INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3084 - 3091
RECEIVED : 05.03.2018 PUBLISHED : 03.04.2018
April 03, 2018

DESIGN AND FABRICATION OF AUTOMATIC DRAINAGE CLEANING SYSTEM

[1]S.Manikandan, [2]G.Mohan raj, [3]M.Nandhakumar, [4]P.Neelamanikandan
[5]Mr R.Sateesh, [6]Dr N.Balakrishnan
[1,2,3,4] UG Students, [5]Assistant Professor, [6]Head of the department
Department of Mechanical Engineering
Gnanamani College of Technology- Namakkal-637018.

Abstract

In this project the proposal concept is to replace the manual work in drainage cleaning by automated drainage system. The chief function of the automatic drainage system is to collect, transport, as well as dispose the solid waste in the waste bucket by the help of collecting bin. In this project we are using solar energy as the power sources indeed of manual power with the help of solar plane and it is useful as well as economical process by that we can accrue energy easily and quickly this will provide as time saving and riskless process. This project automatically cleans the water in the drainage system each time any impurity appears, and claws which are driven by chain sprocket grasp the solid waste and threw it into the waste bucket to avoid blockage.

Keywords: Gear, Chain, Dc motor, Solar Panel, Teeth, Battery, Drainage system

1. INTRODUCTION

In this research paper the proposed concept is to replace the manual work in drainage cleaning by automated system. Now-a-days even though automation plays a vital role in all industrial applications in the proper disposal of sewages from industries and commercials are still a challenging task. Automatic Drainage Water Cleaning overcomes all sorts of drainage problems and promotes blockage free drains promoting 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 waste and gases 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. Drainage pipes are using for the disposal and unfortunately sometimes there may be loss of human life while cleaning the blockages in the drainage pipes.

The device is place across drain so that only water flow through lower grids. Waste like bottle, etc. Floating in drain are lifted by teeth which is connected to chain. This chain is attached by gears driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank. DC motors with help of h-bridge designed ic. Dc motor control plays a major role in many applications; dc motor is required to be rotated in clockwise and counter clockwise directions. For this purpose h bridge is designed. In this project l293d ic is used to drive two dc motors. Automatic Drainage Water Cleaning overcomes all sorts of drainage problems and promotes blockage free drains promoting 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 waste and gases 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.

Water running through a water drainage system mostly carries along waste materials most which are non-biodegradable which not only cause flooding but also climate change. Overflow of water drainage system occurs when there is a blockage of an end of the drainage system forcing the water to find its way elsewhere apart from the mapped out drainage system, therefore the running water spills over the horizontal height of the drainage systems spreading to regions alongside the drainage system, thereby causing problems such as pushing down of structures such as fences, water logging of farm lands and residential building, etc. The impurities present in water can cause hazardous and disease. As long as the draining system is considered the function of the main drainage system is to collect, transport and dispose of the water through an outfall or outlet. Impurities in drainage water can be only like empty bottles, polythene bags, papers, etc.The problem such as Environmental pollution and spreading of viral diseases are avoidable. Automation of Drainage Cleaning System would reduce the risk of various diseases spread due to accumulation of waste. This Drainage Cleaning system will clean the waste at the surface of drainage which would allow the flow of water. The devices is place across drain so that only water flow through lower grids, waste like bottle, etc. Floating in drain are lifted by teeth which is connected to chain. This chain is attached by gear driven by motor. When motor runs the chain starts to circulate making teeth to lift up. The waste materials are lifted by teeth and are stored in waste storage tank.

2. LITERATURE REVIEW

Ganesh U L, et.al. [1] 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 a mechanical semi-automatic drainage water cleaner and so the water flow is efficient because of regular filteration of wastages with the help of that project. Different kinds of environment hazards reduced with the help of Drainage system machine.

Elangovan K., et.al. [2] reviewed about 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”. PLC and SCADA were designed. In this project to use efficient way to control the disposal of wastage regularly, treatment of disposal in different way toxic and non-toxic gases. 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.

Dr .K.KUMARESAN [3] explained manual work converted to automated system. Drainage pipe using for disposal and it may be loss for human life while cleaning the blockage in the drainage pipes. To overcome this problem they implemented “Automatic Sewage Cleaning System”. They designed their project different way clearance of gaseous substance are treated separately so the flow of water efficiently.This project may be

developed with the full utilization of men , machines, and materials and money. They made their project economical and efficient with the available resources. They used automation technology concerned with his application of mechanical, electronics, computer based systems to operate and control production.

