International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 07 | July 2021 www.irjet.net p-ISSN: 2395-0072

PRACTICAL ASSESSMENT OF AUTOMOBILE VEHICLE SERVICE STATION WASTE WATER FOR VEGETATION

ANDANAGOUDA V R[1], DR.S.SURESH[2]

[1]PG Student, Department of Environmental Engineering, BIET, Davanagere, Karnataka, India.
[2]Professor, Head of the Department, Department of Civil Engineering, BIET Davanagere, Karnataka, India.

Abstract: Automobile service stations are increasing rapidly from the decades all over the world as number of vehicles increasing simultaneously. Present study is aimed to explore the potential pollution level in automobile service stations. As Vehicular service station which generates large quantity of impurities such as sand, mud, detergents, soaps, oil and grease particles. In today's world, Oil and grease released from automobile service centres may affects many species like fishes, aquatic organisms and also for plants and animals. Therefore disposal of waste water from various service centres which contaminate water and causes water and soil pollution.

Key words: Automobile service station, Physical-Chemical parameters, waste water management, environmental pollution, Oil and grease.

1. INTRODUCTION

Water is one of the most essential sources for all creatures on earth surface. Due to human advancement water source is getting polluted rapidly. It is very hard to find the source for drinking purpose, almost all the surface water source is polluted in India due to various human activities. Contaminants level is increased by discharging the pollutants from various industries to public sewer.

Automobile service station waste water is one of the forward looking approaches to minimise the contaminants. Some professional service centres contains washed waste water which if not handled and discharged, can have significant environmental effect. A pollutant from service stations includes surfactants, detergents, dust, mud, oil & grease. Some pollutants like detergents, oil & grease are toxic to animals. Some acids like phosphates are the plant nutrients can cause nuisance plantation water bodies.

Due to urbanisation and industrialisation rapid growth of automobile service stations in most of the cities. In most of the developing countries we all forget that equally we are polluting our nature too. Some small scale service centres performs variety of tasks like vehicles cleaning, applying air to tyres, fuel stations, Vehicle servicing, gasoline pumping. According to International car wash Association, washing of home car may requires 300-530 litres of water, whereas washing of cars in service stations may take 180-350 litres of water. Washing of cars consists of oil & grease particles during engine cleaning, high suspended solids from brake lining with dust particles present. Contaminants in vehicle wash water can cause variety of health effects like kidney damage, increased cancer risk. Depletion of oxygen has a detrimental effect on aquatic life. It is simple act like washing of vehicles in driveway can directly harm our natural resources. Detergents are used in vehicle washing which affects fish population. Fishes will die when detergents concentration is near to 15ppm: however detergents concentration as low as 5ppm will kills the fish eggs. Scarcity of water is the only key issue for sustainable development of country in future. Reuse and recycle plays an important role in automobile service station in order to save water instead of discharging.

2. RESEARCH OBJECTIVES

1] To study the quantity of waste water generated from service station in davangere city.

2] To study their physical and chemical characteristics of Automobile service station waste water.

3] Comparing the service station waste water quality with the general environmental standards for discharging pollutants as per KSPCB/CPCB.

3. METHODOLOGY

Wastewaters from automobile service station are collected by grab sampling method. In order to evaluate the pollution load caused by service station waste water, Samples are analysed for pH, BOD, COD, oil & grease, Chlorides, Alkalinity, TSS & TDS.

3.1 Sample collection

Automobile service station waste water is collected in Davangere city area. Service station handles light, medium & heavy vehicles. All these 4 automobile service station discharges untreated waste water to inland surface. Waste water is generated from vehicle washing, vehicle servicing. In service station 1&4 usually 8-10 vehicles are serviced and station 2 are car servicing station usually 4-6 vehicles are servicing on rotation basis, service station 3 approximately 6-8 vehicles are washed per day. All the information was obtained from interacting with Automobile service station owners.

Fig-1: Wash water collected

Table-1: Number of washed vehicles and water consumed for washing

Location	Station 1	Station 2	Station 3	Station 4
Vehicle Type	Light	Medium	Heavy	light
Operation time per day (hours)	12	12	12	12
No of vehicles washed per day	8-10	4-6	6-8	8-10
Water requires (litres)	140	250	350	160

3.2 Methodology

Table-2: Experimental test method

Parameter	Units	Test methods
pH	-	Electrometric method
Turbidity	NTU	Turbidity meter
Chlorides	mg/l	Mohr's titrimetric method
Oil and grease	mg/l	Gravimetric method
TSS	mg/l	Gravimetric method
TDS	mg/l	Gravimetric method
BOD	mg/l	Modified Winkler's method
COD	mg/l	Refluxing flask method

4. RESULT & DISCUSSION

Table-3: Pollutant characteristics for different stations

Sl No	Service station	pH	Chlorides	DO	BOD	COD	TSS	TDS	OIL & GREASE
1	Station 1	7.47	79.97	1.6	115	320	52	228	8.1
2	Station 2	7.25	112	1.2	134.5	415	215	1035	13.6
3	Station 3	7.96	199.97	0.8	192	580	244	1664	21.6
4	Station 4	7.36	85.97	1.6	124	380	78	174	7.8

Table-4: Test results are compared with general environmental standards for discharging the pollutants as per KSPCB/CPCB

Sl No	Parameter	Inland Surface water	Public Sewer	Irrigation Land
1	pH	5.5-9	5.5-9	5.5-9
2	TSS	100	600	200
3	TDS	2100	-	-
4	BOD	30	250	100
5	COD	250	-	-
6	Oil and Grease	10	20	10

5. DISCUSSIONS

Waste water collected from service station is analysed its parameters of pH, BOD, COD, TSS, TDS, chlorides, Oil & grease. The characteristics of each service station waste water samples were dependent on the type of vehicle washes. From the analytical study conducted we conclude that the parameters of pH, TDS are within the standard limit and parameters of TSS, Oil & grease, BOD, COD are above general environmental standards. Station 1&4 has concentration of BOD, COD are above the standards, Station 2 has high concentration of BOD, COD, Oil & grease this is due to use of surfactants, Station3 has high concentration of TSS, BOD, COD, Oil & grease; where the values are above general Standards for discharging pollutants. High suspended solids in waste water affect the plant growth and decrease the oxygen level. Toxic compounds in raw effluent disrupt aquatic ecosystems. When a huge amount of biodegradable substances end up in the water, organisms present will start to break them down ,and they use lot of DO. Dissolved oxygen is critical for marine life to thrive, and its become depleted, it can life threatening for fish. Oil & grease causes ecology damages for aquatic organisms, plants, humans and animals. Proper screening methods should be adopted in every service station in order to reuse the water.

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