International Journal of Applied and Natural Sciences (IJANS)
ISSN(P): 2319-4014; ISSN(E): 2319-4022
Vol. 5, Issue 3, Apr - May 2016; 91-106

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

ROLE OF LOGISTICS IN OIL POLLUTIONS DISASTERS

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ABSTRACT

The idea of this paper is to highlight the importance of logistics during action to reduce the impact of pollution disasters in order to minimizing the damage occurred.

Disaster management aims to minimize and diminish the effects of a disaster.

In the pre-disaster phase. And the importance of which could benefit from the application of logistics in the fight against marine pollution was the idea behind this paper, which lead to the reduction of marine pollution disaster.

KEYWORDS: Disaster, Pollutions, Oil, Logistics, Spill

INTRODUCTION ABOUT DISASTER LOGISTICS

Disaster is a term that can be defined in different ways, depending on whether the scale is broad or narrow. Organizations and agencies define it according to the situation. For the Red Cross, a disaster is an occurrence such as hurricane, tornado, storm, flood, high water, wind-driven water, tidal wave, earth quake, drought, blizzard, pestilence, famine, fire, explosion, volcanic eruption, terrorist attack, building collapse, transportation wreck or any other situation that causes human sufferings or creates human needs that the victims cannot alleviate without assistance According to the "who", a disaster is any occurrence that causes damage, ecological disruption, loss of human life, deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community area.

Disaster management aims to minimize and diminish the effects of a disaster. In the pre-disaster phase, disaster effects and events are studied and plans are made to fight against them. In the during disaster phase, activities are performed to minimize the losses that result from the disaster. Finally, in the post-disaster phase, attempts are made to neutralize the disaster's long-term effects as well as to establish real-time response to decrease the unwelcome aftermath of disaster.

In pre-disaster disaster management, several measures are undertaken to understand the vulnerability of the community to disaster and to prevent or protect the community from disaster. The goals are to identify the risk of and minimize the effects of a disaster to which a community is exposed by using the following methods:

- Hazards assessment (how frequently disaster strikes a certain location and what is the severity of a disaster if it strikes),
- Vulnerability assessment.
- Risk assessment using hazard monitoring Forecasting tools.

Logistics of Oil Spill Crisis

Oil is required in huge amounts because of the increasing need for energy supplies; since energy is in everything in our life, so it's demanded in a huge way. Oil is used in many things in our life, such as fuel, plastic, and lubricating oil. Oil can be transported using all modes of transport; it is commonly transported by barges, tankers, pipelines, and trucks, each of which has its own imperfections that can lead to an oil accident. Tankers and barges can crash or run into unexpected land that causes a crack or hole which allows oil to leak. Likewise, pipelines which transport oil underground can develop leaks or cracks that allow oil to seep into the environment. Oil shipping trucks can also initiate an oil spill in the event of an accident. Some oil can leak while it is being moved from one vessel to another, a process called lightering. Uncontrollable factors such as hurricanes and other violent weather can cause tankers or barges to wreck or can damage offshore drilling facilities, incidents that can lead to oil spills.

Causes of Oil Spills

Oil spills happen due to several reasons and in different phases, such as phases of production, when oil is being extracted from an oil well or being converted into other products at a refinery. Human mistakes as well as equipment failure are common causes of accidents in such situations. Sometimes oil is even spilled intentionally as an act of war or vandalism. Illegal dumping of oil is another deliberate act that causes harm to the environment.

Oil Spill Causes Can Be Classified Into Two Categories

Accidents

This usually occur when a large amount of oil is spilt in the sea, it's considered a spill when the amount of oil spilt is about 1/5 which means the oil loss is over 700 tones. Accidents can take several forms such as:

- **Collisions**
- **Hull failure**
- **Fires and explosion**
- **Groundings**

Operations

This is the second category of oil spill, and this happens when the vessel is carrying out the routine procedures in the port or the terminal. This kind of oil spill is small compared to accidents. This kind of oil spill occurs during two phases which are:

- **Loading/ discharging.**
- **Bunkering.**
- **Tank cleaning.**

Pipelines

Pipelines are the prime reason of oil spills whether onshore or offshore. Oil spill can occur due to the corrosion and other aging problems of the pipeline network. But the majority of the oil spill of the pipelines occurs due to external

factors such as anchors and other vessel –related activities.

