

AUTOMATED SEWAGE CLEANING AND GENERATION OF FUEL FROM THE COLLECTED GAS

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ABSTRACT

Sewages are challenging environment for cleaning as it is filled with sludge consisting of toxic substances such as human faces, urine, waste water etc. Because of the hazardous environment, Sewage cleaning rank among the most dangerous occupations killing at least 500 workers every year. Manual scavenging was abolished in 1993 and the ban was again reinforced in 2013. According to 2018 report by the National Commission for Safai Karamchari (NCSK), one-person losses their life every five days while sewage cleaning and septic tank across the country. The number of people who died while sewage cleaning increases from 68 in 2018 to 110 in 2019. In this project, we are designing a new technique to clean the sewage. 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. Impurities in drainage water can be any like empty bottles, polythene bags, papers etc. These impurities present in drainage water can cause blockage of the drainage system. To avoid such situation these impurities are needed to be taken out time to time for the smooth working of the drainage system. As we know, in this fast-growing population the demand for energy and the discharge of waste are increasing day by day. To overcome the energy crisis, alternative energy sources are the only remedy. That's why we are developing this automated technique to solve this issue. In this project, designing a new technique for cleaning the sewage and to generate fuel from the gas present inside the sewage. This project is going to be the best solution for reducing manual scavenging and it also reduces labour.

Keywords: *Fuel Generation, Sewage Cleaning*

INTRODUCTION

According to the survey conducted in United Nations, nearly 2 million tons of sewage waste in dumped into the world's waterways. The wastewater that goes straight into the rivers affects the downstream populations widely. The true danger is untreated waste water brimming with bacteria and other parasites, many of which cause deadly diseases. Manual scavenging exists because India is a resource rich country and a large human resource and a death of jobs. According to Harnams Singh, the chairman of the Delhi Safai Karamchari Commission, almost 70 percent of the manual scavengers die on the job. Due to less supplies of manpower for cleaning the sewage we used the motors and tanks for removing the waste dumped in the sewage. Then the technology took a great control over the century and we used the automated stick to clean the sewage waste. If a country generates fuel by using this technology then it is one of the best economical problem solutions. The technology of generating fuel is well to show the environment clean.

IMPORTANCE OF SEWAGE CLEANING

- It is very important to provide some degree of treatment to waste water before it can be used for agricultural or landscape irrigation or for aquaculture
- The principle objective of sewage treatment is generally to allow human effluents to be disposed of without danger to human health or unacceptable damage to the natural environment

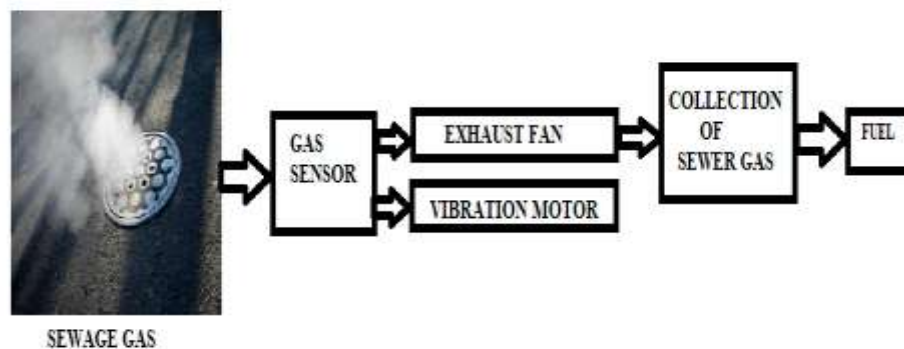
- According to a research a large number of people die from water borne diseases in most of the developing countries. Therefore, it is very important to get the proper treatment of the water for a healthy living

