

# Disaster Management: Identifying Uncertainties in Layers of Protection and Rectifications

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## ABSTRACT

Proper functioning and operation of any workplace heavily depends on the working conditions present there. For an optimum output of an organization, it is of prime importance that the employees have a healthy and safe environment. Recent surge in the frequency of disasters has necessitated proficient safety infrastructure. Thus, health and safety today has been identified as one of the most crucial ingredient of smooth and subtle running of an organization. This paper is a step by step approach to draw out and identify the major problems that lead, eventually, to large scale disasters and thereby suggests preventive measures to be implemented in the future.

The intent of this paper is to study the recurring obstacles and problems that have led to/ can lead to potentially disastrous situations, perform a comparative case study of recent environmental disasters, their causes and effects, recommend viable solutions and strategies, based on rational evaluations, of the above mentioned problems and discuss their real life applicability.

## KEYWORD

Pre spill parameters, Post spill parameters, Policy analysis

## INTRODUCTION

During the last century a number of disasters have occurred in the energy sectors which have led to the losses in life, money and resources. Mankind has since tried to reduce the effect of these disasters by investing heavily in knowledge and technology. However, even though man has made rapid strides in technology development the occurrence of a disaster is still not unthinkable.

Disasters are of many kinds, but in this paper we are mainly focusing upon oil spills, as it not only damages the environment but also affects the general public. Some such spills are recorded below. The blow out at Ecofisk Bravo<sup>[1]</sup> platform, in the year 1977, led to the loss of an estimated 80,000–126,000 barrels (13,000–20,000 m<sup>3</sup>) of oil. On similar lines, we can cite the Ixtoc oil spill<sup>[2]</sup> in the Bay of Campeche, Gulf of Mexico to gush out 3,000,000 barrels (480,000 m<sup>3</sup>) of valuable oil into the open sea leading to huge environmental deterioration effects. The oil spill lasted for 290 days from 3 June 1979 to 23 March 1980. It was the largest oil spill to be ever recorded in history. Apart from material and environmental problems these spills have also taken many human lives. The Piper Alpha disaster<sup>[3]</sup> in 1988, accounted for a loss of total £1.7 billion (US\$3.4 billion), and killed 167 of the total 230 men on the platform.

In this paper, we have analyzed the policies of various countries in handling an oil spill on the basis of some selected parameters and discussed the attitudes of various countries towards these parameters. We then suggested some changes for the formulation of a stronger oil spill policy which would be applicable in a worldwide scenario.

## 2) THE IDENTIFICATION OF KEY PARAMETERS

A country's preparedness for dealing with an oil spill crisis is determined by a set of various factors that affect the organizational, technical and safety handling of a crisis. These innumerable factors are in turn dependent on the response policy of the government concerned. A more efficient response policy of a particular government ensures a better handling of these parameters.

An analysis of all these parameters to determine the best response to a spill is very difficult, nearly impossible. Thus, for determination purposes a few parameters have to be selected based on their importance, relevance and applicability in disaster response techniques. By studying some major disasters like Ecofisk Bravo, Ixtoc Oil Spill, Piper Alpha Oil Spill and BP Oil Spill<sup>[4]</sup>, we first determined two Categories of parameters on which we would analyze the policy of each country. They were pre disaster Parameters and post disaster parameters.

1) Pre disaster parameters –

These are those parameters, to which, if particular care is given, would result in preventing the happening of a disaster once and for all. They are:

- Research and development
- Equipment testing
- Personnel training and management

2) Post disaster parameters-

These are those parameters, which after a spill; stand out as a major debate points, and in the end determine how effectively the spill is managed. They are:

- Technology: which cleanup method?
- Responsibility: Of the polluter or of the government?
- Decision making: Democratic or authoritarian approaches?
- Beach cleanup: How much emphasis?
- Logistics: Essential to quick response

After the identification of the two categories of parameters, we would, in the next two sections, discuss the attitude of France, Netherlands, Norway, UK, USA, and India towards these parameters

### 3) A POLICY ANALYSIS OF VARIOUS COUNTRIES BASED ON PRE SPILL PARAMETERS

#### Research & Development

In our analysis, it was seen that almost every country has some or the other research organization present like CEDRE (France), PIRO (US), MPCU (UK), TERI (India). Countries like US and India are fast emerging as major R&D players. Innovative research is going on at a large scale in these countries. For example, in India, research of a biological species known as Olizapper, which could destroy the spilled oil, is going on. Similarly, research about oil grades and characteristics are also going on in these countries. However, a significant point that came to our notice was recurrence of

