

# AN EFFECTIVE ALERTING SYSTEM OF SEWAGE MONITORING TO SECURE HUMANS BY IDENTIFYING THE TOXIC GASES

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**Abstract.** The project is entitled, "An effective alerting system of sewage monitoring to secure humans by identifying the toxic gases". In many developing countries, the sewage cleaners still clean without knowing or understanding the presence of poisonous gases, which compromise their lives due to their exposure to the dangerous gases. This project detects harmful gases which may get emitted via sewage.

A mobile phone or computer is used to display air quality data. The sewerage system is underground in the majority of the cities, and it is the responsibility of municipal corporations to keep cities clean, healthy, and safe. This work is aimed at detecting toxic gases and altering the system by designing a microcontroller. When the air quality deteriorates beyond a certain limit and when a sufficient amount of harmful gases is present, like carbon monoxide, hydrogen sulfide, ammonia, methane, esters, sulfur dioxide and nitrogen oxides, it will be sensed with best Air quality sensor MQ135, microcontroller automatically alters the system. When the gas concentration level rises, the buzzer alarm is activated immediately, and also an alert message (SMS) is sent via GSM to the authorized person and the corporation person. Think speak is an additional platform that can be used to visualize data in the cloud. The advantage of this project's associated alerting system over IoT technology is its ability to provide quick response times and precise detection of a potential emergency. The reading values of the gas sensor will be driven out by an Arduino module without the assistance of human hands. (**Keywords** : Arduino, Air quality sensor MQ135, GSM, Think speak)

## I.INTRODUCTION

An accumulation of deathful gases obtained by the disposal of domestic wastes or industrial wastes. Sewer gases can include hydrogen sulfide, ammonia, methane, carbon monoxide, sulfur dioxide, and nitrogen oxides. Sewer gases can cause health problems. There are still cases where the hazardous gases emitted by sewage endanger the lives of workers in developing countries like India where the sewage has to be cleaned by unskilled labor. Furthermore, such a harmful gases, a highly concentrated exposure of gases which, may even lead to their death. Thus an efficient method to detect the presence of such harmful gases becomes a necessity.

The main objectives are:

- The closed sewages emit harmful gases.
- Untrained sewer cleaners still clean the sewers, putting their lives at risk due to the release of harmful gases.
- To identify the safety limits of these gases and calculate the level by using air quality sensor.
- Concentration of these toxic gases present in the air is identified accurately using cloud(Thinkspeak).
- Monitor and detect the harmful gas emission from sewage and provide vital information through GSM, information consists of what kind of health effects may rise to human.

## II. LITERATURE REVIEW

[1]An Effective Safety System for Identification and Removal of Toxic Gases in Drainage Cleaning Process.

Microcontrollers detect the toxic gases and alert the system. Hazardous gases like H<sub>2</sub>S, CO, CH<sub>4</sub> will be detected and displayed in real time on the LCD monitor. In the event of a gas concentration increase, an alarm is generated and a message is sent via GSM.

[2]Human security from death defying gases using an intelligent sensor system.

A GSM mobile phone can broadcast the emergency alert messages, which, in turn, can alert other rescue workers to the potential hazard the worker faces while on duty.

[3]Smart safety monitoring system for sewage workers using iot.

By using a Heart Beat sensor and a concentration sensor for CH<sub>4</sub>, our device will monitor the person's pulse rate and O<sub>2</sub> concentration, and inform the worker or outdoors unit when parameters are out of range.

[4]Iot based smart safety monitoring system for sewage workers with two way communication.

A clog inside the drainage system will be identified by the sensors and system, and the exact location of the clog and other information will be provided

[5]Smart sensors and Arm Based Drainage Monitoring System The core unit of this project is ARM7.

By sensing the sewage water level and blockage, the ARM7 processor can determine the root cause of the problem. By attaching a gas sensor, an alert message or buzzer sound will be heard if there is any leakage.

## III. PROPOSED METHODOLOGY

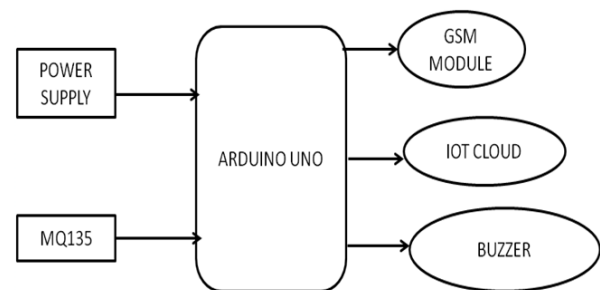
The MQ135 sensor can sense hydrogen sulfide, ammonia, methane, esters, carbon monoxide, sulfur dioxide and nitrogen oxides and

some other gases, so it is perfect gas sensor for this project. When it is connected to Arduino Uno, then it will sense the gases, MQ135 gas sensor gives the output in form of voltage levels and need to convert it into PPM. So for converting the output in PPM, here used a library for MQ135 sensor. The details from the sensor is passed to Arduino Uno where it will be processed and the details passed via GSM module using SMS to alert humans.

Sensor was giving us value of 90 when there was no gas near it and the safe level of air quality is 350 PPM and it should not exceed 1000 PPM. When it exceeds the limit of 1000 PPM, then it starts cause Headaches, fatigue, nausea, dizziness and if exceeds beyond 2000 PPM then it may put life in death with minutes or in an hour.

