



DESIGN AND FABRICATION OF AUTOMATIC TRASH REMOVAL MACHINE USING IN AUTOMOBILE SERVICE STATIONS

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ABSTRACT

In this project the proposal concept is to replace the manual work in drainage cleaning by automated system in Automobile service stations. We know that water has a great importance in human being life, the water flow in drain full of wastes like polythene, bottles, chemicals etc. The drains get blocked due to these wastes in water. Drainage are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockage in the drainages. To overcome this problem and to save the human life we implement design “Trash Removal System”. We designed our project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages like chemicals, grease etc. This machine also uses battery for power supply and is locomotive system.

Keywords: - Automated System, Drainage, Blockage, Disposal, Battery, and Locomotive System.

1. INTRODUCTION

As today's era is moving towards being digitalized and automated with a great speed, the youth want everything very easily and smart. Not only the youth but the people of all generation are finding it very easy to be smart effort and more and more being healthy and are getting attracted or joined towards latest technology of being “smart work”. Anywhere you go, you get this technology available. So we thought of using this technology and adding more to it for our final year project. Nobody likes to suffer and wait for our long waiting hours just to get good surrounding or so. To avoid this and to save time of our management of waste we are creating a application called trash Removal System.”

For that we are using system by which Trash Removal Machine can do this work more effectively and efficiently. The Trash Removal System proposed to overcome the real time problems. With the continued expansion of industries, the problem of sewage water must be urgently resolved due to the increasing sewage problems from industries of the surrounding environment. The waste and gases produced from the industries are very harmful to human beings and to the environment.

Second Important thing is waste management system by which worker can maintain all his health and work good through application maintain that reporting worker don't need to wait and get in to drainage. One more very useful and important advantage of our system is that the worker to replace the manual work in drainage cleaning by mechanical drainage trash remover. And can access them very easily. Automatic drainage Water Cleaning overcomes all sorts of drainage problems and promotes blockage free drains promoting continuous flow of drain water.

In the modern era there have been adequate sewage problems where sewage water needs to be segregated to clean our surrounding environment. The wastes produced from the industries are very harmful to human beings and to the environment. Our proposed system is used to clean and control the drainage level using auto mechanism technique.

2. LITERATURE SURVEY

¹**International Journal of Science Technology Management and Research** Today the advanced time has such a variety of advances for make our life modern. Like that cleaning procedure is likewise play a critical part. For example, our Smart Cleaning System do the residential reason cleaning flawlessly and keep the mosquito era from the sewage by the way intestinal sickness, influenza and so forth illnesses are stayed away from In future the robotization cleaning framework will be lies on each different house sewage cleaning framework .It was found out that at the absence of some variables like heavy winds, the propeller moved at a rate relative to the velocity of the running water. The cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity.

²**Journal of the American Water Resources Association (JAWRA) (Copyright © 2004), pp 503-522** the term flashiness reflects the frequency and rapidity of short term changes in stream flow, especially during runoff events. Flashiness is an important component of a stream's hydrologic regime. A variety of land use and land management changes may lead to increased or decreased flashiness, often to the detriment of aquatic life.

³**Journal of Hydrology, Volume 341, Issues 1-2, 20 July 2007 Research** conducted for the last 35 years has shown that subsurface drainage has a significant impact on hydrology and contaminant transport. This can be observed at the field-scale and also at the watershed scale. Impacts are always associated with modifying otherwise natural flow paths. Most computer model representations of drainage have been drawn at the field-scale. These models require relatively precise data that are usually unavailable when simulating hydrology and water quality in large watersheds. We believe that in this case drainage representation should be simplified and yet closely match observations.

⁴**Canadian Water Resources Journal Vol. 8, No. 2, p 88-103, 1983. 1 Tab, 49 Ref. -** Every commercial agricultural crop grown in Ontario requires a well-aerated soil for maximum economic production. Soil which does not drain quickly and naturally can be improved by the installation of a subsurface tile drainage system. Over half the agricultural land in Ontario needs this form of drainage improvement.

⁵**International Research Journal of Engineering and Technology (IRJET)**²This paper presents fabrication and experimentally investigates the working of Pedal Powered drain cleaner is positioned on its stand in such a way that driven shaft of the centrifugal pump was butted to the bicycle wheel. By pedaling the bicycle, the bicycle wheel rotates thereby rotating the centrifugal pump which in turns discharges water from the sump.

