bodies, and property of citizens of the Republic of Korea outside the territory of the Republic of Korea, and which shall be handled by the Government

## National Disaster Management Standard System.

Standard principle, including roles, functions and methods that all disaster responders regardless the type of disaster must observe.

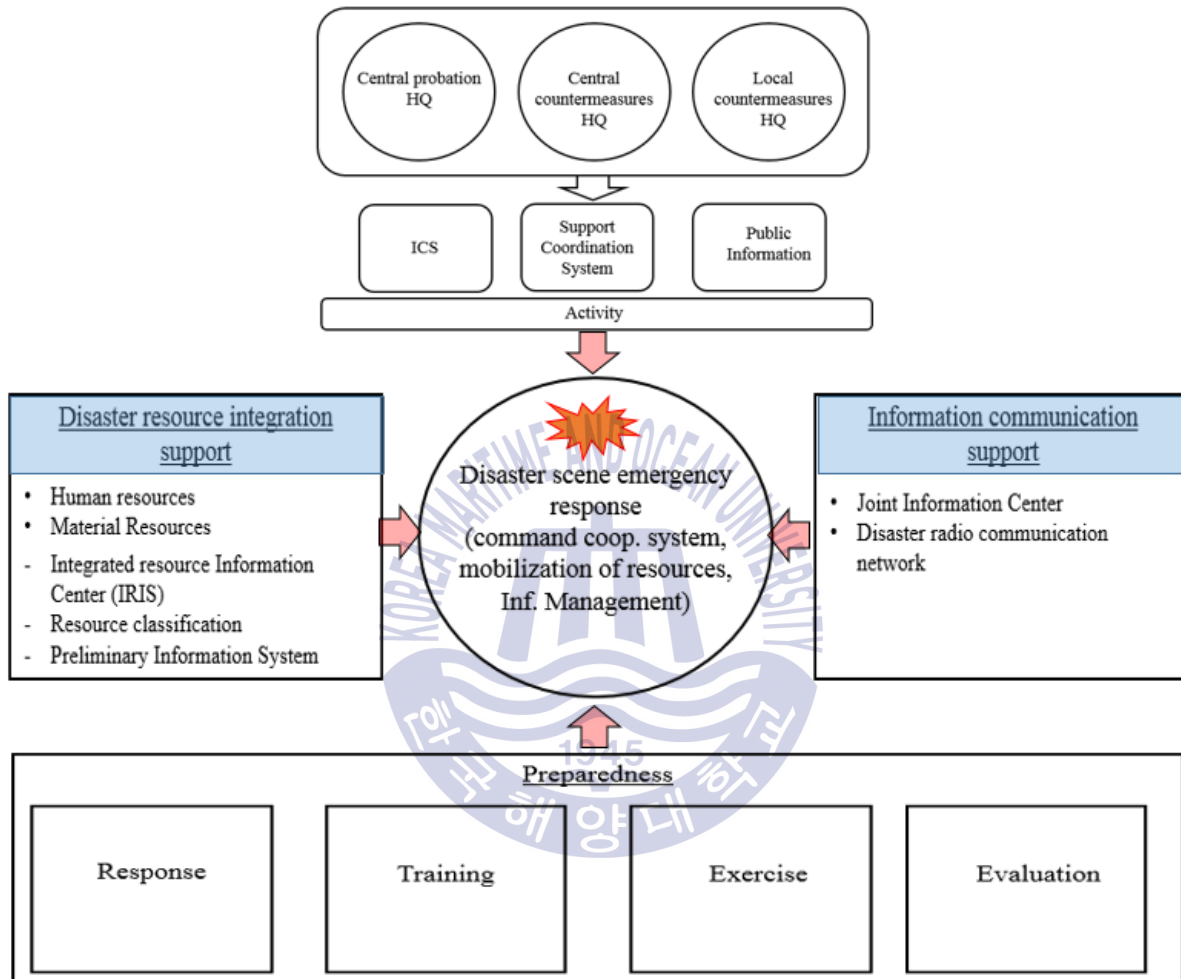


Figure 23. National Disaster Management Standard System.

Under the “Disaster resource integration Support” area there is a disaster support system with 13 functions. (Situation management, promotion, environmental maintenance, emergency communication, emergency recovery, energy, energy living safety, material support, traffic countermeasures, volunteer, maintenance of order, rescue and emergency medical service)

## Standard procedure for disaster management

Command and support between emergency response agencies at the disaster site and support agencies. Standard procedures for disaster management such as command, coordination, and support.

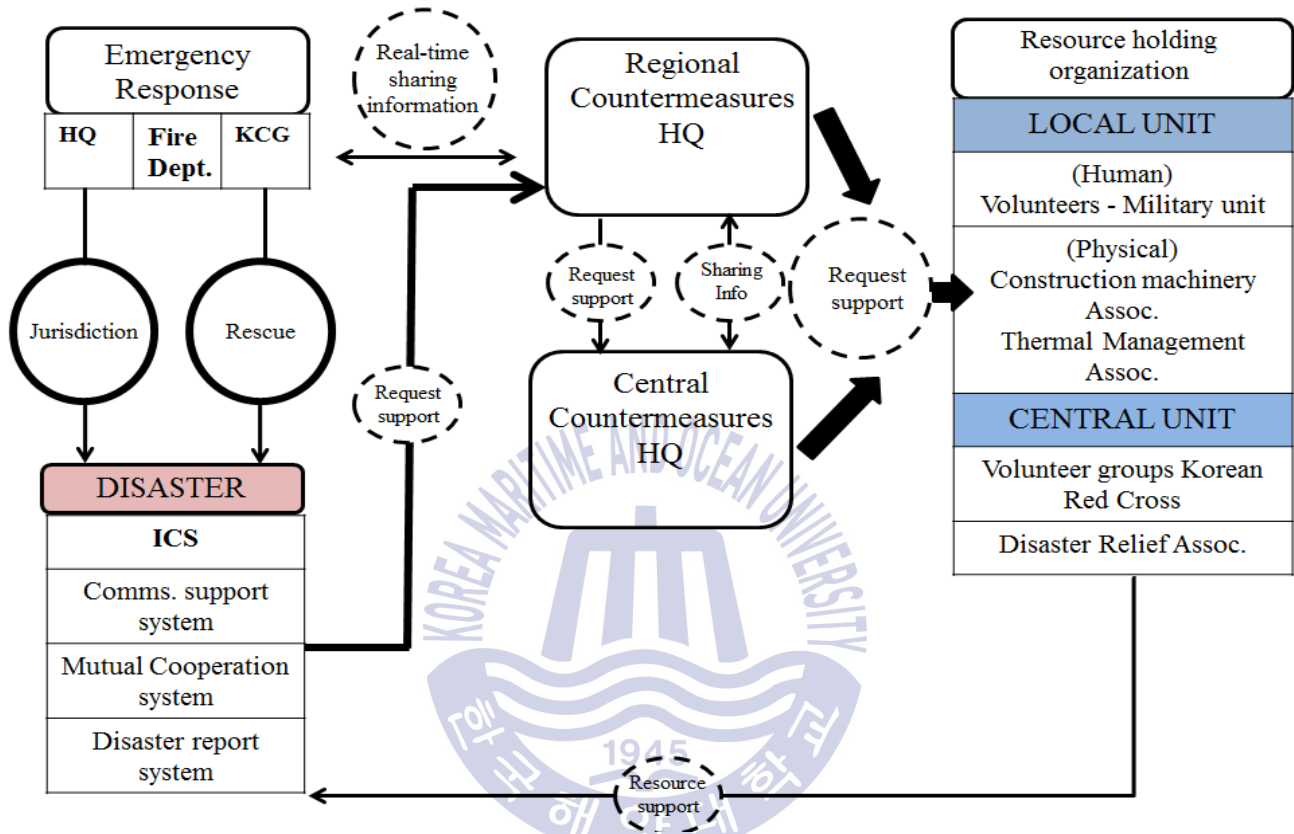


Figure 24. Standard procedure for disaster management



#### **4.3.2 RESCUE AND AID AT SEA AND IN THE RIVER ACT**

Enforced in order to protect human life and properties from aquatic accidents and to promote public welfare by prescribing matters necessary for SAR, salvage and protection of people, maritime assets and aircraft in distress at sea and/or inland waters and shall apply to all accidents occurring at sea or on inland waters.

The Act also defines terms related to maritime accident, search and rescue in sea or inland waters. The Minister of Public Safety and Security (MPSS) shall formulate a master plan to prepare against aquatic accidents every five years to protect people's lives and bodies and property from accidents occurring from natural or artificial causes and to efficiently perform aquatic rescue and relief activities. It is a task for the MPSS to formulate and implement an implementation plan to prepare against aquatic accidents every year to implement the master plan to prepare against aquatic accidents.

