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Design and Fabrication of Automatic Trash Removal Machine

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ABSTRACT

In this project, the proposal concept is to replace the manual work in drainage cleaning by an automated system. We know that water has a great importance in human being life, the water flow in a drain full of wastes like polythene, bottles etc. The drains get blocked due to these wastes in water. Drainage is using for the disposal and unfortunately, sometimes there may be a 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 an efficient way to control the disposal of wastages and with regular filtration of wastages. This machine also uses the battery for power supply and is the locomotive system.

Keywords: *Automated System, Drainage, Blockage, Disposal, Battery, 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 the time for our management of waste we are creating an application called trash Removal System.".

For that, we are using the 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 well through application maintain that reporting worker doesn't need to wait and get into 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 a 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 to make our life modern. Like that cleaning, procedure likewise plays 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 stay away from In future the robotization cleaning framework will be lies on each different house sewage cleaning framework.It was found out that in 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. The pan functioned effectively. It moved at a rate relative to the velocity of the running water and at the rate of the propeller .The deplete squander water cleaner machine is outlined and produced by utilizing gear changing and shaft coupling standard. It comprises principally DC adapted engine, shafts, squander evacuation plates, clean container, heading, sprocket and chains Construction materials are effortlessly available, creates work (development and maintenance), simple to build .Mechanization is an innovation worried with his utilization of mechanical, electronic and PC based frameworks to work and control generation. This framework is utilized to operate automatic sewage cleaning equipment. This venture might be created with the full use of men, machines, and materials and cash. Additionally we have taken after altogether the investigation of time movement and made our venture temperate and productive with the accessible assets. This framework was Designed, Fabricated effectively and furthermore tried. It works satisfactorily. We trust that this will be done among the most flexible and compatible one even in future.

[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. This paper presents a newly developed flashiness index, which is based on mean daily flows. The index is calculated by dividing the path length of flow oscillations for a time interval (i.e., the sum of the absolute values of day-to-day changes in mean daily flow) by total discharge during that time interval. This index has low inter annual variability, relative to most flow regime indicators, and thus greater power to detect trends. Index values were calculated for 515 Midwestern streams for the 27-year period from 1975 through 2001. Statistically significant increases were present in 22 percent of the streams, primarily in the eastern portion of the study area, while decreases were present in 9 percent, primarily in the western portion. Index values tend to decrease with increasing watershed area and with increasing unit area ground water inputs. Area compensated index values often shift at eco region boundaries. Potential index applications include evaluation of programs to restore more natural flow regimes.

[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. As a first step towards incorporating drainage systems into large-scale hydrological models, we propose an equivalent representation of drains buried in a soil profile by using a homogeneous anisotropic porous medium without drains. This representation is based on a "self-consistent" approach and on geometrical considerations. Simplification is such that calculating the equivalent hydraulic conductivity requires only information on the main length and spacing of the tile drains and not on their precise location. This approach also provides a much simpler discretization of the domain because of the absence of internal boundary conditions on the drainage pipes. Compared to other methods that have simplified drainage representation in existing watershed models, it requires no parameter fitting. Two alternatives to the method are presented: in the first one, the soil profile equipped with the actual drain pipes is represented by an equivalent, horizontally layered system with no pipes; in the second, the layered system has been replaced with an equivalent homogeneous profile. The efficiency of these approaches was tested against a classical representation of tile drains using the SWMS 3D code, which solves the Richards equation for a typical drained plot configuration. The equivalent-medium approach appears to give satisfying results for global water outflow and mean water table elevation.

[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. The effects of land drainage on stream flow are reviewed. Conclusions on effects are difficult to establish because response varies with different types of drainage work and differing physiographic and climate situations. Coincident changes in land use, and the high variability of inputs, add complications. Tile drainage provides storage capacity in the soil profile. This storage acts as a reservoir which fills and reduces surface runoff for low intensity storms but will have only a minimum effect for medium and high intensity storms. Tile drainage decreases peak flow up to the point where the soil becomes saturated after which it probably only increases it slightly. If a large portion of a watershed is drained by enlarged surface channels, increased flood peaks may be expected. The effect is damped if contributions to the channel are not synchronized. Channel enlargement will increase flood peaks in unimproved channel sections downstream of the area of improved channel drains. Connection of swamps or enclosed areas to rivers by large arterial drains increases flood peaks. Over the range of rainfalls giving rise to floods, a combination of tile drains and outlet channel enlargement appears to be beneficial in modifying flood peaks.