Drilling

Oil spill can occur during the early stages, in which the oil is extracted from the wells. These wells can be either on land or in sea, and they are subject to leak at any time due to any failure whether mechanical or human error.

Terrorism

Terrorists may cause an oil spill because they will dump oil into a country's ocean. Many terrorists will do this because they are trying to get the country's attention, or they are trying to make a point to a country.

Illegal Dumpers

Those are people that will dump crude oil into the oceans, because they do not want to spend money on decomposing their waste oil. Because they won't spend money on breaking up the oil (decomposing it) they will dump oil into the oceans, which is illegal.

Natural Disasters

Hurricanes may cause an oil spill, too. If a hurricane was a couple of miles away, the winds from the hurricane could cause the oil tanker to flip over, pouring oil out.

Oil spills are very dangerous to all living organisms that come in contact with them. It causes several adverse effects on the well-being of the living organisms, that's why it causes pollution, which is very dangerous and harmful to all the surroundings.

POLLUTION DEFINITION

The term 'pollution' describes the occurrence and inputs of wastes and the impact of these wastes on the environment.

• Marine Pollution (UN definition)

"The introduction by man, directly, or indirectly, of substances or energy to the marine environment resulting in deleterious effects such as: hazards to human health, hindrance to marine activities, impairment of the quality of seawater for various uses and reduction of amenities."

Oil pollution crisis is one of the major crisis's that have a very adverse effect on the environment. It has several side effects, such as killing the aquatic life, and all the birds that feed on the sea animals. Also, oil pollution cause several adverse effects on the human health such as increasing the rates of cancer, affecting the central nervous system as well as the respiratory system, kidney damage, heart conditions, and can lead to premature death.

Effects of Oil Spills

Oil spills can affect everything around it, anything underneath it, and anywhere above it. The things that may be found around, underneath or above this oil spillage area are the wildlife and the habitats. Oil spills can affect the wildlife and their habitats in various ways. There are degrees of severity of injuries depending up on the type and the quantity of the oil spilled, the season and weather, the type of waves and tidal energy in the area of the spill and last but not least, type of the shoreline.

Oils in general can be broken down into five groups ranging according to its density from very light to very heavy oils. Because most oils have a lesser density than water, it causes the floating characteristic. Maybe the floating characteristic could be taken as an advantage because what can't be seen is very hard to fix yet still, even if it is floating above water, it has various side effects. Once the oil reaches the surface of the water, it tends to spread since there is no border stopping it from spreading. Very light oils such as jet fuel or gasoline are highly volatile and evaporate quickly but that doesn't mean it doesn't have side effects. These very light oils are one of the most acutely toxic oils and generally, they affect aquatic life such as fish, or plants that live in the upper water column. Other kinds of oils such as diesel or heating oil's are moderately volatile and may leave a residue of up to one third of the amount spilled after several days yet; it has the potential to cause long-term contamination.

Medium oils such as crude oils are less likely to mix with water but can cause severe and long-term contamination to intertidal areas. As for the heavy oils such as heavy crude, also don't mix with water and have far less evaporation and dilution potential and my cause severe long-term contamination as well. The clean-up process for the heavy oils is very difficult and takes much longer time. The heavy oil kind can be extremely heavy where it may even mix, sink, or hand in the water. These oils can become oil drops and mix in the water or even accumulate on the bottom or mix with sediment and then sink!

Total Amount of Spilled Oil

In the 1990 there were 358 spills of 7 tonnes and over, resulting in 1,133,000 tonnes of oil lost, 73% of this amount was spills in just 10 incidents.

In the 2000 there were 181 spills of 7 tonnes and over, resulting in 196,000 tonnes of oil lost, 75% of this amount was spills in just 10 incidents.