For the overall management and coordination of matters concerning aquatic rescue and relief operations at sea, for the coordination of aquatic rescue activities among institutions cooperating in aquatic rescue and relief activities, civilian aquatic rescue and relief organizations, etc., and direction and control thereof, and for international cooperation in aquatic rescue and relief operations, it is responsibility of the MPSS to establish the Central Rescue Headquarters in the Ministry and/or in each Regional Headquarters of the Korea Coast guard and a local rescue headquarters at each Coast Guard center.

In order to maintain mutual assistance systems necessary for aquatic rescue and relief operations with institutions cooperating in aquatic rescue and relief activities, the head of the central rescue headquarters, the heads of metropolitan/provincial rescue headquarters and the heads of local rescue headquarters may request the heads of relevant agencies and organizations to dispatch their employees.

In such cases, the heads of agencies and organizations who receive such request shall comply therewith unless any special ground to the contrary exists.

Regarding the plans for SAR for passenger ships, the act has established that the owner of a passenger ship sailing on an international route shall prepare a plan which includes the emergency communications network of rescue headquarters, emergency training schedules, etc. (hereinafter referred to as "emergency search and rescue plan for passenger ship"), for search and rescue operations for the passenger ship in an emergency, and report such plan to the chief of the competent coast guard station, and keep it on the relevant passenger ship and in the main office of the relevant owner after obtaining confirmation thereof. Where the emergency search and rescue plan for passenger ship is amended, the owner of a passenger ship shall, without delay, report the details of such amendment to the chief of the competent coast guard station. Where the chief of the competent coast guard station deems it necessary for the safety of a passenger ship, he/she may have police officers under his/her control board the ship or visit the main office of the owner of the passenger ship to confirm the emergency search and rescue plan for the relevant passenger ship. The owner of the ship shall be responsible for conducting emergency SAR training of the relevant ship under the command of the captain at least one time each year.

The head of a local rescue headquarters or the head of a fire agency shall issue instructions on aquatic rescue and relief operations at the scene of an accident with the first and most important order to rescue humans at the scene of accident, followed by arrangement and management of resources and equipment, to take extra precautions to prevent further accidents and to control access to the scene.

International cooperation can be handy when it comes to large scale disasters, especially regarding SAR; this act establishes if a foreign rescue unit requests permission to enter the territorial waters, territory or airspace of the Republic of Korea for prompt aquatic

rescue and relief activities in accordance with a treaty concluded with the Republic of Korea, the head of a central rescue headquarters shall give permission without delay, and notify the relevant authorities of such fact.

The Act also defines the responsibilities and jurisdiction on aquatic rescue and relief; the establishment, duties and qualifications of the Korea Marine Rescue Association for the research, development, publicity, education and training on technology, systems, culture, etc. of search, rescue and salvage at sea, the implementation of duties entrusted by administrative agencies. Also, it is established in the act the assistance of civilians and organizations to perform rescue and relief ; the designation of a maritime rescue coordination center to manage the distress signals and the use of communications equipment; handle the victims of an accident and penalty provisions for negligence in reporting an accident or fail to take actions for rescue.

The Enforcement Decree of Rescue and aid at sea and river act set to prescribe matters delegated by the initial act. The enforcement decree defines the scope of the agencies that have general responsibilities on maritime accidents.

#### **4.3.3 Ministry of Public Safety and Security.**

Established in 2014 after the Sewol ferry disaster, with a merger of the National Emergency Management Agency, Korea Coast Guard, a branch of Safety of Ministry of Security and Public Administration to prevent and efficiently respond to national disasters.

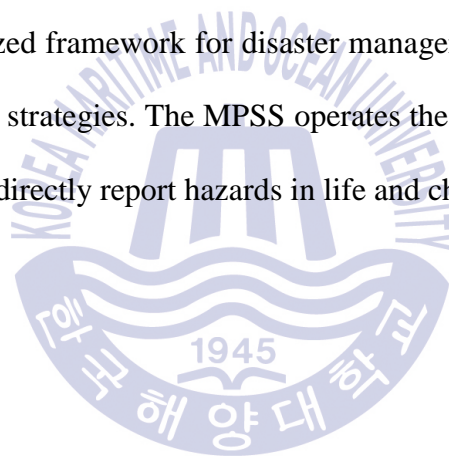
As the lead emergency rescue agency and as the Article 6 (General Control and Coordination of Affairs Related to Disaster and Safety Management) states the Minister of Public Safety and Security shall exercise the general control over and provide coordination of affairs related to disaster and safety management performed by the State and local governments.

The MPSS have for strategy to strengthen the disaster and safety control tower functions, Improve the disaster responding capacity at the scene, to teach a safety culture in daily life, expand preventive infrastructures against disasters and manage safety measures according to the field.

The MPSS have targeted three areas:

- People: Teach and inculcate safety measures in their daily lives.
- Society: Embodying a culture of safety.
- National: Prioritize safety thru policies.

The Master Plan for Safety Innovation, developed through public participation, the MPSS has setup a standardized framework for disaster management and is preparing for 100 actions plans based on 5 key strategies. The MPSS operates the Safety Reporting Application which enables the people to directly report hazards in life and check any improvements.



## Organization

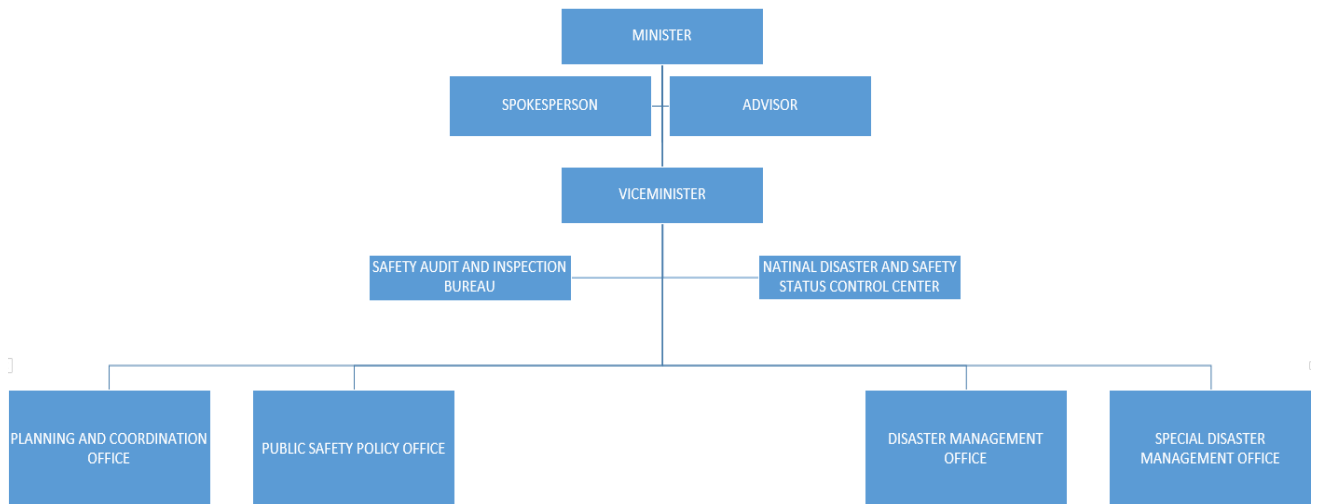


Figure 25. MPSS organizational chart

Under the Minister of the MPSS in the event of a disaster also follows the National Fire service and the Korea Coast Guard along with their respective bureaus. Other affiliated Organizations are the National Civil Defense and Disaster Management Training Institute, National Fire Service Academy, National 119 Rescue HQ, Korea Coast Guard Academy, Korea Coast Guard Special Rescue Unit, National Disaster Management Institute, among other Coast Guard Departments.

#### 4.3.4 Korea Coast Guard.

Following what is stated in the Rescue and aid at sea and river act and as a sub-agency from Ministry of Public Safety and Security the Korea Coast Guard is responsible for safeguarding lives and property, maritime safety and control off the coast of South Korea, as well to support the Ministry of Oceans and Fisheries in its responsibilities stated in the Marine Environment Management Act regarding marine pollution. As a peninsula, Korea's maritime jurisdiction covers a vast area, and a better response to the perceived inability of the KCG to mount a successful large-scale SAR operation would be to upgrade the service to allow it to become more agile and effective. After the events of the Sewol ferry disaster, the KCG received reforms on maritime administrative procedures to reestablish accountability and increase effectiveness.