When the value will be less than 1000 PPM, then the SMS will display information as normal background level. Whenever the value will increase 1000 PPM, then it will display "Caution: Dizziness, nausea and convulsions – unconscious within 2 h – death within 2 to 3 hour" and gives sound of buzzer. Buzzer will protect the people who is working in cleaning of sewer and public can be alert and evacuate from the location. This project is useful in factories also where some harmful gases may release.

## IV. BLOCK DIAGRAM



## V. COMPONENTS

### Arduino Uno

Arduino/Genuino Uno is a microcontroller board primarily based on the ATmega328P. It has 14 virtual input/output pins. "Uno" means one in Italian and the Uno board is the first in a collection of USB Arduino boards, and the reference version for the Arduino platform. Arduino is an open-source electronics platform based totally on smooth-to-use

hardware and software. Using the Arduino programming language (primarily based on Wiring), and the Arduino software program (IDE), based totally on Processing.

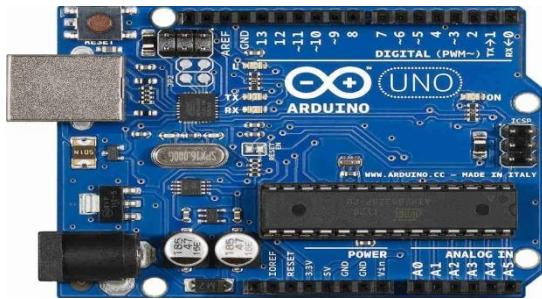


Fig No. 5.1 Arduino Uno

### MQ135 Gas Sensor

The MQ135 sensor can sense hydrogen sulfide, ammonia, methane, esters, carbon monoxide, sulfur dioxide and nitrogen oxides and some different gases, so it is perfect gas sensor for this assignment. MQ135 gas sensor offers the output in form of voltage degrees and need to convert it into PPM. So for changing the output in PPM, right here used a library for MQ135 sensor.

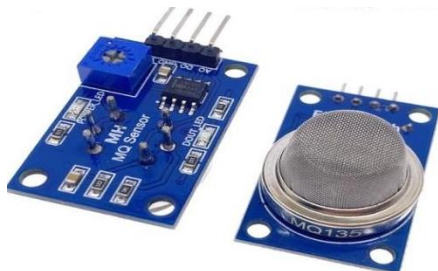


Fig No. 5.2 MQ135 Gas Sensor

### Jumper wires

Jumper wires usually come in 3 variations: Male-to-male, male-to-female and female-to-female. distinction between every is in the cease point of the twine. Male ends have a pin protruding and can plug into matters, even as female ends do now not and are used to plug things, nice and poor cables in the jumper cable set.

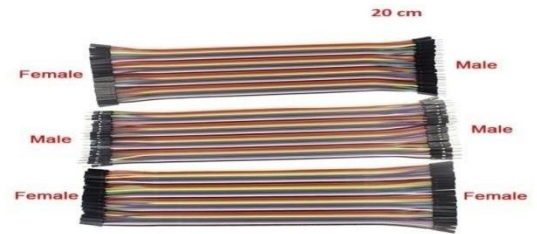


Fig No. 5.3 Jumper wires

### Breadboard

There are several tiny holes on each side of a rectangular plastic board. These holes allow you effortlessly insert digital additives to prototype (meaning to construct and check an early version of) an electronic circuit, like this one with a battery, transfer, resistor, and an LED (light-emitting diode). The connections are now not everlasting, so it is clean to take away a factor if you make a mistake, or simply start over and do a new task. This makes breadboards first rate for novices who are new to electronics.

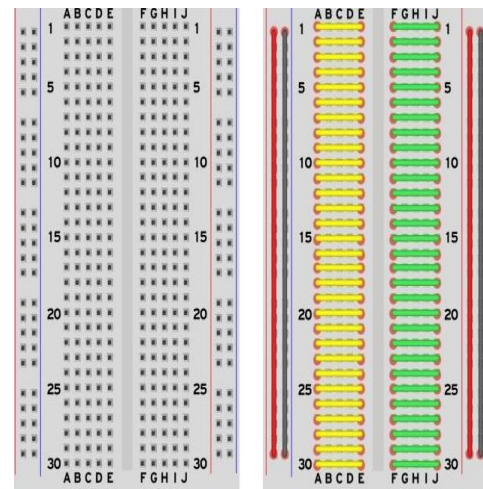


Fig No. 5.4 Breadboard

### GSM(Global System for Mobile communication)

GSM modems or GSM modules provide data links to remote networks using the GSM mobile telephone technology. Mobile phone networks view them as identical to regular mobile phones, including the need to identify themselves to the network by using a SIM card. Generally, GSM modems are connected to their host via TTL-level serial interfaces. GSM

modems are often embedded within embedded systems.



Fig No. 5.5 GSM

### Buzzer

It is like a magnetic speaker, it needs voltage with different frequency so that it can make sound accordingly. The pitch becomes louder when the frequency gets higher.



Fig No. 5.6 Buzzer

### VI. CONCLUSION

The system to monitor the Gas level in Sewage using Arduino microcontroller, IOT

Technology is proposed to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects of Sewage such as air quality monitoring issue proposed in this paper. Here The using of MQ135 gas sensor gives the sense of different type of dangerous gas and Arduino is the heart of this project which control the entire process. A GSM module and buzzer alert the system.

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