Review Paper on Storm Water Drainage Blockage

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Abstract - India has announced a project to make smart cities. To make a smart city, it is necessary to consider many aspects like smart home, smart television, smart transportation etc. A smart underground framework will be required in which underground storm drainage system is of utmost importance. All underground systems play an important role in our daily life. They provide smooth functioning of every point and also create problems for us all if they are not properly maintained.

We have known about the flood situation in some cities of India like Chennai, Mumbai, Pune for recent years. Every time, the government and the people have suffered a lot due to waterlogging. Due to road and traffic congestion, industries were affected in all areas. Considering the above problems, in this project we are introducing a smart system using sensors to alert about the problem of blockage chambers. The system consists of GPS6M, GSM 800L with float sensor, ESP32 board controller, I2C module, LCD display and Blynk IoT application. The level sensor detects the level flow in the drain system and we can detect the block by the water flow. When the sensor exceeds its level, it alerts the concerned authority via mobile text message. Once a block is detected, an alert is received and municipal staff and employees can take immediate action. This system has economic impact and will be beneficial for environment and drainage workers.

Keywords — Storm water, Urban flood, drainage system, Leakage detection, water level sensor, sensor network, water management.

I. INTRODUCTION

The road network and its underground services plays an important role in economic development; hence the Maharashtra government invests heavily in the road network and its services. Roads provide facilities for users to move from one place to another. But maintenance and repair of road services is not given enough importance. Therefore, waterlogging is seen in many cities every monsoon. Lack of advanced technology, poor workmanship leads to the problem of chamber choking. Failure of roads has a major impact on serviceability, ride quality and road safety.

In a city like Pune, such problems occur in every monsoon, according to the PMC Roads Department, water accumulates in various parts of the city, mainly near housing societies in Vadgaonsheri, Chandannagar, Vishrantwadi, Hadapsar, Warje, Wakad, Karvenagar, Bavdhan, Kondhwa, Hinjewadi. This leads to traffic jams, unnecessary fuel consumption, loss of time and sometimes accidents have also occurred. We have been seeing the above issues for the past few years, viz. Bhumkar Chowk in Wakad gets waterlogged every year during monsoon season and it affects all of us, due to water there is no footpath so citizens suffer a lot, observed long queues of vehicles many times and people have to stand in one place for hours. This not only causes financial loss to everyone in the form of fuel but also wastes valuable time. To solve all these problems, we have come up with a system called "Drainage Blockage Detection Technique Using Sensors". This system will alert you periodically so that the location of the chamber can be known and an action plan can be made. Also, this system will alert people around with the help of its alerting buzzer and lightning signal.

II. STORM WATER MANAGEMENT SYSTEM

Storm management is a general term that refers to the flow of rainwater collected from roofs, roads and other surfaces

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into low-lying areas. Although they can be used in rural areas (e.g. for rainfall harvesting), they are needed in urban areas where the surface is impermeable and therefore impermeable to waste water. Rainwater is collected from roofs, gardens, wooded areas, roads, etc., among other things, and stored in rainwater tanks or sent away from the building through a network of storm drains that send the water into lakes, streams or the ocean. Storm drains are specifically designed to collect excess rainwater and runoff from impervious surfaces.

Rainwater can be collected from a variety of water sources, including impervious surfaces and underground. Soil water refers to water that accumulates just below the surface layer of the soil. It is important to manage this water as it can affect your home's foundation and retaining walls. Basement stormwater can be controlled using French drains.

Storm water Drainage Type:

1. Surface drainage system: -

In some cases, the land surface is shaped or sloped to slope toward a watercourse. Different types of surface drainage systems include open drains, humps and depressions, embankments, and grass ponds. Monolithic trench drainage is an excellent example of a surface drainage system.

2. Underground drainage system: -

An underground drainage system is implemented below the top layer of soil. Also called a French drain, this drainage device serves to remove excess water from the root level. Dig a trench to install an underground sewer pipe. ABT sells a variety of underground drainage solutions depending on your drainage needs and location.

3. Drainage system on slopes: -

Inclined drainage systems are designed to allow water to drain out of the structure in a downward direction. This is done using pipes that run down a slope. Because the installed pipes are anchored to the slope, water flows through them and quickly moves away from the structure.

4. Drain pipes and drainage systems: -

Drain pipes and drainage systems are the first way to protect structures from oversaturation from storms. This often drains into an aluminum superstructure, buried downspouts, rain barrels or other solutions. The goal is to redirect the water and direct it to another drainage system on the street or sidewalk. Sometimes they are connected to underground sewers using gutters.