On November 19, 2014, the previous Korea Coast Guard the main responsibilities transferred to the newly formed Ministry of Public Safety and Security. The previous KCG was an external branch of Ministry of Maritime Affairs and Fisheries in peacetime. Korea Coast Guard (KCG) co-ordinates search and rescue operations. There are 13 regional coast guards, which operate SAR command centers on a 24 hr. basis.

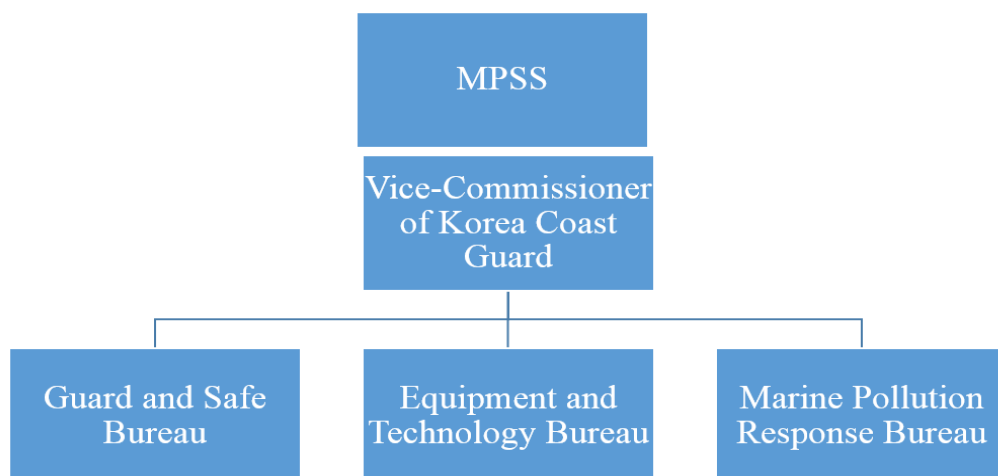


Figure 16. KCG organizational chart



**Korean Coast Guard Search and Rescue Command System.**

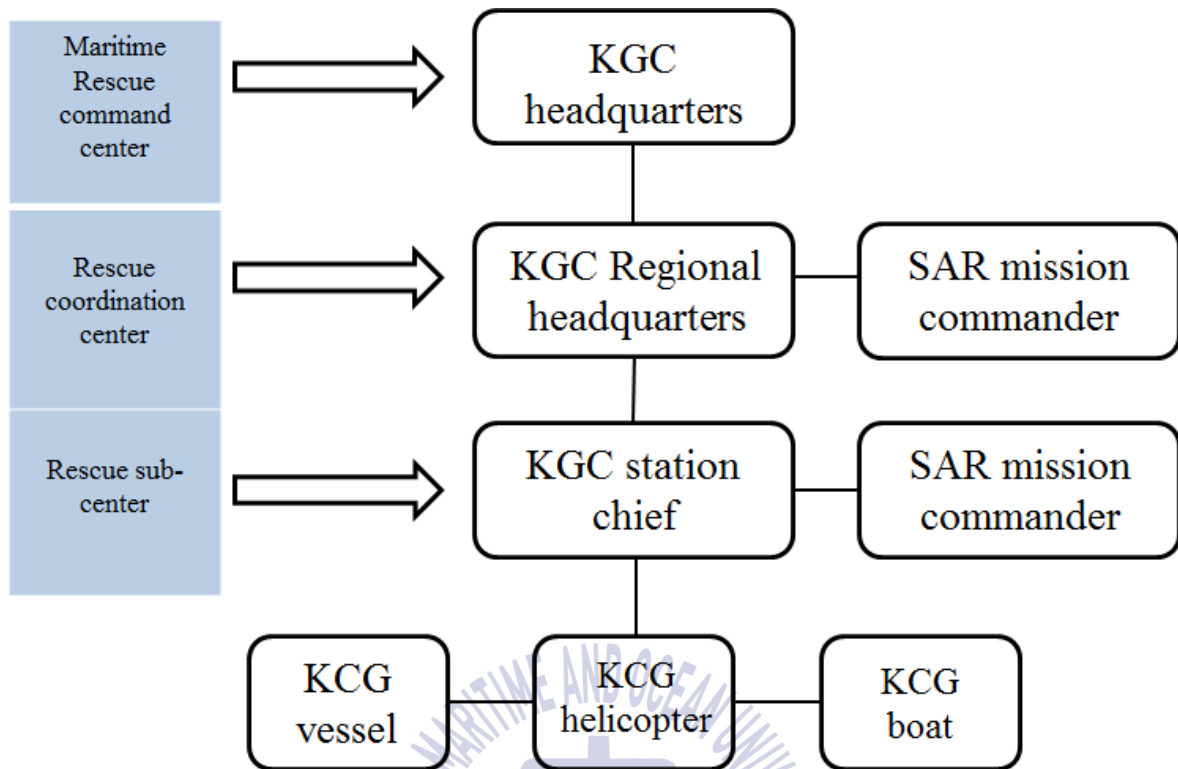


Figure 27. KCG Search and Rescue Command System. [21]

[21] A Study on the Decision Making Process of OSC and On-Scene Command System on Occurring of Disaster at Sea - Focusing on the Sewol Ferry Sinking Case - Ki-Hwan Kim, Jung-Ho Choi, Hyun-Kue Choi

#### 4.4 Comparative analysis of selected countries and its implications

Although three different countries were exposed before but we can clearly see that each one has established legislation for disaster management as well as specific plans to address the Search and Rescue issues. In the table below we can see more detail the law, act and plans for each country, the organizations involved and the response system in use. Important to take consideration is that each country is signatory of the IMO Search and Rescue Convention. Also, on how the plans or frameworks appoints the countries' Coast Guard as the responsible agency or organization to respond to this matter.

Country	USA	United Kingdom	Republic of Korea
<b>Legal basis</b>	<ul style="list-style-type: none"> <li>- Homeland Security Act (Public law 107-296)</li> <li>- National Search and Rescue Plan</li> </ul>	<ul style="list-style-type: none"> <li>- Civil Contingencies Act 2004</li> <li>- Search and Rescue Framework for the United Kingdom of Great Britain and Northern Ireland</li> <li>- Merchant Shipping Act 1995</li> </ul>	<ul style="list-style-type: none"> <li>- Framework Act on Management of Disasters and Safety</li> <li>- Rescue and aid at sea and river act</li> </ul>
<b>Organizations</b>	<ul style="list-style-type: none"> <li>- Department of Homeland Security</li> <li>- United States Coast Guard</li> <li>- FEMA</li> <li>- United States Air Force</li> </ul>	<ul style="list-style-type: none"> <li>- Civil Contingencies Committee</li> <li>- Civil Contingencies Secretariat</li> <li>- Marine and Coastguard Agency</li> </ul>	<ul style="list-style-type: none"> <li>- Ministry of Public Safety and Security</li> <li>- Ministry of Oceans and Fisheries</li> <li>- Korea Coast Guard</li> </ul>
<b>Response system</b>	Incident Command System	SOSREP	Incident Command System

Table 4. Country legislation, organizations and system.

## **United States of America**

The Department of Homeland Security positive view we can mention the increased organization of all levels of agencies to facilitate an effective response to every emergency. Every major federal law enforcement and security agency is directly involved and has specified responsibilities. Another benefit is the creation of a critical infrastructure that can more effectively use available resources. These resources are organized under the umbrella of the Federal Emergency Management Agency, under the Department of Homeland Security, in such a way that the government's response includes every type of major man-made and natural disaster. While it has several positive benefits also has several concerns related no to man-made or natural disasters but to terrorism.

The Department of Homeland Security structure and organization as well as its agencies provides, to the United States of America as one large nation, a well-coordinated approach to national security from all know emergencies and disasters.

## **United Kingdom**

The emergency management system of the United Kingdom (UK) has faced significant reforms and changes since World War II with the primary aim of decreasing human casualties. The historical data over the last decades demonstrates the increasing frequency and threat of major disasters such as natural, biological, social, technological, manmade, chemical, or environmental incidents affecting the UK.

Significant structural changes, historical path of natural and manmade disasters, and growing frequency of hazards demonstrates the need for and importance of effective emergency management system in the UK. The type of the hazards affecting the UK are quite numerous – ranging from natural, technological, biological, chemical, social to manmade disasters – that require collective action.