PROPOSED SYSTEM

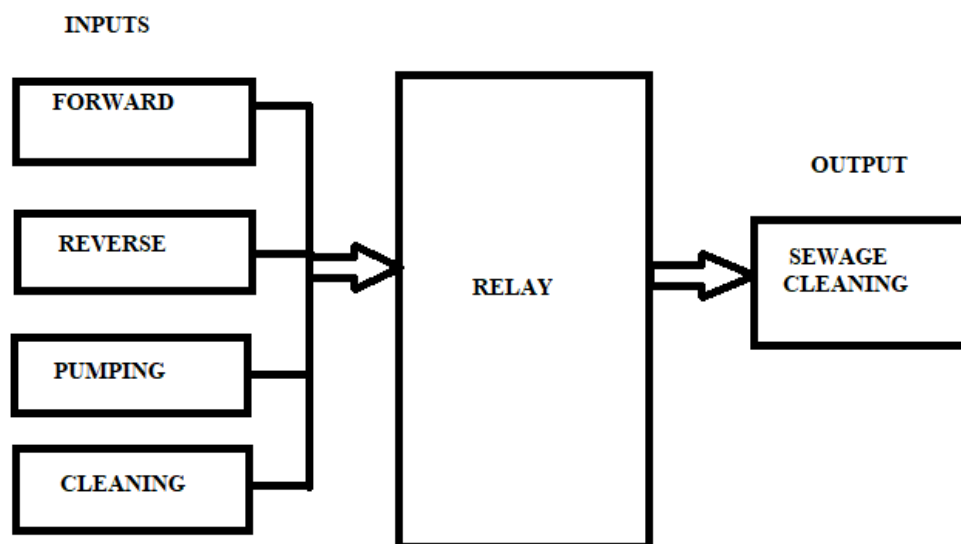
Here we are primarily going to sense the sewage that it has gases or not with the help of sensors. If yes then there will be a vibration indication. When Vibration motor gives indication, our machine will automatically collect the gases into the container. This collected gas can be directly used as a fuel for cooking and other activities. Second stage of this project is to clean the sewage. We are going to use RF Transmitter and RF Receiver for cleaning the sewage in horizontal pipe by giving commands such as forward, reverse, pumping and cleaning. Additionally a stick like structure, which will be sent depth into the sewage and it gets expanded like an Umbrella. After the expansion, the stick is then pulled out for collecting

The waste in vertical pipe, all the solid waste can be taken out easily and generation of fuel is done.

BLOCK DIAGRAM FOR GENERATION OF FUEL



BLOCK DIAGRAM FOR SEWAGE CLEANING



METHANE AS A FUEL

Methane is an odorless, colorless, flammable gas. It is used as primarily as fuel to make heat and light. It is also used to manufacture organic chemicals. Methane can be formed by the decay of natural materials and is common in landfills, marshes, septic systems and sewers. If you can smell it, the level may be too high to be safe. In home, methane may be used to fuel water heater, stove and clothes dryer. The gas produced from decaying sewage could be clean enough to heat homes. Make electricity and even use for cooking.

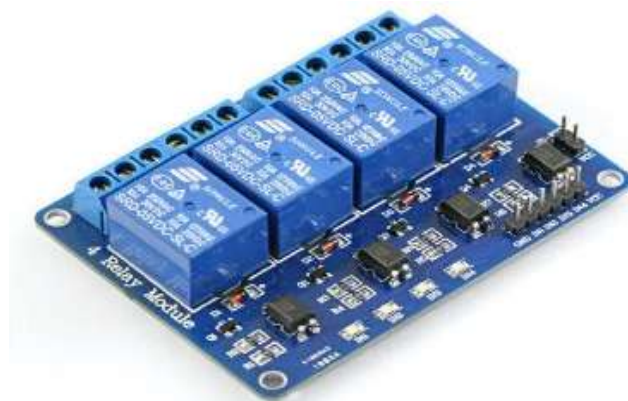
MATERIALS USED

VIBRATION INDICATOR



The cylindrical shape is also called bar-type vibration motor. This vibrating motor is essentially a motor that is improperly balanced. In other words, there is an off-centered weight attached to the motors rotational shaft that produces a centrifugal force while rotating. This unbalanced force displaces the motor. Moreover, increasing the voltage supplied to the motor will increase its speed, and therefore the vibration frequency, as well as the vibration amplitude

CHANNEL RELAY



This is a 5V 4-channel relay interface board, and each channel needs a 15-20mA driver current. It can be used to control various appliance and equipment with large current. It is equipped with high-current relays

that work under AC 250V 10A or DC 30V 10A. it has a standard interface that can be controlled directly by microcontroller.

EXHAUST FAN



This Exhaust fan is used to suck the gas present inside the sewage. The gas can be easily collected and stored for many applications.

