

Oil Skimmer Mechanism in Sugar Factory

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Abstract: Aim of this project is to remove the oily effluent from waste water of sugar factory. A free floating endless belt oil skimmer was developed as means of recovering spilled oil from surface water. The skimmer utilizes a unique high efficiency belt which is driven by motor. By removing oil we can preprocess water for other use. A free floating endless belt oil skimmer was developed as means of recovering spilled oil from surface water. The skimmer utilizes a unique high efficiency belt which is driven by motor. By removing oil we can preprocess water for other use. The contamination of oil is 80% is removed by means of belt.

Keywords: Oil Recovery, Oil Pollution, Oleophilic Skimmer, Operational Planning.

I. INTRODUCTION

An Oil Skimmer are the cheapest and most efficient way to remove unwanted surface oil in process baths, chemical baths, washing machines and leakage oils from coolant machinery etc. A belt skimmer are great in many ways. The capacity is high and the oil collection rate is excellent. Oil skimmer is easy to install, because you do not need to worry about the height to the surface of the bath. Floating oil and grease cling to skimming media more readily than water, and water has little affinity for the media. Oil skimmer allows skimming media in the shape of a belt, disk, drum to pass through a fluid surface to remove floating oil and grease with very little water. This oil is removed from the media with wiper blades or pinch rollers. Oil skimmers effective tools for removing oil and other dirt from water. A oil skimmer achieve the desired level of water purity. Oil skimming is a cost-effective means of removing most of the oil before using more complicated and costly treatments such as chemical processes. Floating oil and grease cling to skimming media more easily than water, and has little affinity for the media. This allows oil skimming media in the shape of a belt to pass through a fluid surface to pick up floating oil and dirt with very little water. This oil material is subsequently removed from the media with wiper blades. Oil skimmers are simple and effective tools for removing oil, grease, dirt from water. A oil skimmer can achieve the desired level of water purity. In more demanding situations oil skimming is a cost reducing means of removing most of the oil before using costly treatments such as chemical processes.

II. BACKGROUND OF THE REVIEW

Sugar factory have problem of water pollution. It affects the surrounding area the waste water from factory contain various harmful oils and dirt. The main aim of this project to remove the waste oil from the waste water line of the sugar factory. The oil can be recycled for the application of lubrication. The belt skimmer can be used for removing the waste and dirty oil from the water.

III. COMPONENT OF THE PROJECT

A. Motor:

DC41 series motors are Dc motors that are used in combination with some Mechanical gearheads. Depending on the application, output speed, load applied the type of gear can be selected. Case hardened steel gears are used due to the high torque generated by these motors. First pair of gears can be helical to damp the noise. All bearings are permanently lubricated and therefore require no maintenance.

B. Gear Box:

Gear box is mounted on motor shaft for reduction in speed of motor. one end of gear box shaft is attached to motor shaft and other end is attached to the coupling. From all the calculation done it is seen that the required torque is 5.7323 N-m

with weight of 1 Kg. The whole assembly of the motor with gear box is mounted in the molded box. It reduces speed from 2400 to 25 rpm by using four stage reduction gear box. In this four stage the first stage is helical gear because the speed reduction is maximum so compare to other gear it is effective. And other three stages are the spur gear.

C. Belt:

It is made up of polymer material. It is endless type which has width of 155 mm. The material is so selected to stick oil to belt. It is mounted on the steel pulley. Length of open belt is 1860 mm. It is immersed in liquid up to 150mm. Belt material has good oil removal rate and it can withstand high temperature up to 170 to 180F .hence we have selected polyurethane belt. Tension to the belt is given by lower pulley with dead weight according to requirement.

IV. PROCESS PARAMETERS

Belt Material:

Stainless steel belts used in parts washing applications because of high temperatures and chemicals. Polyurethane is best for all other standard skimming applications including coolant, wastewater, monitoring wells, etc

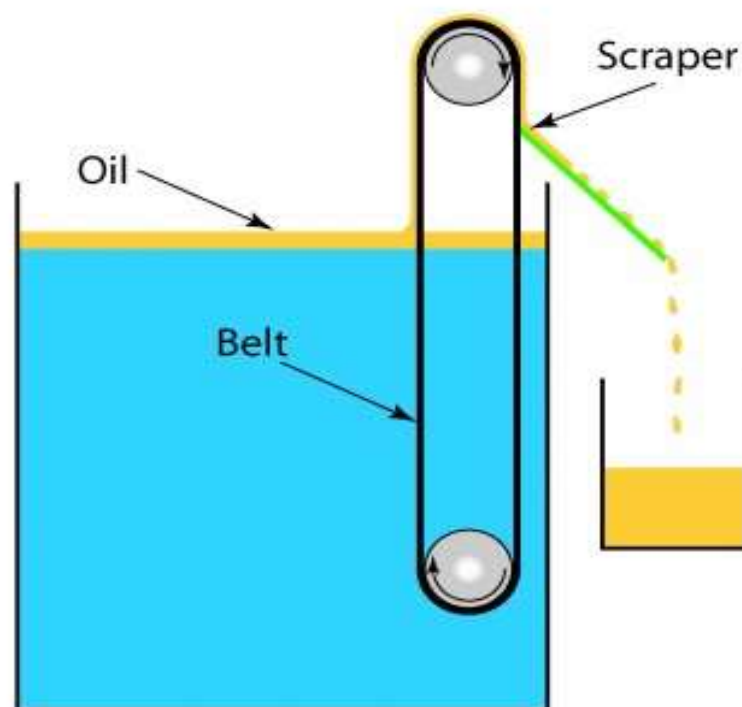
Quantity of Oil:

Belt skimmers are a “rough” oil removal tool and not meant to remove 100% of floating oil .They are most effective with a oil layer of 1/16” or more and the oil must be present at the belt.

Lift Rate:

Approximate lift rates are dictated by rpm and belt type & width. Lift rate will vary with other factors such as type of oil, temperature, etc.

V. PROJECT MODEL



VI. WORKING PRINCIPLE

The two rollers are used for mounting the belt on it. Gear arrangement is used for speed ratio adjustment and coupled with motor. Wiper is used for removing oil from the belt. One end of roller is deeped in waste water of sugar factory. The oil is removed up to 80%.

VII. FUTURE SCOPE

Speed of the belt cannot vary so it is to be improved by providing multispeed arrangement of gear. Scrapper plate arrangement may be changed. Oil resisting belt can be used to improve life and strength of belt. Solar panel can be attached to run the motor so improving the energy efficiency. The belt slips slightly on the drum due to the collection of the oil. Water drops are collected with oil and this is to be reduced for better performance. Stirrer mechanism can be used to improve oil removal rate from sugar factory

VIII. CONCLUSION

The main purpose of project to remove the waste oil from sugar factory. The project is important for increase the sugar factory efficiency. The waste oil can be recycled for other purposes like greasing, lubricating. etc. the recycled water can be used for the various application in sugar factory. The model can reduce the load of water and increase the plant efficiency.

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