[5]International Research Journal of Engineering and Technology (IRJET) This 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.

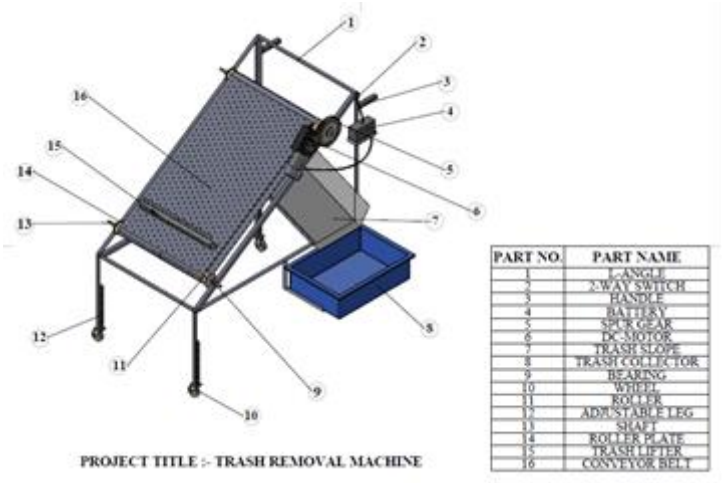

Figure 1: Solid Work Design of Trash Removal Machine in 3-D

3.2 Problem Statement

Every dynamic spring is subject to these constraints where the 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 parameter i.e. operating modes, operating temperature, and imperfections, as we seen as temperature increases the strength of material decreases.

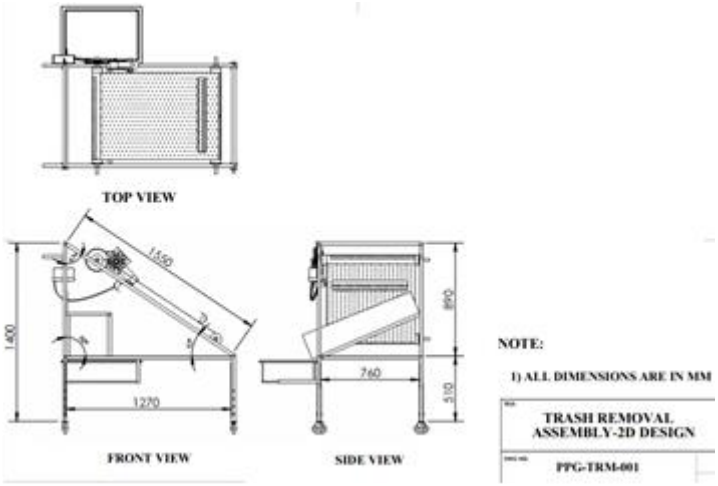

Figure 2: Solid Work Design of Trash Removal Machine in 2-D

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 the manual machine.
- This Also increased the dumping rate of waste. And help to operator does easily work. The purpose of selecting drain waste water cleaner machine is follow-Simplicity of Design and Control.
- This type of machine is 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 the 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. ADVANTAGES OF TRASH REMOVAL MACHINE

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

8. 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.
- It can be used for the proper treatment of sewage as well as to avoid blockage of drains.
- Manual assistance is not required.

9. 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 to 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 cab sweeps 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.