Research done in different organizations. Table 1<sup>[5]</sup> shows the planned research programs of several US agencies and their priorities. This table indicates the overlapping of research program of different organizations only in the US. Several such similarities were seen in research areas of European countries and the US. Therefore, there comes a high probability of same research, conducted by Different organizations and giving more or less the same results. Higher co-ordination between Different governments, the government and private sector and among many other interests worldwide is essential to reaching desired goals with minimum waste of resources and to avoid duplicity.<sup>[6]</sup>

**Table 1: Comparison of various research programs of different organizations**

| Research area               | PIRO | Coast guard | MMS | EPA |
|-----------------------------|------|-------------|-----|-----|
| Source containment          | L    | H           | —   | —   |
| Mechanical recovery         | L    | H           | L   | —   |
| Dispersants                 | H    | L           | M   | M   |
| Other/shoreline remediation | M    | —           | H   | M   |
| Health and safety           | L    | M           | —   | —   |
| Training/testing            | —    | H           | M   | —   |

Note: H= high emphasis M= medium emphasis L = low emphasis

#### **Personnel training & management**

The availability of skilled personnel for fighting an oil spill is possibly more important than having the ideal type of equipment for a particular spill. Some type of safety drills and pre disaster training was present amongst all the countries but it was seen that Norway had made a strong commitment to oil spill response training. An impressive aspect of this program was the wide range of personnel that participate: virtually all municipal, state and private employees receive training with the goal of knowing their responsibilities in a spill situation. A notable tactical exercise in which employees play the roles they would play in real emergency situations is worth mentioning. As a result of this extensive training program, those with oil spill cleanup responsibilities, an estimated 3000 people,

Were well informed about the decision making process and types of thing that can go wrong.

#### **Equipment testing**

Most of the times, equipment are designed on the basis of ideality rather than reality. There is a large gap between claimed and actual performance of an equipment. The action group overseeing the Ekofisk bravo disaster in Norway was shocked to observe that their equipment proved only 25% effective of their claimed capacities.<sup>[8]</sup> The problem that is to be identified here is not the service

Provider's fake claims but the unavailability of real life oil spill conditions to test the equipment. Measures for countering this problem were seen to be undertaken in some European countries like, Norway, France, and UK with the concept of "test or controlled spills". Though not fully realistic, this is seen as the only method that could somewhat elevate the standards of testing the equipment to be used, to counter full blown disasters. A problem however is the money required to conduct these test Spills (an estimated \$1 million for single spill).<sup>[9]</sup>

### **4) A POLICY ANALYSIS OF VARIOUS COUNTRIES BASED ON POST SPILL PARAMETERS**

#### **Technology: which cleanup method?**

We saw that most of the countries, except UK, depend upon mechanical means of containment and recovery. Norway and Netherlands exclusively apply mechanical methods, keeping the use of chemical dispersants to a minimum. However this does not advocate the use of dispersants as something wrong. The England experts argue that recent advantages in dispersants have improved their effectiveness and made them less toxic. According to MPCU General Information notes, "the only operational proven technique for combating oil at sea in the conditions prevalent around the

Coastline is spraying with dispersants". A feature of French oil policy worth noting is keeping all the cleanup methods at hand and using the most applicable method in cleaning up the spill. The

Dutch use dredges as dual purpose vessels, in time of a spill. They equip their dredges with recovery equipment and hence are able to recover back a large amount of otherwise waste oil, The use of single equipment for many purposes, in times when there is a shortage of quality equipment, is in fact

A very smart and innovative approach.

#### **Responsibility: Of the polluter or of the government?**

In most of the countries it is seen that the responsibility for cleanup of oil spill caused by platform blowouts is of the polluter and for tanker spill is of the government. In US and Norway, it is the responsibility of the polluter to cleanup both tanker and oil spills. However this policy has been severely criticized. By general evaluation one can argue that by the time government deems the polluter incapable of dealing with a spill, it may well be too late for anyone to mount a successful countermeasures effect. Critics of US response policy have pointed out that although the polluter is

Initially responsible for the cleanup, he lacks the authority to respond as he thinks appropriate.<sup>[13]</sup>

The responsibility for fighting a tanker spill should basically be of the government as in case of a tanker spill, it is understandable that the polluter may have neither the preparedness nor the capability to fight a tanker spill in some unknown shore. The country on whose shore the spill occurs knows its environmental and geological characteristics and can thus best counter the spill. However, in case of a platform spill, the polluter may have the preparedness to fight the spill effectively. So, the polluter in this case, should be given both the responsibility and the authority to counter the spill, as without any authority he would be bounded by the government's laws.

