

# “BANDICOOT: DRAIN CLOG DETECTION AND PREVENTION TO SUPPORT SWACHH BHARAT ABHIYAN”

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**Abstract:** This Bandicoot presents a robotic mechanism for detecting and preventing blockages in pipes. This robot is designed to replace human sewage cleaners in order to ensure their health and hygiene. The proposed robot moves through the pipeline, detects the blockages if they are present and clears them by cutting through the blockage and moves forward. The robot operation is monitored and controlled manually by the sewage worker using a laptop or palmtop computer. The operator can monitor the insides of the pipe via a wireless camera attached to the robot. The various sensors attached to the robot helps to determine the distance of the block from the robot and the presence of poisonous gases inside the pipeline. The robotic arm mechanism is used in order to loosen and clear the block. The rotating mechanism consists of a fan like structure with sharp blades that penetrate through the blocks by cutting them. This robot is used to inspect various pipeline elements of different size.

**Keywords:** pick and place arm, Atmega16 Controller, zigbee Controller, Servo Motor, cleaning Operation.

## 1. INTRODUCTION

Every day hundreds of men descend into the putrid, foul smelling sewage for cleaning without any safety gear. Workers who handle the maintenance and cleaning of sewage pipes are at increased risk of serious diseases like Hepatitis A. Many deaths occur due to drowning, trench collapses, falls, and exposure to chlorine or Hydrogen- sulphide gas. Those who die during the duty are replaced by others, waiting to put their lives in danger just to earn a living for themselves and their families. Every week, young men line up for Rs 200 that they get to clean 20-25 gutters, putting their precious lives at risk.

While sewage cleaning has become mechanized in some parts of the country, the government figures suggest nearly 8,00,000 people still work as sewage cleaners.

In Metro cities, sewage travels across nearly 5,600- kilometer long sewer lines at the speed of one meter per second. Reports suggest that nearly 23,000 men and women die in India every year doing various kinds of sanitation work. A research at Tata Institute of Social Sciences has found that 80% of the sewage cleaners die before age 60 because of work-related health problems.

### 1.1 PROBLEM STATEMENT

Pipe cleaning is very important for the proper transportation of raw materials from one place to other in industries. But cleaning is not an easy task. Harmful substances which are accumulated in the pipe make it very difficult for humans to work in the pipes. The changing diameter of pipes from few millimeters to several meters also a major factor. To overcome the size variation problem and to prevent human intervention in pipe cleaning an in-pipe robot with suitable features has to be developed in this project.



Fig: Problem Statement

## 2. LITERATURE SURVEY

Lot of work has been done on the pipe cleaning robot up to now. Many types of robots had been invented. In this a lot of literature study is done to understand the mechanism of various types of in-pipe robots. Literature work is also done on various sensors that are used for inspection of in-pipe environment for detecting the flaws in the pipe.

### Classification of In-Pipe Robots

Generally, in-pipe robots configured into the following six types:

- i. Wheeled type
- ii. Caterpillar type
- iii. Wall-pressed type
- iv. Walking type
- v. Inchworm type
- vi. PIG type (Pipe Inspection Gauges)

Sr.NO	Paper Title	Publication	Main Findings	Scope Of Future WORK
1	Development of In Pipe Inspection Robot	IOSR Journal	Cutting edge technology for ducts & pipes inspection	Duct cleaning , hollow pipe brushing etc
2	Motion control of passive mobile robot with multiple casters based on feasible braking force and moment	IEEE/RSJ International Conference on Intelligent Robots and Systems	Its appropriate motion is controlled using the servo breaks.	Controlling moving Mechanism of Arms And Controlling Strategies
3	Motion control of intelligent walker based on renew of estimation parameters for user state	IEEE/RSJ International Conference on Intelligent Robots and Systems	Support the walking of the user based on the physical interaction between the user and the walker.	Using various software interfaces we'd be able to communicate between a user and walker

### 2.1.MOTIVATION / NEED OF PROJECT

To replace human sewage cleaners with high tech robots in order avoid these unfortunate deaths and save their precious lives. This robot paves way for the sewage workers to monitor and clean the pipes without getting into the drainage. This will not lead to unemployment instead it helps the workers to finish their job easily with the help of robot. This ensures the health and hygiene of the sewage workers.