In the six year period 2010-2015 there have been 42 spills of 7 tonnes and over, resulting in 33,000 tonnes of oil lost, 86% of this amount was spilt in just 10 incidents as a following:

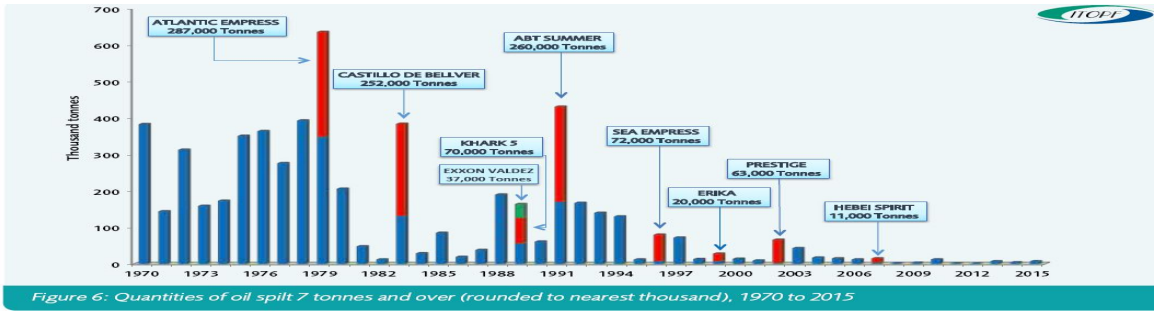

Figure 6: Quantities of oil spilt 7 tonnes and over (rounded to nearest thousand), 1970 to 2015

Source: Oil Tanker Spill Statistics, Feb. 2016

Cases

"On Sunday December 12th 1999, the Maltese tanker Erika, loaded with 30,000 tons of heavy fuel oil, became caught in 60mph winds and 20 foot waves north of the Bay of Biscay. The ship was in route from Dunkirk (France) to Livorno (Italy), when the storm caused the vessel to break into two sections, subsequently sinking 80 kilometres off the French coast of Brittany, in the northern part of the Biscay Bay.

The very first assessment of the situation revealed that between 5,000 and 7,000 tons of heavy oil had been

released into the sea. Due to the current weather conditions this would take two weeks before the oil would start washing up on the coast. Diffuse pollution however reached the shore 1 to 2 days before the main slicks.

On the 27th December, a new oil slick of approximately 10,000 tons measuring 10 km long and 400 m wide was observed on the sea surface close to where the stern section of the Erika tanker sank, moving towards the Brittany coastline. The remaining 10,000 tons of heavy crude oil was still contained in the two sunken sections of the tanker, 120 meters deep in the ocean. No significant leakage was noted from the wreck.

On June 19th 2006, Calcasieu River, Louisiana

An estimated 71,000 barrels of waste oil were released from a tank at the CITGO Refinery on the Calcasieu River during a violent rain storm.

July 15th 2006, Beirut, Lebanon

The Israeli navy bombs the Jieh coast power station, and between three million and ten million gallons of oil leaks into the sea, affecting nearly 100 miles of coastline. A coastal blockade, a result of the war, greatly hampers outside clean-up efforts.

On August 11th 2006, Guimaras Island, The Philippines

A tanker carrying 530,000 gallons of oil sinks off the coast of the Philippines, putting the country's fishing and tourism industries at great risk. The ship sinks in deep water, making it virtually unrecoverable, and it continues to emit oil into the ocean as other nations are called in to assist in the massive clean-up effort.

On December 7th 2007, South Korea

Oil spill causes environmental disaster, destroying beaches, coating birds and oysters with oil, and driving away tourists with its stench. The Hebei Spirit collides with a steel wire connecting a tug boat and barge five miles off South Korea's west coast, spilling 2.8 million gallons of crude oil. Seven thousand people are trying to clean up 12 miles of oil-coated coast.

On July 25th 2008, New Orleans, Louisiana

A 61-foot barge, carrying 419,000 gallons of heavy fuel, collides with a 600-foot tanker ship in the Mississippi River near New Orleans. Hundreds of thousands of gallons of fuel leak from the barge, causing a halt to all river traffic while clean-up efforts commence to limit the environmental fallout on local wildlife.

On March 11th 2009, Queensland, Australia

During Cyclone Hamish, unsecured cargo aboard the container ship MV Pacific Adventurer came loose on deck and caused the release of 52,000 gallons of heavy fuel and 620 tons of ammonium nitrate, a fertilizer, into the Coral Sea. About 60 km of the Sunshine Coast was covered in oil, prompting the closure of half the area's beaches.