R.Sathiyakala, et.al. [4] explained E bucket (electronic bucket) use for drainage cleaning system because E-bucket lifted a sewage and used evaporation treatment for this sewage wet sewage was converted into dry matters, with the of ARM board (ARDUINO) this process was performed. After this process they were add this waste a government bank without any kind of affection of the bacteria.

S D Rahul Bharadwaj, et.al. [5] proposed with the automatic cleaning of waste water in order to prevent global warming and melting of glaciers. The results emphasize the need of waste water treatment plants, through which the water is treated before suspending in rivers. Firstly power is generated and that power is used for waste water cleaning process.

Nitin Sall, et.al. [6] explained flow of used water from homes, business industries, commercial activities is called waste water. 200 and 500 liters wastage water are generated each person every day. So using waste water technology that removes, rather than destroys, a pollutant in a drainage system.

Mr. Nikhil S. Pisal1, et.al. [7] proposed safe load for the chain and the ability of the same to withstand the use of Finite Element Modeling would be the core objective of the work. An existing chain link was used for benchmarking the research work. Finite Element Analysis tools like Hyper Mesh and ANSYS were suitable to find the performance of the link under tensile loads. The design for the chain would be subjected to F.E Analysis to find the effect of loads (tension) on the link. The proposed method utilizes software in the FEA domain for analyzing the effects of the variation in the values of the design parameters influencing the performance criterion. The FEM method is used to analyze the stress state of an elastic body with a given geometry, such as chain link.

NDUBUISI C. Daniels, et.al. [8] showed the Drainage system cleaner machine used to remove garbage and sewage automatically which helped to protect the environment from different kinds of environmental hazards. The drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all makes up for its effective functioning

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3084 - 3091
RECEIVED : 05.03.2018 PUBLISHED : 03.04.2018
April 03, 2018

3. WORKING PRINCIPLE

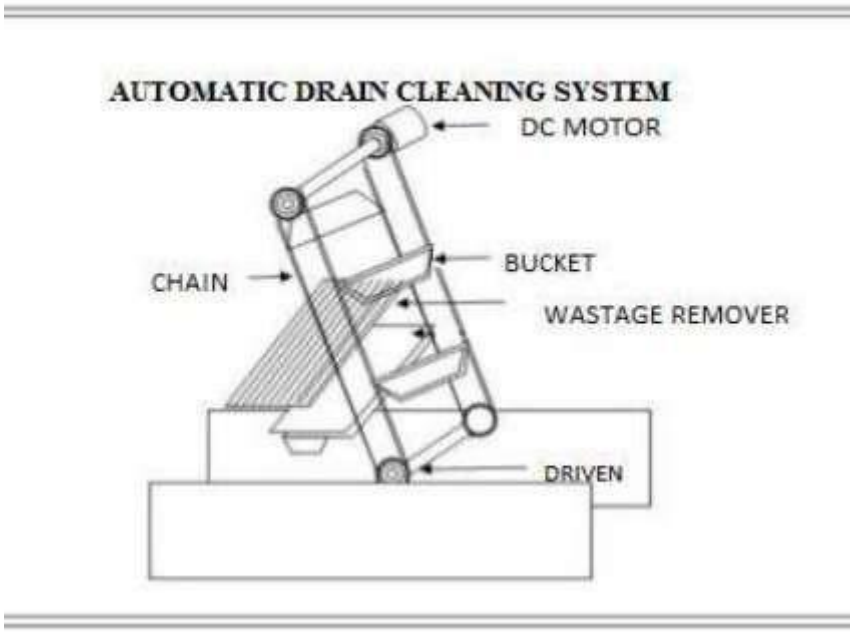


Figure 1: Sketch Diagram of Automatic Drainage Cleaning System

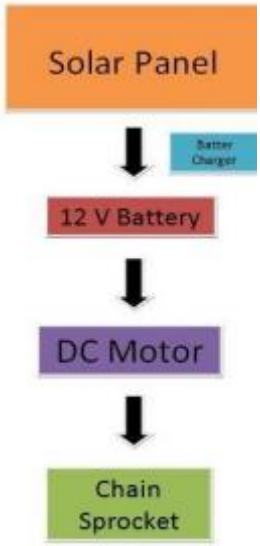


Figure 2: Block diagram

In today's era automation plays a very important role in all industrial applications for the proper disposal of sewage from industries and household is still a challenging task. Drain pipes are used for the adequate disposal of waste and unfortunately sometimes there may be a threat to human life during the cleaning of blockage in the drain pipes or it can cause serious health issues because of the pertaining problems like malaria, dengue, etc. In order to overcome this problem as well as to save human life we implement a design

INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3084 - 3091
RECEIVED : 05.03.2018 PUBLISHED : 03.04.2018
April 03, 2018

"Automatic Drainage Cleaning System". We designed our project in order to use it in an efficient way to control the disposal of waste along with regular filtration of drains, removal of solid waste in order to avoid blockage in drains to promote continuous flow of drainage water which ultimately reduces the threat to human life.Light from the sun is incident on the solar panel in order to generate power in terms of solar energy which is then transmitted into chemical energy of the battery by the help of battery charger which is connected to the solar panel as well as the battery. Battery is connected to the DC motor and once it is fully charged chemical energy is converted into electrical energy and is passed to DC motor which rotates the armature of coil which in turn initiates the chain & sprocket drive mechanism. Chain is properly lubricated. Finger shaped clasp is attached to the chain which is used to pick up the solid waste from drain and carries it and throws it away in waste bucket attached at backside of drainage system model. This process continues automatically till the energy is imparted to the motor by the help of battery in order to avoid blockage of drains and enhance sewage treatment system.

4. CONSTRUCTED WORKING MODEL

Figure.3. Under Construction Working Model

Chain Drive mechanism

In automatic drain cleaner the lifting pans are lifted by the chains which are in-line with the sprockets. This mechanism is known as chain drive mechanism.

Working Procedure

The drain cleaner machine helps us to clean small or big sewage through its mechanical design and functioning. This machine consists of parts such as motor, shaft, chain, sprocket, lifter, collecting bin etc. When we give power to this machine then motor starts functioning which gives rotation to the shaft and through the help of shaft, the sprockets which are fixed to the shaft rotates. Due to the rotation of the sprocket,

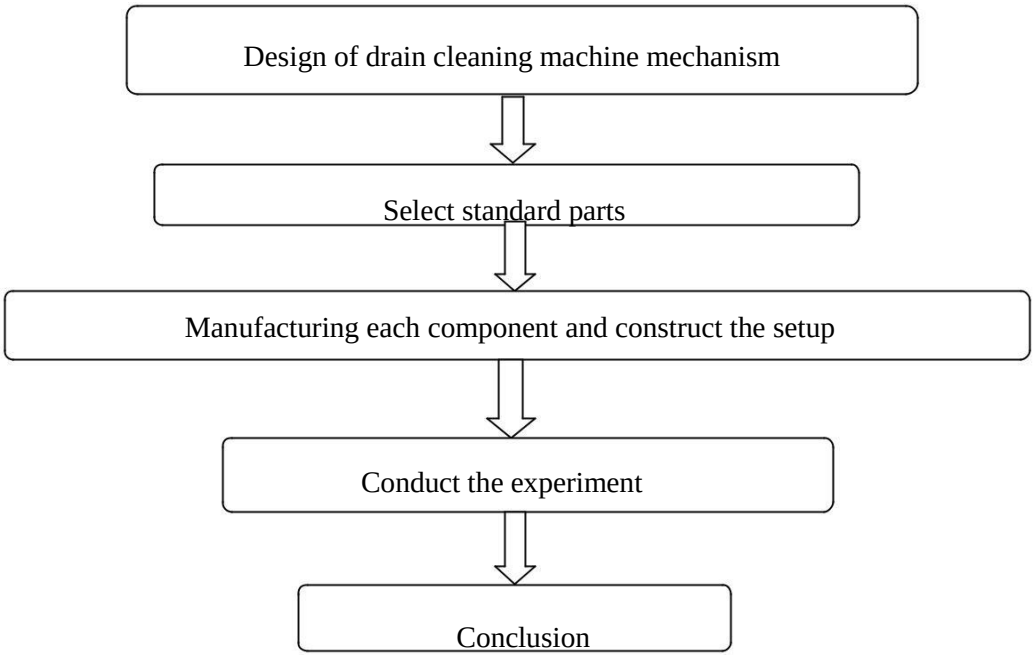
INTERNATIONAL RESEARCH JOURNAL IN ADVANCED ENGINEERING AND TECHNOLOGY (IRJAET) E - ISSN: 2454-4752 P - ISSN : 2454-4744
VOL 4 ISSUE 2 (2018) PAGES 3084 - 3091
RECEIVED : 05.03.2018 PUBLISHED : 03.04.2018
April 03, 2018

