

Automatic Drainage Cleaning System

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ABSTRACT: The proposed concept of "AUTOMATIC DRAINAGE CLEANING SYSTEM", which replace the manual work of cleaning drainage by humans. AUTOMATIC DRAINAGE CLEANING SYSTEM (ADCS) proposed to overcome the real time problems. Now-a-days almost all the processes are being automatized but the drainage cleaning system in our country is still completely manual. The solution proposed in this paper is to design a vehicle which is capable of collecting the plastic and floating wastes. The aim of our project is to replace the manual work performed in drainage cleaning by using an automated system. The drains get blocked due to these wastes and due to the sediment accumulation in water. Many lives are lost during the cleansing processes due to unhygienic conditions of the drainage. The government spends too much money to clean the drainage.

KEYWORDS: Shaft, Sprocket, Rotating motion, linear movement.

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. Hygienic surroundings are needed to maintain the health of a person. Now-a-days drainages are most important in keeping the surroundings clean. But the drains and sewers in most of the places are being left unsupervised. 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. 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. Almost 1.2 million workers are involved in sanitation works. The working conditions of these sanitary workers have remained unchanged over years.

II. RELATED WORK

Drainages are very dirty. Sometimes it can be very harmful for human life during the process of cleaning the drainage system. To overcome this problem, they implemented mechanical semi-Automated drainage water cleaner and so the water flow is efficient because of regular filtration of wastages with the help of that project. Reviewed about drainage cleaning to replace manual work to automated system because manually cleaning system is harmful for human life and cleaning time is more so to overcome this problem, they implemented a design "Automated drainage water pump monitoring and control system using PLC and SCADA". The idea of usage of PLC and SCADA were obtained from this project.

III. METHODOLOGY

This device is placed across a drain so that only water flows through the lower basement. Floating waste like bottles, plastic cans, covers, etc. is lifted by lifters which are connected to the chain. The chain revolves with the sprocket wheel which is driven by the motor. When motor runs the chain starts to circulate making the lifter to lift up. The wastage material are lifted by lifter teeth and stored in storage or collecting bin. Once the collecting bin is full, the waste materials are removed from the bin. If we turn on motor switch the motor starts to rotate. The rotary motion of the shaft is connected to the top shaft by chain and sprockets which is placed on taper bars. From top shaft that motion is transferred to the bottom shaft by using sprockets and chains.



The teeth which is used for lifting waste from drainage is placed or attached between two chains which are on top and bottom shafts. The dust bin which is used for collecting all the waste is attached to vertical bars behind the chains. There will be a mesh between the chains and dust bin which act as a barrier for stopping the waste without floating. When we switch on the motor the two shafts starts to rotate. These are the basic steps included in our project. The first step is the selection and purchasing of the raw materials required for the proper design of the drainage cleaner. All the tools and materials required for the manufacturing and design are found out and purchased. The next step is the most important step which is the proper design of the drainage cleaner, a proper design with exact measurements is a must so as to function properly. The next step is the finishing of raw materials and assembling of all the parts according to the made design to get the final product. The final product is to be then tested for any mistakes and the finishing touches are to be given, this Methodology gives way about how work is to be carried out in systematic way. It is standard process of describing process and how it is done in the simplest manner.





IV. EXPERIMENTAL RESULT

The designing of the prototype of the automatic drainage cleaning system was successfully completed with the help of trial-and-error method. The designing and fabrication of the drainage system was completed and it is able to clear the drainage efficiently.

The drainage system is built using shaft, bearing, sprocket and chains. Shaft is mainly used for rotating machine element, usually circular in cross-section, which is used to transmit power from one part to another, or from a machine which produces power to a machine which absorbs power. Bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Sprocket or sprocket-wheel is a profiled wheel with teeth, or cogs, that mesh with a chain, track or other perforated or indented material. The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. Chain drive is a way of transmitting mechanical power from one place to another. It is often used to convey power to the wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles.

V. CONCLUSION

The project provides a proper solution to an underlying problem of drainage cleaning. This is far better than the existing systems and reduces the risks involved in the drainage cleaning by manual labours. The operation of this system is simple and it also provides flexibility. This project is to provide a system that is economical and helpful to remove water impurities like plastics, trashes, water debris which is floating on drain water surface. Risk of labours catching infections or poisoning due to large amounts of waste and chemicals will be reduced.

REFERENCES

- [1] Ganesh U Let.al. 2016 "Semi-Automatic Drain for Sewage Water Treatment of Floating Materials", International Journal of Research in Engineering and Technology, 05.
- [2] Mr. Abhijeet. M. Ballade, Mr. Vishal. S. Garde, Mr. Akash. S. Lahane and Mr. Pranav. V. 2017. Design & fabrication of river cleaning system. IJMTER Volume 04 -Issue 02. Nitin Sall, et.al., 2016 "Drain Waste Water Cleaner", Global Journal of Researches in Engineering: J General Engineering Vol No- 16.
- [3] Sheikh Md Shahid, Md Rafique, & Dr. Akash Langde (2017). Design and fabrication of river cleaning machine. International Journal for Science and Advance Research in Technology, 3(11), 8-18.
- [4] Astrup, T, J. Mollee and T. Fruergaard (2009). Incineration and co-combustion of waste: accounting of greenhouse gases and global warming contributions. Waste Management & Research: 27: 789-799.