



# Automatic Monitoring and Blockade Removing in Sewer System Using GPS Tracker

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**ABSTRACT:** Sanitation is a one of the factor that decides the hygiene of the country. To create diseases free clean India, Automatic monitoring and blockade removing in sewer water system is developed. In this paper real time system was designed and implemented for sensing and removing the blockade automatically. Thus in turn the death rate and exposure of toxic gases such as methane, hydrogen sulphide by the sanitation workers will be reduced drastically. Ultrasonic sensor, motor, wireless communication and Global positioning system was used. GPS locate the appropriate location and message was sent through GSM to mobile.

**KEYWORDS:** Ultrasonic sensor, Wireless communication, Sanitation workers, Sewer system

## I. INTRODUCTION

Sewer systems are generally networks which convey waste water, solid wastes, rain water from the environment through the series of underground pipes and manholes. Finally it is retreated or returned to the environment. A sewer gas is a combination of toxic and non toxic gases which accumulate in the different zone of the sewer system depending on the wastes. Sewer gas is generated during the decay of household and industrial wastes. Highly toxic components of sewer system include hydrogen sulphide, ammonia and Nitrous oxide. Sewer gas also contains methane, carbon dioxide, sulphur dioxide and nitrous oxides. In addition, bleaching powder, industrial wastes and gasoline frequently are present in municipal and privately owned-sewage treatment systems. Sewer gases are taken in to major consideration because of its terrific features such as odour, health issues, potential for creating unhygienic environment. Several risks and health issues arises because of exposure of sewer gases which includes hydrogen sulphide poisoning, Asphyxiation, tuberculosis, ulcer etc. Hydrogen sulphide at low concentration (<0.02ppm) smells like rotten eggs and its exposure leads to eye irritation, cough, sore throat, loss of appetite, poor memory and drowsiness. Hydrogen sulphide at extremely high concentration (>150ppm) may leads to loss of consciousness and causes death. High concentration of methane will decrease the presence of oxygen in air. The scarcity of oxygen causes several abnormalities such as head ache, nausea and giddiness. When oxygen concentration is less than 12% then death may occur suddenly. In addition to above features specific sewer gases such as Hydrogen sulphide and methane holds explosive property.

In most of the developed countries there are various protective measures are taken to prevent the death rate of sanitation workers such as providing bunny suits and respiratory apparatus to the person entering in to the manhole but in our country sanitation workers uses spliced bamboo sticks to dislodge the block. The sudden blast of such block exposed with sewer gases which will affect the functioning of brain as soon as possible. Apart from the sewer workers there are the persons called divers who swim along the pipe line to remove the blockages. This process may take up to 48 hours. 225 sanitation workers are died in last five years. 2000 children under the age of five died in India particularly 1800 children are died because of poor sanitation and hygiene.

## II.SYSTEM MODEL AND ASSUMPTIONS

In India, Real Time Control based sewer system is still in a defined stage. Due to the blockade in the sewer system an unhygienic environment is created. When human beings go inside to remove the blockage, it brings dangerous diseases to mankind even death. The conception of this work is to automate the sewer system in an efficient, cheaper way to reduce the death rate and to create a clean India.

Ultrasonic sensor is at the transmitter side to sense the level and send the signal to the motor through microcontroller. Microcontroller is at intermediate stage to control the process. Relay (SPDT) is used to convert 5v to 230v and to isolate the circuit while getting damage from overloading. Contactor circuit and snubber circuit are used to protect the process during overloading. GPS is used as a mode of communication and GSM is used to transmit the signal to the receiver end. Wiring should be properly insulated to ensure safety of the circuit as well as to prevent the electric shock. The block diagram of automatic sewer system is shown in figure-1.

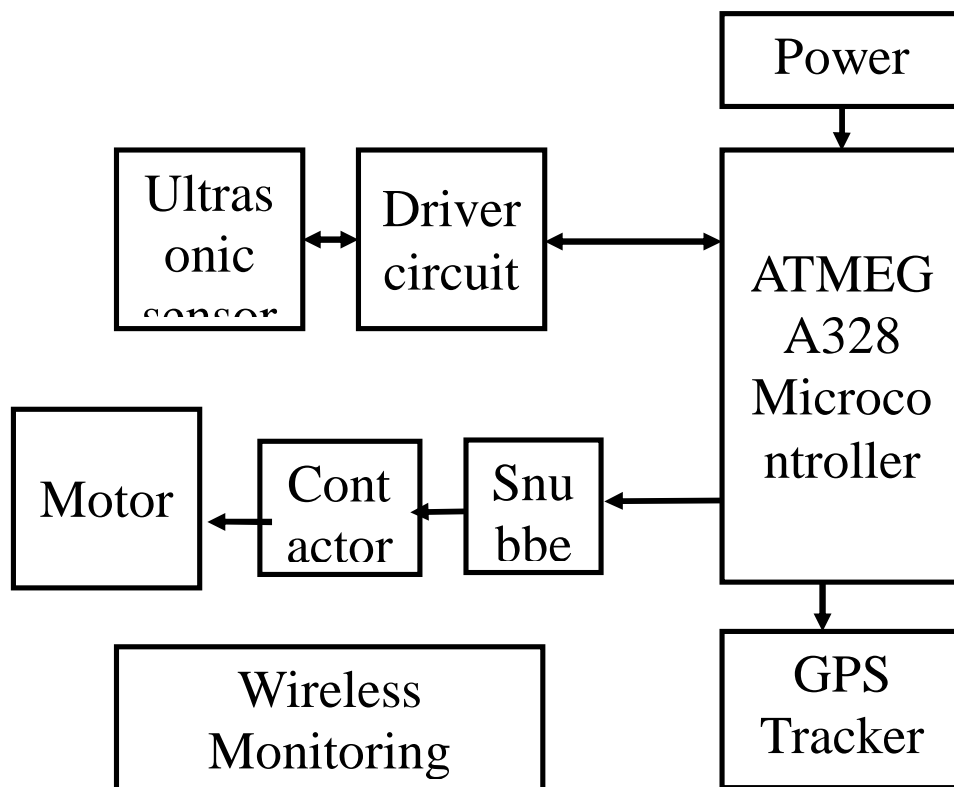


Figure-1 Block diagram of automatic sewer water system



Figure-2 Experimental setup with Relay in OFF condition



Figure-3 Experimental setup with Relay in ON condition

### III.PROCESS DESCRIPTION

The sensor senses the level when it comes nearby 10cm and a signal is send to the motor through microcontroller as shown in figure-2 and figure-3. Then the motor tends to rotate and it cut the larger particle in to small pieces.Theultrasonic sensor senses the level of the water and sends it to the motor for performing action through microcontroller. Microcontroller also sends the signal to relay for performing conversion of 5v to 230v. On one side



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GPS locate the exact area of blockade and send the signal to GSM for conveying it to the receiver end. GSM is compact in size and adapt with various frequencies such as 900MHZ, 1800MHZ and 1900MHZ. On another side through relay, supply is given to motor and a filter is placed above the motor to collect the clogs. In between relay and motor contactor circuit is provided to protect the motor during overloading. The contactor circuit consists of Miniature circuit breakers which get tripped if there is any overload and it prevents from damage of the Circuit.

#### **IV. CONCLUSION**

The implementation of automatic monitoring and blockade removing in sewer system in GPS tracker will create a clean India and also save the life of thousands of sanitation workers. This work will create a disease free environment for our younger generation and will provide a chance to feel the air of purity. It also provides effective change in the environment at effective cost and in a efficient manner. Thus the work results in helping the government to develop its sanitary infrastructure.

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