

“OIL SPILLAGE WITHIN COASTAL PART AND ITS COASTAL STRUCTURES, THE EFFECTIVE STUDY WITH SPECIAL REFERENCE TO CHENNAI” - MARINA BEACH

Prof.S.M.Gawande¹, Vipul Neeraj Khosla², Sartaj Ahmad Malik³, Prodinso Pul⁴

¹Prof. S. M. Gawande, affiliated to Head of Department of Civil Engineering,
Anantrao Pawar College of Engineering & Research,

²Mr.Vipul Neeraj Khosla, ³Mr. Sartaj Ahmad Malik, ⁴Mr. Prodinso Pul,
UG students affiliated to Department of Civil Engineering, Anantrao Pawar College of Engineering & Research,
Parvati, Pune.

Abstract - oil spill is a very big issue all over the world. Oil spill is a form of pollution caused due to human activity, especially in the marine areas due to the release of a liquid petroleum hydrocarbon. Oil spills can have disastrous consequences for the society economically, environmentally and socially. Marina beach is a natural urban beach in Chennai, India. The oil spillage in marina beach has occurred due to the collision caused by two cargo ships colliding near Chennai has affected a 30km stretch along a coastline and has spread because of waves and strong winds. The oil spillage along the marina beach has affected the fishes and humans in the Marina beach. Cleaning of the Marina beach is very important; various NGO's are participating in the cleaning of the Marina beach.

Key Words: oil Spill, liquid petroleum hydrocarbon, pollution, coastline, collision, beach

1. INTRODUCTION

The release of petroleum hydrocarbon into the marine areas due to the human activity or collision of two ships or cargo is known as a oil spill. This oil spills can also occur due to the release of crude oils from the tankers, offshore platform and also from the spills of redefined petroleum products (such as gasoline, diesel) and by their by products. Oil spills have adverse effects on the society environmentally, economically as well as it effects on the tourism industry. This oil spills effects the life of birds and mammals causing them fatal.

The cleaning up of an oil spill depends on various factors such as the type of oil spilled, the temperature of the water and the type of shorelines and beaches involved. The cleaning up of the oil spill is a very difficult task; these can take upto weeks, months and sometimes even years to cleanup.

The oil spill at the Chennai's Marina beach occurred due to the collision of two cargo ships and has affected a 30 km stretch along the coastline. This oil spill has adversely affected the life of the humans and animals living there.

II. Objectives

Oil spillage effects the environment near the coastal area very adversely, one such adverse of effect of oil spillage is experienced at Marina beach, Chennai, India. The main objective of this paper is to study about the oil spillage, effects of oil spillage and how it has affected the life of human and animals at Marina beach, Chennai, India.

III. Effects of Oil spillage

Oil spills occur due to the release of the liquid petroleum hydrocarbon in the environment, especially in marine areas. This released oil floats over the surface of the body thus preventing the sunlight to pass through it and making it difficult for the plants and animals to survive below water level.

The three main effects of oil spillage are listed below:-

1. Environmental Effects: First of these is the environmental effect. The animal life that lives in the water or near the shore is the ones most affected by the spill. In most cases, the oil simply chokes the animals to death. Others that live face a number of other problems. The oil works its way into the fur and plumage of the animals. As a result, both birds and mammals find it harder to float in the water or regulate their body temperatures.

Many baby animals and birds starve to death, since their parents cannot detect their natural body scent. Birds that preen themselves to get rid of the oil accidentally swallow the oil and die due to the toxic effects. In many cases, the animals become blind due to repeated exposure to the oil. Dolphins, sea otters, fish, countless species of birds and many oceanic mammals face these consequences. Countering these effects and cleaning the oil can take anywhere between a few weeks to many years, depending on the damage caused.