The decentralized system and structure of emergency management enables UK to establish sustained emergency response and support. Changes and improvements, in emergency management system, that took place in the last decade focuses on providing more effective an in time response to incidents, including uncertainties and threat of terrorism. While, on the one hand, focusing on the increased natural threats and challenges the UK will also consider the threat of intensified manmade incidents as well.

The UK government, by establishing new agency with emergency management focus, is hoping to provide successful, timely, collaborative provision of support in order to reduce the potential threat to human life and property, and establish safe environment for future generations. Central government and local authorities play important role through collaboration and established emergency management framework. Since the future possibility and threat of natural disasters is certain, the UK government has to be ready and prepared to face any devastating challenge.

### **Republic of Korea**

The emergency management system in South Korea has traditionally focused on natural hazards because of its history experiencing these kind of hazards. But as many large-scale man-made disasters have occurred in South Korea in the past years, major changes have taken place in Korea`s emergency management systems. Accordingly, the emergency management system in South Korea in terms of structural dimensions for emergency management along with the definition types of disasters had experience various changes to effectively not only response but to prevent disasters.

The Disaster Management Act was established after Korea experienced serious disasters in the mid-1990s. Korea`s emergency management system is still evolving with recent specific acts. The emergency management organizations have coordinating power for a

unified response to a crisis as quickly as possible and that the emergency management system in South Korea is equipped with mitigation and preparedness strategies.

The sinking of the Sewol ferry on 2014, caused by a variety of factors, including human error and institutional and legal deficiencies. The disaster has had a profound impact on the Korean society. Shocked by an undeveloped country-type disaster, the country has engaged and developed a comprehensive package of measures to enhance maritime safety as shown with the management disaster and safety framework and the Rescue and aid at sea and river act. Along with these safety measures, a culture of “safety first,” is being entrenched by the MPSS in daily life, and more emphasis is placed on proactive measures to prevent and reduce maritime accidents.

The main aim in this chapter was to review and analyze disaster management systems in selected countries focused on Search and Rescue. Accordingly, the first major practical contribution of the present research is that it provides much needed legal basis in order to continue and develop any kind of disaster response act, framework or plan.

Effective disaster response systems are committed to preserve life and property. Any country beginning with the implementation of disaster management system and laws or acts to address specific problems, the organizations experience high levels of commitment to the nation to maintain high levels of safety and response measures. Further, ethical professional judgment must be viewed as central to the effective response. A disaster management system also identify that it is empowered to take action when they see vulnerable situations that needs attention, noted in the prevention phase.

In this case, an effective SAR plan management is correlated with higher maritime safety. Organizations beginning feel efficacious in their ability to establish clear and effective routines and procedures. These perceptions suggest that the plan have developed, with the

help of support of others organizations, comprehensive and well-articulated rules and procedures for prevention and response.

From the countries overview before, several implications followed and resulted in the following observations and suggestions (chapter V). Each country have developed its own disaster response system and appointed one organization to address disasters in general. After carefully evaluated the topic, regarding Search and Rescue, a plan, framework or act was developed and put in practice. Each of those have an established organization, appointed roles and responsibilities and manage of resources as well as define the structures and procedures of response in case of emergencies. All of them participate in activities or multi-agency training that provides opportunities to network and give better response to events also provide faculty with new knowledge and skills.

The countries analyzed can serve as initial benchmark on developing laws, plans and manuals, but cannot be taken all as a bulk and apply them as they are in those countries as each one has different needs, resources and threats. Every country beginning on establishing new legal basis followed by search and rescue plans and operational systems would fell more efficacious if they have opportunities to observe and take recommendations from exemplary and experienced countries as the ones analyzed before, thus, it is recommendable that the beginner country identifies the process in overall from these more experienced ones.



## **Chapter V. SUGGESTION OF MARITIME DISASTER MANAGEMENT SYSTEM IN THE DOMINICAN REPUBLIC NAVY**

### **Chapter II summary.**

In this chapter we can overview the basic definitions of concepts such as disaster, accident and incident as well as the difference between them. Each country, in their disaster management laws or Acts have their proper definition of these concepts but all considered and aimed to the same purpose to protect human lives and property.

The chapter also overviews the concept and purpose of a Maritime Disaster Management System, and mentions maritime accidents, causes and types as well as ship global loses and some examples of ship accidents including the sinking of MV Estonia as one large scale disaster. But, when speaking of maritime incidents the IMO conventions for safeguarding lives and the environment must be taken accounted for, mentioning the most important ones in this matter such as the SOLAS, MARPOL and SAR conventions.

### **Chapter IV summary.**

In order to have a wider view of emergency response systems in general as well aimed to the maritime area, this chapter describes and analyzes the laws and Acts, the organizations and agencies as well as the response systems of different countries regarding emergency response when it comes to maritime emergencies. It is worthy of mentions that each country has developed their own systems and policies after defining their main issues as each country, in part, have different threats but, all these systems comply with the international convention to address these problems.

## 5.1 Legislative suggestion on Search and Rescue.

As we saw in the previous chapter, a country cannot have a proper emergency response system if it doesn't have the legal basis that define in specific the problems and give responsibilities to the appropriate institutions in order to give effective response in case of emergencies and disasters.

Taking considerations on this, the first step to adopt or develop a disaster management system is to establish concepts and define the main short and long term issues, in this particular case, in the maritime area. Followed by roles and responsibilities, plan and response system development, etc.

The Dominican Republic and its law 147-02 emergency related terms are defined but this law lacks of specific maritime related terms, scope and institutions responsible for response at sea. For a better understanding and comprehensive disaster management, "Life cycle of a disaster" should be understood including the four phases of disaster.

After making and developing proper legal basis for emergency response at sea in Search situations, as stated before, the Dominican Republic Navy as the maritime authority of the country with functions of Coast Guard as there is no Coast Guard in the country, can be in charge of developing the response procedures, plans and establishment of headquarters in cases of maritime search and rescue. The responsibility for spill prevention and environmental protection will shared and response will be supported by the Ministry of Environment and natural resources as well as the National Authority for Maritime Affairs that has as function to the country to research all relative to sea, its uses and rights.

Based on chapter 4 countries and their legislation, plans and Act, the following chart can be suggested as the initiation of a law project in the Dominican Republic related to search and rescue.

<b>Law No. XXX-XX about Search and Rescue in Dominican Republic's waters.</b>	
<b>Chapters</b>	<b>Content</b>
<b>Chapter I</b> General Provisions	<ul style="list-style-type: none"> <li>● Purpose</li> <li>● Terms and definitions</li> <li>● Establishment of the competent authorities, roles and responsibilities.</li> </ul>
<b>Chapter II</b> Preparedness against maritime accidents	<ul style="list-style-type: none"> <li>● Preventive plans elaboration.</li> <li>● Evacuation plans elaboration</li> <li>● Ship inspections</li> <li>● Education, training and exercises</li> <li>● Establishment of headquarters and emergency centers</li> </ul>
<b>Chapter III</b> Rescue and recovery	<ul style="list-style-type: none"> <li>● Jurisdiction and definition of naval zones</li> <li>● Multi-agency cooperation</li> <li>● Assistance from other ships in the area</li> <li>● Assistance from international SAR units</li> </ul>
<b>Chapter IV</b> Final provisions	<ul style="list-style-type: none"> <li>● Suspension and finalization of the SAR operations</li> <li>● Investigation</li> <li>● Final Report</li> <li>● Salvage</li> </ul>
<b>Chapter V</b> Penalties	<ul style="list-style-type: none"> <li>● Fines and punishment to:               <ol style="list-style-type: none"> <li>1- Those who fail to report an accident that caused loss of lives and property.</li> <li>2- Those who interfere and affected SAR operations.</li> <li>3- Those who do not comply with the instructions of the HQ</li> <li>4- Those who deny resources for SAR operations</li> </ol> </li> </ul>

Table .5 Legislative suggestions on the Dominican Republic search and rescue legal basis.

### **Chapter descriptions.**

#### Chapter I:

Purpose: The purpose of this law will be to prevent maritime accidents and to contribute by promoting safety measures and precautions, by inspections and education. Also, to protect people's lives prevent death or injury to persons and loss or damage to property from maritime accidents.

Terms and definitions: The terms used in this law will be regarding to the specific matters of Search and Rescue and maritime accidents such as: Sea, territorial waters, inland waters, accident, incident, rescue, salvage, SAR headquarters, Search and rescue commander, institutions cooperating in SAR, rescue unit, etc.

Competent authorities: The competent authorities will be the ones that will take overall management and coordination on the matters concerning Search and rescue operations at sea as well as those that provide support in such operations.

