

SMART REAL TIME MANHOLE MONITORING SYSTEM

PRABHA.A¹, KAMALAKANNAN.R², MEGALA.J³,
Associate Professor^{1,3}, Assistant Professor², Dept. of EEE,
S.A Engineering College (Autonomous), Chennai-77

prabhaa@saec.ac.in, kamalakannanr@saec.ac.in, megala271@saec.ac.in

Abstract— The present sewage framework in India isn't innovative and census 2011 of India also states that only 18.1% of closed drainage is available and 33% of open drainage. Nowadays, Manhole cover failure is on the rise and generally affects the safety, safekeeping and economy of the society. During rainy season the drainage may overflow, causing traffic jam and creates an unnatural environment. Since drinking water mixes with sewage water, it causes serious infection like cholera, diarrhea, etc. An integral part of drainage system is to access points into it when it comes to clearout, clearing, and inspection.

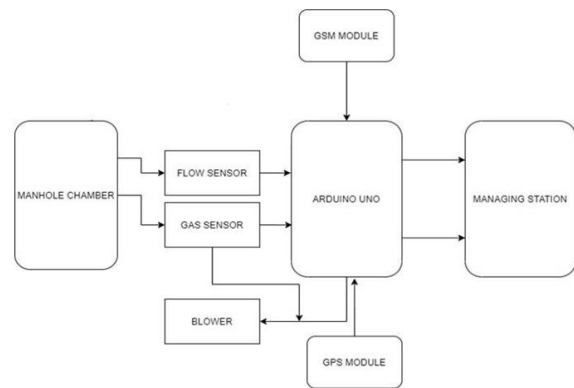
Keywords- Sewage water, Drainage system monitoring, Inspection, Low cost

I. INTRODUCTION

An integral part of any drainage system is the access points into it when it comes to clearout, clearing, and inspection. Urban cities have adopted underground drainage system and the city's municipal corporation must maintain its cleanliness. If the sewage preservation is not proper, ground water gets infected causing infectious diseases. Blockages in drains during monsoon season, causes problems in the normal of the public. Hence, there should be a facility in the city's firm which alerts the officials about blockages in sewers, their exact position and also if the manhole lid is open automatically. Underground drainage consists of sewage system, gas pipeline network, water pipelines, and manholes. It represents the implementation and design function of an Underground Drainage and Manhole Monitoring System (UDMS) with separate transmitter and receiver models. The vital considerations of this design are low cost, low maintenance, fast deployment, and a high number of sensors, long life-time and high quality of service. It mainly acknowledges in the field of alerting the people about the gas explosion, increase in the water level and the opened lid. The present sewage framework in India isn't innovative and census 2011 of India also states that only 18.1% of closed drainage is available and 33% of open drainage. Nowadays, manhole cover failure is on the rise and generally affects the safety, security and economy of the society. During rainy season the drainage may overflow, causing traffic jam and creates an unhealthy environment. Since drinking water mixes with sewage water it causes serious illness like cholera, diarrhoea etc., An integral part of drainage system is to access points into when it comes to cleaning, clearing, and inspection.

II. EXISTING SYSTEM

Today's drainage system is not high-tech. so, whenever there is overflow it is difficult to figure out the exact location. Hence, detection and repairing become time consuming. Improper closing of lids leads to many accidents especially in rainy seasons. The harmful toxic gases such as methane, natural gas produced may be harmful to human lives. As the possible consequences may have effect on personal hygiene and lives of human being. The welfare of sewage workers must be taken into account.



The functional block diagram describes the monitoring of manhole in underground drainage system. Any blockages, rise in temperature, explosion due to toxic gases, overflow, manhole lid left open is detected by the sensors. The signals from the sensors are fed to the controller, which is programmed to generate alerts. In this we use sensors to detect blockage, floods, and gases. The sensors will identify the clogging inside the drainage system and will give information about the location and further actions will be taken care by the municipal.

Arduino UNO: Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header a





Flow sensor: Flow sensors are mainly used to measure the quantity or the rate of flow of liquids or gases. We are using it to detect overflow.

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ii. Gas sensor: Gas sensor is a device which detects the presence or concentration of gases in the atmosphere. It detects combustible gasses and smoke.

iii. Blower: Blower is a device which increases the velocity of air or gas when it is passed through equipped impellers. They are mainly used for flow of air/gas required for exhausting, aspirating, cooling, ventilating, conveying etc.,

iv. GSM Module: GSM module is a hardware device that uses GSM mobile telephone



technology to provide a data link to a remote network. It is used to enable communication between a micro controller/microprocessor and GSM network.

GPS Module: GPS module contain tiny processor and antennas that directly receive data send by satellites through dedicated RF frequencies. From there it will receive time stamp from each visible satellites, along with other pieces of data.

III. PROPOSED SYSTEM

Use of ultrasonic sensors to monitor improper closing of lids. Use of flow sensors to detect the variations in the flow(overflow).Get the prior alerts of overflow and locate them using IoT and tracing the location using GPS and send SMS through GSM. Use of gas sensors to detect the presence of methane and harmful gases. The abnormal level of gases simultaneously switches ON the air blower.



IV.RESULT

This system detects the blockages and water level in the manhole. It also monitors the continuous water flow rate. With the help of sensors temperature, humidity and gas leakage can be identified. The system also informs whether the manhole lid is open or closed by using the ultrasonic sensor. When a particular sensor reaches the respective threshold level, then that respective value of the sensor will be sent to the microcontroller. Microcontroller updates the live values of all the sensors using IoT. If any problem arises in the manhole, sensor senses it and sends that information to the microcontroller. Furthermore, the microcontroller sends the signal and the exact location of the manhole through IoT to the managing station. Then, an automatic mail is sent by Raspberry Pi. This alerts the person-in-charge to take the required actions regarding the problem occurring inside the manhole.

CONCLUSION

Sensor unit automatically senses and updates the live values of the physical parameters like temperature, humidity, water level and flow rate, blockages, and manhole cap is open or closed through IoT. This makes the system smart and automated. The deployment of Wireless Sensor Networks (WSN), helps in the implementation of the Smart cities in a developing countries. This WSN can also be useful in designing of environmental monitoring systems, which helps in monitoring of volcanic activities, flood detectors and other system. By a small modification in the implementation, this project can be used in agriculture

fields or other environmental fields to monitor and control the systems. In future, Smart cities infrastructure could be modified for intelligent communication and management of traffic signals, street lights, transit applications, active lanes, and so on. With the integration of smart devices in a city infrastructure can makes life in a city a lot easier. Also further by using PLC controller and SCADA systems, drainage water can be controlled, monitored and also this water can be used to irrigate plants, clean toilets, etc. This PLC and SCADA systems can be used as a treatment system for drainage water. Primarily, PLC controls the process of sewage treatment plant and SCADA is a remote terminal unit, which monitors and controls the entire area.

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