DESIGN & DEVELOPMENT OF AUTOMATIC DRAINAGE CLEANING MACHINE

[1]Rohit Angre, [2]Samruddhi Kamble, [3]Ojas Mahajan, [4]NanduSethunath
[1,2,3,4] UG Students, Department of Mechanical Engineering
[1,2,3,4] Dhole Patil College of Engineering, Pune, Maharashtra, INDIA

Abstract: Here proposed concept is to replace the manual work in drainage cleaning by mechanical drain cleaner. Drainage pipes are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockages in the drainage system. To overcome this problem and to save human life we implement a design "Mechanical automatic drainage water cleaner" and we are designing our project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages. It also helps to protect the environment from different kinds of environmental hazards through the promotion waste management by the removal of garbage from the drainage system.

Index Terms - drainage pipes, wastage, river blockages

I. INTRODUCTION

Drain cleaner machine is the system installed at the outlet of drainage pipe so that manual extraction of waste to be replaced through it. This helps us to prevent the spreading of diseases in between humans by manual working in garbage waste. Plastic & other waste dump & block the flow of water in Canal & Rivers near the bridges support pillars, so it can prevent the waste from getting into river & canal & allow the water to flow without any obstacle. Drain cleaners can be classified in two categories: chemical, or device. If a single sink, toilet, or tub or shower drain is clogged the first choice is normally a drain cleaner that can remove soft obstructions such as hair and grease clogs that can accumulate close to interior drain openings. This project automatically cleans the water in the drainage system each time any wastage appears and this form an efficient and easy way of cleaning the drainage system and preventing the blockage. It also reduces labour and improves the quality of water that is cleaned. If the garbage are allowed to flow that will end up flowing down to recreational beaches used for tourism purposes making a scene not pleasurable to the eyes else these garbage flow to residential sites where they are burnt in a way of getting rid of them, thereby causing climate change. The drainage systems are cleaned when there is no water in them i.e. when it is not raining, but when it is raining the drainage systems cannot be cleaned because of the harsh conditions of the rain which no one would volunteer to endure to ensure garbage does not enter into the drainage systems.

II. LITERATURE SURVEY

Vinod Rampur & Ganesh U L [1] made up a device to carry out the garbage or trash present in the water streams which may clog the drainage system. The device is place across a drain so that only water flows through the lower basement. Floating waste is lifted by lifters which are connected to the chain. The chain revolves with the sprocket wheel which is driven by the motor. The energy provided to the motor is electrical energy. 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.They got result as follow- uniform flow rate of water, depth of the channel is 1feet and height of the channel is 3feet, rate of disposal of waste is uniform, lifter speed and motor speed is constant. Alarm will turn on when the collecting bin is filled. Lifter speed is constant and it regularly lifts the waste. Cost of the machine is economic and it requires only 12-24 volts of current. They showed the usage of mechanical drainage cleaner to replace the manual work required for drainage cleaning system. Drainage pipes are very dirty. Sometimes it is harmful for human life while it is need for cleaning drainage system. To overcome this problem, they implemented mechanical semi-automatic drainage water cleaner and so the water flow is efficient because of regular filtration of wastages with the help of that project. Different kinds of environment hazards reduced with the help of Drainage system machine.

V.Kalavathiet.all[2]having the same principle, the idea of solar energy to run the device is introduced here. By implementing the solar panel we can easily save the electrical energy we require to run the motor. The load reducing concept is also there which means to reduce the waste which is going to add in streamline through different places. As well as, the usage of single sheet with slot as claw is not much effective as some tree bodies and garbage may stick in it, so the strainer or conveyor type design is introduced here

Prof. NitinSallet.all [3]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. The main objective of this project to minimize or overcome the problem which can face in manual drainage cleaning along with increased the dumping rate of waste which also helps operator to work easily. Wastewater treatment plants works on the last part of water cycle (i.e. river), helping nature protects water from the excessive pollution.

VikiBagulet.all[4]studied that the cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity. The deplete squander water cleaner machine is outlined and produced by utilizing gear changing and shaft coupling standard. It comprise 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.