Figure 1:- Showing a Surf Scoter Covered In Oil As A Result Of The 2007 San Francisco Bay Oil Spill^[12]



Figure 2:- Showing a Bird Covered In Oil From The Black Sea Oil Spill^[12]

In general, spilled oil can affect animals and plants in two ways: direct from the oil and from the response or cleanup process. There is no clear relationship between the amount of oil in the aquatic environment and the likely impact on biodiversity. A smaller spill at the wrong time/wrong season and in a sensitive environment may prove much more harmful than a larger spill at another time of the year in another or even the same environment. Oil penetrates into the structure of the plumage of birds and the fur of mammals, reducing its insulating ability, and making them more vulnerable to temperature fluctuations and much less buoyant in the water.

Animals that rely on scent to find their babies or mothers cannot due to the strong scent of the oil. This causes a baby to be rejected and abandoned, leaving the babies to starve and eventually die. Oil can impair a bird's ability to fly, preventing it from foraging or escaping from predators. As they preen, birds may ingest the oil coating their feathers, irritating the digestive tract, altering liver function, and causing kidney damage. Together with their diminished foraging capacity, this can rapidly result in dehydration and metabolic imbalance. Some birds exposed to petroleum also experience changes in their hormonal balance, including changes in their luteinizing protein. The majority of birds affected by oil spills die from complications without human intervention. Some studies have suggested that less than one

percent of oil-soaked birds survive, even after cleaning, although the survival rate can also exceed ninety percent, as in the case of the Treasure oil spill.

Heavily furred marine mammals exposed to oil spills are affected in similar ways. Oil coats the fur of sea otters and seals, reducing its insulating effect, and leading to fluctuations in body temperature and hypothermia. Oil can also blind an animal, leaving it defenseless. The ingestion of oil causes dehydration and impairs the digestive process. Animals can be poisoned, and may die from oil entering the lungs or liver.

There are three kinds of oil-consuming bacteria. Sulphate reducing bacteria (SRB) and acid-producing bacteria are anaerobic, while general aerobic bacteria (GAB) are aerobic. These bacteria occur naturally and will act to remove oil from an ecosystem, and their biomass will tend to replace other populations in the food chain.

2. Effect on Economy: This is the second major effect of an oil spill. The loss of precious crude oil during an oil spill effects on the economy as more barrels of oils are then needed to be imported. As after the oil spill the cleaning up of the spill is also an expensive and tedious task, however the company is responsible for the cleaning up of the oil spill but a lot of government help is needed while the cleaning process. This cleaning up of spill also affects the health of the workers cleaning the spill and thus increasing the cost of medical treatment.

3. Effect on Tourism Industry: The oil spills also majorly effects the tourism industry as the site of oil spread on beach, dead animals and sludge as the tourists stay away from these types of sites. This affects the economy of the people living there as the tourism is affected and the various activities such as sailing, swimming, rafting, paragliding and fishing cannot be performed.

IV. Major causes of Oil spill:

- Sinking or leakage of oil carrying vessels or pipelines
- Illegal dumping by industries
- During wars
- Terrorist activities
- Natural disasters

V. Study Area (Mariana Beach Chennai)

Marina Beach is a natural urban beach in the city of Chennai, India, along the Bay of Bengal. The beach runs from near Fort St. George in the north to Foreshore Estate in the south, a distance of 6.5 km (4.0 mi), making it the longest natural urban beach in the country and one of the world's longest beach ranking with 1. The average width of the beach is 300 m (980 ft) and the width at the widest stretch is 437 m (1,434 ft). Bathing and swimming at the Marina Beach are

legally prohibited because of the dangers, as the undercurrent is very turbulent. It is one of the most crowded beaches in the country and attracts about 30,000 visitors a day during weekdays and 50,000 visitors a day during the weekends and on holidays. During summer months, about 15,000 to 20,000 people visit the beach daily.

The Marina beach was famed for its pristine beauty, jolly ambiance, and rich ecosystems. However, since the middle of the 20th century, the beach and water have become polluted. Proliferation of plastic bags, human waste, and other pollutants have rendered many parts of the beach unusable. In recent years, many voluntary organizations have taken up the task of cleaning up the Marina and protecting the ecosystem. Particular efforts include protection of olive ridley turtle nests along the Neelankarai section of the beach.

