

Automatic Drainage Cleaning System

Vijay Rajendra Nikam
 Department of Mechanical Engineering,
 LokneteGopinathjiMunde Institute of Engineering
 Education and Research, Nashik,India..
 Email Id- vijaynikam001@gmail.com

Kawale Rohit Kailas
 Department of Mechanical Engineering,
 LokneteGopinathjiMunde Institute of Engineering
 Education and Research, Nashik,India.
 Email Id- Rohitkawale3@gmail.com

PatilHemkant Rajendra
 Department of Mechanical Engineering,
 LokneteGopinathjiMunde Institute of Engineering
 Education and Research, Nashik,India.
 Email Id- Hemkantpatil4141@gmail.com

Kumbhar Roshan Dattatray
 Department of Mechanical Engineering,
 LokneteGopinathjiMunde Institute of Engineering
 Education and Research, Nashik,India.
 Email Id- roshankumbhar726@gmail.com

Prof. Satish DamodarShewale
 Department of Mechanical Engineering,
 LokneteGopinathjiMunde Institute of Engineering
 Education and Research, Nashik,India.
 Email Id- shewalesatish86@gmail.com

Abstract - Water is the basic need for the existence of life on earth. In spite of 70% water on earth majority of water is not suitable for drinking purpose. There is a huge demand of clean water as it is used for a variety of purpose such as drinking, bathing, cleaning, cooking etc.. The chief function of the automatic drainage system is to collect as well dispose the solid waste to the waste bucket with the help of forks. Solid waste in drainage water includes empty bottles, polythene bags, papers etc. Impurities in drainage water can lead to blockage of the drainage system. In order to avoid such situation these impurities are needed to be taken out time to time for the continuous flow of drainage water. Drain can be cleaned continuously by the help of model using the drive system to remove the solid waste and threw it on roller conveyor to flow with it towards dumping ground. This project is designed with the objective to initiate the efficient working of system. This project automatically cleans the water in the drainage system each time any impurity appears, and forks which are driven by chain sprocket grasp the solid waste and threw it on roller conveyor to avoid blockage. It even reduces the cost of manual labour as well as reduces the threat to human life.

Key Words: Drainage System, Clean water, Sewage, River.

I. INTRODUCTION

The proper disposal of common wastes is still a challenge faced nowadays, even though automation plays a vital role in the industrial and commercial applications. Usually what we see in a country like India is that common wastes like plastic bottles, covers, sanitary pads, etc and others are left in the streets and in the open drains. These waste particles obviously cause blockage of the drainage system during monsoon season when there is a flow of water through the roads and drainage systems. Also where the closed drainage system open near a river causes the pollution of river. This blockage of drainage system can cause accumulation of waste water in these drains. Several water borne diseases such as cholera, worm disease, typhoid, malaria etc will occur due to the contamination of these stagnant water. This can cause many health issues and may even lead to deaths, other than the local common issues caused by the blockage of drainage. In India, there is no existing automated mechanism by which this blockage of drainage can be removed. Currently these blocked drains are cleared with the help of manual workers were the workers have to get

into the drains and manually remove the wastes. In such situations the rate of diseases spread among these workers are high and this affects their life's and reduces their immunity.

As a solution to these social relevant problems and as a solution to the health issues caused thereby, we propose an automated mechanism, "Automatic Drainage Cleaning mechanism".

Our proposed system is used to clean and control the suspended waste in drains eliminating the human labour involved in doing so.

II. PROBLEM STATEMENT

A. Motivation and objective

The problem of water logging due to plastic, thermocole and metal leads to pest growth and it favors diseases like malaria, typhoid etc. This is unsafe for human life and hence the idea of this project emerged. The objective of the proposed project is to design and fabricate an automated machine for drainage cleaning in order to prevent humans from getting affected by various diseases from the infectious microbes present in the sewage while cleaning manually. This proposed system is to minimize or overcome the problem faced while using man operated machine and to minimize the increased dumping rate of waste.

B. Existing method

The existing system is completely a mechanical based project. It is a stationary system, simply kept in the sewage area to collect the wastes passing over it. The chain and sprocket is used for conveyor movement, which has fitted fork plates to collect the wastes from the sewage. The rotation of the chain along with the plates will collect the floating wastes and put off the wastes in the bin that is placed at the backside of the system.

C. Proposed method

In the treatment system of drainage Waste water control by the motor, roller chain and sprocket, lifter and the Roller conveyor drive which will carry the waste particle towards the dumping to achieve automatic control of sewage waste

water treatment.

As in present there is a store tank to store /collects the waste contaminate, so in that there are so many problem to remove the tank and also there is human contact with its. So we have decided to overcome that problem with the help of conveyor system instead of using tank. The cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity. Also the system is make with more effective with the used of microcontroller (Arduino) to regulates the motor so as to improve the life and performance of the motor.