III. Storm Drainage System

Systems used to drain rainwater are often called storm drains and are also called storm drains and storm drains. Rainwater refers to all precipitation that falls on the Earth's surface, including rain, snow, and sleet.[8]

A network consists of public and private systems. Controlling the quantity, quality, timing and distribution of stormwater runoff is an essential part of the county system. It is not part of the system that transports water and waste from drains (sinks, bathtubs, showers, etc.) and toilets to a treatment plant for treatment and filtration. Stormwater does not reach wastewater treatment plants. Stormwater drainage projects are an essential component of both site and overall stormwater management projects. Control flooding of properties, structures and roads during design flood events. Storm water catchment systems must be designed to provide adequate surface drainage while meeting other stormwater management goals such as water quality, riparian waterway protection, habitat protection, and groundwater recharge.[2]

Types of Drainage Systems:

Drainage systems can be classified according to drainage method and requirements. Here we explain the different types of drainage systems based on their role.

a) Surface drainage system: -

This drainage system is used to drain surface water. Surface water is usually generated by precipitation in the area. Sometimes canals are created to transport water from one place to another to meet their needs.

b) underground drainage system: -

A subsurface drain system or French drain is installed beneath the topsoil. It is used to drain excess water present in the lower layer of topsoil.

c) Drainage system on slopes: -

Slope drainage systems are constructed on specific slopes. It is used to drain water in a downward direction under the influence of gravity.

d) Drain pipes and drainage systems: -

These drainage systems are typically used to collect water at the point of generation and convey it to the main drainage system pipes. Sometimes a gutter can be used to connect to an underground drain.

IV. Innovative System Used for Strom Water System

Using sensors to identify obstructions in storm water drainage systems is a creative way to assure effective operation. In order to monitor water levels, this system typically includes placing a variety of sensors throughout the drainage network. When a blockage happens, these sensors anomalous readings set off alarms that let the authorities quickly locate and resolve the problem. Furthermore, by incorporating remote monitoring and real-time data processing, the system becomes more efficient at identifying and removing obstructions, which strengthens the storm water infrastructure's resilience.

Water level sensors offer several advantages, including:

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1. Automation: They enable automated monitoring and control of water levels in various applications, reducing the need for manual intervention.
2. Efficiency: By providing real-time data, they help optimize water usage, preventing both wastage and shortages.
3. Prevent Damage: They can detect and alert to potential flooding or overflows, helping prevent damage to property and infrastructure.
4. Cost Savings: By optimizing water usage and preventing damage, water level sensors can lead to cost savings in terms of water bills and maintenance expenses.
5. Remote Monitoring: Many modern waters level sensors offer remote monitoring capabilities, allowing users to check levels and receive alerts from anywhere with internet access.
6. Safety: They contribute to safety by ensuring that water levels are maintained within safe limits in various industrial and domestic settings.

V. USE OF STORM WATER

1. Reuse of Storm water: - Storm water can be captured through various means such as rain barrels, cisterns, or underground storage tanks. Once captured, it can be treated to remove pollutants and then used for non-potable purposes like irrigation of landscapes, flushing toilets, or even for industrial processes. Reusing storm water reduces the demand on potable water sources and can help conserve water during dry periods.
2. Restoration of Storm water: - Restoration focuses on returning storm water runoff to a more natural state by slowing it down and allowing it to infiltrate into the ground. Techniques include constructing vegetated swales, rain gardens, and permeable pavement that allow water to filter through the soil, removing pollutants and recharging groundwater. These methods help reduce erosion, prevent flooding, and improve water quality by removing contaminants before they reach rivers, lakes, and oceans.
3. Benefits: - Both reuse and restoration of storm water offer numerous benefits such as reducing erosion, preventing flooding, improving water quality, and enhancing groundwater recharge. They also contribute to green infrastructure, which can enhance urban aesthetics, provide habitat for wildlife, and increase property values. Additionally, these practices can help communities become more resilient to climate change by managing water more sustainably.

VI. CONCLUSION

This system provides better way of blockage detection. It is a smart and real-time monitoring system to maintain a clean and hygienic environment, reducing unnecessary efforts of cleaners. With the help of sensors, we can take specific actions on problems, as it will give us early indications of blockages and increases in flow levels. This project has full scope for future improvements. In future this project can be implemented with Wi-Fi technology which will be connected to cloud to save data and report for further analysis. the field of advanced automation and this will make the way for rapid development in the same field.

VII. REFERANCE

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