On Jan. 23th 2010, Port Arthur, Texas

The oil tanker Eagle Otome and a barge collide in the Sabine-Neches Waterway, causing the release of about 462,000 gallons of crude oil. Environmental damage was minimal as about 46,000 gallons were recovered and 175,000 gallons were dispersed or evaporated, according to the U.S. C. Guard. (www.infoplease.com)

ROLE OF LOGISTICS IN OIL SPILLAGE

Whenever a spillage occurs in the sea, resources such as aids, help, transportation, or maintenance is very difficult to reach the location. Eventually, all these assistance will be able to reach the location thanks to logistics but what about after reaching the location? People who reach the spillage area need care and equipment's to be able to operate properly and efficiently to fix what has occurred. Other needs the location will need such as the proper equipment to response successfully with the contamination that occurred and other detailed logistics support and services that will be able to help with clearing the oil spilled.

OIL SPILL PREPAREDNESS

In every crisis there must be preparation plans in order to help the easy execution of the logistical procedures and help save the damaged from further complications from the crisis. In case of the oil spill the preparation plans start by assessing the situation and classifying the type of the oil spill, because according to its type the logistical response will differ. The assessment of the situation is classified into three categories, which are:

Tier 1

This category involves the minor oil spills but yet they are frequent. We can find such oil spills in the port, terminals, harbours, and oil handling facilities. The responsibility of such oil spill is the responsibility of the facility operator, because he didn't prepare well for such risks and put contingency plans for such accidents. In each facility there must be a trained work force that is familiar with the procedures of initiating the response plan. With the correct application of the response plan, the leakage or spill will be stopped, and the spilt oil will be contained and in some cases it can be recovered. In case of larger oil spill tier 1 can only serve as a mean of first aid measures. The quality of the response in tier 1 can vary according to the plan put to save the situation, sometimes there is poor planning or untrained work force, this will lead to the inefficient performance and might increase the damage caused by the spill.

Tier 2

Those spills are by virtue of their size; require a greater response than those of tier 1, since their impact is much bigger than tier 1. A local government agency will be responsible for managing and directing the response plan, using its own resources and other authorities resources, and all the available resources from different authorities will be pooled and cooperate together in order to form a reliable response plan to overcome the crisis and save all that can be saved.

Tier 3

This category of oil spills is the most important and of national significance, since it is caused by a major spill that may involve one large country, a region, and sometimes globally. Such case requires a greater response than tier 2, there must be resources available from the local government and industry, stockpiles of equipment and cooperation. Tier 3 spills will force the governments to be involved in the clean-up resources and managing the spill response. The establishment of a national contingency plan is crucial in order to develop capabilities and strategies to prepare for such event, also it should provide for the pooling of local government and industry equipment resources.

The oil properties that should be considered during a spillage investigation are:

- Density

- Viscosity
- Pour Point
- Solubility
- Chemical composition (% aromatics)
- Emulsification potential
- Toxicity

These properties in combination with the environmental data for a specific theoretical scenario can help to determine the behaviour of the discharged oil as well as the natural resources in danger.

OIL SPILL RESPONSE THROUGH METHODS OF RECOVERY

The success of the oil spill response depends primarily on realistic attitude and basic organization. Oil spill response methods are generally divided into three main categories which are: mechanical recovery, non-mechanical recovery, and manual recovery.

Mechanical Recovery

Contains the spilled oil using booms, and collects it with a skimming device for storage and disposal. Booms are deployed from vessels or anchored to fixed structures or land. A number of different kinds of skimmers exist; they use suction, lyophilic materials or weirs to remove oil from the water's surface. Once the oil has been recovered, it must be transferred using pumps and hoses to temporary storage until it can be properly disposed of. An effective mechanical recovery requires sufficient equipment's and well trained personnel.

Non-mechanical Recovery

This could be done through **in-situ burning** which involves a controlled burning of the spilt oil, the fire starts by releasing a burning gelled fuel from a helicopter, or by releasing an ignition device from a vessel or any other access point. But this method is not 100 % effective, because after the burning still some residues remain and non-volatile compounds. In order for this method works it requires slick thickness for ignition, minimal wind and waves, and the oil didn't emulsified so much with water. Also, another non-mechanical method is dispersants which is a group of chemicals sprayed or applied to accelerate the dispersion. This kind of recovery doesn't remove the oil from water but it limits the amount of oil forming a slick on the water surface or the shoreline. Dispersants are monitored by aircrafts to see its effectiveness; also they have a limited time frame for effective application, and it requires a prompt, accurate application of the chemical to the spilt oil, salinity of water, weather conditions, and sea state in order to ensure effective response.