VI. Structures along the Beach

Being the city's primary area for recreation, the entire stretch features numerous statues and monuments that have come up over the years along the beach promenade, called Kamarajar Salai. While the beach stretches along the eastern side of the road, the western side is dotted with various governmental institutions and historic and stately buildings from the British rule all along its length. Victory War Memorial, a memorial for the warriors who lost their lives in the World Wars, marks the northern end of the beach. Memorials for C. N. Annadurai and M. G. Ramachandran, former Chief Ministers of Tamil Nadu, are present on the northern end of the promenade known as the Anna Square. All along the length of the promenade, stone statues adorn the roadside area of the beach starting from the Triumph of Labour statue, the first statue erected in the beach, near the memorials at the Anna Square to Mahatma Gandhi statue near the lighthouse. Most statues are of national or local legends while others have symbolic significance like the Triumph of Labour statue. The statues along the promenade are (from north to south):

- Robert Caldwell (erected on 2 January 1968)
- Kamarajar (erected on 2 January 1968)
- Ilango Adigal (erected on 7 November 1971)
- Triumph of Labour (erected on 25 January 1959)
- Bharathiar (erected on 2 January 1968)
- Kannagi (erected on 2 January 1968/re-erected on 3 June 2006)
- Subhas Chandra Bose (erected on 15 December 1997)
- Thiruvalluvar (erected on 2 January 1968)
- G.U.Pope (erected on 2 January 1968)
- Annie Besant
- Bharathidasan (erected on 2 January 1968)
- Swami Vivekananda (erected on 12 July 1964)
- Avvaiyar (erected on 2 January 1968)
- Mahatma Gandhi (erected on 14 April 1959)
- Veerama Munivar (erected on 2 January 1968)
- Kamarajar

- Periyar
- Sivaji Ganesan (erected on 21 July 2006)

VII. Newspaper articles regarding the Chennai oil spill

A. Chennai Oil Spill Way Past Marina Beach, Spread By Winds and Waves (Chennai | NDTV News Desk | Updated: February 03, 2017 09:31 IST)

The oil spillage in Mariana Beach has occurred due to the collision caused by two cargo ships colliding near Chennai is believed to have affected a 30-km stretch along the coastline and has spread because of the waves and strong winds. Close to a thousand workers, including volunteers from engineering colleges and fishermen are using their bare hands to clear the thick sludge that machines have failed to remove, and dump it in vats. According to the Hyderabad-based Indian National Centre for Ocean Information Services or INCOIS, around 15 to 20 tonnes of oil spilled into the sea when the ships collided near Chennai's Kamarajar Port on Saturday.

According to the report that Chennai oil spill was 10 times more than what was reported, says Coast Guard On January 28, when two cargo ships collided off the Ennore port near Chennai resulting in oil spreading rapidly on the coast of Bay of Bengal. Since then, the oil spill has washed ashore the marine species, putting in danger the marine biodiversity, environment and the volunteers who have been using their hands and buckets to clean up the sea. All efforts were being made and heavy force were been deployed to clean up the oil spill.

On Friday, S Parmesh, Coast Guard Inspector General told ANI that there was no oil spill at sea, and only accumulation of sludge. "Also, 116 tons of sludge has been cleared from beaches till now," he added. On the marine life, he further stated that Coast Guard was giving full support so that there is no loss to marine life.

Speaking to India Today, IG Parmesh said ships involved in collision tried to lessen the scale of the spill. On the spill, he added that it was 10 times than what was actually reported. He also described the situation at Marina beach saying 80 per cent of cleaning work has been completed and by Saturday evening full stretch of Marina will be cleared.

- The ship BW Maple (UK flag), an LPG tanker, rams the petroleum tanker Dawn Kanchipuram (Indian flag), just two nautical miles off the Kamarajar Port at Ennore near Chennai on Jan 28.
- The collision ruptures the water ballast tank and a part of fuel pipeline resulting in oil spillage to sea.

- Reports by the Coast Guard have estimated that over 20 tonne of oil have spilled into the Bay of Bengal.
- Oil spill affected the marine life of the coastal area especially sea turtle, fishing activity and Marina beach.
- Coast guard and Tamil Nadu Pollution Control Board working on removal of oil spillage.