## Chapter II

This chapter in general will establish the elaboration of plans, programs and preemptive actions by the competent authorities to prepare and prevent maritime accidents, these plans and programs shall be revised in periods considered by the law. For search and rescue operations and coordination as well for the relief operations and international support this law shall estipulate a establishment of a headquarters were the competent authority directs its operations.

## Chapter III

Jurisdiction and definition of naval zones: The SAR and relief operations in the country's waters shall be performed by the competent authority appointed in this law. The definitions of the naval zones can be considered the same naval zones the Dominican Republic navy has defined and divided its operational areas.

Multi-agency cooperation\*: This part shall name the institutions that will provide support to the SAR and relief operations as well as their roles and responsibilities. \*See 5.4 *Multi-agency cooperation in the Dominican Republic.*

Assistance from ships and International SAR units: The head of the SAR headquarters will be able to request via the corresponding channels assistance and cooperation in necessary

and will be responsible to establish a system for information exchange and mutual communications concerning the rescue and aid units.

#### Chapter IV

This chapter shall describe the situations that can lead to the culmination of SAE operations by the competent authorities. Examples of these situations can be: a) If the rescue activities are completed, all people rescued. b) If it is unnecessary to continue the operations because there is no chance of rescuing survivors.

The competent authority may organize an investigation together with relevant institutions cooperating in the rescue operations and conduct investigations on the cause on the accident. Also, after the relevant investigations are done and concluded, to elaborated final reports for official and public information as well as to, if necessary, conduct the necessary procedures to make salvage operations.

#### **5.2 Organizational suggestion**

The country is not signatory of the SAR conventions and by being party of this convention, which is necessary to have a proper and more precise SAR response system, must accept the obligation to provide aeronautical and maritime SAR coordination and services for the nation, SAR services shall be on a 24-hour basis.

Dominican Republic decree No.360 creates the Emergency Operations Center as the voice of the government in case of disasters, which is activated in response of disasters under representatives of the Civil Defense the Armed Forces or fire department that will be appointed by decree of the Executive power. Considering this, still there is neither organization nor plan for major search and rescue operations.

After considering and developing the legislation the maritime authority, in this case the Dominican Republic Navy, maritime authority which has functions of Coast Guard and it

is the only organization in the country to project resources at sea, shall be appointed as the head in the organizational chart of the eventual search and rescue plan. It will be the navy's responsibility for maritime SAR and for assessing the adequacy of Dominican Republic civil aeronautical and maritime SAR resources, response and co-ordination.

To address Search and Rescue organization, within the command of the Dominican Republic Navy shall fall the command staff such as operations (which is responsible for the Navy's fleet), communications, logistics and public affairs as well as the Direction of salvage and rescue and the Naval auxiliary with their resources. Other supporting organizations shall fall under the direction or command of the Operations department; these organizations include the Fire department and Civil Defense.

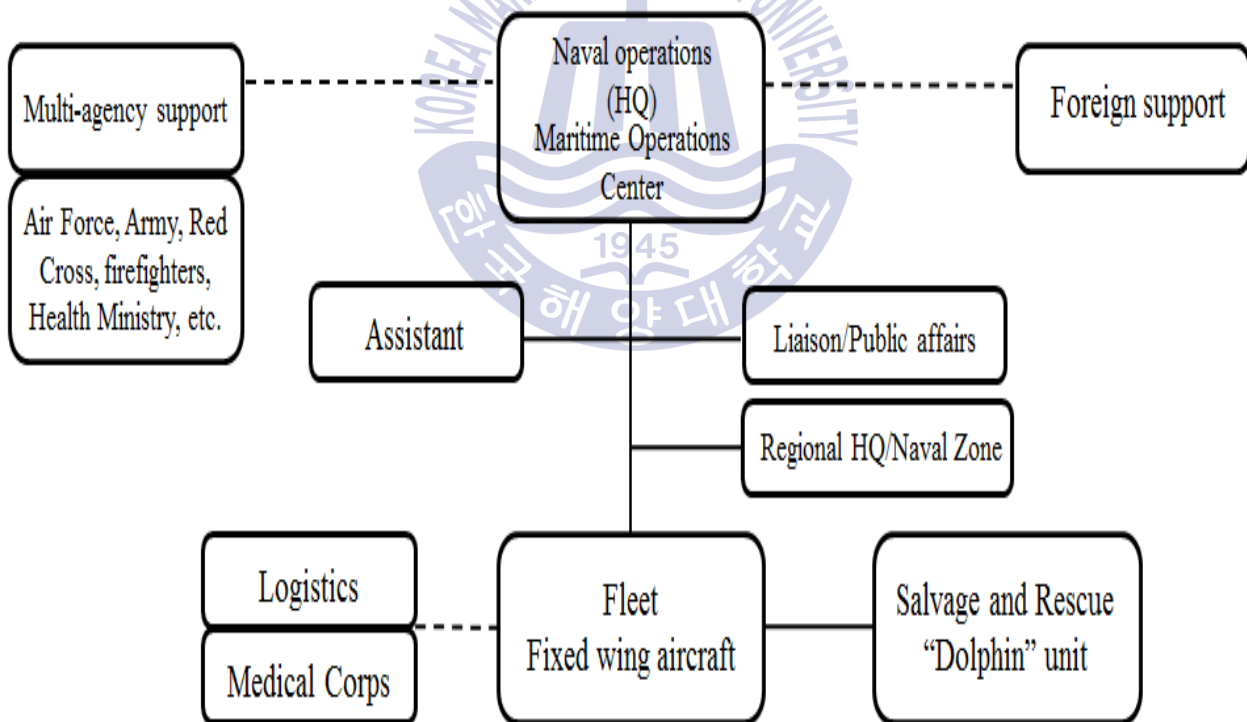


Figure 28. Organizational suggestion for SAR operations

- Naval Operations/HQ: Director of Naval Operations, which can perform the duties of Incident Commander.



- Regional HQ/Naval zone: Port detachment commanding officer, which can perform the duties of On-scene commander.
- Fleet and fixed wing aircraft: See Chapter III, Dominican Republic Navy's equipment.
- Salvage and Rescue "Dolphin" unit: Dominican navy special unit for salvage and rescue. (riverine boats, swimmers and divers)

### **5.3 Operational suggestion**

The success of a SAR mission often depends on the speed with the operation is planned and carried out. The prompt receipt of all available information by the Operations Center is necessary for thorough evaluation of the situation, immediate decision on the best course of action, and a timely activation of SAR assets. While every SAR operation differs one from the other, they follow exactly the same pattern, and SAR incidents generally pass through defined stages, which can be used to help organize response activities.

SAR operations generally proceed through the five stages: Awareness, Initial Action, Planning, Operations, and Conclusion followed by investigation and data collection.

The planning and operational procedures first steps can be provided by the IAMSAR Manual, Volume II, which provides the basic guidance and worksheets for planning searches manually. This method, should be modified accordingly on resources and data that are either locally available or can be obtained and entered by the search planner. The goal of search planning is to deploy the available resources in the best way possible so as to maximize the probability of success as quickly as possible.

