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ESTIMATION OF TOXIC GASES LEVEL IN SEWAGE

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***Abstract* - The lack of prior caring of sewage work is the witness for the deaths of thousands of sewage cleaners throughout the year from accidents and various diseases such as hepatitis and typhoid due to sudden or sustained exposure to hazardous gases like carbon monoxide, methane, hydrogen sulphide and sulphur dioxide. A better knowledge related to hazards in the surroundings is necessary for the prevention of poisoning of gases. These gases have to be keep on track so that enormous rise in the normal level of effluents should be known. The safety of the people shall be the highest law. As safety concerns are reasonable it is necessary to implement good safety system in places of work. Toxic effluents are more often released from sewage and sanitary areas which cannot be easily detected by human senses. Acquaintance of make them preventive and bettering sewers' safety is lacking largely. This Project focuses on designing an embedded system to track down effluents and generate alert signal through wireless network. The hazardous gases like ammonia, hydrogen sulphide, methane and carbon monoxide turns out from sewage are sensed by gas sensors every moment and updated to the client when it surpass the normal grade. The advantage of this smart system is its quick response time and accurate detection in extremity cases with the proof of safety.**

***Key words*: Embedded system, Wireless Network, Gas sensors**

I. INTRODUCTION

Toxic gases like carbon monoxide is colorless and odorless. lower concentrations yet such smell vanishes at higher concentrations due to olfactory factors. It will be very harmful if drainage workers think that they can easily recognize the presence of toxic gases by smell. H2S, CO and CH4 are the most common hazardous gases found in drainage worksites. In addition, oxygen deficiency is another major cause of illness and fatalities. Hydrogen sulphide is a deadly dangerous gas with unique "rotten egg" odor that can be detected even at very low concentrations. H2S has a paralyzing effect on the sense of smell at concentration of 100ppm and certainly workers cannot detect changes in concentrations. Carbon Monoxide(CO) the colorless and unfragrant gas is given out when charcoal is burnt in poorly open areas. Similarly it is generated when gasoline/diesel generators or other fuel-driven tools are used in adequately ventilated workplaces**.** Methane is commonly produced when nuclear matter is crumbled by a variety of bacterial processes . It is a colorless, extremely convulses and ignitable gas that can cause fire and explosion. The accumulation of methane in a poorly ventilated area will lead to displacement of normal air, those results in an oxygen deficient environment also occurs in organic and inorganic compounds of which the latter is clearly more toxic and may cause cancer of skin, lungs and the urinary tract.

II. PROPOSED SYSTEM

HARDWARE DESIGN : Project proposed a concept of using sensors for the purpose of monitoring sewer gas. Sewer Snort dispensers are executed at strategic areas by analysing the sewer map and inspection demands. The dispensing schedule is framed based on the applications. Once it is deployed, there is a need to track its position. This system operates with the construction of pipe profile.

It examines the presence of indwelling toxic gases in critical plots, their layoff and mode in air to prevent miners from contacting diseases. It mainly focuses on devious monitoring composition of wireless sensor network.

Sensor name	Detection range
Methane sensor	300-10000 ppm
Carbon monoxide sensor	10-10000 ppm
Hydrogen sulphide sensor	1-1000 ppm

Table 1. Gas detection range of sensor

H2S Sensor: This sensor is under constant development because of the hazardous and corrosive nature of H2S. It is used to identify hydrogen sulphide in the hydrogen feed stream of fuel cells for the prevention of catalyst. It is used in personal protective equipments to alert the presence of hydrogen sulphide gas to the user. It can sense the gas to the maximum of 1000ppm.

Methane Sensor: This sensor is highly sensitive to CH4 and natural gas. It gives quick response with long life with stability. It is highly used in gas leakage detection system. Resistance value of this sensor is different to various concentration gases. So, sensitivity adjustment is very necessary

Carbon Monoxide (CO): The colorless and unfragrant gas is given out when charcoal is burnt in poorly open areas. Similarly it is generated when gasoline/diesel generators or other fuel-driven tools are used in adequately ventilated workplaces. Unmasking to carbon monoxide at concentrations over 350ppm can cause blurring, fainting on exertion and collapse. An aerial concentration of carbon monoxide more than 1200ppm is immediately dangerous to health and life.

