

# Design and Fabrication of 360° Flexible Drilling Machine

Harshal Umale, Kunal Pardhi, Nehal Bhivgade, Pranav Meshram, Abhijeet Wanjare,  
Sahil Wazade

Bachelor Student, Department of Mechanical Engineering, Dr. Babasaheb Ambedkar College of Engineering & Research Nagpur, Maharashtra, India

## ABSTRACT

Nowadays machines are widely controlled by embedded system, for this an effective control of machines are necessary. Our project can easily rotate and drill in any direction, Materials like plastic, wood and light metals can be drilled with this machine. In previous researches there were alignment problems. We can drill holes horizontally, vertically and upside down. This project uses hinges with motor and supporting structure. Our project deals with an interesting manner of drilling system using ATMEGA328 microcontroller and HC-05 Bluetooth serial communication module.

**Keywords :** Drilling Machine, Automated, Bluetooth Module, Microcontroller

## I. INTRODUCTION

Drill machines have been important part of every industry. Drilling holes in parts, sheets & structures is a regular industrial work. Well aligned and perfect drilling needs fixed and strong drills. While drilling, some parts cannot be drilled using fixed drills due to low space between drill bit and drill bed. In such cases we need to use hand drills but hand drills have alignment problems while drilling. So here we propose a 360° flexible drilling machine that can be mounted on table and can be used to drill holes horizontally, vertically. So, this makes it possible for easy drilling even in complicated parts and surfaces.

### Drilling Machine Construction

The important parts of a drilling machine are a base, column, drill head and spindle. The base is made of cast iron and may rest on a bench, pedestal or floor depending upon the design. The column is mounted vertically upon the base. It is a accurate machine and the table can be moved up and down on it. The drill spindle, an electric motor and the

Mechanism are meant for driving the spindle at various speeds and are mounted on the top of the column. The power is transmitted from the electric motor to the spindle.

### Drilling Machine Working Principle

The working principle of this flexible drilling machine is initially started by connecting wires to 12V battery and then pairing machine with Bluetooth module. Machine consist of four D.C motors for rotating drill bit, chuck and to move connecting arm up and down and to give machine a full 360° rotation.

## II. METHODS AND MATERIAL

Our project can easily drill at any direction. Due to this job setting operation is not complicated as well as it reduces the setting time for the operation. It also takes into consideration the most effective method of controlling the drilling machine by bluetooth module. Materials like wood, plastic and light metals drilled with this drilling machine. While drilling the work

piece should be fixed on the work table. As the machine tool exert Vertical pressure to original a hole it loosely called a drill press. The Up/Down and rotating mechanism is available in this Drilling Machine. These arms are made up of mild steel. The parameters in the subgroup is called the degrees of freedom of the joint.

### DESIGN CONCEPT



Figure 1

### CALCULATIONS

Length of arm 1 = 450 mm

Length of arm 2 = 370 mm

Length of base = 300 mm

Motor 1: - Speed (N) = 500 RPM

$$P = 2\pi NT/60$$

$$60 = (2 * \pi * 500 * T) / 60$$

$$T = 1.45 \text{ N-m}$$

Motor 2,3,4: - Speed = 300 RPM

$$P = 2\pi NT/60$$

$$= (2 * \pi * 300 * T) / 60$$

$$T = 1.90 \text{ N-m}$$

### III. CONCLUSION

1. A number of holes can be drilled with this simple unit in 360 degree.
2. It is economical and efficient.
3. It becomes relatively cheap when compared to other units considering its use and cost of project.

### IV. REFERENCES

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