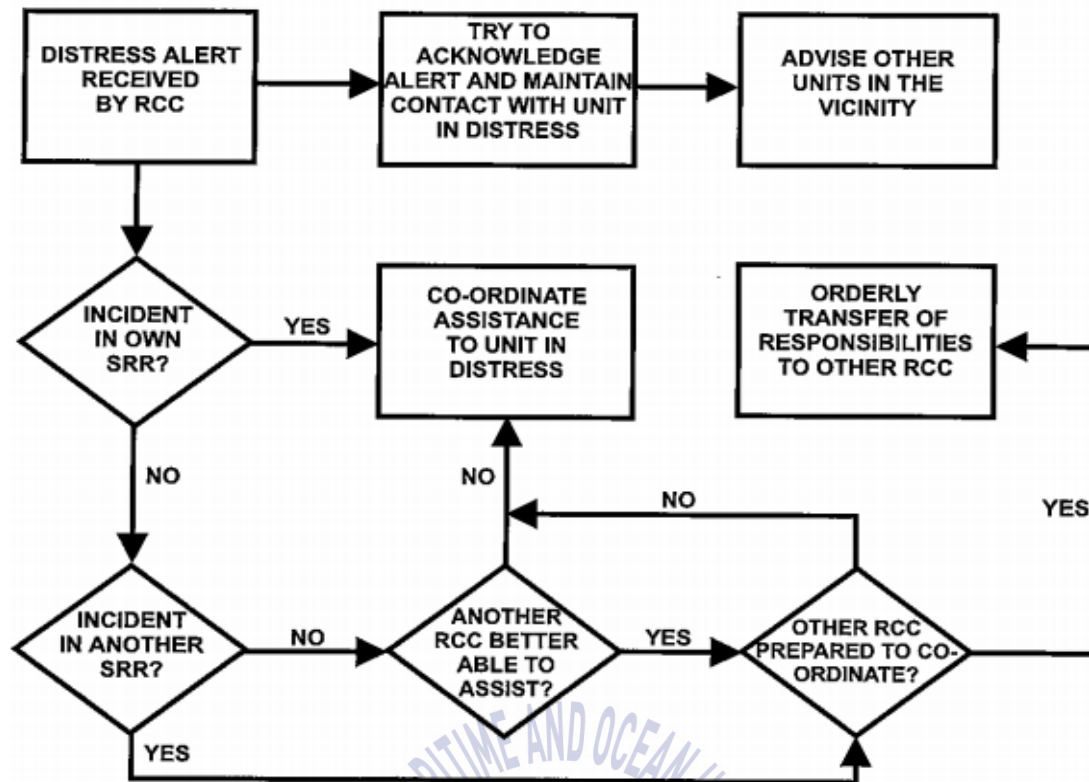


Figure 29. Operational procedure of IAMSAR

The Dominican Navy should prepare comprehensive plans of operations for its SAR, these plans should be brought up to date whenever a change in conditions or experience in actual operations and exercises makes it necessary or advisable.

The plans of operation should include all information on procedures and types of SAR operations, responsibilities to the parties and personnel assigned in SAR ops., facilities, communications, operational information as well as training. The location of the main Rescue Command Center shall be appointed in the Center of Maritime Operations of the Navy.

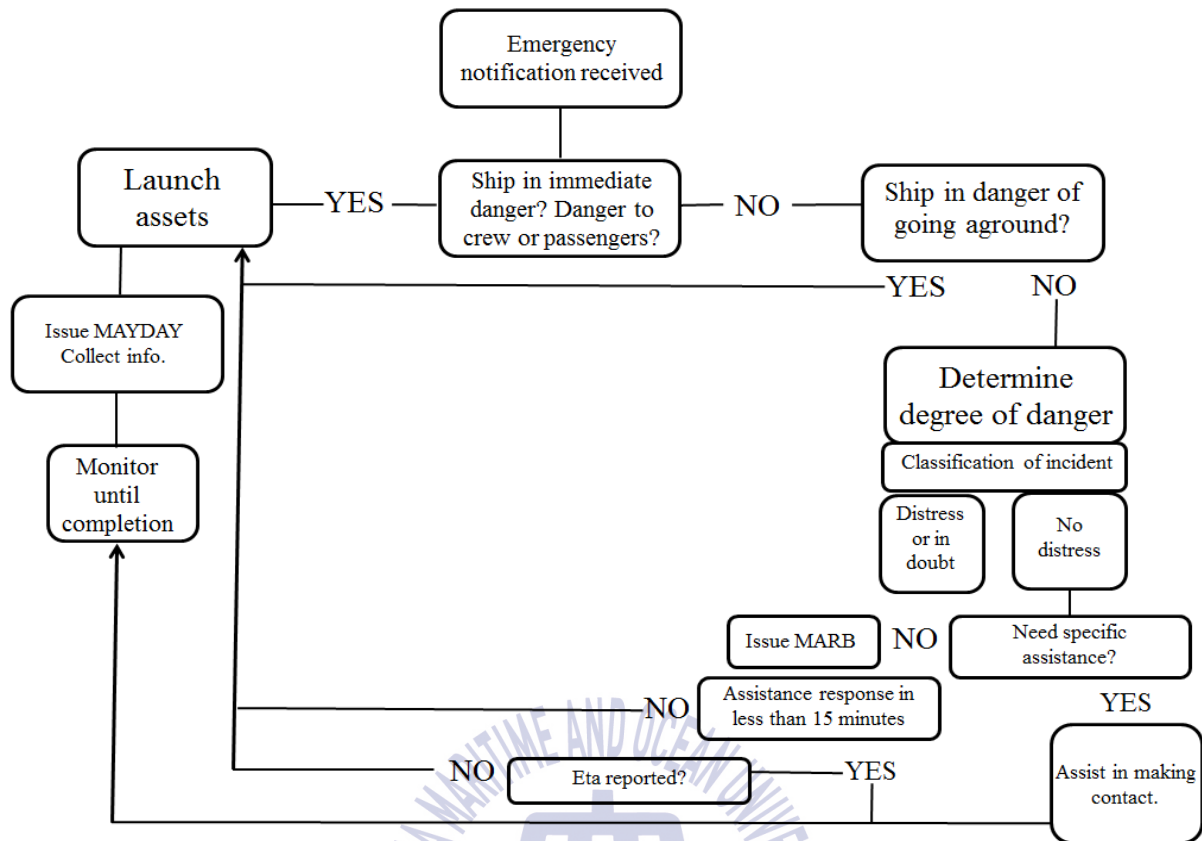


Figure 30. Suggested operational procedure. (own work)

- Ship in danger: Sinking, fire, etc
- Assets: Naval ships, helicopters, boats.
- Danger of going aground: Cannot anchor, anchor not holding, loss of power, etc
- Degree of danger: a) Nature of situation, b) conditions of the vessel. c) Position, d) Weather conditions (visibility, tide and current), e) Crew and passenger situation, f) Available communications
- Specific assistance: Marina, commercial firm (ex. For specific after service troubleshooting on equipment, tug, etc

\* MARB: Maritime Assistance Request Broadcast

### Adopting foreign systems.

Adopting other's countries systems can save time in the planning and developing phase of the system and it is convenient any case the modification of the adopted system so it can fit with the available resources. One example of system is the United States of America Incident Command System as it is flexible and can adapt to any kind and level of emergency.

The Incident Command System is in use by the United States Coast Guard and it must be emphasized that the USCG is the Dominican Republic's main supplier of training and joint exercise partner, which makes the ICS very suitable when it comes to the training phase. Another, detail similarity with the ICS is its structure as it can fit easily with the organization and structure of the Navy.

The SOSREP system of the United Kingdom can also be taken in consideration for its simple structure and the only to take the final considerations on an emergency situation, but can rise negative views if a "civil servant" is appointed and must be carefully consider this case.

#### **5.4 Multi-agency cooperation in the Dominican Republic**

Responsibility for the control for a maritime incident will fall immediately under the command of the navy, establishing headquarters, a command structure and setting up communications with the participating agencies/institutions. Although communicating with some agencies is frequently a challenge during an incident pre-planning, training and exercises in this area is critical task in order to ensure effective communications.

##### **- Dominican Air Force and Dominican Army**

In the event of a maritime disaster the Air force and the army may include additional transportation, SAR helicopters and the Army Humanitarian Response Unit, the deployment and operation of these assets will fall directly under the Navy's Incident Command System commander. If deployed, these assets along with their personnel can provide rescue, care and casualty collection as well to transport patients to nearby hospitals when military aircraft are used for this purpose.

- **Dominican National Police**

The role of the police in a disaster would be to secure the incident scene (Port/dock perimeter, access control, etc.), to provide control of vehicles and movement of the people as well as escort to emergency vehicles.

- **Fire Department and the Red Cross**

The Fire Department will take precautionary actions and assessment if there is a major risk of fire or explosion, as well to provide rescue swimmers, divers, first aid and ambulances if necessary. The Red Cross will provide personnel, if necessary, to stabilize and perform first aid, help to transport the victims of the accident to the designated hospital and to collect blood donations.

- **Coroner**

The role of the coroner is to take charge of the deceased, help to positively identify the bodies and responsible for the removal of the deceased from the scene.

- **Ministry of environment and natural resources.**

The ministry will work side by side with the navy in the event of an oil or hazardous material spill assessing the situation along with the responsible or spill source operator.

- **Media**

Media on its very own way can assist by alerting the public of the current situation to mobilize volunteers and to warn me community to stay away in case of a hazardous disaster.

- **United States Coast Guard**

Both institutions have a long history on cooperation, either incidents or exercises. Besides the Agreement between the Government of the United States of America and the

Government of the Dominican Republic concerning maritime counter-drug operations, signed at Santo Domingo March 23, 1995, also the USCG provides general support to the Dominican Navy.

- **Other regional Coast Guards and institutions.**

Caribbean Coast Guard (Netherlands), Jamaican Defense Force Coast Guard, Colombia Navy and Coast Guard, Haitian competent authorities, etc.





