
DRAINAGE CLEANING BOT

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INTRODUCTION

A robot that will be used to clean the interior of the drainage using a brushing and drilling mechanism. Areas of usage are oil, gas industry, Sewage pipes, etc. Over time these pipes have accumulated amount of slug and other deposits; this leads to decrease in carrying capacity, reduced reliability, loss of power due to higher pumping pressure required and irregular flow. This bot helps in clearing any kind of blockage from drainage, which includes in domestic and industrial sector. Many of industries used different diameter drainage for different application like to carry chemicals, high pressure steam and gases hence there may be chances of problems like corrosion, leakages. It is not possible to avoid all these problems manually. The mud inside the drainage can reduce the efficiency of the water flow. The conventional method is very difficult and tiring.

Drainage pipes are using for disposal and unfortunately, sometimes there may be loss of human life while cleaning the blockages in the drainage pipes. To overcome this problem and to safeguard human life we implement a design "Drainage cleaning bot". We designed our project to use this inefficient way to control the disposal of wastages and with regular

filtration of wastages, clearance of gaseous substances are treated separately and continually monitor the disposal. Drainage cleaning bot will be highly effective in areas with tough reachability and unsuitable conditions. It also reduces manual work and improves the quality of water that is cleaned.

RELEVANCE OF WORK

In most of the countries the waste and processed water has been treated through majority of the drainage system, the main function of the drainage system is to collect the waste particles like plastic bottles, waste papers, polythene bags and other humans contaminated wastes. The wastages in the drainage can cause blockage in the water path and reduce the flow of water, To avoid such situation the blockage can be prevented by regularly cleaning and maintaining the drainage system for smooth working of drainage system, the drainage system can be maintained by manually or automatically using machines or systems to throw out such waste particles out and will help to keep the water clean and fit for usage.

ISSUES AND CHALLENGES

- i). This robot may have an issue of power consumption and load carrying capacity.
- ii). This bot can face the connectivity challenges regarding the drainages.

PROBLEM STATEMENT

The waste inside the drainage can reduce the efficiency of the water flow and also forms the poisonous gases which causes the pollution and results to human death. Due to the water blockage it causes leakage.

OBJECTIVES

- To construct the bot that is easy to use which does not harm the interior of the drainage system.
- To operate the robot using remote/mobile app.
- To increase the accuracy of the bot and make it eco-friendly.

LITEATURE REVIEW

Ravindra R. Patil et al. [1] stated that using automation and robotic systems for tasks that are dangerous or inconvenient and dirty for humans is becoming more common. Sewer's maintenance and cleaning is an example of a task where robots are already being used to inspect underground pipes for blockages and damage. [6].

Siddhant D et.al. [2] Proposed a concept which is to replace the manual work in drainage cleaning by mechanical drain cleaner. The chief function of the automatic

drainage cleaning system is to collect, transport, as well as dispose the solid waste in the waste bucket by the help of claws. The conveyer collects waste and transports it to a bag behind it, where it is disposed of.

Jayasree et.al.,[3] designed an automated sewage cleaning system to avoid the risk and also to reduce the time of cleaning the drainage based on the problems faced by the people. By using automation, they are able to control and dispose of waste in an efficient manner instead of using normal cleaning methods.

Ganesh U L, et.al. [4] Drainage pipes are very dirty. Sometimes it is harmful for human life while it is need for cleaning drainage system. To solved this problem, they implemented a mechanical semi-automatic drainage water cleaner. the usage of mechanical drainage cleaner to replace the manual work required for drainage cleaning system.

Dr. K. Kumaresan [5] explained manual work converted to automated system. They made their project economical and efficient with the available resources. As their risk of human loss during cleaning Drainage pipe this project works to reduce the loss of death during work disposal. To overcome this problem, they implemented "drainage cleaning machine".

R. Sathiyakala, et.al. [6] 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) After this process they were

add this waste a government bank without any kind of affection of the bacteria.

NDUBUISI C. Daniels, et.al. [7] showed the Drainage system cleaner machine used to remove garbage and the drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all makes up for its effective functioning.

Balachandra et.al. [8] reviewed about drainage cleaning to replace manual work to automated system because manually cleaning system it is harmful for human life. for toxic & in toxic gases wastage thrown into the drainage this project works efficiently to dispose of the waste. 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

S D Rahul Bharadwaj, et.al. [9] proposed with the automatic cleaning of waste water in order to reduce global warming& wastage of power to treat waste water management.

Shao-Wu-Zhang, et.al. [10] introduced three drainage devices about the ceramic filter dewatering system. They compared the working processes of three drainage devices, and analyzed its future development. Modified the design according to the shortage coming of drainage equip and working mechanism of automatic drainage device.