Effects of Oil Spillage on Fishes and Humans in Mariana Beach

Oil spills are harmful to marine birds and mammals as well as fish and shellfish. Oil destroys the insulating ability of fur-bearing mammals, such as sea otters, and the water repellence of a bird's feathers, thus exposing these creatures to the harsh elements.

An oil spill as a result of a collision between two cargo ships off the Kamarajar Port in Ennore on January 28 has been polluting the beaches in Chennai. The effects have been grave- it has affected local livelihood, fishermen and aquaculture.

The fishing industry has been badly hit because people have not been buying fish thinking it is unsafe for consumption, forcing fishermen to stay away from the sea for about four days now and are expected to not venture into the sea for at least another week. "There have been heavy losses. I have not sold fish even worth Rs 2,000. Nobody turned up over the last three days," Shakila told NDTV adding that she has Rs 30,000 worth of fish, but no customers to buy them. However, Fisheries Minister D Jayakumar and senior government officials inspected the area following reports that people were not buying seafood since several fish died due to the oil spill. The minister dismissed such reports as untrue and said that people "need not fear to consume fish. It is our duty to allay such fears. Therefore, we took some samples of the dead fish taken from Ennore, Marina, Thiruvanmiyur areas. There were reports of oil slick. The results from laboratory have clarified that it is safe to consume".

The oil spill has affected marine life as well, with several sea turtles having died due to the incident. It has got environmentalists worried. "The spill will affect oxygen supply to these aquatic species. More species will die. But we are not able to assess the loss as we don't have a base line," environmentalist Emily Titus told NDTV.

The Indian National Centre for Ocean Information Services in Hyderabad has been keeping track on the oil spill trajectory through computer models to study the long term effects of the spill on the environment, TOI reported.

The National Green Tribunal (NGT) also issued notices to the Tamil Nadu Pollution Control Board and the Central

Pollution Control Board on Wednesday regarding the oil spill.

The bench, while hearing an application in the matter, took note of how the spill was being managed and has sought a report on how it could be tackled and remediated in a scientific manner, the Hindu reported.^[17,8]

B. Oil blackens Marina (Report of Indian Express)

Unprecedented scenes were witnessed on the shores of the Bay of Bengal from Bharathiyar Nagar near Ennore to Marina Light House, with tonnes of tar-like thick black oil allegedly leaked from one of the vessels that collided near Kamarajar Port two days ago, polluting several square kilometers of sea. The oil deposit has converted sandy beaches, including the Marina, into a rubbery ground, making it inaccessible to the public.

When express travelled on a fishing boat along the Marina beach stretch, several chunks of oil deposits were spotted among the waves. The biggest challenge was that both Kamarajar Port and the vessel that caused the disaster remained in denial, leaving the official machinery clueless about what they were dealing with. Minister of State (Shipping) Pon Radhakrishnan visited the port and observed that there were no spills/sheens in the area, claims a release from the port.

The Tamil Nadu Pollution Control Board collected samples and sent them to a lab at IIT-M to ascertain the pollutant. While corporation officials said they couldn't issue an advisory until they know what the material is, they cautioned beach-goers against coming in contact with the water.

Meanwhile, the coast guard removed 4,000 litres of oil on Monday. Sources said a bio-degradable chemical would be used on Tuesday to solidify pollutant particles and deposits on the sea bed, to avoid loss of marine life. What was initially termed as a minor incident turned into a major environmental hazard, threatening marine life and ecological balance. Several stretches of the Bay of Bengal turned brown as tidal waves filled with thick layer of black oil hit the shores. Thousands of shallow water fishermen are up in arms after their gear was damaged by the oil and their catch went unsold due to bad odour.

In a bid to map the hotspots of disaster, Express travelled from Ennore to Marina. The scale of pollution was enormous. Bharathiyar Nagar in Ennore, KVK Kuppam, Kasi Vishalakshipuram, Kasimedu, Tiruvottiyur, Palagai Thotikuppam, and Nochikuppam near Marina Light House are among the worst-hit.