III. DESIGN ,MATERIALS AND WORKING METHODOLOGY

With the help of solid modelling software we were able to do a sketch of our prototype and finally developed a 3D model of primary design considering all the aspects of the mechanism. The Fig 1.1 show the isometric view of developed design of prototype. Further changes were made in the dimensions and design during the time of fabrication, to make the equipment more stable and effective.

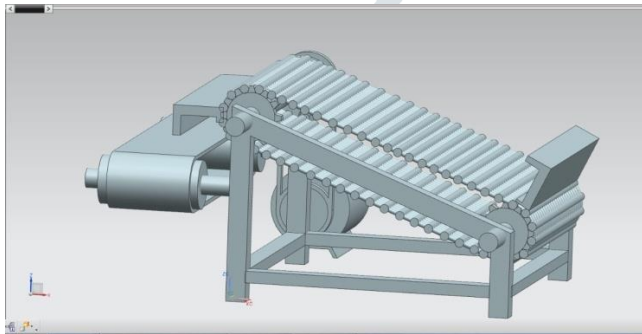


Fig. 1 Isometric view of prototype design developed in solid works

A. Component Description

The major components involved in design and fabrication are

[1] D.C. Motor

A 12 v dc wiper motor is adopted to meet the required torque and varying loads. The motor is attached to a driving shaft, which gives motion to chaine drive.

[2] chain drive mechanism

The motor is coupled to shaft, which will be driving shaft. The driving shaft is connected to a driven shaft via 2 sets of chains and 4 sets of sprockets. The lifter are then linked to each set of chain drives on the either side, thus we obtain a conveyor motion for the lifter.

[3]Lifter

The lifter acts as a rake in the collecting the floting and sub floting particles in the drains and carry them towards the belt drive.

[4] conveyor

Conveyor are the group of devices, used for the moving loads in horizontal or inclined direction along a fixed path in continuous flow. . The conveyor belt is the endless belt used for carrying the material from one end to the othe end. So In our project we can used flat belt conveyor for carrying the floting particles outside of drainage. A flat belt conveyor is run by using another 12 v dc motor.

[5] Timer

During the literature survey it was found that suspended waste particles do not flow continuously through the drains, so the continuous operation of the motor is found to be ineffective. To make the system more effective and to save the charging of the battery we adopt a timer relay, such as an timerelay to regulate the rotation of the motor. With the help of the timer relay we can regulate the rotation speed and the interval time between two adjacent rotation of the motor. The charging of the battery will be saved during the stagnant condition of the motor and the life of the motor will increased .

B. Working Principles

There are only two major principles on which our proposed machine generally works:

1. Chain drive mechanism
2. Flat belt conveyor

IV. CONCLUSION

Our literature review highlights the ongoing advancement in the drainage cleaning system. Many specific empirical studies have been carried out and categories such as automatic drainage cleaning system and its automation have been studied to a great depth. We focus more on making the system mobile in the drainage.

ACKNOWLEDGMENT

We wish to express our gratitude to all those who provided help and cooperation in various ways at the different stages for this research paper. Also, we would like to express our sincere appreciation to Principal of LokneteGopinathjiMunde Institute Of Engineering Education And Research Prof K.V. Chandratre, Head Of Department Prof. R.R. Chakule, and we express our gratitude to our project guide Prof.S.D.Shewale , assistant professor, Department of mechanical engineering, for his valuable guidance, Support and encouragement during the project work.

REFERENCES

- [1] Ganesh U L et. al.,“Semi-Automatic Drain For Sewage Water Treatment Of Floating Materials”, International Journal of Research in Engineering and Technology, Vol No- 05, Jul-2016.
- [2] James C. Conwell, G.E. Jhonson, “Design, Construction and Instrumentation of a Machine to Measured Tension and Impact Forces in Roller Chain Drives”, December 1989.
- [3] S D Rahul Bharadwaj, Shraddha R Jogdhankar, “Automatic Wastewater treatment process to reduce global warming” International Journal of Environmental Science: Development and Monitoring, Vol No- 2 (2013).
- [4] Dr .K.Kumaresan et.al., “Automatic Sewage Cleaning Equipment”, International Conference on Explorations and Innovations in Engineering and Technology , 2016.
- [5] R.Sathiyakala et.al., “Smart Sewage Cleaning System” International Journal of Innovative Research in Computer and Communication Engineering, Vol No- 4, February 2016.

[6] Balachandra, et.al.”Automatic Drainage Water Pump Monitoring and Control System Using PLC and SCADA” International Journal of Innovative Research in Technology, Vol No- 1, 2014.

[7] Nitin Sall, et.al., “Drain Waste Water Cleaner”, Global Journal of Researches in Engineering: J General Engineering Vol No- 16, 2016.

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

[9] Theory of machines –S S Rattan Department of Mechanical Engineering Regional Engineering College KurukshetraS (2004). Publication: Tata McGraw-Hill Publishing company Limited.