### 3. SYSTEM ARCHITECTURE

#### 3.1. BLOCK DIAGRAM OF TRANSMITTER

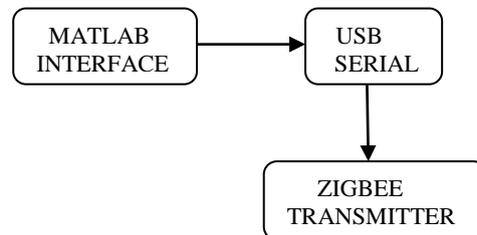


FIG 3.1:-ZIGBEE TRANSMITTER

#### 3.2. BLOCK DIAGRAM OF RECEIVER

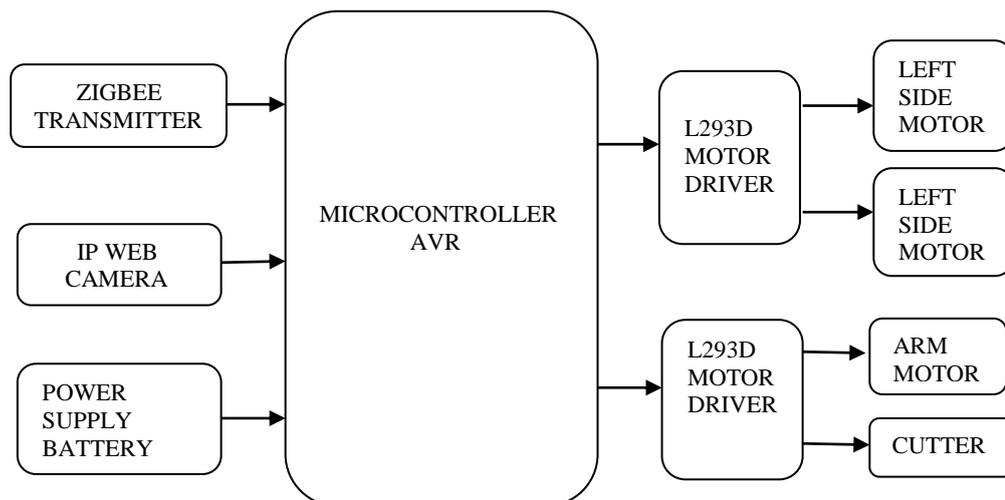


FIG 3.2:-ZIGBEE RECEIVER

### 4. HARDWARE

#### 4.1. ROBOTICS ARM

An overview of how we can to make use of servo motor to make joints of a robotic arm and control it using atmega16 microcontroller. And used high loaded industrial application. It can reduce in the future enhancement that is maybe we can use high power servo motor and by the help of it vibration can be reduced even the grabbing power is less that it can pick a very heavy object just a lighter object. Now talking about servo motors they are excessively used when there is a need for a accurate shaft movement or position. Servo motors are proposed for low speed, medium torque and accurate position application.

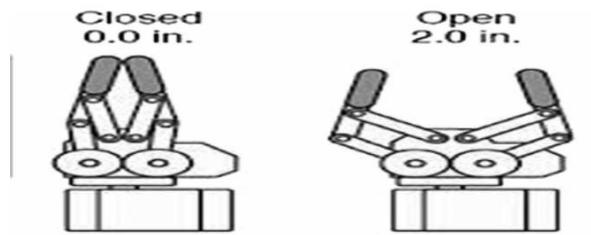


FIG 4.1-Robotics Pic Arm Opening And Closing

**4.2. DRAINAGE SYSTEM FOR CUTTING**

The challenges on drilling decks it somewhat different, through the process of changing drill pipes result in large quantities of drilling mud with a very high solid content on the deck. Drainage water poses major challenges in terms of processing. The composition of the drainage water varies considerably. Normal water processing systems are not suitable for this purpose. In this case a good solution is to use a combination of an upstream decanter, which removes the coarse solids, and a downstream separator. It is of course self-evident that this complete system has to be designed with ATEX explosion protection. The combination of a decanter and separator has already demonstrated its worth. The required MARPOL figure of less than 15 ppm oil in water is attained reliably. Consistently drilling companies have already used this technology of GEA on many occasions in the past for building new platforms and drilling vessels or retrofitting the equipment.

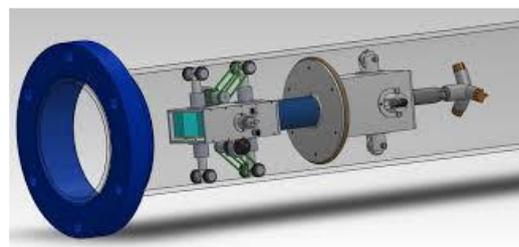


FIG 4.2 -MECHANISAM FOR CUTTING

**5.RESULTS**

This programming code is written in embedded C language. For that we have used MATLAB software. We provide instruction through software. The control instruction is sent to the robot via ZigBee.