The more rapid the response is the more it's easier to remove the spilt oil, because as the time pass it will be more difficult to remove the oil from the water.

Cleaning the shores and the seas is a difficult job, because it requires a quick response and a good understanding of the crisis. To do such thing there are various forms of cleaning up, but choosing the method of cleaning depends upon the type of oil spill and the complications resulting from this oil spill. The clean-up takes several forms such as:

Normal Process

This process doesn't require any human interference, since it depends on the evaporation, oxidation, and biodegradation process.

Evaporation

This occurs when the liquid components found in the oil evaporate and they are converted into vapour and then released to the atmosphere. This happens in the first 12 hours after the spill, and it removes the lighter-weight substance in the oil. This method decreases the toxicity of the oil, since the most toxic substances are the lighter- weight substances.

Oxidation

This happens when the oxygen reacts with the chemical compounds in the oil, this causes the oil to break down into simpler compounds, which tend to be lighter and can dissolve in the water.

Biodegradation

This occurs when bacteria living in water or on land consume the oil. The spilt oil at the beginning may be toxic to some bacteria which make the first biodegradation, and it will be very slow. As the oil evaporates and more toxic substances are removed their process speeds up since the bacteria grow and increase in number. Such operation is very slow but it can be accelerated by providing the bacteria with nutrition's such as phosphorus and nitrogen, and this process is called bio-stimulation. Also, to increase the process micro-organisms can be added and this is called bio-augmentation.

Physical Methods

Physical methods is a time-consuming procedure that requires a lot of equipments as well as personnel, this can be done using the following:

- Wiping with absorbent materials
- Pressure washing
- Raking or bulldozing

Before using this method, booms of absorbent materials were used and put on the edge of the banks, this booms prevent the oil from returning back to the water so that it can be skimmed from the water for proper disposal.

Wiping With Absorbent Materials

This method uses materials that absorb much more than its weight. It can be used to wipe the whole contaminated shoreline. These materials are designed as large squares, such as paper towel, or they can be shaped into "mops". These absorbents can clean up almost every type of oil on any shoreline. These absorbents are environment friendly since they don't cause any harm to the shoreline or the organisms that live on it. Personnel using these absorbents must wear protective clothes in order to avoid direct contact with the oil while removing it. Such method can be so costly and the intervention of a lot of personnel in an isolated shoreline can lead to the disruption of the behavior of animals in such places.

Pressure Washing

This method involves rinsing the contaminated shorelines using hoses that supply low or high pressure water streams. As another method of creating streams, hot or cold water can be used. After pressuring the oil it is flushed from the shore to plastic-lined trenches, and then collected by sorbent material and then disposed correctly. This method can be used in vegetation areas. From the disadvantages of this method is that the high pressure stream causes the oil to be pushed deeper into the beach and it kills many organisms that live on the shoreline. Also, high pressure streams accelerate the erosion of the banks and dislocate organisms, such as algae and mussels. But on the other hand, this method is inexpensive and it is very simple to apply, but it requires a huge number of personnel to operate and execute such method correctly.

Raking or Bulldozing

As it is very well known, since the oil is spilled over water, they don't carry out the same density therefore, the oil will start to move and spread. When oil moves downwards into the sands to the shoreline, it becomes harder and harder to remove. If the oil has moved downward for only a short distance, raking or tilling the sand may as a result increase evaporation of the oil by increasing its exposure to air and sunlight. In other cases where if the oil has moved or penetrated several inches into the sand, bulldozers may be brought in to remove the upper layers of the sand that has been contaminated with the spillage. This allows the oil to be exposed so it can be collected and removed from the site, washed with pressure hoses or to be left to degrade naturally.