the chain connected to the sprocket rotates. As the chain rotates the two lifters which are connected to the chain at half length of the chain starts rotating as well. When one lifter completes one round from down to upward direction, it takes all the garbage material like waste bottles, plastic, tins, etc, on the grid and drops it in the collecting bin attached at the back. Since there are two lifters, the collection rate of garbage will be more. This is how this machine helps us clean sewage or any garbage from water.

1. The gadget is place over the deplete so water course through lower grids, squander like bottle, cloth wood papers etc. Flowing in deplete are restricted by teeth which is associated with chain.
2. This anchor is appended to equip driven by motor. Motor is begin bind is begin to circle.
3. Making teeth to lift up squandered material put away in tank.
4. Motor can use to rotate chain drive.
5. This motor can operate on battery and battery charge using solar plate.

5. METHODOLOGY

Methodology used for whole processing of Drain cleaning Machine is given below; this methodology gives way about how work is to be carried out in systematic way. It is standard process of describing process, how it is done in simplest manner.



APPLICATIONS

1. It can be installed for domestic sewage treatment.
2. It can be used for proper treatment of sewage as well as to avoid blockages of drains.
3. It is portable and compact in size which initiate easy handling.
4. Manual assistance is not required.
5. In industries, streets, houses, etc., which can be practically implemented in real time.

FUTURE SCOPE

The proposed project can extend the project by adding wind power to charge the battery from wind turbine energy. It can also extend the project by adding one suppression motor to suppress the dust particles in the storage tank also increase the storage tank size for more particles to store which are collected from the drain water.

CONCLUSION

Automation is a technology concerned with the application of mechanical, electronic and computer based systems to operate and control production. This system is used to operate automatic drainage cleaning system. This project may be developed with the full utilization of men, machines and materials and money. Also we have followed thoroughly the study of time motion and made our project economical and efficient with the available resources. We hope that this will be done among the most versatile and interchangeable one even in future. Thus we can able to obtain automatic drainage cleaning equipment. As long as the drainage system is considered the function of the main drainage system is to collect, transport, and dispose of the water through an outfall or outlet. The drain waste water cleaner machine is designed and manufactured by using gear changing and shaft coupling principle. It consist mainly DC geared motor, shafts, waste removal plates, dust bin, bearings, sprocket and chains. Construction materials are easily available, creates employment (construction and maintenance), simple to construct. This system was designed, fabricated successfully and also tested. It works satisfactorily.

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. Prof.NitinSall, Chougle Mohammed Zaid Sadique,PrathmeshGawde,Shiraz Qureshi and Sunil Singh Bhadauriya Vol.4 Issue 2, February 2016.

3. Dr .K.Kumaresan., ph.d..,Prakash S, Rajkumar. P, Sakthivel.C, Sugumar.Gissn: 2349 - 9362 (iceiet - 2016)

4. NDUBUISI C. Daniels, “Drainage System Cleaner A Solution to Environmental Hazards”, International Refered Journal of Engineering and Science, Vol No- 3, March 2014.

5. Yadav, D. (2009). Garbage disposal plant mired in controversy. India Times, TNN, 19 Feb 2009. 61 Bharat, K. and G.A. Mihaila, when experts agree: using non-a_liated experts to rank popular topics . ACM Trans. Inf.Syst., 20(1), (2002), pp.47-58.

6. Astrup, T., J. Mollee, and T. Fruergaard (2009b). Incineration and co-combustion of waste: accounting of greenhouse gases and global warming contributions. Waste Management & Research: 2009: 27: 789-799.

7. R. Sathiyakala, S. Flora Grace ,P.Maheswari,. S. MajithaBhanu, R.Muthu Lakshmi Vol. 4, Issue 2, February 2016.

8. S S Rattan Department of Mechanical Engineering Regional Engineering College Kurukshetra (2004). "Theory of machines" Publication: Tata McGraw-Hill Publishing Company Limited.