

Design and Fabrication of Oil Skimmer and Purifying with Centrifugal Separator

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Abstract— This paper deals with the separation of oil from use oil, waste oil in refinery industries, sugar factories and many small scale industries to find out the better solution for oil recovery from the water surface to produce oil free water. Also a deal with the fabrication of mechanical equipment to separate oil from the water than centrifugal separation. Oil and water separator is mechanical equipment, which is used in the environment pollution control from oil spillage and centrifugal separation is the process of to remove heavy viscous and dirt material from waste oil. Oil separator helps in removing the oily from the waste water. By removing the oil from waste water, it becomes free of oil pollution. This is mainly due to oleophilic material used in the oil separator. This oil separator can be used in the effluent treatment plant. This project consists of construction, fabrication details, assembly, working and applications of oil and water separator. The belt speed, oil recovery rate and oil recovery efficiency are the operating parameters of oil separator. The oil recovery rate and the oil recovery efficiency, the two most important parameters displayed the performance of the oil separator.

Key words: Oil Skimmer, Oil Spill, Centrifugal Separator, Refinery

I. INTRODUCTION

There are many cases regarding to oil spill, oil pollution. Also aquatic life, environment also affected by oil pollution. So there is need to find effective way to solve this oil pollution problem. River and other small water source are polluted by the industries. in industries to separate oil from coolant and water oil skimmer use.

This model deals with the separation of oil from oil-water mixture, coolant and purifying it with centrifugal separator for more perfect oil recovery. It also removes heavy viscous particles and dirt. This model also deals with the fabrication of model regarding oil separation and purification in which oil skimmer belt with oil filter and centrifugal separator are used.

II. MATERIAL SELECTION

Oil skimmer belt is the main material in this project. The selection of proper belt considering all the properties is very important.

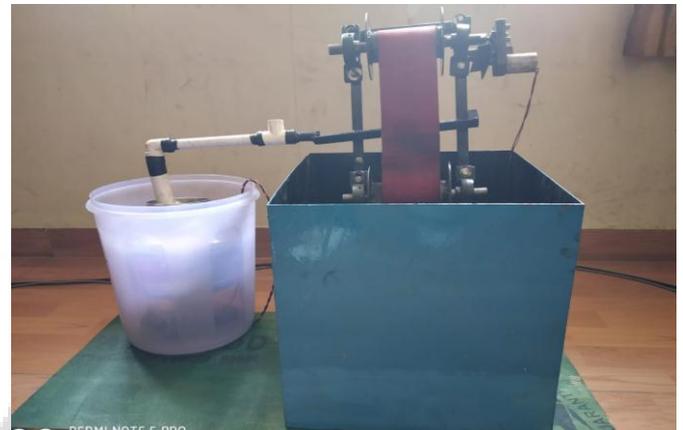
The properties include oil drawing capacity, heat resistance, toughness. Oil skimmer belt changes with viscosity of oil. One of the research paper concluded that for thicker oils, i.e. oil with high viscosity, neoprene belts (nylon 6-6) are used and for thinner oils i.e. oil with low viscosity, nylon belts are used. Hence, in this project, N-18 type Nylon belts are used to draw oil as it has greater affinity to draw oil than water.

III. COMPONENTS DESIGN

A. Centrifugal Separator:

This is a device in which oil is separated from oil-water mixture by centrifugation. It considers a dome shaped container which revolves inside a larger stationary container. The denser oil, accumulates at the periphery of the rotating container and the less dense oil i.e. purified oil is collected in the stationary container.

IV. CONSTRUCTION



In this model the working system is oil skimmer, oil filter and centrifugal separator. Oil skimmer belt is made up of oleophilic material i.e. more affinity to draw oil than water which rotates on bearing block at certain speed. This model is placed in a tank of oil-water mixture. The belt is made to run against the container which carries only oil. This oil is made to flow through the oil filter by some piping arrangement. Further this oil is sent to centrifugal separator which rotates at higher RPM and heavy materials stick on sides of dome and remaining oil falls down in outer container for oil collection.

V. WORKING

- 1) In this fabrication of mechanical equipment is done to separate oil from the water with the help of oil skimmer belt and stored in the tank.
- 2) The tank is further connected with a pipe to pass the stored oil in oil filter. In this the separated oil from water is filtered and we get the filtered oil with high viscosity.
- 3) This process is very slow and filtered oil comes out of oil filter drop by drop. The oil is then passed to a dome shaped container which rotates at high speed.
- 4) Due to high speed movement the viscous oil sticks around the surface of dome and refined oil is settle in the container.

VI. APPLICATION

- 1) Oil is removed from sea and save Marine life.
- 2) Oil removal in industries and factories.
- 3) Also clean oil from river which is polluted by factories pollutants.
- 4) The refined oil is used in lathe machines to avoid friction in gears.
- 5) To separate oil from coolant used in lathe machine.

VII. Conclusion

Oil skimmer and centrifugal separator is effectively, environmentally, eco-friendly system to tackle the global oil crisis of oil spill.

It has many advantages to present day to clean spill water. The system can capable for collecting most of oil from water surface.

Lots of human efforts reused and also hazardous effects of oil pollution And oil spill get faster.

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