3. THEORY AND CONCEPT

3.1 Definition

Wastewater is defined as the flow of used water from homes, businesses, industries, commercial activities and institutions which are subjected to the treatment plants by a carefully designed and engineered network of pipes. There are large numbers of machines used for removing out the wastes from drains.

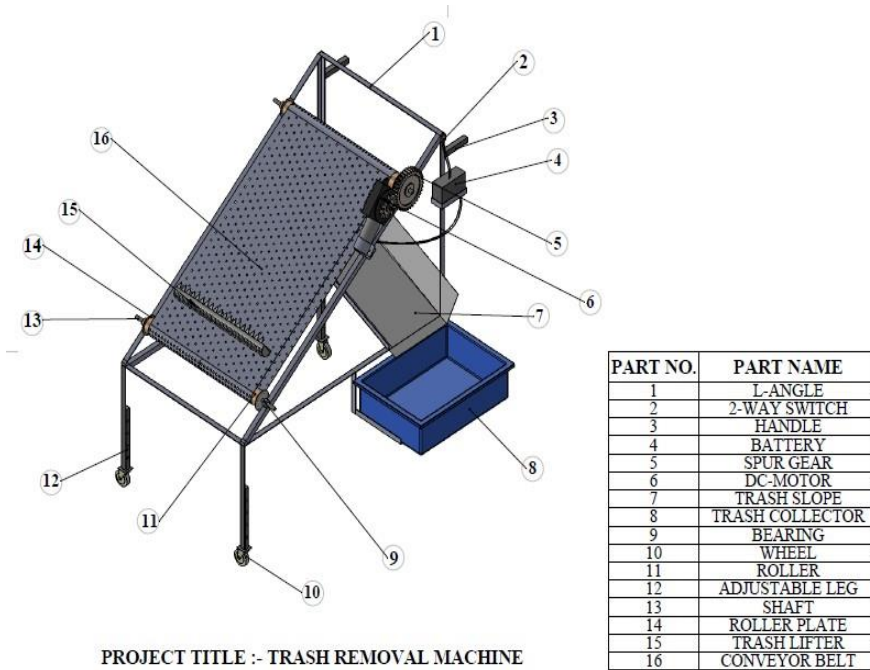


Fig. 1 Solid Work Design of Trash Removal Machine in 3-D.

3.2 Problem Statement

Every dynamic spring is subject to these constraints where variation of forces and alignment takes place. To find a solution for the problem of water logging due to plastic, thermocol, metal, etc. To treat problems like malaria, typhoid, etc. caused due to water accumulation.

3.3 Past Researches

By doing some research in the past we can say that it is seen that major factors that affect the strength of the machine are design parameters, material selection, raw material defect, and surface imperfection. It is seen that design parameters i.e. operating modes, operating temperature, and imperfections, as we seen as temperature increases the strength of material decreases.

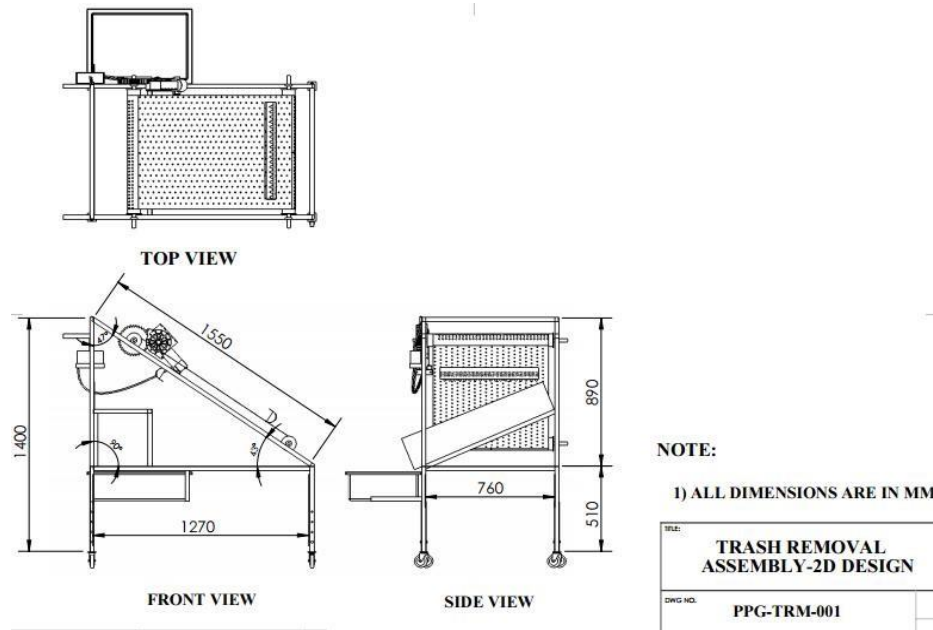


Fig. 2 Solid Work design of Trash Removal Machine in 2-D.

