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A Comparison of the Exxon Valdez, Torrey Canyon and Amoco Cadiz Oil Spills: Challenges, Lessons Learned and Impacts on International Environmental Legislation

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ABSTRACT

Water forms a great chuck of our planet earth. It still remains the most cost-effective way of moving great volumes of cargoes from one location to the other. The marine environment is very fragile and that ecosystem should not be degraded. Human error accounts for over eighty percent of accidents that occur at sea. It is even more this disturbing if the pollution is by caused by oil. Oil contains hydrocarbons which are deadly with high toxicity and affecting the marine life and the immediate environment which surrounds the place of the spill. The ecosystem is thrown out of balance as substantial damage is done to the marine flora and fauna which is either severely damaged or die. When oil gets in contact with seawater, certain processes immediately occur. The processes are physical, chemical and biological in nature as in oil dispersion, evaporation, emulsification, and a biodegradation occurrence. Three major oil spills by namely the Exxon Valdez, Torrey Canyon and Amoco Cadiz greatly impacted the marine environment and its coastal surroundings. This paper will interrogate these marine environmental disasters and their impacts when these spills occurred. It will also explain the major challenges that occurred dump these major oil spills, the challenges and lessons learned and their culminating impacts on international environmental legislation.

Keywords: Amoco Cadiz, Exxon Valdez, Marine Environment, Oil Spill, Torrey Canyon

INTRODUCTION

Transportation of crude oil is primarily by sea with some 1800 million tonnes being transported worldwide annually [1]. Marine transportation still remains the only cost-effective way of moving large quantities of oil round the globe. Though care is taken in this regard, accidents do happen causing huge damage to the environment and great financial loss. According to [2] though a worrying trend it is often said that major maritime disasters have resulted in the development of international safety regulations. The first international convention bothering on oil pollution of the sea was convened on 1926 in Washington and duly attended by thirteen maritime states. Two aspects, the legal and technical terms were discussed but no ratification was made by the participating nations [3]. The Torrey Canyon, Amoco Cadiz and Exxon Valdez Oil spills proved the need for more stringent regulations regarding oil tankers. The environmental damage caused by oil pollution to the coastal and marine environment was not obvious till the Torrey Canyon accident. It is obvious the Torrey Canyon disaster caught the maritime world off guard [4]. Frantic efforts are made to amend legislations when a major disaster occurs with little or no preventive actions and after adopting a convention it takes normally between two to five for it to enter into force [5]. Three relatively

distinct marine oil spill accidents would be considered in this paper. They are the Torrey Canyon (1967), Amoco Cadiz (1979) and Exxon Valdiz (1989). According to Scalon [6] each of these maritime disasters had its own peculiarities some of which bothered on equipment failure, and human factors. These would be looked at in the light that each had its own challenges and vital lessons to be learned and the fact that it created an impact on international environmental legislation.

OILPOL 54

In the late 19th century, the first oil tankers emerged on the world scene. Their size stayed in the 16,400 DWT bracket until in 1959 when a 100,000 tonnes tanker was delivered [7]. Consequently, an International Convention for the Prevention of Pollution of the Sea by Oil 1954 (OILPOL 54) was concluded [2].

Torrey Canyon

The first response from the UK government was to use massive amounts of toxic dispersants. Research into the toxicity of dispersants was not known at the time and its impact on the environment was grave, though now modern dispersants are low in toxicity [8]. All salvage efforts failed so the government made arrangements to commence **in situ** burning and this was initiated by bombing the vessel [9].

One key lesson which emerged from the Torrey Canyon was the influence of governments in implementing response policies. The UK over relied on private salvors but later realized a direct involvement was necessary. There were zero contingency plans when the spill occurred so this opened a door for the UK to adopt a country led approach [9].

Environmental and International Legislation

The key international convention bothering on prevention of pollution from ships to the marine environment be it accidental or operational is the International Convention for the Prevention of Pollution from Ships (**MARPOL**). It combined two treaties adopted in 1973 and also in 1978 with amendments and updates over the years. The Torrey Canyon brought to the fore the consequences of human error on the Masters part and the owners of the cargo. The International Convention on Standards of Training and Watchkeeping for Seafarers **(STCW)** 1978 setting the standard for seafarer training has been adopted and amended over the years. The enormity of the spill compelled the UK to seek an international law which would empower states to intervene and provide compulsory compensation to affected victims of oil pollution. A proposal was sent to the (IMCO) by the UK in April of 1967 and this culminated in IMCO adopting **three major** instruments: The accident paved the way for examining the need for a system to address the payment of compensation. On November 29th 1969, the International Convention on Civil Liability for Oil Pollution Damage **(CLC).** was adopted to address the question of compensation and ship owner's liability. In 1971, the International Fund for Compensation for Oil Pollution Damage **(FUND)** was adopted to augment the liability limits [7]. Any short falls in compensation as provided by the CLC convention was catered for by this fund. In November of 1969 the International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties **(INTERVENTION)** convention was adopted. It gave a coastal State the right to adopt measures on the high seas to prevent, mitigate or eliminate any danger by way of oil pollution to its coastline after a maritime accident [7].