Both simple methods, the raking and bulldozing, are mainly used to help remove oil that might otherwise escape into sediments. Nevertheless, these methods may disturb both the natural shape of the shoreline and the plants and animals species that live on and in the sediments. Not only that but also in addition, the use of bulldozers requires specially trained operators who have the ability to manoeuvre them without damaging the shoreline. Both of these methods are time-consuming and they require many people to be able to precede such operations.

DISPOSAL OF OIL AND DEBRIS

The cleaning up process from the location of an oil spill is not considered complete and clean until all waste materials are disposed of properly. Cleaning up such an oiled shoreline may create several different types of waste materials including liquid oil, oil mixed with sand, and tar balls. In some cases, this oil may sometimes be recovered and reused. As for what is required or preferred by the federal government, they strictly regulate the disposal of oil. The reuse or the recovery of the oil requires that the oil would then be processed and separated from the other materials such as water that are mixed in with it. The oil that has been recovered could then be blended with other fuels for use in power plants or boilers.

Burning or incineration uses extremely high temperature in order to have the ability to convert compounds, such as oil into carbon dioxide and water. When a mobile incinerator is used at a remote spill site, the need for transporting large volumes of oiled wastes to distant disposal sites is eliminated. Such thing can be a practical and an efficient method to manage such large volumes of waste generated during a clean-up. Since incineration may potentially produce air pollution, it is critical that it is used in strict compliance with air pollution laws.

Another method of disposing of oiled debris is the land filling. The oil gets mixed with chemicals, such as calcium oxide, that stabilize the oil and make it less able to leak into groundwater or soils. Mixtures of quicklime and oil

must sometimes be taken to specially designed landfills for disposal.

Skimmers

For every crisis we need a good fighting system to decrease the amount of losses as much as possible. The only proper fighting system and the most suitable would be the logistics system. Oil crisis happens all around the world and has various side effects and that's why it is considered to be the most vital and most dangerous kinds of crisis. Whenever an oil spillage occurs within the deep sea, the best solution is to use skimmers. The skimmer ship is a method of filtering or cleaning the deep sea from the crisis of oil spillage where its Semi catamaran-bow is considered to be the oil skimmer. The second part after the bow would be the tanker. It is the first loading tank section behind the bow-section where it is either used as a loading tank or as the water/oil separation tank and it is closed by double sealing, double hull hydraulically operated separation blade at the bottom.

CONTINGENCY PLAN AND ROLE OF LOGISTICS

Logistics puts into place the necessary tools for a successful deployment and sustainment of the contingency oil spill response by lining up resources well in advance. Lining up resources well in advance can be like establishing a comprehensive series of industry contacts, defining roles and responsibilities, laying out clear procedures, and formulating plans and testing them. From the logistical processes that moves equipment between trailers and aircraft, to the sourcing of adequate disposal facilities, on-site medical, field transport and appropriate fuel types, all elements and interfaces bust be properly identified, supported and tested to be able to work in the most efficient manner.

The core to having an effective logistics is the leadership behind it that should be broad, with a strategic vision, capable of forming an operations/logistics team and guiding the effort as a response process. Logistics existence in the oil spillage situation is to support operations where operations exist as a result of logistics. The ability of establishing an effective response process involves merging operations and logistics into a single ream and the skill to orchestrating their highly complementary and equally dependent functions into a single response effort. It is extremely vital for a complete and precise definition of responsibilities and an understanding by all players to occur for the sake of the mutual contributions of each to the response effort.

Logistics role is not only operating when a crisis such oil spillage occurs but also it anticipates any operational requirements needed in the field. It would be too late to source a capability when it is needed in time of spillage therefore, such need must be anticipated. A clear and straight communication between operations and logistics promotes or encourages a shared and a complete understanding of current and future options. With such understanding and communicating skills, logistics expands all these available options and provides operations additional opportunities that were not otherwise available.

Contingency Logistics Functions

The following contingency logistics functions are the ones which are commonly associated with large-scale oil spill removal organizations as a following:

- Anticipate future conditions
- Appreciate their major characteristics

- Shape the operation around those conditions
- Sort out the true priorities
- Marshal appropriate resources
- Apply those resources to maximum effect

Strategic planning is essential and critical where it is both comprehensive and forward-looking. It is mainly the process through which available resources provide maximum support to an operation and expand operational options and what could be better to support all these operations and assistance than logistics?

