Automatic Drain Cleaner

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Abstract:- This research paper aims the formation of the proposed concept which is used to replace the manual work done in the cleaning of the sewage drains by a semi-automatic drain cleaner. Since the mechanical drainage plays a very important role in all the industrial applications, its proper maintenance and disposal of sewages from the commercial sites and the industrial areas is still a big challenging task for the cleaning systems. The use of drainage pipes and their cleaning the blockages and maintenance works sometimes cost human life too. Therefore, to counter this problem and to save human life this design is being implemented which is "Mechanical Semi-automatic Drainage Water Cleaner" and this project has been designed to use this concept in as efficient way to control and maintain the disposal of wastages with the regular filtration. This mechanical drainage water cleaner helps in protecting the environment from various kinds of hazards by removing the wastages from the drainage systems and promoting the waste management. When these wastes are not removed from the drainage then they end up settling in residential areas where they are either gets burned causing pollution or blocks the drainage causing flooding.

Keywords:- *Gear, Solar Panel, Drainage, Chain, Teeth, Battery, Wiper Motor, Wastewater, Primary Treatment, Secondary Treatment, etc.*

I. INTRODUCTION

Since the world is fast approaching towards the technology of digitalization and automation, humans want every task and operations to be performed quickly and easily. Now the time is for advanced techniques which can perform tasks efficiently and with minimum time. The human wants to apply minimum effort in order to accomplish its tasks. To achieve this there has to be automated techniques which can fulfill these objectives. Hence in this project we tried to add this automation technology with the knowledge of drainage systems in order to make the drainage cleaning system easy and efficient tool for the cleaning of the drainage systems and hence save the environment. For this we are using system by which drainage cleaner can do his work smartly using communication through application. The problem of the sewage disposal coming from the industries is growing rapidly day by day and thus it needs to be resolved urgently since this problem is causing various environmental issues and is very harmful to the human life. This is a real time problem and it needs to resolved and overall speaking this proposed concept is very much efficient in this work to be accomplished.

Also, there is one more important advantage of this drainage cleaning system is that the health of the workers working in drainage scavenging can be improved and maintained since they have to no longer be in drainage for its scavenging process. One more very useful and important advantage of our system is that this system can replace the manual work done in sewage scavenging by a semi-automatic scavenging system and the worker can access this system very easily and efficiently.

II. LITERATURE REVIEW

Ganesh U L, et.al. [1] Sometimes the drainage pipes used in drainage systems are very dirty and contains many organisms that can cause diseases. Therefore, to solve this problem they implemented a semi-automatic drainage cleaning system which can replace the manual scavenging by the automated mechanism.

Elangovan K., et.al. [2] reviewed about the cleaning process to be carried out in cleaning the drainages. Since the process which is carried out is manual scavenging which causes a lot of health and other problems to the workers therefore they came up with a mechanism to dispose the sewage wastes efficiently by the application of PLC controller used from Siemens in wastewater treatment and by the use compressor, gas exhauster, pressure valve and the liquid level flow analog variables considered.

Dr. K. Kumaresan [3] reviewed about the conversion of the manual work done in sewage water waste disposal into an automated sewage water waste disposal and treatment by the implementation of an economical and efficient mechanism by using the available resources. This has been employed for eliminating the risks of life of workers while doing scavenging.

III. OBJECTIVE

The main objective of this proposed concept is to design a semi- automatic drain cleaner considering all the factors which might affect the functioning of the equipment. It also consists of the fabrication of the model and assembling of all of its parts in proposed way. The process studies to be carried out for the evaluation and optimization of the effective semi-automatic drainage cleaner in the treatment of sewage water for the wastes and floating materials.

IV. COMPONENTS

➢ *Parts Materials Quantity*

Fabrication of Mild steel and 3 lifter and box G.I Sheet Motor Cast iron 1 Chain Stainless steel 4 Sheet metal G.I Sheet 3 Shaft Mild steel 2 Sprockets Stainless steel 4 Paint work Paint (Silver) 1 Iron bars Cast iron 9.

V. METHODOLOGY

The various phases of the selected project are listed below: 1. Literature review and the identification of the need. 2. Selection of the materials for the components of the model. 3. Design and calculation required for the proper functioning of the model. 4. Purchasing of the components required for the project. 5. Assembly of all the components into the proposed model. 6. Testing and analysis. 7. Interpretation of the result obtained and the conclusion.

VI. PROPOSED SYSTEM

A. Construction

The fabrication of the model consists of the preparation of the basement through the welding of bars by electric arc welding. Then the welding of the supporting rods is done at an angle of 90 degrees from the basement. The pillow block bearings which supports the load and movement of the shaft are fixed to the supporting rods and to the front part of the basement through the proper joining technique. A shaft of proper calculated strength and material is fixed with the bearings and also the chain drive is mounted on the shaft for proper running. Factor of safety is considered and calculated for the proper functioning of the shaft. Finally, the lifters of sufficient carrying strength are mounted on the chain drive at regular intervals.

