

# Development of Flat Belt Type Oil Skimmer

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**Abstract:** *During the recent decade, world has witnessed big oil spillage accidents into ocean and made huge impact to the environment. Apart this, sometimes oil is getting spillage through being the results of chronic and careless habits in the use of oil industries and oil products. It is estimated that approximately 706 million gallons of waste oil enters the ocean every year; whereas more than half of that sourced from land drainage and waste disposal. Offshore drilling & production operations and spills or leaks from ships or tankers are typically contributing less than 8% of the total whereas routine maintenance of ships (nearly 20%), onshore air pollution & hydrocarbon particles (about 13%) and natural seepage from the sea floor (over 8%). This has caused ever lasting damage to aquatic life. To separate the mixed oil from the water, industries wide various type of oil skimmers are getting used. Herewith, the objective of this project is to design and conduct efficiency studies of belt type oil skimmer by using various material belts. The belts absorb the oil from water which can be scooped out and collect into a vessel by providing piping arrangements. The collected oil can be reused for many purposes.*

**Keywords:** Spillage, Offshore, Onshore, Seepage.

## I. INTRODUCTION

Oil is one of the most important energy draw material source for synthetic polymer and chemicals worldwide. As long as oil is explored, transported, stored and used their will ether risk of spillage .Oil pollution, particularly of sea and navigable water, has exited more public concerned than other water or spilt materials .Oil pollution of the sea has steadily increased with the increase in oil consumption. The bulk this in flux is due to transportation related activities spill from tanker loading and unloading operations, pipeline rupture which may be due to industrial waste as leakage from engines, incorrect operations of valves and discharge of oily wastages. Oil pollution of the shore in addition to the reduction of amenity, also affects marine, shore life and vegetation .Crude oil consists of different hydrocarbon that range from light gas to heavy solids. When oil is spilled on water, the physical and chemical properties of oil change progressively. Spilled oil has an undesirable taste and odour and causes severe environment damage on water fall, material life and affects tourism economy. The pollution increasing various sectors of the world.

### 1.1 Objective

The basic objectives of this project work for carrying the waste oil from the marine area to remote place where the waste oil is dropped.

- [1] To minimize the oil pollution from ocean.
- [2] To separates the oil and water mixture from workshop, garage.
- [3] To minimize the overall operation and production cycle time.
- [4] To reduce labor cost.
- [5] To separate high viscosity oil.

## II. PROBLEM IDENTIFICATION

According to the U.S. Environmental Protection Agency (USEPA), almost 14,000 oil spills are reported each year in the United States alone. The considerable increase of oil exploration and transport in Arctic waters will increase the risk of an oil spill occurring in cold and ice-infested waters. Currently, mechanical oil spill recovery in cold climates is inefficient largely due to the fact that the equipment available to oil spill responders was not designed to collect very

viscous oils and oil-ice mixtures. The presence of ice crystals in oil emulsions affects the adhesion processes between an oil slick and the surface of an Oleophilic skimmer and prevents oil from being efficiently recovered. Oil spill responders have used weir type skimmers and large vacuum hoses to suck in oil-ice mixture, resulting in a significant amount of free water in the recovered product, reducing oil spill recovery efficiency and creating a discharge problem. Various shapes of the recovery unit, such as a mop, belt, brush, disc, and drum, have been developed to increase skimmer efficiency. Our research has shown that the relatively low recovery rate of smooth drum, belt and disk skimmers can be explained by their relatively small surface area. Only a limited amount of oil adheres to the recovery surface in every rotation, requiring more time or more skimmers to increase the overall recovery. Brush and mop skimmers attempted to address this issue by increasing the surface area in contact with oil. Although these skimmers allow more oil to adhere to the recovery surface, not all the adhered oil can be removed from the belt. Thus, a significant fraction of the oil remains on the belt, reducing the overall recovery efficiency.

### III. FUTURE SCOPE

- [1] Speed of the belt cannot vary so it is to be improved by providing multispeed arrangement.
- [2] Scrapper plate arrangement may be improved. Oil resisting belt can be fitted to improve life and strength of belt.
- [3] Solar panel can be attached to run the AC motor so improving the energy efficiency. [4] The belt slips slightly on the drum due to the collection of the oil. Water drops are collected simultaneously with oil and this is to be reduced for better performance.
- [5] Stirrer mechanism can be used to improve oil removal rate.

### IV. ADVANTAGES & APPLICATION

#### Advantages:

- All the components are readily available in the market.
- Simple in Construction.
- Maintenance Cost of the system is less as Compare to other oil skimmer
- Easy to transport from one place to another place

#### Applications:

- **Wastewater Sumps:** - Most manufacturing or processing facilities have circulating water systems. This water collects in a central tank or sump. Removing floating hydrocarbon contamination with little water content can reduce the cost of disposal and lower the contingent liabilities of wastewater discharge.
- **Coolants and Cutting Fluids:-** When machine coolants become contaminated with tramp oils, four things usually occur: 1) coolant life is reduced, 2) quality of machined parts is reduced; 3.) in many cases, a smoke will begin to appear in the shop, causing irritation to the workers on the job; and 4.) the fluid takes on a “rotten egg” odor. Skimmers that remove tramp oils solve these problems and typically pay for themselves within a few months
- **Heat Treating:** - Quench oils that must be removed from heat treated parts can be captured for re-use or disposal. The results are lower quench oil costs, prolonged wash water life and lower disposal costs.
- **Parts Washers:** - Floating oils re-contaminate parts as they are removed from a wash tank. Oil skimmers can remove this oil. The benefits of using an oil skimmer are oil-free parts and extended fluid life.
- **Food Processing Facilities:** - Removal of vegetable oils, greases, and animal fats from a plant’s wastewater stream reduces the costs of processing and disposal.

### V. CONCLUSION

In this project, we enforced to highlight the function of oil skimmer, its various design aspects and performance. All the results of experimental studies indicate that slight design improvement of typical oil skimmers towards to include additional belt shaft and use of belt with steel material instead of rope; significantly improve the oil recovery efficiency and also its structure became simpler. As practical overview of different oil spillage cleanup method, this paper has

illustrated several limitations of these methods and current oil spill technology. Further extensive research & testing can improve the existing techniques and equipment to have better control for oil recovery exercise

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