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## **Review of Recycling of Wastewater Collected from Automobile Service Station**

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### **Abstract –**

The aim of our project is to separate oil from water. Oil skimmers are pieces of equipment that remove oil floating on the surface of a fluid. In general, oil skimmers work because they are made of materials to which oil is more likely to stick than the fluid it is floating on. At the same time, the fluid has very little attraction to oil skimmers. This oily material is subsequently removed from the media with wiper blades or pinch rollers. Oil skimmers are simple, dependable and effective tool for removing oil, grease and other hydrocarbons from water and coolants. Here we design a model for skimming purposes.

**Keywords:** Disc, Tank, Collecting Tray

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### **1. INTRODUCTION**

Growth of urban population has increased the demand for fresh water sources and its rapid depletion has been a concern to ecologists. According the reports provided by International Car Wash Association, a home car wash can go through 80 to 140 gallons(300 to 530) litres of water, whereas a wash at one of the garages will take about 30 to 45 gallons(115 to 170) litres, and after the wash of vehicles, some water will also be used to wash floors and washing equipment's. Until today the waste water is not conserved, from today onwards we have segregate pure water from the waste water by this method. The aim of our project is to separate oil from water. Oil skimmers are pieces of equipment that remove oil floating on the surface of a fluid. In general, oil skimmers work because they are made of materials to which oil is more likely to stick than the fluid it is floating on. At the same time, the fluid has very little attraction to oil skimmers. This oily material is subsequently removed from the media with wiper blades or pinch rollers. Oil skimmers are simple, dependable and effective tool for removing oil, grease and other hydrocarbons from water and coolants. Here we design a model for skimming purposes:

#### ***1.1 Pipe:***

A pipe is a tubular section or hollow cylinder, usually but not necessarily of circular cross-section, used mainly to convey substances which can flow - liquids and gases (fluids), slurries, powders and masses of small solids. It can also be used for structural applications; hollow pipe is far stiffer per unit weight than solid members. In common usage the words pipe and tube are usually interchangeable, but in industry and engineering, the terms are uniquely defined. Depending on the applicable standard to which it is manufactured, pipe is generally specified by a nominal diameter with a constant outside diameter (OD) and a schedule that defines the thickness. Tube is most often specified by the OD and wall thickness, but may be specified by any two of OD, inside diameter (ID), and wall thickness. Pipe is generally manufactured to one of several international and national industrial standards. While similar standards exist for specific industry application tubing, tube is often made to custom sizes and a broader range of diameters and tolerances. Many industrial and government standards exist for the production of pipe and tubing.



#### ***1.2 DC Motor:***

The d.c generators and d.c motors have the same general construction.

##### ***1.2.1. Motor Principle:***

An electric motor is a machine which converts a electrical energy to mechanical energy. All D.C machines have five principal components (i) Field system (ii) armature core (iii) armature winding (iv) Commutator (v) brushes.

### 1.2.2 Field system:

The function of the field system is to produce Uniform field within which the armature rotates. It consists of a number of salient poles (of course, even number) bolted to the inside of circular frame (generally called yoke) the yoke is usually made of solid cast steel whereas the pole piece is composed of stacked laminations. Field coils are mounted on the poles and carry the d.c exciting current. The field coils are connected in such a way that adjacent poles have opposite polarity.

### 1.2.3 Armature core:

The armature core is keyed to the machine shaft and rotates between the field poles. It consists of slotted soft-iron laminations (about 0.4 to 0.6mm thick) that are stacked to form a cylindrical core. The laminations are individually coated with a thin insulating film so that they do not come in electrical contact with each other. The purpose of laminating the core is to reduce the eddy current loss. The laminations are slotted to accommodate and provide mechanical security to the armature winding and to give shorter air gap for the flux to cross between the pole face and the armature "teeth".

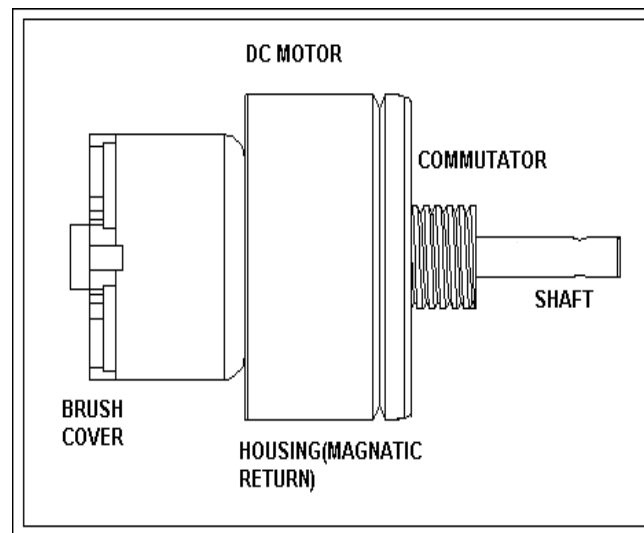
### 1.3.4 Armature winding:

The slots of the armature core hold conductors that are connected in a suitable manner this are known as armature winding. This is the winding in which "working" e.m.f. is induced. The armature conductors are connected in series-parallel: the conductors being connected in series so as to increase the voltage and in parallel paths so as to increase the current the armature winding of a d.c. machine is a closed - circuit winding: the conductors being connected in a symmetrical manner forming a closed loop or series of closed loops.