4. WORKING PRINCIPLE

The project Drainage cleaning machine which we fabricate is easy to construct and simple in operation. The 12 volt battery is used to drive the permanent magnet D.C motor. The two conveyor roller is fixed to the two ends of the frame stand with the help of an end bearing (6202) with bearing cap. The conveyor roller shaft is coupled to the D.C.

Permanent magnet motor with the help of spur gear mechanism. This total arrangement is used to waste trash from water bodies transfer the material from one place to another place with the help of conveyor. There is only one conveyor used in this project that is used for trash removal from water bodies.

5. OBJECTIVES

- The main objective of this project to minimize or overcome the problem which can face in manual machine.
- This also increased the dumping rate of waste. And help to operator do easily work.
- The purpose of selecting drain waste water cleaner machine is follow-Simplicity of Design and Control.
- This type of machine are easy to operate and less time consuming.
- Evaluate the effectiveness of alternative drainage design and operational practices, to reduce nitrate-N losses from drained agricultural lands.
- Assess the impact of various soil and crop management practices on reducing nitrate-N loadings to subsurface drains.

- Assess the need for further research in other aspects of water quality from drained agricultural lands, including the emerging issues of pathogens and phosphorus from manure applications.
- Develop drainage guides and other extension materials, and work with state and federal action agencies, to assist in implementation of improved design and management practices for subsurface drainage systems.

6. TECHNICAL SPECIFICATION

6.1 Frame (Material Used: Mild Steel)

Breath : 760 mm
Length : 1270 mm
Height : 1400 mm
Slant Length: 1550 mm
Leg length : 210 mm
Adjustable leg length: 300 mm
Total Leg length: 510 mm
L- and frame: (25 x 25) mm

6.2 Roller (Material Used: Mild Steel)

Length : 600 mm
Radius : 36 mm
Roller plate radius: 45 mm
Thickness : 2 mm

6.3 Bearing (Material Used: Stainless Steel)

6202 Ball Bearing

6.4 Battery

12 Volts, 7 Ampere, Lead Acid battery, Rechargeable type battery, Works for 2 Hrs.

6.5 D.C Motor

12Volts, 90 Watts, 60 rpm, Permanent Magnet D.C Motor, Worm Gear Motor.

6.6 Spur Gear (Material Used: Cast Iron)

Gear Ratio : 1:4
Pitch : 8 mm
Radius : 52.5 mm
Radius hole : 10 mm

6.7 Conveyor Belt (Material Used: Rubber-Nylon)

Breath : 600 mm
Length : 890 mm
Thickness : 3 mm

6.8 Wheel (Material Used: Nylon)

Radius : 37.5 mm

Thickness : 25 mm

6.9 Shaft (Material Used: Mild Steel)

6.9.1 Upper Shaft

Length : 915 mm

Radius : 7.5 mm

6.9.2 Lower Shaft

Length : 790 mm

Radius : 7.5 mm

6.10 Trash Lifter (Material Used: Mild Steel)

Length : 580 mm

Breath : 140 mm

6.11 Slope (Material Used: Mild Steel)

Length : 915 mm

Breath₁ : 305 mm

Breath₂ : 190 mm

7 . REAL TIME IMAGE



Fig. 5 Real time Image of Trash Removal Machine (Front View).



Fig. 6 Real time Image of Trash Removal Machine (Side view).

8. ADVANTAGES OF TRASH REMOVAL MACHINE

- ✓ Low-cost drain-off solution if drains already exist.
- ✓ Construction materials are often locally available.
- ✓ It is Portable.

9. APPLICATIONS OF TRASH REMOVAL MACHINE

- ✓ It can be used domestic sewage treatment.
- ✓ It can be used to separate plastic, thermocol from sewage.
- ✓ It can be used in plastic industries and automobile service stations.
- ✓ It can be used for proper treatment of sewage as well as to avoid blockage of drains.
- ✓ Manual assistance is not required.