These following functions are essential to make a difference in any oil spillage location:

- Assisting operations and formulating the strategies for any resource management in order to include positioning and the use of available operational resources. Also the activation of on-call resources and the time phased release of assets as operational conditions permit.
- Advises operations of characteristics and capabilities of available and on-site equipment, personnel, and material assets.
- Coordinates transportation resources to support deployment requirements.
- Coordinates availability of on-site medical capability
- Sources, mobilizes, and deploys response assets to include hazardous material trained personnel, boom, temporary storage devices, recovery equipment, heavy equipment, marine platforms, etc., and Coordinates availability of on-site security.
- Coordinates availability of on-site structures to accommodate office, medical, restroom, and bed down, shower, decontamination, storage, and maintenance requirements.
- Coordinates availability of bed down facilities as necessary
- Tracks movement of equipment, personnel, and material resources deploying to, operating within and redeploying from an operating area.
- Coordinates availability of messing capability and potable water supply
- Coordinates availability of portable generators, heaters, and light sets to sustain field operations
- Coordinates availability, placement, and activation of field communications equipment necessary to sustain operation
- Coordinates availability of supplies of fuel types required to operate field equipment
- Coordinates availability of temporary oil storage capability
- Coordinates availability of transportation to move contaminated waste from operating locations to certified disposal areas.
- Coordinates availability of certified disposal areas to support disposal requirements

- Coordinates availability of field transport andhandling for equipment, personnel and material assets.
- Manages equipment scheduled/unscheduled maintenance capability to include spares inventory, equipment, facilities, material and technical support.
- Coordinates administrative services and processes necessary to support operations
- Coordinates refuge services
- Coordinates availability of depressant application systems, dispersant chemicals, and appropriate platforms
- Coordinates availability of remote sensing capability
- Appraises operations of logistics shortfalls
- Appraises operations of assets received into/released out of operation area
- Liaises directly with contractors in the field to identify and resolve unsatisfied logistics requirements
- Manages decontamination, reconstitution, and redeployment of equipment resources
- Functions as focal point for all logistics issues so as to maximize efficiencies of support operations, eliminate redundancies, and ensure complete support coverage without oversight.

MARPOL 73/78

The overarching objective of the MARPOL Convention is to entirely eliminate pollution of the marine environment by discharges of oil and other hazardous substances from ships and to minimize such discharges in connection with ships' accidents. One shall thus prevent pollution of the marine environment due to discharges of oil, chemicals (transported in bulk or in packaged form), sewage and household waste (solid waste, also including solid cargo hold wastes) from ships.

The MARPOL Convention was originally made ready for ratification in 1973, but had to be amended by a protocol that was approved in 1978 before it step by step could be ratified from 1983 and onwards.

The MARPOL 73/78 Convention is a frame convention with six annexes containing detailed regulations regarding permissible discharges, equipment on board ships, etc.

Annex 1

The MARPOL 73/78 Convention is extensive and contains regulations of how tankers and other ships shall be constructed to minimize the risk of pollution. The Annex also contains criteria and limits for permissible discharges of oil and oily residues under different circumstances.

The Annex may, for practical reasons, be split up into the two groups: oily waste from machinery spaces including oil contaminated bilge water (operational waste) and ballast and tank-cleaning water from cargo tanks and pump rooms of oil tankers (cargo related waste).

An important regulation says that there is a global total ban on the discharge of all kind of plastics and plastic materials.

Special Areas

The coming into being of the conception *Special Areas* in the MARPOL Convention was a great step forward in comparison with earlier international convention in the area of shipping. Special Areas according to the MARPOL 73/78 Convention are areas that, due to their special ecological conditions, are considered to be so vulnerable to pollution that especially far reaching and mandatory regulations are needed to limit discharges of pollutants.