Clearly, the oil float boom that was deployed by Kamarajar Port to arrest the seepage from MT Dawn Kanchipuram, which was carrying petrol and diesel, has failed. Inbound

vessel MT Dawn Kanchipuram suffered damages when it collided with outbound vessel LPG/CBW Maple on Saturday. Though the Coast Guard, along with other government agencies, has been manually removing the oil deposits from the sea shore, tonnes of pollutants travelled about 13 km south and impacted the Marina beach on Monday.

The Tamil Nadu Pollution Control Board (TNPCB) officials said that the float boom could be used to remove lighter oil, but, in this case, the deposits were too thick to yield any result. So far, the coast guard has removed six to seven tonnes of oil and officials are still unable to estimate how much oil is still left. The board officials said the collected oil will be transported to a waste oil recycler. "We have identified a recycler and the oil will be sent there as soon as the cleaning process is over. After proper scientific testing, the oil will be processed," an official said. The Coast Guard conducted an aerial survey on Monday and sources told express that several square kilometers of sea were found polluted. Sources said that representatives of MT Dawn Kanchipuram vessel, which allegedly caused the oil spill, reportedly visited Bharathiyar Nagar and interacted with Coast Guard. However, the Coast Guard officials said the vessel management was yet to submit a report on quantum of oil spill.

On Tuesday, a bio-degradable chemical, which will solidify the pollutants and deposit them in the seabed, is likely to be sprayed. While Express was conducting a reality check on the extent of pollution, the crew of a mechanized trawler operating in the deep sea said that thick layers of oil, measuring 10 meters in diameter, were found floating in large sections of the bay from 10 km into the sea off Marina to Thiruvannamiyur shore. As days passed by, the ship traffic turned the thick layer into tiny tar balls, which were found inside the dead fish gills that washed ashore near Broken Bridge. On any possible harm that fisher folk could face, the officials said that it would be mostly unlikely, unless a person came into direct contact with the oil or was exposed to it for a long time.

Corporation Health Official Senthilnathan said that there did not seem to be any immediate effect that could be caused by the oil, but added that a proper assessment was needed to be done first. "We are not directly linked to this issue, but we can only advise or take precautionary action after the TNPCB submits an authentic report showing that the oil is toxic. But it is best not to swim in the area or stand too long in the water," he advised. Nityanand Jayaram, noted environmental activist, questioned the way the whole episode was handled and the rationale behind Kamarajar Port official's stand that there was no damage to the environment. "Port has been irresponsible. Accidents do happen, but the emergency management should immediately kick-off. The incident shouldn't be underplayed. I strongly suspect whether the standard operating procedure has been followed. First, they haven't

taken the spill seriously. The disaster management protocol is completely missing," he said.

Meanwhile, an official statement from the port said that as per the instructions from DG Shipping and officials of Mercantile Marine Department (MMD), the discharge of cargo from MT Dawn Kanchipuram has commenced at 3 pm and berthing got completed by 7.30 pm. The vessel sustained breach in the space forward of accommodation between engine room and tanks. Also, it had some damage in the accommodation port side.

The cry for compensation among the fisherfolk kept growing. In Bharathiyar Nagar, there was a verbal dual between the local villagers and Coast Guard officials, which halted the clean-up drive for close to three hours on Monday afternoon.

The fishermen from surrounding villagers have stormed the place and said the clean-up shouldn't be carried out until the compensation is paid. They alleged that their livelihood is lost at least for next six months. "We can't use the fishing nets that are soaked in oil. Even the boats are greased with blankets of oil," K Shankar, a fishermen leader from KVK Kuppam said.

However, they were pacified by the Coast Guard and police officials, who said the clean-up was being carried out for their own good and the issue of compensation was being taken up by the higher authorities.^[19]

VIII. Conclusion

The oil spill has major impacts on the environment. This oil spill has adversely effects the life of the people and animals living there. The oil spill in the Marina beach, Chennai, India occurred due to the collision of two cargo ships. This oil spill has effected around the area of 30 km stretch. The cleaning up of the Marina beach is still going on many volunteers has taken part in the cleaning up of the oil spill including fishermen and students from the engineering colleges. Hence, an oil spill is a very disastrous calamity.

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