SAWA PGD Fellow	:	*K. A. D. Ariyawansa*
Institution	:	
Designation	:	*Mechanical Engineer*
Title	:	*Wastewater Treatment System for Vehicle Service Stations*
Email	:	*daya_k2007@yahoo.com,*

Background:

In Sri lanka, the number of vehicle service stations are increasing rapidly. Effluent from such facilities is one of the major causes associated with water pollution in Sri Lanka. Most of the vehicle service stations are located near urbanised areas and are facing several problems with treatment of effluents. Since, the land area of vehicle service stations is very small, they cannot afford large extent of lands for effluent treating.

Although, it seems that all of them have wastewater treatment systems, they are not functioning well owing to poor management practices, lack of awareness and financial constraints. At the moment all of them are compelled to purchase treatment plants at reasonable prices. In the long run maintenance will become a critical issue due to financial constraints, since treatment plant producers insist on replaceable filters and chemicals from them at unbearable prices for the owners of the service stations. Such information in all cases was hidden from customers. Unfortunately the owner of the service station cannot afford to maintain the systems that are installed. Naturally they are not willing to pay for it. Hence, development of an economically viable, effective and efficient effluent treatment system is vital. This research was conducted with the aim of developing a low cost and effective treatment system for vehicle service station effluents.

Research Methodology

The effluent from a service station located at Katugastota town was used in this study. The study consisted of two treatment methods which were electro-floatation with carbon electrodes and filter bed with Clay Polythene Clay liner that was developed by University of Peradeniya. Carbon electrodes were placed 6 cm apart and 12 V supplied to the electrodes throughout the experiment. Electrical conductivity, TDS, Salinity, Temperature, pH and Current were measured in 30 minute intervals. For the filter bed, an immature compost layer of 1 cm thickness (900g) was placed on surface of the liner. After that 20 l of effluent was put and the permeate was analysed for pH, salinity, TDS, conductivity, COD, oil and grease for seven days on a daily basis.

Gravity separation can be used to reduce the pollutants loads up to 80% to 85%. Hence, TDS reduced by 86%, COD reduced by 80% and oil and grease reduced by 85%. pH and salinity did not change during gravity separation. However, it did not reach effluent discharge standards or reuse purposes standards. It is evident that Electro-floatation was not very effective, since, after six hours, pH only changed from 7.1 to 7.6, TDS changed from 350 to 320. It would have been best to use aluminum electrodes rather than Carbon as reported by Priyadarsana 2005, since results were better.

Research Findings

The reduction in pH in the beginning could be attributed to initial activities of the media, responding to influent substrate and thereafter, it is likely that the increase in microbial populations were adequate to assimilate the incoming influent to stabilize the media as indicated by the gradual decrease in conductivity and TDS. The drastic reduction in oil and grease at the commencement supports this interpretation of the results. Notably, the COD reductions were high at the beginning and then stabilized. But the main problem is the low quantity of filtrate, 1.56 l/day/m2 percolating through the liner system. The rate is not adequate for treating effluents more than 4000l per day, thus further investigations can be done with different clay types and different clay and polythene layers.

The merits are; low energy requirements, easily accessible for monitoring and do not require skilled personnel to operate, no need for chemicals, construction costs low and the labour is mostly manual.

The demerits are; the land area required may be a limiting factor, odour problems can occur, form cracks during dry spells and clogging of the filter media is possible.