AMOCO CADIZ

The VLCC Amoco Cadiz encountered steering gear failure in heavy weather on 16th March 1978 while enroute to Rotterdam after loading from the Arabian Gulf. The vessel grounded and after several towing attempts on Portsall, three miles off the coast of Brittany it spilled all of its cargo of 227 000 tonnes of oil [10]. Unlike the Torrey Canyon and Exxon Valdez, the Amoco Cadiz incident was not an element of human error on the part of the crew but mechanical failure and management incompetence. According to Toomey [11] a Chicago court found the Amoco International and the Spanish Ship builders accountable for the Amoco Cadiz incident. Among the evidence levelled against Amoco International was it having changed its maintenance schedule of its vessels from 18 months to 30 months. This was a deliberate company policy and thus would only dry dock every four years saving the company 1.25 million US dollars and additionally, savings in off hire of approximately 200 000 US dollars annually. Regarding the shipyard Astilleros Espanoles, it was detected they did not build the steering gear to the required specifications [11].

Some Lessons and Challenges

The French government did not envisage a spill of such magnitude as it far exceeded the Torrey Canyon. They instituted remedial measures to lessen the risk of future accidents and ensure a better response resource. A novel contingency plan Pollution Maritime, **(POLMAR)** was established to target oil spills. Off the coast of Ushant France established a new traffic separation scheme **(TSS)** providing a 50 km off the coast limit to hazardous material carrying vessels [12]. A high sea tug, the Abeille Flandre was positioned to assist vessels traversing the shipping lanes. Finally, a specialised technical surveillance centre was created to do monitoring [11]. In ecology, science and legal issues the Torrey Canyon depicted how unprepared the maritime world was to confront a spill that size. Large quantities of toxic dispersants were used and at the time little research had gone into dispersal of oil by dispersants [13]. However, in the Amoco Cadiz spill, less than 3000 tonnes of dispersant were used [14].

ENVIRONMENTAL AND INTERNATIONAL LEGISLATION

It was learnt by the French authorities that eliminating substandard ships from sailing could prevent such accidents from occurring. Stringent regulations were demanded by public concern thus in 1982 the Paris Memorandum of Understanding on Port State control was formed as stated by the Paris MoU of 2012. Unlike the Torrey Canyon, the Master of the Amoco Cadiz had difficulty agreeing on the salvage terms as the tug master of the Pacific wanted a Lloyds Open Form **(LOF)** with a “no cure no pay clause”. Considering the size and cargo of the Amoco Cadiz the Salvage company would have made a substantial amount. According to [10] the Brussels Convention (1910) was replaced by the **Salvage Convention** of (1989).

MARPOL 73/78

Grave environment concerns arose after the Torrey Canyon incidents so in 1973 the International Convention for the Prevention of Pollution from ships was adopted including much of OILPOL 1954 in its Annex 1 which concerned oil pollution [15]. It was an improvement on OILPOL 1954 since it made provision for constant monitoring of oily water discharge and provision of reception facilities by governments for oily waste. There was the need to revisit the MARPOL 73 Convention after the Amoco Cadiz oil spill. The 1978 protocol modified the MARPOL 73 [15].

SOLAS

There were also concerns about the steering gear failure of the Amoco Cadiz. This culminated in the SOLAS Chapter II-1 Regulation 29.6.1 and regulations 29.7.2 and 7.3 provision which ensured that VLCC's have a main steering gear and an independent steering.

EXXON VALDEZ

The single hulled tanker Exxon Valdez on 24th March 1989 grounded at Bligh Reef in the Prince William Sound when trying to avoid icebergs and sailed out of the shipping lanes [16]. Mammals and thousands of seabirds were killed as shorelines got contaminated by oil [17]. At the time of the accident only a few people could be mobilised in a timely way [18].

Lessons and challenges

Unlike the Amoco Cadiz, the Exxon Valdez like the Torrey Canyon accident was caused by human factors. The inexperienced third mate manoeuvred improperly the vessel probably out of fatigue. The master due to alcohol impairment failed to properly supervise the navigational watch and the vessel was ill supervised by Exxon Shipping company. Additionally, no escort or effective pilot services existed [19]. At the time of the accident only a few equipment could be mobilised in a timely way [18].

ENVIRONMENTAL AND INTERNATIONAL LEGISLATION

The accident and spill received very inadequate response and contingency arrangements [20]. Public outcry, political concerns and pressure made the US congress pass the Oil Pollution Act of 1990 (OPA, 90). Its intention was to improve tanker design and spill preparedness [21]. The OPA 90 stated **double-hull** requirements for new tanker builds sailing US waters and by 2015 have all single tankers phased out [22]. **Frail contingency** arrangements to mitigate a devastating spill like Exxon Valdez gave a perception of ineffective response. This hard lesson learned led to the view by the international community that efforts be made to confront and tackle the issue. The result was the establishment in November 1990 of the International Convention on Oil Pollution Preparedness Response and Cooperation **(OPRC)**. Though the IMO did not react till 1992, amendments were made in Annex 1 of MARPOL 73/78. Two new regulations **13F** and **13G** were added. For Regulation 13G tankers of 20 000 dwt and above were to have Segregated Ballast Tanks **(SBT)** and for 13F all new tanker builds after 6th July 1993 and above 600 dwt needed to have **DB** tanks.

CONCLUSION

Attention was paid initially to ship source pollution than to preventing spills from tanker accidents. When major spills like the Amoco Cadiz and Torrey Canyon occurred the relevance of prevention and preparedness was noticed. As has been shown national and international convention have been adopted for all major oil pollution accidents [7]. With conventions like SOLAS 1974, MARPOL 73/78 and OPA90 coming into force, statistics have shown a downward trend [23]. Though a proactive approach to accident prevention would have been better most conventions emerge only after a major catastrophic maritime accident. Questions of liability and short comings in internal law were not addressed till the Torrey Canyon accident [24]. Many improvements have been made but a lot could be made by enacting and enforcing preventive measures before they occur. Unfortunately, this is not the case and out of complacency accidents still occur [20].

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