## Chapter VI. Conclusion

### 6.1 Concluding remarks.

This paper has reviewed the emergency management terms and systems in foreign countries. Many in the international community as well as in Dominican Republic are expected to have a better understanding about the process of emergency management.

Maritime disaster response and management is a very complex activity that requires extra awareness and attention for influences that are not normally tested in exercises and smaller incidents.

Every country with access to sea, which depends on maritime traffic for its economy, is prone to maritime disaster and this is why, to ensure safety in the waters all countries must have and develop sophisticated and all-embracing maritime disaster management system. For this, it is important to distinguish responsibilities from all incident response institutions to allow better handling and cooperation between all agencies in case of an incident. The Dominican Navy's proficiency at responding to any incident should be regional renowned, developing high standard of proficiency and expertise in crisis response will honor the country and will improve the Navy's service to the nation.

Taking special considerations on chapter IV, pointing overviews the legal basis for foreign countries to manage, respond and the general considerations of disaster management and maritime emergency response as well as its systems such as the Incident Management System used in the United States and the SOSREP system in the UK, that have proved effective in their own countries, these can be first steps in comprehending the overall concept of a disaster management system and apply it in the best and effective way into the Dominican Republic.

Complicated at first glance, comprehensively elaborated coordination enables to relevant bodies take concerted actions what increases response efficiency.

After developing the correct guidelines and having a well prepared “Preparedness cycle” which is the most consistent and predictable way to improve readiness for incidents and develop skill for crisis response, the Navy’s ability to successfully meet all expectations in any kind of incident requires great understanding, planning, training and experience.

## **6.2 Recommendations.**

Based on the elaboration of this paper, these recommendations shall give the initial steps for the implementation of a Maritime Disaster Management System in the Dominican Republic.

1. - The Dominican Republic shall become a ratifying member of the IMO International Convention on Search and Rescue followed by identification of maritime threats and problems to the country, start legislation projects on specific laws to address maritime disasters such as Search and Rescue and Oil spills.

2.- Dominican Navy, as the maritime authority and responsible for safety in Dominican territorial waters, shall proceed to the planning and developing phases on Maritime Emergency Management as well the operations and planning staff be trained in Incident Command System procedures as well on how to make adequate plans to effective response. Training could be given with expert foreign institutions by making mutual agreements and MOUs on education, training and exercises.

- 3.- After recognizing the short, medium, long terms issues and adopted a response system, within the training with local and foreign institutions, the Dominican Navy and regional partners should prepare workshops to bring together experts in the field, particularly those with vast knowledge and responsibility to respond to a maritime disaster.
4. – To develop a flexible emergency response structure based on ICS that can fit the actual structure of command of the Dominican Republic Navy along with the supporting institutions and the respective plans of response. Within the response plans, the planners should identify potential sites for Incident Command Posts including military bases, police or fire department HQ and consider on mobile command posts paying particular attention to the ability of a facility to support maritime operations.
5. - To introduce the TRIAGE system (*see glossary*) in all the operating units of the Dominican Republic Navy and other cooperating agencies in order to give proper treatment to the victims. (Multilingual in case of international assistance is provided).
6. - As some of the vessels of the Dominican Navy have limited storage capacity because of their function, the navy should develop a “kit” with basic supplies to respond any emergency at sea. The kit will be movable, easy to transport and will be located in ports/docks where the navy has deployed its ships. The kit will be always on station, larger ships will have a permanent kit onboard as they need more time to prepare for departure and to arrive on scene. The kit will contain lifeguard vests, thermal blankets, first-aid kit and additional supplies. And, shall be inspected every certain time.
7. - Technology implementation to enable all units involved to effectively perform, search and rescue as well to communicate in a secure and clear mode with the scene commander and to provide real-time update.

8. - After developing the contingency plans of an adequate Maritime Disaster Management System, the leading institution, in this particular case the Dominican Navy, shall conduct training exercises and operational meetings between the other institutions operational departments to identify potential issues, analyze capabilities and see how the chain of command will perform. Contingency plans containing tactics, techniques and procedures should be made in an agreement of assistance and joint operation with international cooperating institutions i.e. United States Coast Guard, Caribbean Coast Guard (Netherlands), and other maritime related institutions.



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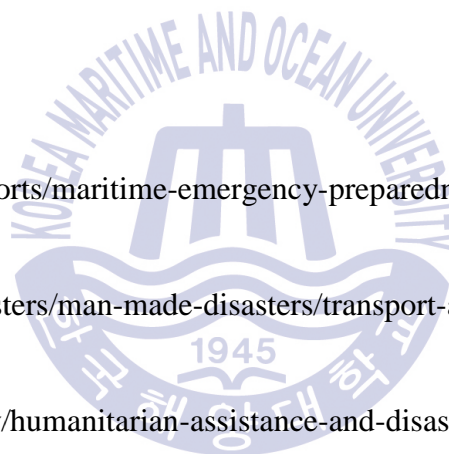
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## ANNEX I

### Glossary.

#### A

**Agency:** An agency is a division of government with a specific function, or a nongovernmental organization (e.g., private contractor, business, etc.) that offers a particular kind of assistance. In ICS, agencies are defined as jurisdictional (having statutory responsibility for incident mitigation) or assisting and/or cooperating (providing resources and/or assistance). (See Assisting Agency, Cooperating Agency, Jurisdictional Agency, and Multiagency Incident.)

**Agency Representative:** An individual assigned to an incident from an assisting or cooperating agency who has been delegated authority to make decisions on matters affecting that agency's participation at the incident. Agency Representatives report to the Incident Liaison Officer.

**Air Operations Director:** The person primarily responsible for preparing and implementing the air operations portion of the Incident Action Plan. Also responsible for providing logistical support to helicopters operating on the incident.

**Allocated Resources:** Resources dispatched to an incident.

**Area Command (Unified Area Command):** An organization established to oversee the management of (1) multiple incidents that are each being handled by an ICS organization, or (2) large or multiple incidents to which several Incident Management Teams have been assigned. Area Command has the responsibility to set overall strategy and priorities, allocate critical resources according to priorities, ensure that incidents are properly managed, and ensure that objectives are met and strategies followed.



Available Resources: Resources assigned to an incident, checked in, and available for a mission assignment, normally located in a Staging Area.

## **B**

Base: The location at which primary Logistics functions for an incident are coordinated and administered. There is only one Base per incident. (Incident name or other designator will be added to the term Base.) The Incident Command Post may be collocated with the Base.

## **C**

Chain of Command: A series of management positions in order of authority. Check-In: The process whereby resources first report to an incident.

Chief: The ICS title for individuals responsible for functional Sections: Operations, Planning, Logistics, and Finance/Administration.

Command: The act of directing and/or controlling resources by virtue of explicit legal, agency, or delegated authority. May also refer to the Incident Commander.

Command Staff: The Command Staff consists of the Public Information Officer, Safety Officer, and Liaison Officer. They report directly to the Incident Commander. They may have an Assistant or Assistants, as needed.

Coordination: The process of systematically analyzing a situation, developing relevant information, and informing appropriate command authority of viable alternatives for selection of the most effective combination of available resources to meet specific objectives. The coordination process (which can be either intra- or interagency) does not involve dispatch actions.

Coordination Center: A facility that is used for the coordination of agency or jurisdictional resources in support of one or more incidents.

## **D**

Dispatch Center: A facility from which resources are ordered, mobilized, and assigned to an incident.

## **E**

Emergency: Absent a Presidentially declared emergency, any incident(s), human-caused or natural, that requires responsive action to protect life or property.

Emergency Operations Plan (EOP): The plan that each jurisdiction has and maintains for responding to appropriate hazards. Event: A planned, non-emergency activity. ICS can be used as the management system for a wide range of events, e.g., parades, concerts, or sporting events.

## **F**

Facilities Unit: Functional Unit within the Support Branch of the Logistics Section that provides fixed facilities for the incident. These facilities may include the Incident Base, feeding areas, sleeping areas, sanitary facilities, etc.

Field Operations Guide: A pocket-size manual of instructions on the application of the Incident Command System.

## **G**

General Staff: A group of incident management personnel organized according to function and reporting to the Incident Commander. The General Staff normally consists of the Operations Section Chief, Planning Section Chief, Logistics Section Chief, and Finance/Administration Section Chief.

## H

**Hazard:** Something that is potentially dangerous or harmful, often the root cause of an unwanted outcome.

## I

**Incident:** An occurrence or event, natural or human-caused that requires an emergency response to protect life or property. Incidents can, for example, include major disasters, emergencies, terrorist attacks, terrorist threats, wildland and urban fires, floods, hazardous materials spills, nuclear accidents, aircraft accidents, earthquakes, hurricanes, tornadoes, tropical storms, war-related disasters, public health and medical emergencies, and other occurrences requiring an emergency response.