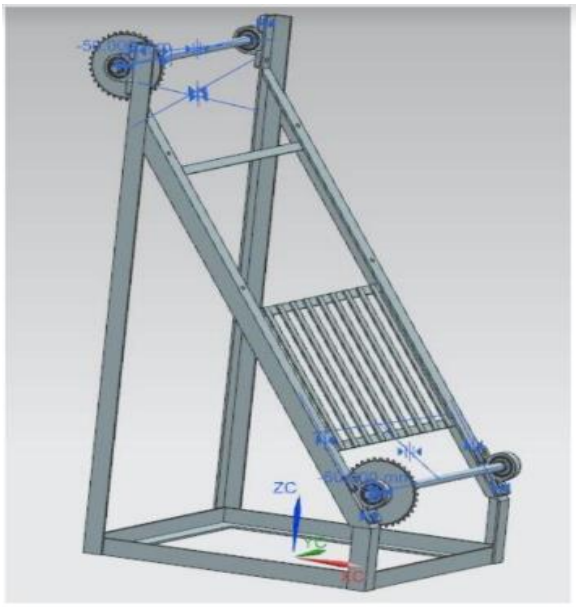

Fig 1:- Proposed Model

B. Working

- The equipment is placed over the flowing water drainage. The wastes such as bottles, plastics, cloth, wood, papers etc. flowing in water are restricted by the teeth which are associated with the chain.
- The anchor is appended to be equipped and driven by motor. The motor held by the frame is begin to rotate.
- Thus making teeth to lift up squandered material and put away in tank.
- Motor can be used to rotate chain drive and move the lifters to lift the wastes and throw them in collecting tank.
- This motor can be operated on battery which could be charged using solar plate.

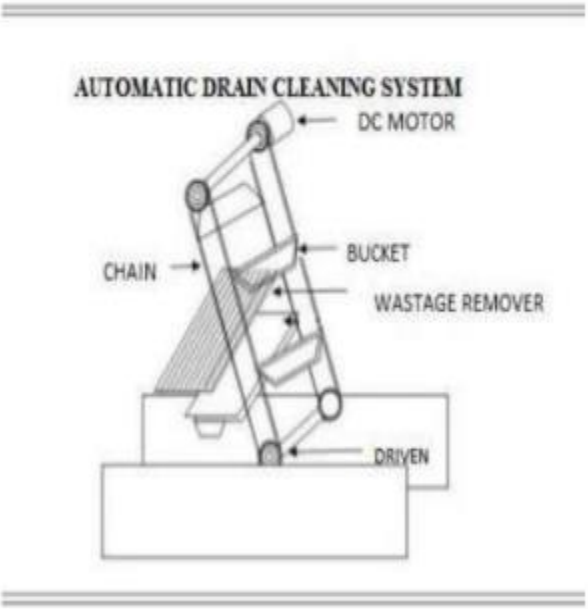

Fig 2:- Working

VII. RESULTS AND DISCUSSION

A. Applications

This model can be used in all types of drainage water systems such large, medium or small. 2. It can be used in effective and efficient way to remove the floating wastes from the running water of drainage system. 3. Proper disposal and maintenance of the sewage from the industries and residents.

B. Advantages

- This proposed model can be used in every type of drainage systems.
- The model is operated on solar powered battery source which is eco-friendly and renewable source of energy.
- The treatment and removal of sewage wastes by this model is environment friendly.

C. Disadvantages

Small vibrations could be produced into the model. 2. Sometimes the slurry present into the drainage water could jam the chain drive while dipping into the water.

D. Future Scope

In future this project can be made fully automated system by the use and application of automatic sensors and by the implementation of control algorithms. This system can be run fully automated by eliminating the idle time running by starting and stopping mechanism by use of proper sensors. Controlling and managing the wastes efficiently by use of appropriate handling devices.

VIII. CONCLUSION

- This project could be efficiently used to control the sewage water waste by the proper application of the components such as motor, sprocket, chain drive, lifter and collector bin to achieve the objective of semi-automatic drain cleaning system.
- Drainage coming from the industries can be treated efficiently to meet the standards of environment protection.
- Drainage wastewater can be treated by this project to irrigate the plants, cleaning toilets etc. 4. The model could work more effectively at the time of heavier rains since the volume of flowing water in more.

REFERENCES

[1]. R. Shashikala, S. Flora Grace, P. Maheshwari, S. MajithaBhanu, R. Muthu Lakshmi Vol. 4, Issue 2, February 2016.

[2]. Department of Civil Engineering Michael Okpara University of Agriculture UmudikeAbia State March 2014.

[3]. Prof. NitinSall, Chougle Mohammed Zaid Sadique, Prathmesh Gawde, Shiraz Qureshi and Sunil Singh Bhadauriya Vol.4 Issue 2, February 2016.

[4]. Dr. K. Kumaresanme, Ph.D. Prakash Rajkumar. P, Sakthivel.C, Sugumar.Gissn: 2349 - 9362 (iceiet - 2016).

[5]. Yadav, D. (2009). Garbage disposal plant mired in controversy. India Times, TNN, 19 Feb 2009. 61 Bharat, K. G.A. Mihaila, ACM Trans. Inf.Syst., 20(1), (2002), pp.47-58.

[6]. NDUBUISI C. Daniels, “Drainage System Cleaner A Solution to Environmental Hazards”, International Referred Journal of Engineering March 2014.