Marine Oil Separator

R. VIJAYAKOTHANDARAMAN[1], P.K. CHIDAMBARAM[2], S. GINI[3], S.SUBBURAM[4]

[1,2,4] New Prince Shri Bhavani College of Engineering and Technology, Chennai, India.
[3] New Prince Shri Bhavani Arts and Science College, Chennai, India.

Abstract

The Novel feature of oil skimmer is to remove oil from the liquid. Oil skimmer plays a major role during the accided of oil tanker in sea port during the transportation in sea ports which create major disastor to marine ecosystem. The performance of oil skimmer enhanced by fire tuning the angle between the plane of disk and vertical plane the efficiency which improve the performance better than conventional disk oil skimmer. Thus the measure implemented will require less effort to alter from disk and belt skimmer, result shows requirement of less immersed area needed for offset angle to be perfect. About rotational speed of 80rpm will be effective, needless of operating or design parameter. Belt and disk skimmer shows the improved concentration of hydrocarbon in comparison with the existing oil skimmer.

1. Introduction

The oil skimmer test equipment segregate the oil from water.The skimmer is used to hand operated and also motor.The drum rotate oil is sucked from the water and drained into the container.Many mounting systems used for oil skimmer,but belt and disk model skimmer is compact and customer satisfaction.The addition treatment while providing overall reduction in bilge oil concentration also provides bilge separators some reduction to withstand failures during initial stages. The inclusion of more polishing step will add to the operational cost of the ship, however, the bilge separator is more economical than holding all oil bilge.

2.Description

Disk skimmer: ''Oil Skimmer' have capacity of 50-120m.It's new mechanical equipment which is used for environmental pollution control during oil spillage. The oil skimmer's help in eliminating the oily effluent from the waste water and by removing the oil from waste water, it becomes pollution free. The oil skimmer can even remove a thin floating film of oil from the water. This property of oil removal is mainly due to the "Oleophilic material" used in the oil skimmer. These oil skimmers are manufactured based on the requirement from the effluent treatment plant.

Belt skimmer:Where the tanks or ponds are very large above ground and gravity drain is not possible, the oil collected is pumped out with pumping system. Where the tanks are under ground and size is small, belt type oil skimmer is suggested. Oil spillage problems mainly occur in the industries like oil refiners, sugar factories, petrochemical industries etc. Oil spillage contributes to heavy water pollution as it is not biodegradable. In the sugar factory spillage of mainly contributes from the mill section.

Daily 200 to 300 litres of oil and grease is being used for lubrication of heavy gears in every sugar factory. Whenever oil spills over water it forms an emulsified layer. At the effluent treatment plant (E.T.P.) in every sugar factory recovery of oil is big problem as it

seriously affects the quality of treated effluent water. The oil has to be separated from water and purified from dirt particles for effective reusage in order to meet high efficiency and environmental regulations.

3.Selection of material and property

i) source of material
ii) service conditions
iii)material cost
iv)property of physical, chemical and mechanical property.
Mechanical property
i)stress, strength,elasticity,plasticity,ductility,brittle,brinell test and Rockwell test.
The engineer consider material and their properties before design the equipment.

4.Working

The oil seperated from water and drained into container by using belt and disk oil skimmer. It could be used when the oil/water separation is to be enhanced while processing. These substances will not be used when the water is drained to the bilge which is normally not seen in operation. The vessels must minimize the discharge of oil in to water which could be done by minimizing the the production of bilge water and disposing the water in shores where adequate facilities are not available to remove the oil from the water.

5.Environmental

The compliances are verified by means of inspection. Measurements and sampling a defined environmental parameter in accordance with the rules and compliance with identified standards and guidelines for effective removal of oil from water.

The developed design helps in identifying additional requirements for controlling and limiting operational emissions and discharge. This design also reduces the consequences of accidents and also protects against possible accidents.

The addition treatment helps in providing overall reduction in bilge oil concentration along with making bilge separators more reliable by providing some reduction to withstand problems or failure of individual stages. The inclusion of more polishing steps adds to the cost of the ship operation, however, the on board bilge separation is typically more economical than holding all oily bilge water for transfer and subsequent treatment on shore.

Acknowledgements

References

[1] Chun changZhang,"Modified Assessment Methodology For Mechanical Recovery Capacity for Oil Spill Response at Sea," International Oil Spill Response Technical Seminar., pp. 29-34, 2015.
[2] O.A.Omoniyi, F. Abdul Malik, "A Review of Microbial Enhanced Oil Recovery: Current development and Future Prospects". International Journal of Scientific & Engineering Research, 2015.

[3] JingangYao,"Techno-economic assessment of hydrogen production based on dual fludizedbedd bio-mass steam gasification,biogass steam reforming and alkaline water electrolysis process ," Energy Conversion and Management., pp.278-292, 2017.

[4] S. K. Nataraj, F. Al-Turjman, A. H. Adom, R. Sitharthan, M. Rajesh and R. Kumar, "Intelligent Robotic Chair with Thought Control and Communication Aid Using Higher Order Spectra Band Features," in IEEE Sensors Journal, doi: 10.1109/JSEN.2020.3020971.

[5] B. Natarajan, M. S. Obaidat, B. Sadoun, R. Manoharan, S. Ramachandran and N. Velusamy, "New Clustering-Based Semantic Service Selection and User Preferential Model," in IEEE Systems Journal, doi: 10.1109/JSYST.2020.3025407.

[6] Ganesh Babu, R.; Obaidat, Mohammad S.; Amudha, V.; Manoharan, Rajesh; Sitharthan, R.: 'Comparative analysis of distributive linear and non-linear optimised spectrum sensing clustering techniques in cognitive radio network systems', IET Networks, 2020, DOI: 10.1049/iet-net.2020.0122

[7] Rajalingam, B., Al-Turjman, F., Santhoshkumar, R. et al. Intelligent multimodal medical image fusion with deep guided filtering. Multimedia Systems (2020). https://doi.org/10.1007/s00530-020-00706-0