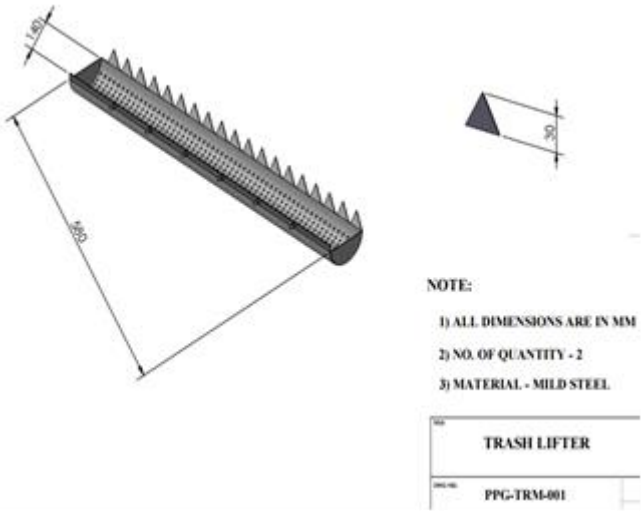

Figure 3: Solid Work Design of Modified Trash Lifter with Minute Holes

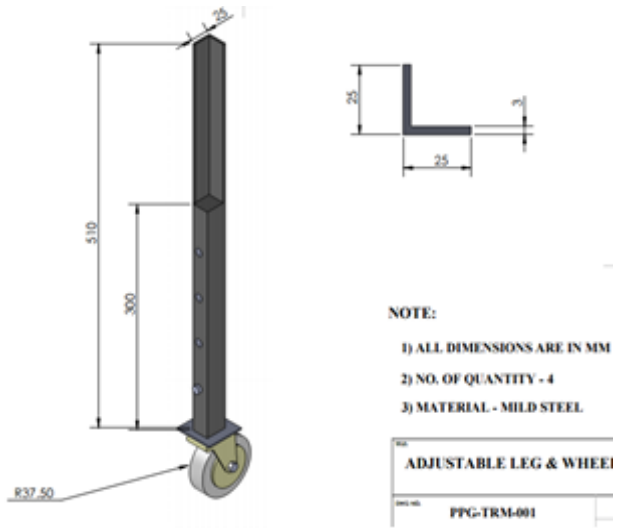

Figure 4: Solid Work Design of Modified Adjustable Leg with Roller for Locomotion

10. 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" 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 applications.

11. FUTURE SCOPE

- In India, sewage drains are open. So, people throw waste in sewage drains.
- Plastic bottles are used in most places and are thrown as such into the sewages.
- This project will be very useful in cleaning these areas.
- In future, it is possible to make it a fully automated system by the implementation of control algorithms. Thus, this project helps in making our nation clean and healthy.
- It can be used to remove the garbage with higher accuracy from the drainage system.
- It can be used in disaster-affected areas.
- The unit can be operated manually with the pedaling system and easily portable.
- As the system is working continuously in the aqueous environment so we can use the more effective corrosion resistant material for the good working of the system under water.

12. REAL-TIME IMAGE

Figure 5: Real-time Image of Trash Removal Machine (Front View)

Figure 6: Real-time Image of Trash Removal Machine (Side view)

13. REFERENCES

[1] International Journal of Science Technology Management and Research.
[2] Journal of the American Water Resources Association (JAWRA) (Copyright © 2004), pp 503-522.
[3] Journal of Hydrology, Volume 341, Issues 1-2, 20 July 2007.
[4] Canadian Water Resources Journal Vol. 8, No. 2, p 88-103, 1983. 1 Tab, 49 Ref.
[5] International Research Journal of Engineering and Technology (IRJET).
[6] International Research Journal of Engineering and Technology (IRJET).
[7] IJSRD - International Journal for Scientific Research & Development| Vol. 5, Issue 02, 2017 | ISSN (online): 2321-0613.
[8] International Journal of Science Technology Management and Research Volume 2, Issue 2, February 2017.
[9] Journal of Soil and Water Conservation 49.n5: pp501 (10).
[10] Journal of the American Water Resources Association, Paper number 2079, pp851-860.
[11] Journal of Irrigation and Drainage Engineering. 34(1):83-88.
[12] Canadian Water Resources Journal Vol. 8, No. 2, p 88-103, 1983. 1 Tab, 49 Ref.
[13] Data book for Engineers - Faculty of Mechanical Engineering, PSG College of Technology.