**Decision making: Democratic or authoritarian approaches?**

It was found that generally there are many approaches to the decision making process, one being democratic approach and the other authoritarian approach. Countries like US follow the democratic approach, while other European countries analyzed and India follows the authoritative approach. In the democratic approach the decisions made by the governing team are subject to the oversight of numerous interested parties. For example, in US a regional response team consisting of regional representatives of various federal agencies has considerable sway over the governing body's (Coast Guard) decisions. The governing body must also be mindful of legitimate state and local concerns and their conflicts of interest. Such type of approach, though suitable for fulfilling the interests of all the parties concerned, takes a lot of time in arriving to a conclusion. As opposed to these an Authoritative approach allows the governing body or the On Scene Commander to make a particular decision without the interference of outside parties facilitating quick and effective decision making.

**Beach cleanup: How much emphasis?**

However well designed a country's oil spill response plan may be, some of the oil is bound to reach the shores. Thus, the emphasis on beach cleanup technologies is an important parameter required, because a wrong technology applied to a beach can do more damage than repair, making beach cleanup a very tricky matter to deal with. One of the countries which have a notable beach cleanup response is France. The OTA found French beach cleaning technology and organization to be an impressive element of its oil spill cleanup plans. Local authorities there have placed stocks of everything from rakes and shovels and hot water pumps to 600ms. Similarly, Norway also has established a local response capability in each of the 52 areas that comprises the coastal zone. Other Countries should take cue from these two countries in the more effective handling of their shorelines.

**Logistics: Essential to quick response.**

It refers to the proper placement and handling of equipment required for dealing with a disaster. It is found to be either centralized or decentralized type both having their advantages and disadvantages. For example, a decentralized technique may be good for a quicker response system but too much decentralization may be difficult to manage in a large country. France, Norway, US etc. have tried to distribute their equipment evenly across the country with the French government dividing France into 3 maritime zones and keeping stocks of equipment at different POLMAR centers, Norway maintaining a total of 14 recovery and transporting systems, establishing 12 equipment depots at strategic locations, and US government establishing 5 major oil spill response depots in the North-east, Mid-South Atlantic, Gulf Coast, Pacific South West and Pacific Northwest. Similarly, India has divided itself into 7 regions for handling oil crisis. A notable feature of UK logistics is its contract aircraft on call for emergencies. Similarly, future contracts have been initiated in Norway for Attainment of mechanical equipment.

Given below is Table 2 summarizing the response of France, Netherlands, Norway, England, United States of America, and India to the post-spill parameters.

It should however be noted that difference of policies of different countries are based in part on circumstances particular to each country. An alternative response of a country to one or more parameters does in no way indicate of it being a bad policy. The aim here is to extract the best response of different countries to particular parameters.

**Table 2: Summary of oil spill response arrangements**

| Parameters                          |          | France  | Netherlands  | Norway  | U K   | United States of America  | India*   |
|-------------------------------------|----------|---|--|---|---|---|--|
|                                     |          |   |  |   |   |   |  |
| Clean up Technology                 |          | Containment & recovery preferred but dispersants used in designated area.                   | Containment & Recovery exclusively .   | Containment & Recovery but will consider dispersant if mechanical means are ineffective.  | Aerial Application of dispersants, containment and recovery where applicable.     | Mechanical Containment is primary response.<br><br>Dispersants have their own place as a substitute.                                    | Mechanical methods of containment preferred over the use of dispersants. <sup>[18]</sup> |
| Responsibility                      |          | Govt. takes Responsibility for spills and coastal cleanup is left to the local authorities. | Govt. takes Charge in event of vessel spills.<br><br>Oil companies expected to | Responsibility of Oil companies to fight oil till govt. deems it unable to fight a spill.<br><br>Generally govt. expects to respond to spills from ships. | Platform spills Responsibility of operator. Tanker spills responsibility of govt. | Responsibility of Oil companies to fight spills till govt. deems it unable to fight.<br><br>Govt. responds to offshore platform spills. | Coast guards Take the matters in their hands.  |
| Decision Makers                     | Onshore  |   | Coastal Provincial and municipal states.                                       | Coastal Communities and intercommunity areas.   | MPCU of maritime Directorate  | Environmental protection agency (EPA)   | Coast guard  |
|                                     | Offshore | Maritime prefects   | North sea Directorate of state waterways board.                                | SPCA  | Coastal local authorities   | Mineral Management Service ( MMS)   | State government   |
| Beach cleanup emphasis              |          | High  | Limited  | Good  | Good  | Limited   | Limited  |
| Research & Development Organization |          | CEDRE   | Risks water staff or state waterways board                                     | NOFO, SPCA  | MPCU  | PIRO, DOI, DOT, EPA   | TERI   |