**Incident Action Plan (IAP):** An oral or written plan containing general objectives reflecting the overall strategy for managing an incident. It may include the identification of operational resources and assignments. It may also include attachments that provide direction and important information for management of the incident during one or more operational periods.

**Incident Commander (IC):** The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. The IC has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations at the incident site.

**Incident Command Post (ICP):** The field location at which the primary tactical-level, on-scene incident command functions are performed. The ICP may be collocated with the incident base or other incident facilities and is normally identified by a green rotating or flashing light.

Incident Command System (ICS): A standardized on-scene emergency management construct specifically designed to provide for the adoption of an integrated organizational structure that reflects the complexity and demands of single or multiple incidents. ICS is the combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure, designed to aid in the management of resources during incidents. It is used for all kinds of emergencies and is applicable to small as well as large and complex incidents.

Incident Communications Center: The location of the Communications Unit and the Message Center.

Incident Management Team (IMT): The Incident Commander and appropriate Command and General Staff personnel assigned to an incident.

Incident Types: Incidents are categorized by five types based on complexity. Type 5 incidents are the least complex and Type 1 the most complex. Incident Support Organization: Includes any off-incident support provided to an incident. Examples would be Agency Dispatch Centers, Airports, Mobilization Centers, etc.

Initial Response: Resources initially committed to an incident.

## **J**

Joint Information Center (JIC): A facility established to coordinate all incident-related public information activities. It is the central point of contact for all news media at the scene of the incident. Public information officials from all participating agencies should collocate at the JIC.

## **L**

**Liaison:** A form of communication for establishing and maintaining mutual understanding and cooperation.

**Liaison Officer (LNO):** A member of the Command Staff responsible for coordinating with representatives from cooperating and assisting agencies. The Liaison Officer may have Assistants.

**Logistics:** Providing resources and other services to support incident management.

**Logistics Section:** The Section responsible for providing facilities, services, and materials for the incident.

## **M**

**Major Disaster:** a major disaster is any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of States, tribes, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

**Mitigation:** The activities designed to reduce or eliminate risks to persons or property or to lessen the actual or potential effects or consequences of an incident. Mitigation measures may be implemented prior to, during, or after an incident.

**Multiagency Coordination (MAC):** The coordination of assisting agency resources and support to emergency operations.

**Multiagency Coordination Systems (MACS):** Multiagency coordination systems provide the architecture to support coordination for incident prioritization, critical resource allocation, communications systems integration, and information coordination. The components of multiagency coordination systems include facilities, equipment, emergency operations centers (EOCs), specific multiagency coordination entities, personnel, procedures, and communications. These systems assist agencies and organizations to fully integrate the subsystems of the NIMS.

**Multiagency Incident:** An incident where one or more agencies assist a jurisdictional agency or agencies. May be single or unified command.

**Mutual-Aid Agreement:** Written agreement between agencies and/or jurisdictions that they will assist one another on request, by furnishing personnel, equipment, and/or expertise in a specified manner.

## **O**

**Officer:** The ICS title for the personnel responsible for the Command Staff positions of Safety, Liaison, and Public Information.

**Operational Period:** The period of time scheduled for execution of a given set of operation actions as specified in the Incident Action Plan. Operational Periods can be of various lengths, although usually not over 24 hours.

**Operations Section:** The Section responsible for all tactical operations at the incident. Includes Branches, Divisions and/or Groups, Task Forces, Strike Teams, Single Resources, and Staging Areas.

## **P**

**Planning Section:** Responsible for the collection, evaluation, and dissemination of information related to the incident, and for the preparation and documentation of Incident Action Plans.

**Preparedness:** The range of deliberate, critical tasks and activities necessary to build, sustain, and improve the operational capability to prevent, protect against, respond to, and recover from domestic incidents. Preparedness is a continuous process. Preparedness involves efforts at all levels of government and between government and private-sector and nongovernmental organizations to identify threats, determine vulnerabilities, and identify required resources. Within the NIMS, preparedness is operationally focused on establishing guidelines, protocols, and standards for planning, training and exercises, personnel qualification and certification, equipment certification, and publication management.

**Prevention:** Actions to avoid an incident or to intervene to stop an incident from occurring. Prevention involves actions to protect lives and property. It involves applying intelligence and other information to a range of activities that may include such countermeasures as deterrence operations; heightened inspections; improved surveillance and security operations; investigations to determine the full nature and source of the threat; public health and agricultural surveillance and testing processes; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice.

**Procurement Unit:** Functional Unit within the Finance/Administration Section responsible for financial matters involving vendor contracts.



Public Information Officer (PIO): A member of the Command Staff responsible for interfacing with the public and media or with other agencies with incident-related information requirements.

## **R**

Recovery: The development, coordination, and execution of service- and site-restoration plans; the reconstitution of government operations and services; individual, private-sector, nongovernmental, and public-assistance programs to provide housing and to promote restoration; long-term care and treatment of affected persons; additional measures for social, political, environmental, and economic restoration; evaluation of the incident to identify lessons learned; postincident reporting; and development of initiatives to mitigate the effects of future incidents.

Response: Activities that address the short-term, direct effects of an incident. Response includes immediate actions to save lives, protect property, and meet basic human needs. Response also includes the execution of emergency operations plans and of mitigation activities designed to limit the loss of life, personal injury, property damage, and other unfavorable outcomes.

## **S**

Safety Officer: A member of the Command Staff responsible for monitoring and assessing safety hazards or unsafe situations, and for developing measures for ensuring personnel safety. The Safety Officer may have Assistants.

Search and Rescue (SAR) – SAR comprises the search for, and provision of aid to, persons, ships or other craft which are, or are feared to be, in distress or imminent danger.

## T

Team: See Single Resource. Technical Specialists: Personnel with special skills that can be used anywhere within the ICS organization.

Threat: An indication of possible violence, harm, or danger.

Tools: Those instruments and capabilities that allow for the professional performance of tasks, such as information systems, agreements, doctrine, capabilities, and legislative authorities.

Triage – The sorting and allocation of treatments to patients, and especially battle and disaster victims, according to a system of priorities designed to maximize the number of survivors.

Triage Kit – A purpose specific kit provided for use by the Triage Officer. This kit should include at minimum, triage tagging material, markers, waterproof note pad, etc.

## U

Unit: The organizational element having functional responsibility for a specific incident Planning, Logistics, or Finance/Administration activity.

Vessel of Opportunity – Any vessel capable of assisting a distressed vessel or having capabilities that are required by the SAR Mission Coordinator.

## ANNEX II

### List of Abbreviations

<b>AIS</b>	<b>Automatic Identification System</b>
<b>CEO</b>	<b>Chief Executive Officer</b>
<b>EU</b>	<b>European Union</b>
<b>FOC</b>	<b>Flag of Convenience</b>
<b>GMDSS</b>	<b>Global Maritime Distress and Safety System</b>
<b>GPS</b>	<b>Global Positioning System</b>
<b>IAMSAR</b>	<b>International Aeronautical and Maritime Search and Rescue</b>
<b>ICS</b>	<b>Incident Command System</b>
<b>IMO</b>	<b>International Maritime Organization</b>
<b>IPS</b>	<b>International Port Security</b>
<b>MCA</b>	<b>Maritime and Coastguard Agency</b>
<b>MOU</b>	<b>Memorandum of Understanding</b>
<b>MPSS</b>	<b>Ministry of Public Safety and Security</b>
<b>NIMS</b>	<b>National Incident Management System</b>
<b>NRF</b>	<b>National Framework System</b>
<b>PSC</b>	<b>Port State Control</b>
<b>SAR</b>	<b>Search and Rescue</b>
<b>SMC</b>	<b>SAR mission coordinator</b>
<b>SOSREP</b>	<b>Secretary of State Representative</b>
<b>STCWC</b>	<b>Standard Training Certification and Watch Keeping Convention</b>
<b>UK</b>	<b>United Kingdom</b>
<b>UN</b>	<b>United Nations</b>
<b>UNCLOS</b>	<b>United Nations Convention for the Law of the Sea</b>
<b>US</b>	<b>United States</b>
<b>USCG</b>	<b>United States Coast Guard</b>
<b>VDS</b>	<b>Vessel Detection System</b>
<b>VMS</b>	<b>Vessel Monitoring System</b>
<b>VTMS</b>	<b>Vessel Traffic Management System</b>
<b>VTS</b>	<b>Vessel Traffic Service</b>