### 1.2.5 Commutator:

A commutator is a mechanical rectifier which converts the alternating voltage generated in the armature winding into direct voltage across the brushes the commutator is made of copper segments insulated from each other by mica sheets and mounted on the shaft of the machine. The armature conductors are soldered to the commutator segments in a suitable manner to give rise to the armature winding depending upon the manner in which the armature conductors are connected to the commutator segments, there are two types of armature winding in a d.c. machine (a) lap winding (b) wave winding.

The purpose of brushes is to ensure electrical connections between the rotating commutator and stationary external load circuit. The brushes are made of carbon and rest on the commutator, the brush pressure is adjusted by means of adjustable springs. if the brush pressure is very large, the friction produces heating of the commutator and the brushes on the other hand, if it is too weak, the imperfect contact with the commutator may produce sparking.



### 1.2.6 Modulator:

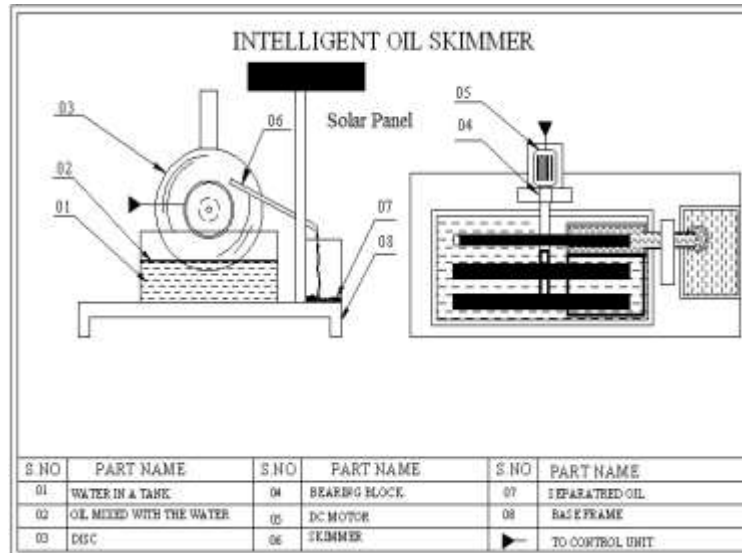
The purpose of modulation is to impress the information on the carrier wave, which is used to carry the information to another location. In radio communication the modulated carrier is transmitted through space as a radio wave to a radio receiver. A modulator is a device or circuit that performs modulation.

## 2. Analysis and recycling of wastewater collected from automobile service station:

P. Sanghamitra et al.[1] This review paper describes a comprehensive understanding of the origin and characteristics, existing techniques in laboratory and pilot scale, screening of different methods, justification for advocating biological methods for treatment of oily wastewater. M.N.Ashaa et al.[2] Wash water was collected from two service station and the effluent was characterised for different parameters such as, oil and grease, COD (chemical

