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# Detection and Disposal of Defects in Sewage Pipe Using Robots

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***Abstract :*** *In All Part Of The World, People Die While Cleaning The Sewage Pipe. Our Main Objective Is To Overcome The Problem By Replacing The Human Life Through The Robot. It Detects The Toxic And Non-Toxic Gases By The Use Of The Gas Sensor. We Can Analyze The Blocks Using The Wireless Camera. The Robot Is Designed With Two Robotic Arms. Finally, It Detects The Blockage And Removes The Block By Using Robot Arms By The User Control And Dispose It At Nearby Sewage Pipeline.*

***Keywords*** *- Pic Controller (16f877a), Power Supply, Gas Sensor, Camera Module, Robotic Mechanism, Control Unit, Proteus, Embedded C.*

## I. INTRODUCTION

This System Is To Provide A Unique Solution For Sewage Worker In Each And Every Country. The Workers Die Before Age 60 Because Of Work-Related Health Problems Because Of Improper Facilities. The Suffocation Or Exposure Of Toxic And Non Toxic Gases Produced And Collected In Sewage Systems By The Decomposition Of Organic Household Or Industrial Wastes, They Often Surrounded By Swarms Of Cockroaches, And The Workers Working Under Sewage Pipes Have No Mask To Protect Him From The Poisonous Fumes That The Sewage Emits. In Our Proposed System We May Implement The New Technology For Cleaning The Sewage System Which Is Carried Out By Self-Controlled Robots With Arm Module.

## II. EXISTING SYSTEM

In This System The Human Is The Only Way To Cleaning The Sewage, They Have To Find The Defective Pipes And Joints In The Public Sanitary Sewer Systems. Sometimes The Waste Material May Be Struck On The Pipe And For That Case, The Humans Are Needed To Entering Into Drainage For Clearing That Waste, Workers Are Needed To Stand In The Sewage, Which Reaches Chest High, And Use Long Wooden Sticks To Clear Jams. In Some Areas, Workers Crawl Through The Sewage, Wearing No Protective Gear. Due To The Formation Of Gas, They May Cause The Health Problem. Sometimes It Leads To Death. To Overcome This We Are Going To Deal With The Robotic System.

## III. PROPOSED SYSTEM

In This Proposed System We Are Dealing With The Robots For Cleaning The Sewage. These Robots Are Preprogrammed With Cleaning Patterns For Sewage System. The Main Aim Of The Robots Is To Find The Occurrence Of Blocks In The Pipe. These Robots Have A Moving Mechanism And Sensor Equipment For Finding The Poisoned Gas, Along With The Camera Module And Two Side Arms For Pick The Blocks Occurred. An Operator Can Control The Movement Of The Robot And The Video System Via Remote. By This Video-Supported Visual Inspection, Any Notable Damages Are Recorded In The Video Stream. Once We Find The Blocked Area In The Pipe, Blocks Are Cleaned With Arms And By The Help Of Giving Water Pressure Fully In The Blocked Portion. Due To A High Pressure Of Giving Water, We Can Easily Clear The Struck Particles In The Pipe. The System Is Used To Reduce The Death Of Human Due To Sewage Cleaning System And Tends To Be Time-Consuming.

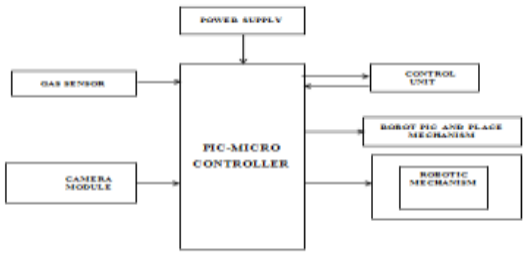


**Fig. 1:** Block Diagram Explanation

## IV. WORKING

The Robot Is Sent Into The Sewage Pipe. It Continuously Senses The Toxic Gas Level In The Pipe. The Gas Sensor Indicates Values In Analog And Digital But Here It Displays In Digital. If Any Blocks Are Visualized In Monitor Then Using Water Pressure It Is Cleared And If Any Obstacles Occur Then The Robot Will Pick And Place Near The Manhole. Here, The Night Vision Camera Is Used For A Clear View Of The Pipe. For The Wireless Transrecevier Here We Are Using The Zigbee Module For Transmitting And Receiving The Data (Up To 100m).

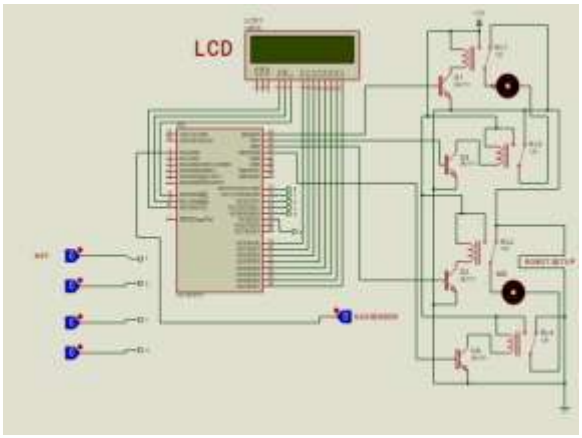


**Fig. 2:** MP Lab Simulation

From Pic1 The Relay Circuit Controls The Control Unit.LCD, Wheels Of Robot Switches, Gas Sensor Are Connected To The PIC Microcontroller (PIC 16F877). Permanent-Magnet DC Motors Require Only Two Leads, And Use An Arrangement Of Fixed- And Electro-Magnets (Stator And Rotor) And Switches. These Form A Commutator To Create Motion Through A Spinning Magnetic Field.

When Switches Are ON (5v).Then The Movement Of Wheels Is Seen According To An Operation Of A User. The Movement Of Wheels Is The Forward Direction, The Backward Direction, Left Turn And Right Turn Respectively. If The Gas Sensor Is Detected Then It Indicates 5v In LCD Or Not Detected (0v).The Mechanism Of Pick And Place Is Done By The Control Unit.

As In Pic 2 The Four Wheels Of The Robot Are Connected To DC Motor Which It Acts As A Control Unit. Here, DC Servo Motor Is Used For 180degree Wheel Rotation For Movement Of The Robot.

**Fig. 3:** DC Motor

## V. RESULT AND DISCUSSION

Thus, The Conducted Setup Cleans The Sewage Pipe. A Robot Allowed Inside The Pipe With A Required Camera, Gas Sensor And Two Arms. Here Gases Are Detected By Gas Sensor Indicating 5v If Detected And 0v If Not Detected. Water Pressure Is Released By The Controller To Clear Gases. If Blocks Detected, Message Sends Via Zigbee Controller And Switches Controls The Arms And Wheels. Blocks Are Cleared By Pick And Place Them In A Waste Bin Attached To It. This Setup Make The Cleaning Sewage At

Easier Level. This Setup Disposes The Waste To Its Near Area. This Entire Setup Is Controlled By The Operator By Remote And Zigbee Controller.

## VI. CONCLUSION

The Intended Objective Is Successfully Achieved In The Developed Prototype Model. In This Paper Is Instead Of Going Human In Sewage Pipe A Robot Is Sent For Inspection And Detection Of Blocks In The Pipe. This Reduces The Human Loss And Time Consuming For The Sewage Workers. The Blocks And The Obstacles Removed By Pick And Place Robot. The Developed Product Is Easy To Use. It Has The Effective Usage Of Cleaning The Sewage And Detecting The Blocks. This Reduces The Risk Of Human Life.

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