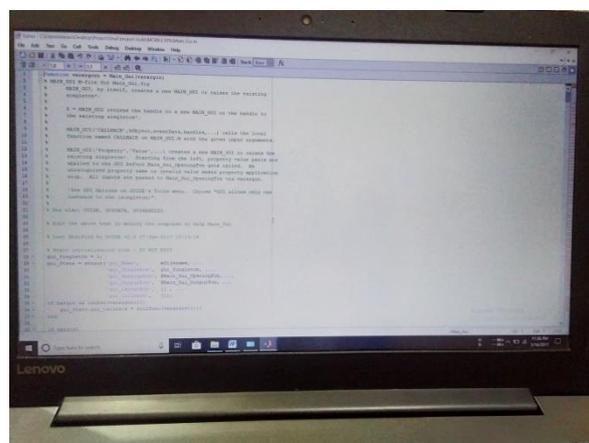


Fig5.1: Programming Code Window

This is the control panel of the robot.robots moving forward and reverse direction.and also we control the cutter rotating and pick and place arm.

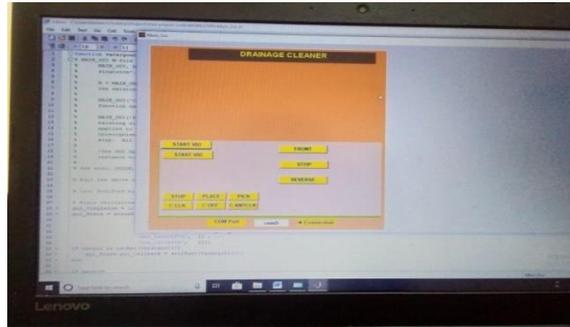


Fig5.2: Control Panel

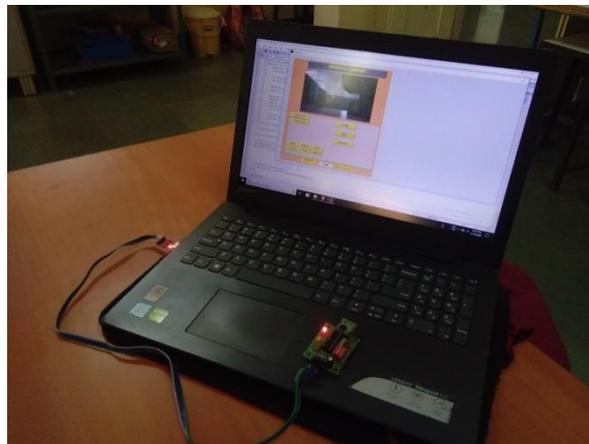


Fig5.3- programming part zigbee transmitter

We can monitor the robot through providing instruction code via zigbee transmitter connected to the system as shown in fig5.1

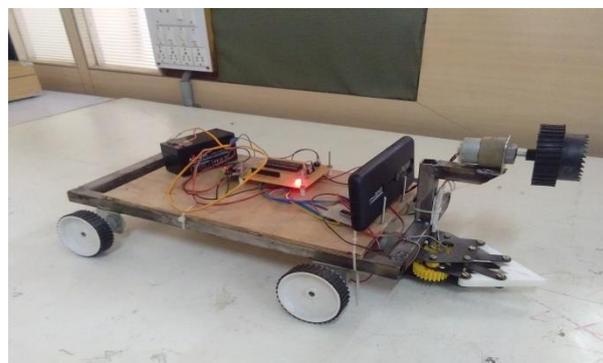


Fig5.4-Bandicoot drainage cleaning robot

## 6. CONCLUSION

The proposed BANDICOOT is designed with the motive of helping the sewage cleaners to prevent them from getting affected by serious diseases because of entering the drainage. The death rate of sewage cleaners is alarming. It is high time that this robot should be implemented to clean the sewage pipes all over the world. Moreover, this robot will help to find the poisonous gases inside the drain which will help the authorities to curb the dumping of untreated raw waste from the industries into the drains. This will not lead to unemployment of sewage workers but will just make the job easier and healthier for them. When this robot would be implemented in real time, it will save thousands of poor people's lives who come forward to clean the drainage just to earn few bucks a day. In this modern society, a human cleaning the sewage waste shows that very less attention has been given to those people's lives due to their poverty. Hence, this robot helps to have clean and hygienic drain systems everywhere.

## 7. REFERENCE

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