oxygen demand), For chemical treatment, alum was used and locally available natural materials such as saw dust and sugarcane bagasse were used for physical treatment. M.Priya et al. [3] This present study investigates the removal of COD, oil and grease from the automobile wash water effluent using electrocoagulation technique (ECT). A M Manilal et al.[4] The results shown that aluminium is superior to iron in removing the oil and grease from the wastewater. Ravindra Chigare et al.[5] Especially in reference to development of design of industrial effluent treatment plants(ETP)system. Hyunju Lee et al.[6] In this study, aqueous washing process for oil removal from ferrous grinding swarf was investigated with two different commercial reagents, Micro-90 and Detergent 8. Ariana M.A.Pintor et al.[7] Gravity separators accomplish removal of free oil as a primary treatment. Secondary treatments include chemical and physical methods, Tighter membranes and advanced oxidation processes can refine treatment in a tertiary step. Michael Andersen et al.[8] Car wash wastewater contains significant concentrations of contaminants such as, oil, grease, diesel detergents and so on. A range of treatment processes such as a membrane bioreactor (MBR), coagulation and ozonation were investigated to treat car wash wastewater. Penyingkiran et al.[9] The results show excellent performance of Kapok fiber in removing oil and grease up to 100%, achieved using 0.1 g with 10 minutes contact time. Meanwhile, highest removal of anionic surfactants was up to 46%, achieved using 3.0 g of Kapok fiber with 10 minutes contact time. A E Ghaly et al.[10] This study describes the treatment and recycling options for carwash wastewaters used to achieve pollution reduction, water conservation and economic benefits for carwash operators. Amir Mirshafiee et al.[11] The kinetics study showed that the removal reaction was consistent with a pseudo-second order equation. Tolulope E et al.[12] The values of pH, electrical conductivity (EC) and total dissolved solids (TDS) levels were in the range of 4– 12.2, 149.1–881.3 mS/m and 1100–6510 mg/L, respectively. P.M.K.Dasanayake et al.[13] Adsorption kinetics were best fitted into Pseudo second order kinetic model giving a theoretical adsorption capacity of 156.25mg/g. Equilibrium data were fitted into Langmuir, Freundlich, Temkin and Dubinin-Radushkevich adsorption isotherms. Lovet N Et al.[14] The removal of O&G from simulated refinery desalter effluent (SRDE) by activated carbon (AC) originated from chemical activation/carbonization of corn cobs (CCs) was investigated through fixed-bed column studies. Zohreh Naghdali et al.[15] Central composite design results reveal that at the optimum conditions, LAS and phenol removal efficiencies, energy consumption and operating cost are obtained 96.7%, 87.65%, 15.99 Wh, 0.001 US\$, respectively. This process reveals a feasible technology for phenol and LAS removal from ASWW. Mohamed Shalaby et al.[16] This new algorithm is tested on laboratory contaminated samples and then used to monitor pollution by lubricating oil in an industrial zone. Sudesh Ratilal et al.[17] The obtained optimum conditions of photocatalytic degradation are the catalyst concentration of 2 g/L, the run time of 30 min and the airflow rate of 1.04 L/min. Jamie Wills et al.[18] Pre-treatment included coagulation, flocculation and sedimentation followed by sand filtration. Isaac et al.[19] The Pollution loads of BOD and COD were up to 2tons/year and 6tons/year respectively. N S Mahmoud et al.[20] The characteristics of the carwash wastewater include pH, temperature, turbidity, electric conductivity, COD, BOD, solids, nutrients (ammonium), heavy metals, oil and grease, all of which have negative impact on human health and aquatic life.

Nasibu Samson Shonza et al.[21] Increasing electrical current tends to increase while increasing either distance between electrodes or the flow rate tends to reduce oil removal. Mohamad Anuar Kamaruddin et al.[22] Pectinolytic enzyme was produced through simplified fermentation from discarded citrus peels that possess high lipase content. J.Mantey et al.[23] Triplicate samples each of the four environmental media for the nine galamsey types (Washing Board, Washing Plant, etc.) were collected and analysed using n-hexane extractable materials in acidic medium by extraction and gravimetry to determine O/G concentrations. Neerajasree et al.[24] The present study is aimed to develop an integrated treatment system for Automobile waste water using Cicer arietinum, Dolichos lab lab and Strychnos potatorium. Saja Mohsan Alardhi et al.[25] Several methods are employed for the treatment of oily wastewater including physical, chemical, and biological techniques in order to minimize the harmful impacts before being reused. Javed Alam et al.[26] It was found that the grey water so produced can be reused for car washing at least once and also for other applications like in road sprinkling, gardening, farming etc. Deniz Ucar et al.[27] When the NF270 nanofiltration membrane was used, the permeate COD concentration was  $8.1 \pm 0.4$  mg L<sup>-1</sup> corresponding to 97% removal. Shahiron Shahidana et al.[28] Moreover, the results also recommended that concrete mixed with car wash wastewater has better compressive strength compared to conventional concrete. Subtil et al.[29] Complementary treatment using an ultrafiltration unit can significantly improve the aesthetic characteristics of reuse water. The reuse potential could reach 70%. In addition to water resources conservation, the proposed system can save up to 6500.00 US\$ per year on operational costs. A.L.Tilbury et al.[30] the tasks undertaken at the Alcoa site were specifically assessed to help better estimate exposure since those given in the national guidelines were not necessarily intended to cover industrial uses.



### 3. PROBLEM IDENTIFICATION:

Nowadays many water resources are polluted by wastewater from automobile industry, automobile industry contain oil and grease. In India, an estimated 38354 million litres per day (MLD) sewage is generated in major cities of India. Only 60% of industrial waste water, mostly large scale industries is treated. On the other 40% water is used by small scale industry it should be useful and is not affected the environment, by using this method.

### 4. CONCLUSIONS

This project is made with pre planning, that it provides flexibility in operation. This innovation has made the more desirable and economical. This project "Analysis and Recycling of wastewater collected from Automobile Service Station" is designed with the hope that it is very much economical and help full to small scale industries and workshops. This project helped us to know the periodic steps in completing a project work. Thus we have completed the project successfully.

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