III BLOCK DIAGRAM

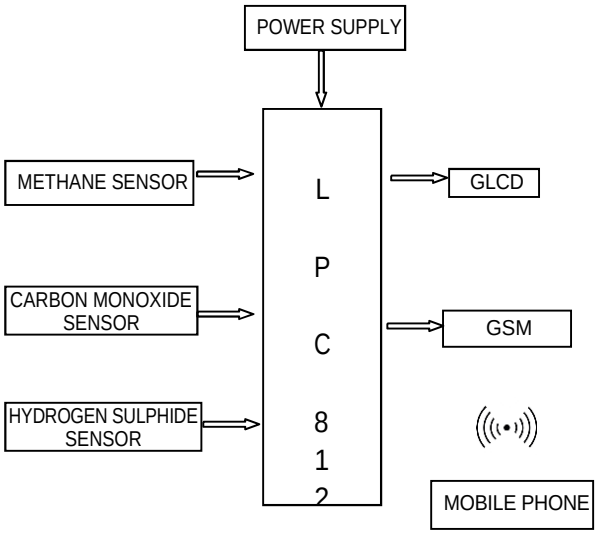

Figure 1. Block diagram

IV WORKING

The project focuses on the intelligent system for hazardous gas detection with emergency alarm when LPG and combustible gas were sensed. It is monitored by microcontroller. A signal is generated and message is sent to the licensed user as an alerting system to help in faster reduction of the critical situation. Certainly this system detects only Three gases. The captious level of respective gas should be known. This system is useful only in residential areas for domestic use.When a suspicious leak occurs, sensor in the system detects the leakage between 400-600ppm and sends the alert message to the end user and activates the alarm to provide the protection circuitry. This system highly focuses only on domestic gas detection. It examines the presence of indwelling toxic gases in critical plots, their layoff and mode in air to prevent miners from contracting diseases. It mainly focuses on devious monitoring composition of wireless sensor network. This inquiry focuses on decision making about safety improvements only in restricted areas of mines and hence it shall be unaffordable in monitoring drainage systems where the whole atmosphere differs huge. Since the modeling of WSN is based on ambient intelligence, the monitoring agent should be a skilled person to maintain the system with flexibility. a paper proposed a concept of using a drifting sensors for the purpose of monitoring sewer gas. Sewer Snort dispensers are executed at strategic areas by analyzing the sewer map and inspection demands. The dispensing schedule is framed based on the applications. Once it is deployed, there is a need to track its position. This system operates with the construction of pipe profile.

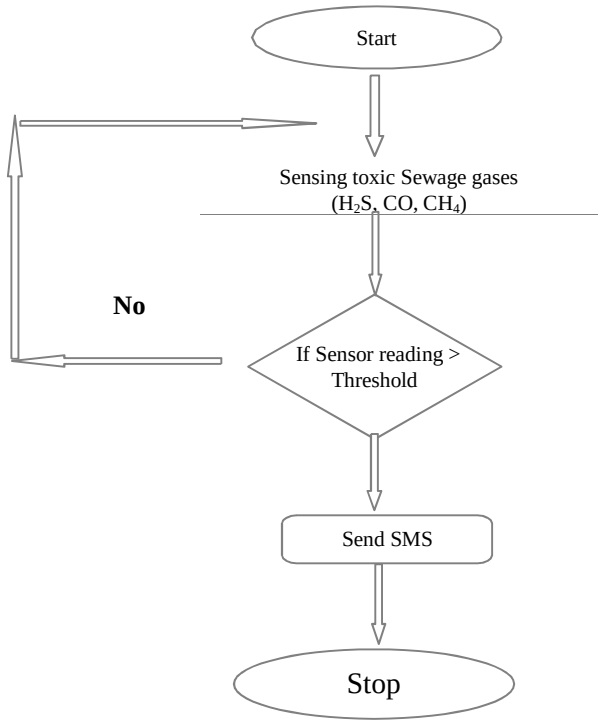

Figure 2. Flow chart

V OUTPUT

As soon as the sensor detects the various gas level of gases such as CH4, H2S, CO, it sends the data to the microcontroller. The microcontroller analyses the data and converts the analog values into digital values. The values are displayed in the LCD display (Figure 3) attached to the device. Once the values reach the threshold level which is predefined to the microcontroller, it sends the alert message to the mobile phones through GSM.

Figure 3. Output display

Different gas levels (figure 4) such as H2S, CO, CH4 are recorded daily and their levels are displayed whenever needed. These gas levels are monitored on daily basis or monitored whenever needed. The graph (figure 4) gives detailed information about different gases levels such as H2S, CO, CH4 in PPM.

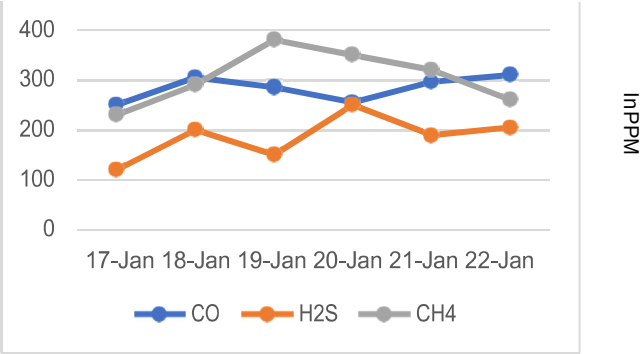

Figure 4. Various gas levels on different days

When the gases reach the threshold level, the GSM Module send the prior information about the gases level to the mobile phone. So if the user could not monitor the gases level daily, this message helps them to know the gas levels.

Figure 5. GSM Module

VI FUTURE WORK

Internet of Things plays a leading role in the digital world. To make our society fulfilled with faster communication at affordable cost, this project aims to upgrade the means of transmission through Wi-Fi. By using this wireless networking technique data can be accessed over maximum coverage area. This system with such advanced technology will bring the drastic change in the lives of sewers. This system hopefully will be the helping hands for the department of health and sanitation.

VII CONCLUSION

This paper has introduced an innovation approach for trench gas detection and regulation based on ppm levels of hazardous gases. The toxic gases like methane, hydrogen sulphide and carbon monoxide are monitored by the hardware designed. That is, when the normal ppm levels of gases exceeds the data is send to the receiver through GSM. This system is highly reliable with accuracy and it is cost effective.

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