10. MODIFICATIONS

Our project is simply a drain waste water cleaner machine, which is automatically operated. Following different modification can be done to improve the output and efficiency. We have use a geared motor, adjustable plates, backside waste bin, single plate clutch, springs. We have modified the trash lifter by making it a completely closed lifter with minute holes in it so that water can sweep down the waste lifter. This machine can be placed inside the drainage pipe

to remove all the wastes like plastic, thermocol, etc. Hence by having above modifications above machine can be made a multipurpose output machine, which can be may power driver and automatically operated.

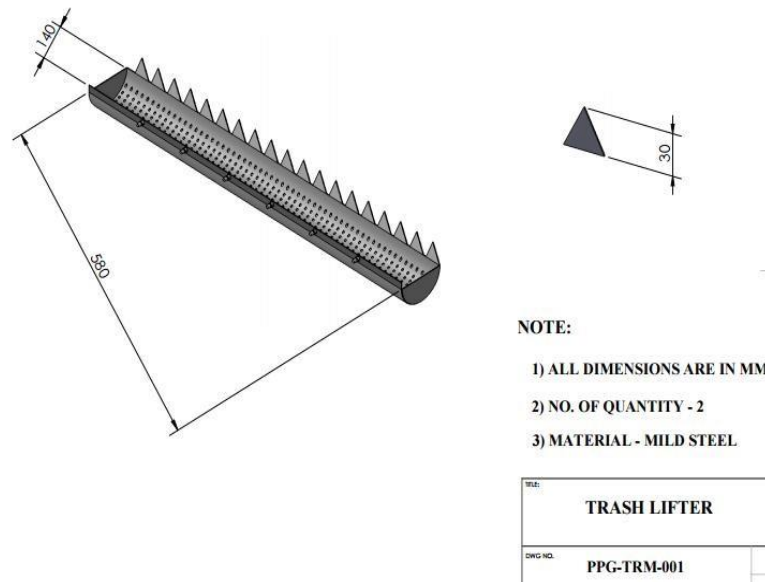


Fig. 3 Solid Work design of modified Trash lifter with minute holes.

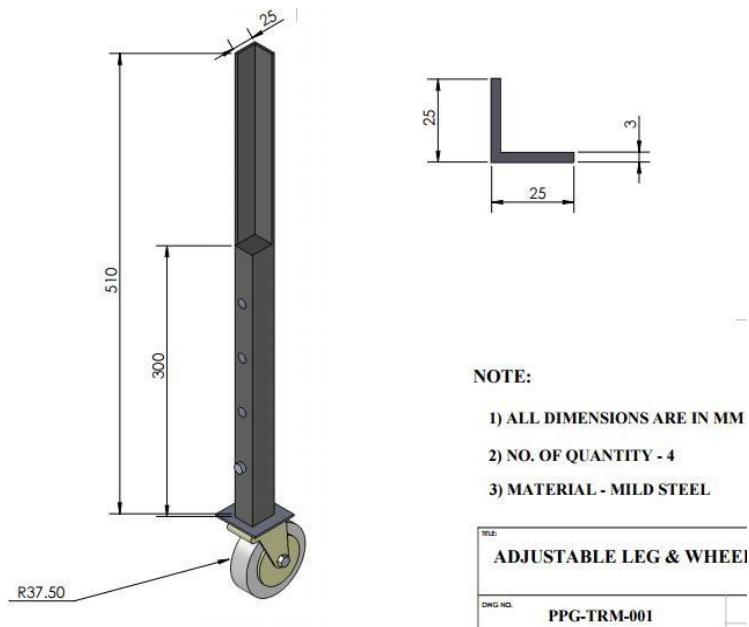


Fig. 4 Solid Work design of modified Adjustable leg with roller for locomotion.

11. CONCLUSION

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries.

We are proud that we have completed the work with the limited time successfully. The “Design and fabrication of trash removal machine using in Automobile service stations” system is working with satisfactory conditions. We can able to understand the difficulties in maintaining the tolerances and also the quality. We have done to our ability and skill making maximum use of available facilities.

Thus we have developed a “Trash Removal Machine” which helps to easily identify the products with defects. In olden days, it was done by various analysis methods which consumed more time and human power. This is completely eliminated with the implementation of our project. By using more techniques, they can be modified and developed according to the real time applications of automobile service stations.

13. REFERENCES

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