

FLOATING OIL SKIMMER WITH RC

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Abstract - The oil skimmer is used to separate oil from mixture of aqua and oil. It causes highly acidic alkaline and salty environment remains a great challenge to aquatic organism and also polluted the coastal areas. Every year 706 million gallons of waste oil enter the water resources and pollute the environment. Sea water has been polluted due to oil spillage it also affect the water bodies. If the oil spill increases it result in serious damage to the environment. About 90% of contaminated oil can be removed by continuous separation of oil by skimmer belt. This setup use polyurethane belt, bearings, supporting L-angle frame and scraper. This work implemented to improve the separation efficiency of the skimmer belt at manual speed. The belt absorbs the oil from water which can be scooped out and collect in to a vessel by providing piping arrangements. The collected oil can be reused for many purposes.

Key Words: oil skimmer, polyurethane belt, oil pollution, scraper, oil spill,

INTRODUCTION

An oil skimmer is a device that is designed to remove oil floating on a liquid surface. Based on the specific design they are used for a various applications such as oil spill response, as a part of oily water treatment systems, removing oil from the coolant and aqueous part washers and collecting fats, mixed oils and greases in wastewater treatment. The types of approaches which are used to filter the oil content from water by using oil skimmer belt. It is a mechanical device that helps in removing floating oil and tiny greasy particles from water. In modern world, rapid and quick working is more important with new idea. The new invention of machines that are used to reduce the problems in the world is necessary. Pollution has created lot of issues in day-to-day life. Due to water pollution, the tourism, fishing and aquatic organisms are greatly affected. An oil skimmer is a device that is designed to remove oil floating on a liquid surface. Oil is one of the most important raw materials for synthetic polymer and chemicals. The release of oil into natural environment is termed as oil spill or spillage.

PROBLEM STATEMENT

During the recent decade world has witnessed big oil spillage accidents into ocean and made huge impact to the environment. Apart this sometime oil is getting spillage through being the result of chronic and careless habit in the use f oil industries and oil product. It is estimated that approximately 706 million gallons of waste oil enters the ocean every year, whereas more than half of the sourced from land drainage and waste disposal.

METHODOLOGY

The general steps to be followed in designing the machines are as followed.

- Selection of groups of mechanism for the design.
- Calculation of the force and energy on each machine member.
- Selection of materials.
- Determining the size of the component drawing and sending for manufacture.
- Preparation of component drawing sending for manufacture.
- Manufacturing and assembling the product.
- Testing of the product for functioning.

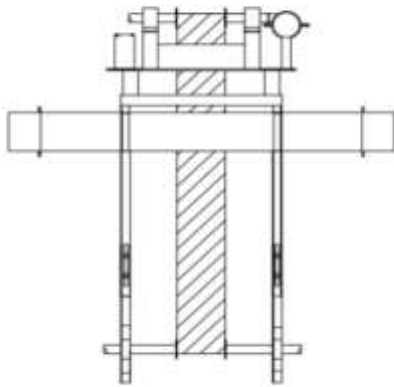
PRODUCT DEVELOPEMENT PROCESS

This product "FLOATING OIL SKIMMER WITH RC" carried based KARL .T. ULRICH'S product development process



Product development process

PRODUCT DESIGNING



Front view of product 2D CAD model

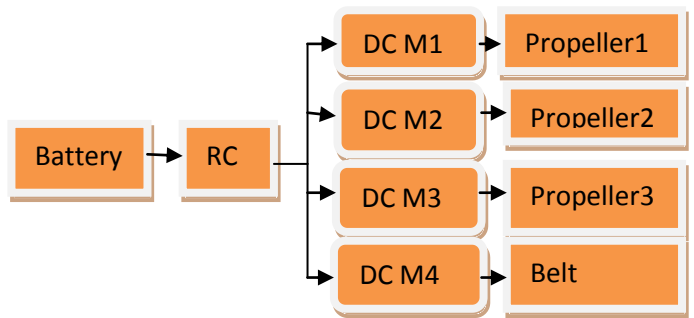


Implemented model

WORKING PRINCIPLE

A belt skimmer is mounted on tank tops. The unit consists of two pulleys. Care is taken that the bottom pulley is below fluid surface level. The top pulley is connected to a geared drive. An endless flat belt of polyurethane material rotates on the pulley. Fluid flows slowly over the belt leaving the floating oil on the surface of the belt.

The belt scrapes through a pair of nylon scrapers near the top pulley. The scraped fluid is collected a tank. The separator tank is specially design with adjustable baffles this separates the additional content and diverts it back to the main tank.



Working of the system

FUTURE SCOPE

Speed of the belt cannot be varying so it is to be improving by providing multispeed arrangement. Stirrer mechanism can be used to improve the oil removal rate.

RESULT AND DISCUSSION

This oil skimmer is very effectively used for skimming away oil spills from the surface of water. It is also used for oil refineries near to ocean or any other industries which disposal waste oil. The deep water horizon rig regions can use the sea swarm in case of accidents.

ANALYTICAL CALCULATION

Let assume,

T=Thickness of skimmer belt in mm.

W=Width of skimmer belt in m.

d= Diameter of shaft in m.

N=Speed of rotation of shaft in rpm

Then, volume rate of oil recover per turn when shaft is rotating 40 rpm. Here we assume 1mm thickness of oil film

Volume rate=Thickness film x Width of belt x Circumferential area of shaft x Speed rotation of shaft.

$$V = t \times w \times \pi \times d \times N$$

CONCLUSIONS

This project has provided us an excellent opportunity and experience to use our limited knowledge. Removal of unwanted oil from water which saves environmental and economical problems. Belt skimmer gives best result comparatively. The separator is simple in designing and very reliable considering all the constraints. The polyurethane oil separator belt has better oil skimming capacity and it is more convenient

to use where less noise operation is required. It is very helpful to operators as it avoids their tedious work for skimming the oil and grease from the wastage water. This small compact inexpensive and self organizing mechanism is suggested to collect and skim away surface oil spills.

ACKNOWLEDGEMENT

We extend our deep sense of gratitude to our project guide Mr. Jabir PP, Lecture, Department of mechanical Engineering for providing us with valuable guidance and whole hearted encouragement throughout the project. We express our sincere gratitude to Mr. Binu KK, Head of Department of Mechanical Engineering for the support and constant encouragement. We express our sincere thanks to Mr. Mansoor Ali PP Principle Orphanage Polytechnic College, Edavanna for the support and constant encouragement. We thank all the teaching and non-teaching staffs, our classmates and friends for sharing their knowledge and valuable suggestions.

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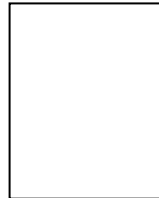
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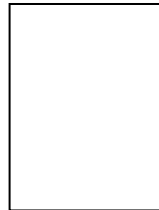
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