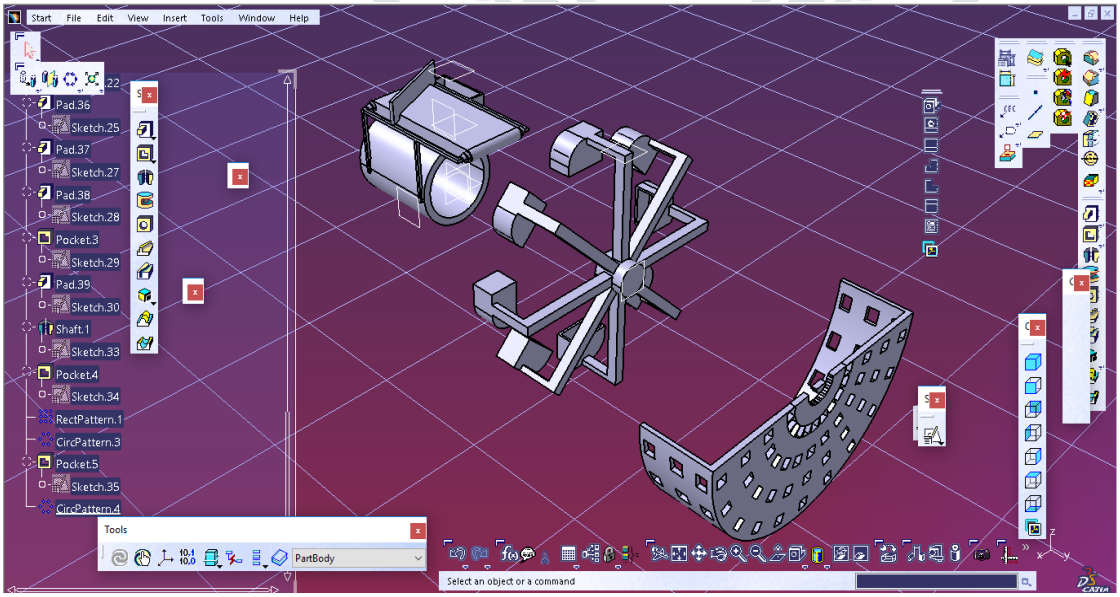
Prof. Amay Tipayaleet.all[5] studied and concluded that the device is place across a drain so that only water flows through the lower basement. Floating waste like bottles, plastic cans, covers any kind of waste etc. is lifted by lifters which are connected to the chain. The chain revolves with the sprocket wheel which is driven by the motor. The energy provided to the motor is electrical energy. 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 collecting bin. Once the collecting bin is full, bin sensor it sense and embedded system message to worker and the waste materials are removed from the bin.

Abhisheket.all[6] built the drainage cleaning machine helps us to clean small or big sewage through its mechanical design and working. This machine consists of parts such as motor, battery, shaft, lifter, collecting box etc. When we give power to this machine then motor starts working which rotates the shaft. Due to the rotation of shafts, the conveyor belt connected to the shafts rotates. As the conveyor belt rotates the two lifters which are connected to the conveyor at half length of the conveyor starts rotating as well. When one lifter completes one round from down to upward direction, it takes all the garbage material like waste bottles, plastics, tins, etc. and the grid drops it on the collecting box attached at the back. The collection rate of garbage will be continuing. This device is placed across drainage so that only water flow through lower grid, waste like bottles, plastics which are floating in drain are lifted by teeth of lifter which is connected to conveyor. This conveyor is attached to shafts driven by motor. When motor runs the conveyor starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste.

Ankita B.Padwal1 et.all[7]studied that drainage cleaning to replace manual work to automated system because manually cleaning system it is harmful for human life and cleaning time, is more so to overcome this problem they implemented a design "Automatic drainage water pump monitoring and control system using PLC and SCADA." In this project to use efficient way to control the disposal of wastage regularly.PLC controller from Siemens was used in the treatment system of drainage wastewater control by the stepper motor, compressor, gas exhauster, pressure valve and the liquid level, flow and other analog variables to achieve automatic control of sewage waste water treatment.

III. PROPOSED MODEL:

As the waste water along with the garbage and plastic waste is led out of the drainage pipe into rivers or canals, all the garbage is collected by the collecting buckets which rotates with the help of DC motor. As the garbage is collected in the lower bucket it rotates about 180°, where it dumps the garbage over conveyor belt. The rotating conveyor belt carries the garbage towards the guide blade. The guide blade directs the garbage into the collecting bin. The outlet of the pipe is compassed with the meshed or perforated cover which ensures that only waste water is let into the river or canal and not the solid waste.



Exploded View

IV. CONCLUSION:

The waste material was able to be fetched from the water and collect it in the garbage collector container. Hence this project can be applied in remote and slum areas with effectiveness. Since drains are linked with hygiene and in slum areas this is major problem and this project can be implemented in those areas and can safeguard health of the people. The concept of this project is very useful in monsoon because in rainy season our drains are usually over flowing and it can be blocked by solid wastes. This project can be incorporated with "SWACCH BHARAT ABHIYAAN" which is a revolution in present times. In India as drains and sewage paths are open, so this project or mechanism can become very handy and use to clean them. Also in the earlier method of waste water treatment the worker used to inhale lot of toxic gases so the health of worker was seriously damaged and he used to die at a earlier age. This was the major drawback of the conventional method. Because of this project as there is no direct contact of the worker with the toxic gases so the health of worker will be good and he will be able to work for a longer duration.

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