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HEAT TREATMENT OF OIL BASED SLUDGE

A PROJECT REPORT PRESENTED BY

POORNI DE SILVA

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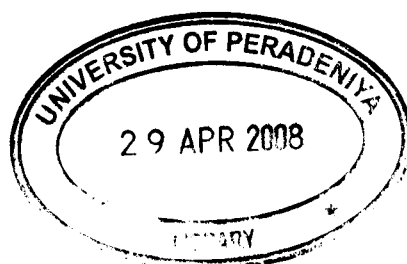
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ABSTRACT**HEAT TREATMENT OF OIL BASED SLUDGE****POORNI DE SILVA**

Post Graduate Institute of Science

University of Peradeniya

Peradeniya

Sri Lanka

Oil contaminated soil disposed from service stations, creates a large scale environmental problem these days while some oil types can be gravity separated. In Sri Lanka there is no proper way to dispose oil coated mud from service stations. The aim of this research project is to find a treatment method for this mud, which is suitable for Sri Lanka.

Bioremediation, thermal treatment and soil washing using biosurfactant have been used in other countries for treatment of oil coated mud. But these treatments are not suitable for Sri Lankan service stations due to high cost. As a low cost treatment, making 'Bricks' using wasted oil coated mud from service stations is suggested.

The main pollutants generated in service stations are chemical pollutants such as motor oil and grease, and physical pollutants such as clay and silt. A portion of colloids is suspended in water while a considerable amount is deposited in the bottom of sedimentation tanks. Wasted sludge mainly consists of this oil coated clay particles.

Wasted oil based sludge contains petroleum hydrocarbons such as hexane, benzene, and naphthalene, it is carcinogenic and cause symptoms like headache, nausea and dizziness. Also it causes impacts on aquatic environment and pollutes the groundwater resources.

During field visits it is observed that a considerable amount of oily sludge (10-100 kg according to the scale of the business) is generated from service stations per week. Further all methods of discharging of oily sludge currently available are contaminated the environment adversely. These observations are confirmed the requirement of a safety disposal method of oil based sludge.

Selection of sampling sites, sampling, analysis of samples at the Environmental Engineering Laboratory, sludge separation using centrifuge method, applying heat treatment methods to oil based sludge, making bricks using sludge and clay as the binding material, testing the quality of bricks according to Sri Lankan standard methods and proposing of a low cost operation method for carry out the treatment method are the main processes of the research.

Field visits and sampling were done according to the time constrains and facilities. More information was gathered from We-uda tile factory and brick work shops. Samples were analyzed at the Environmental Engineering Laboratory, University of Peradeniya, according to the standard methods for the examination of water and wastewater. Results showed that the chemical oxygen demand of the wastewater samples exceeded the tolerance limits and one liter of sludge sample contained about 1.2 Kg of solids. Centrifuging separated oil, water, clay and sand to a certain extent. Heat treatment as heating in sun light, heating in an oven were reduced the water content, weight and volume by considerable amount. When burning sludge mixed raw bricks the oil amount removed completely.

Centrifuging separates the considerable amount of liquid portion (water and oil) from sludge. This separated sludge can used to make bricks mixing with clay. Oily sludge consists of high proportion of sand (about 60%) which is more than in clay mixture (30%) that used to make bricks. Therefore it is required to mix high proportion of clay to oil based sludge mixture. According to the experiments, bricks that made using mixture of 3:1 of clay:sludge volume ratio, show some similar properties with normal bricks. However these bricks may be recommended for selected constructions. By decreasing the sludge fraction in the mixture (about 10%), it could be obtained a better result.

To carry out this treatment method a process suitable for a country like Sri Lanka is proposed. The sludge could be dewatered at the service station itself using a simple centrifuge or using a drying bed under shade. This will reduce the water content, volume and weight of the sludge which are advantages in transporting the sludge. Then this sludge could be collected to a modified three wheeler to transport sludge. Finally it could be distributed to the brick workshops.