|           |   |  |   |  |   |                        |
|-----------|---|--|---|--|---|------------------------|
| Logistics | Division into 3 marine zones<br><br>Equipment maintained at POLMAR Centers. |  | NOFCO maintains 14 oil recovery and transfer systems & 8750m of heavy duty boom along Norway coast.<br><br>12 equipment depots at strategic location.<br><br>17 oil spill depots along the coast. | Aircraft and Dispersants strategically positioned at different airports.<br><br>Seven airplanes Under contract for dispersant application. | Two strike Teams.<br><br>Five major oil spill depots. | Division into 7 zones. |
|-----------|---|--|---|--|---|------------------------|

\*citation needed

## 5) KEY FINDINGS

We have discussed and analyzed the responses of various countries to an oil spill. Out of this analysis we found the response policy of certain countries to one or more parameters to be more effective than the others. Our key findings are as follows:

- France has a wonderful offshore and onshore cleanup policy. Its policy of following the middle path by not exclusively relying on either mechanical or chemical means is appreciable as total reliance on a particular method never really gives the absolute solution. Also commendable are its efforts in beach cleanup preparedness.
- Norway's training program is one of the best that we have ever seen. To train, simultaneously 3000 people, so that each one of them knows their exact role in fighting a spill, is commendable.  
Also quite appreciable is the Norway government's stringent hold over the companies that drill for oil in its shores. It takes note of every step the company takes by timely inspection of the rigs. Also the equipment handling (logistics) of Norway is good. The team was quite satisfied with overall handling of oil spills by the Norwegian government.
- Another important observation is the attainment of future contracts by many governments analyzed, especially UK and Norway. These types of future contracts in which one predefines the sources from which rare spill fighting equipment can be acquired later on, goes a long way in improving the logistics of the concerned country. Also such type of predetermined contracts avoids later confusion about what and whose equipment one should use.
- Containing or destroying the oil is an important requirement but equally important is the effort in Recovering the oil. Netherland's effort in this direction is worth noticing.
- The R&D programs carried out by countries like US and India have proved to be very helpful in expanding our knowledge on various designs, equipment testing and other innovative research related criteria.

## 6) RECOMMENDATIONS AND CONCLUSIONS

So after critically assessing the response of various countries in pre spill and post spill scenario, we were able to suggest some points, the inclusion of which would make the spill policy of a country better.

- Formulation of groups or organization by different countries to help each other during the time of crisis.
- Design a reward culture in which people doing a good job in maintaining the safety of the company are rewarded while those who endanger the company's safety are punished.
- Every country should have a single agency, funded by the government, having ample equipment knowledge and resources, dedicated to fight oil spills, thus putting an end to responsibility issues And blame games.
- Usage of small spills as "spills of opportunities" in order to test equipment at a more realistic level.
- Companies should keep on taking feedback from their employers, to know their mindset and level of preparedness.
- More number of international and national conferences to discuss the research going on at different places in the world and encouraging collaboration in research to minimize duplicity and waste of funds.
- Initiatives to assign safety a carrier path rather than just another department. This would help the personnel involved in safety acquire expertise in oil spill management, by experiencing a number Of spills and learning from it.

These were some of the many measures that, if implemented would go a long way in securing the future of the oil industry. However, only bringing on new regulations, structuring more guidelines, imposing more rules would not bring about any long lasting positive change in the industry. The real need here is to bring a change in the culture of the industry. There is a necessity to make a shift from the mindset of high production to a mindset of optimum production keeping in mind the safety measures, the wellbeing of the employees and the environment. To make this shift from high to optimum productivity, there also comes a need to change the general thinking of the public. We have to make the public understand the consequences of over dependence on oil, over exploitation of natural resources, and sadly the enormous wastage of the same. The change may not be very easy, as it includes questioning the mere fundamentals on which the society is based upon, but as with any other major revolution; we always need to take the first step.

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