RF TRANSMITTER AND RECEIVER

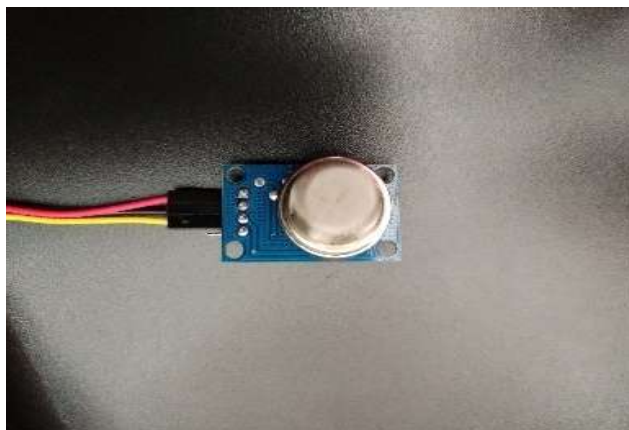


The RF module comprises of an RF transmitter and an RF receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps – 10Kbps. The transmitted data is received by a receiver operating at the same frequency as that of the transmitter.

GAS SENSOR

This sensor can detect a wide range of hydrogen gas, city gas, sewer gas, in particular, is a low-cost sensor for a variety of applications.

Suitable for home and industrial hydrogen leakage monitoring devices. Cannot interface with ethanol vapor, soot, carbon monoxide, and other gases.



PUMPING MOTOR



It can be operated from a 3 -6V power supply. It can take up to 120 liters per hour with very low current consumption of 220mA. Just connect tube pipe to the motor outlet, submerge it in water and power it.

GEAR MOTOR

It can be operated from a 3 -6V power supply. It can take up to 120 litres per hour with very low current consumption of 220mA. Just connect tube pipe to the motor outlet, submerge it in water and power it.



The 30 Rpm Gear Motor and 500 Rpm Gear Motor are used to move forward, reverse and cleaning the waste which is present inside the sewage pipe.

ADVANTAGES

- The cost of equipment and installation is low
- It can be used in any type of drainages based on their sizes
- It will avoid overflowing drainages due to blockages and maintains clean and safe environment
- It also helps in reducing pollution, man power, time and money

APPLICATIONS

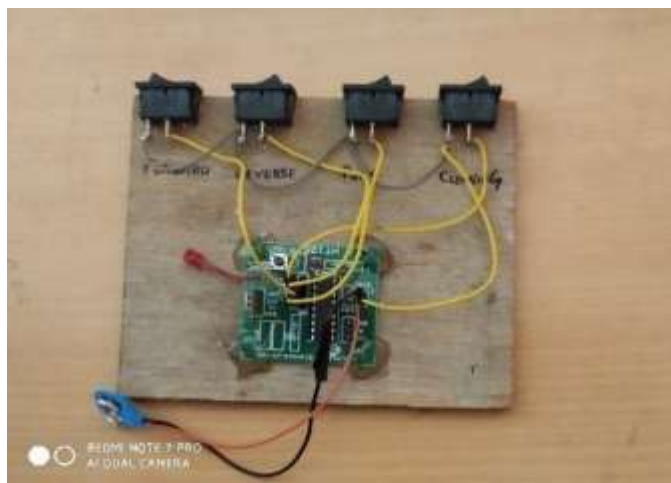
- This system can be implemented in “SMART CITY”
- This could be used for Government projects like SWACH BHARAT mission
- It can be used in maintaining cleanliness of drains like schools, colleges, industries, hospitals etc.,

RESULT:

COLLECTION OF GAS



RF TRANSMITTER FOR CONTROLLING



RF RECEIVER FOR CLEANING



CLEANING



FUTURE SCOPE

The project of sewage cleaning definitely serves the many dimensions to the human needs and definitely presents a bright future aspect. Hence the project can be teachable. Like foreign countries, if we modify this system we can supply the biofuel to the domestic purpose and also, we can able to put a power plant as like petroleum plant to charge the e-vehicles, streetlights etc.

CONCLUSION

This project generates fuel to overcome the energy crisis problem and saves manual scavengers life from death. Sewage waste is treated through this project to meet the national emission standards, with stable operation, low cost and good effect. The technology of generating fuel is well to show the environment clean. Hence this project will become a great success in upcoming years.

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