M. Naveena Reddy, et.al. [11] This project helpful in design and production of high precision elliptical gears. developed

mathematical model of a profile shifted elliptical gear generation mechanism. They investigated the tooth under cutting of a non-standard elliptical gear, based on the purposed mathematical model. They developed driving and driven profile shifted elliptical gears.

METHODOLOGY

The proposed system is developed and designed with an embedded system using robotic equipment which has been created for locating the blockage using camera. These are used with the condition of all diameters in the pipelines by obtaining a proper size of robotic vehicle and easily it can be used. It can operate in the filled liquid of sewer pipes with the consideration of sizes.

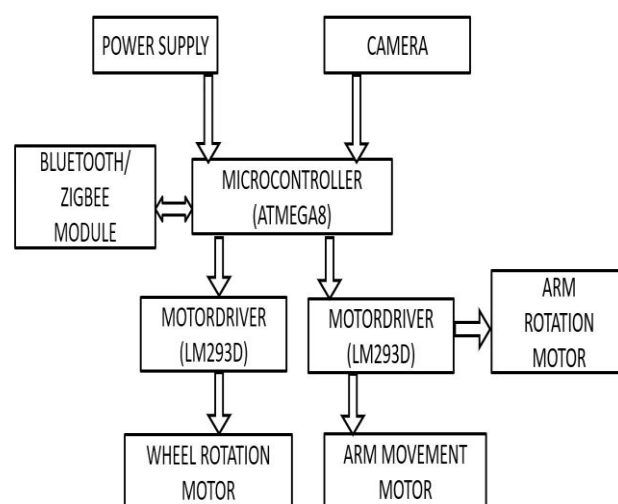


Fig. 3.1 Block diagram of the proposed system

This robot works inside the drainage pipes, it clears every kind of clogs or any kind of blockages. It will have drilling and brushing mechanism. To see the blocks inside the pipe the bot will be connected to

camera as well as some part of the bot will be covered with LED lights so that it will be visible. If there is small amount of water in the drainage pipe then the bot will emit dry ice smoke so that the water dries.

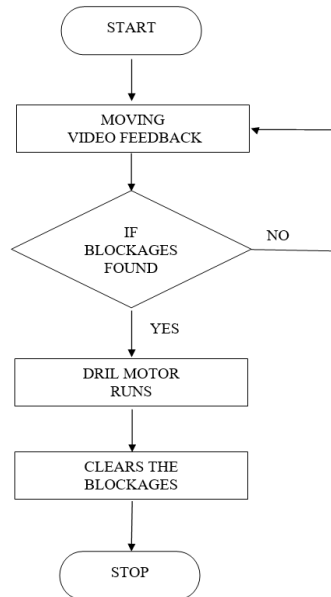


Fig. 3.2 Flowchart

RESULT AND DISCUSSION



Fig . 4.1 proposed robot

This robot is easy to use which does not harm the interior of the drainage system.

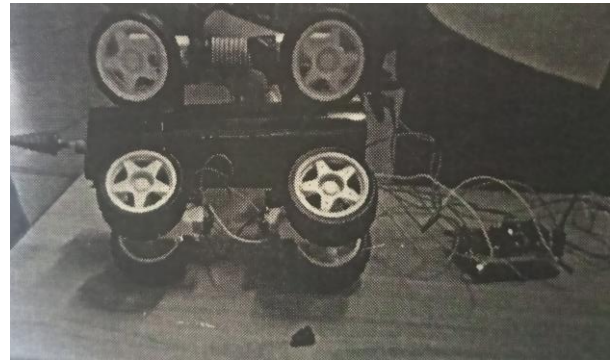


Fig . 4.2 proposed robot

This robot is operated by remote through wirelessly.

DISCUSSION

While conducting the experiment the parameters considered are uniform flow rate of water, depth of the channel, height of the channel, rate of disposal of waste is in uniform manner, lifter speed and motor speed is constant. The cost of the machine is economic. These cleaners are the cheapest way to fix drainage problems. Easy to operate and control as no special skill is required. Reduction of a labor-oriented method of cleaning, thus Upgrading dignity of labor. Lightweight and easily portable. A large amount of garbage will collect which can be remanufactured.

CONCLUSION AND FUTURE WORK

In the drainage waste water control by the machine. Sewage contaminants and sludge from domestic and industries is extracted through this project to with stable operation and good effect. The cleaner functions more effectively during the heavier rains which have more volume of running water with garbage and high

velocity. Risk of Labors catching infections or poisoning due to large amounts of waste and chemicals will be reduced.

The main constraint of this device is the high initial cost but has low operating cost and can be adopted any where across the country at any time, any conditions for cleaning the sewers. Our project is simply a sewage cleaning machine system. Following different modification can be done to improve the output and efficiency. If taken up for commercial production and marketed properly, we are sure it will be accepted in the industry.

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