Another way of preventing oil spills is regional cooperation for oil spills. This method helps the countries lying within the same region to cooperate to prevent oil spills, and in case any oil spill happens they cooperate together to help clean up the spilt oil, and protect the environment as much as possible from the potential damages. From this cooperation's is the **Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea:**

The objective of REMPEC is to contribute to preventing and reducing pollution from ships and combating pollution in case of emergency. In this respect, the mission of REMPEC is to assist the Contracting Parties in meeting their obligations under the Barcelona Convention; the 1976 Emergency Protocol; the 2002 Prevention and Emergency Protocol and implementing the Regional Strategy for Prevention of and Response to Marine Pollution from Ships, adopted by the Contracting Parties in 2005 which key objectives and targets are reflected in the Mediterranean Strategy for Sustainable Development (MSSD). The Centre will also assist the Contracting Parties which so request in mobilizing the regional and international assistance in case of an emergency under the Offshore Protocol, should this instrument enter into force.

CONCLUSIONS

Logistic action plan is the best procedure for prevention pollution of the marine environment from ships, and the development of preparedness for response to accidental marine pollution and cooperation in case of emergency which consists of:

- Strengthening the capacities of the coastal States in the region with a view to preventing pollution of the marine environment from ships and ensuring the effective implementation in the region of the rules that are generally recognized at the international level relating to the prevention of pollution from ships, and with a view to abating, combating and, to the fullest possible extent, eliminating pollution of the marine environment from shipping activities, including pleasure crafts.
- Developing regional cooperation in the field of the prevention of pollution of the marine environment from ships, and facilitating cooperation among Mediterranean coastal States in order to respond to pollution incidents which result or may result in a discharge of oil or other hazardous and noxious substances and which require emergency actions or other immediate response.
- Assisting coastal States of the Mediterranean region which so request in the development of their own national capabilities for response to pollution incidents which result or may result in a discharge of oil or other hazardous and noxious substances and facilitating the exchange of information, technological cooperation and training; and
- Providing a framework for the exchange of information on operational, technical, scientific, legal and financial matters, and promoting dialogue aimed at conducting coordinated action at the national, regional and global levels for the implementation of the Prevention and Emergency Protocol.

- Assisting coastal States of the region which in cases of emergency so request, either directly or by obtaining assistance from the other Parties, or when possibilities for assistance do not exist within the region, in obtaining international assistance from outside the region.

RECOMMENDATIONS TO PREVENT SPILLS FROM TANKERS AND TANK BARGES

This set of recommendations covers management policies and programs, including monitoring of operations, maintenance, personnel policies, health and safety, waste management systems, and spill and near-miss incidents. Employee involvement and communications are addressed, and redundant safety systems and annual performance benchmarks are recommended. Several international standards are recommended for certification of management policies and programs.

Regarding watch practices, we include recommendations covering standards for navigation watch, anchor watch, engineering watch and security rounds. For both tankers and tank barges, we recommend written emergency procedures be established by the vessel master to cover all possible emergency conditions and appropriate actions under such conditions.

Regarding personnel policies, we recommend that tanker and tank barge crew members be required to participate in a comprehensive personnel training program which covers vessel orientation, specific requirements for each position, regular refresher training, and frequent safety and response drills. We recommend that crew members be monitored for fitness and receive annual performance evaluations.

Maintenance of detailed training, drill, and performance records is also recommended.

We recommend that owners and operators of all tankers meet the work hour and navigation watch standards set in OPA 90 while operating in the waters of West Coast jurisdictions. We also recommend that all licensed deck officers and the vessel's Person In Charge of oil transfers be proficient in English and that multinational crews use a common language understood and spoken by both the ships' officers and unlicensed crew.

We recommend that a tanker or tank barge owner/operator ensure that no crew member is under the influence of alcohol or illicit drugs while in a west coast jurisdiction's waters, and that regular physical exams and a policy requiring notification of use of prescription medications be required. We also recommend that while in a jurisdiction's waters, tank barge tow vessel masters should maintain a record of all crew members, and should have three licensed officers or tow operators on board during transit of coastal waters.

In order for the environment to be saved from such hazard there must be rules and regulations that are to be followed to protect the environment and prevent anything from polluting it. This prevention is done through creating conventions and agreements that help set up regulations to allow easy prevention, also they set up rules and prepare for the “what if’s”. One of these conventions is:

Solutions to Pollution

Two main methods

- Correction – costly and time intensive
- Prevention – requires attitude changes

Coastal Scientists believe that prevention is better than cure since the effects of marine pollution maybe

irreversible and we may therefore be creating everlasting damage to the marine ecosystem.

"An ounce of prevention is worth a pound of cure"

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