

To Design An Industrial Tool Handling Attachment

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Abstract - In these current Industrial world there are many large and small scale industries ,which uses different types of machinery and instruments which have different types of application. Different general purpose machines are there one of which is Radial Drill Machine which is used for drilling. Like any other general purpose machine they did not come with the drill bit holder and these holder shoulder should be fabricated in house without causing any harm to original build quality of the machine, but for large scale industries budget is not the problem but they can purchase these kind of equipment at high cost which is readily available in market but when it comes to small scale industries they are not having that much of budget by that they can purchase a tool holder at an high cost at that time these tool holder comes into play as it is cost efficient and easy to handle.

Key Words: Radial drill machine, Ansys software, analysis, attachment.

1. INTRODUCTION

Drilling is the process in which the material is removed by using the cutting tool known as drill bit ,and these bit is attached to the machine which uses the rotational motion in order to remove the material from the job. Radial drill machine is a machine in which the drilling head is mounted in one side on an arm which can rotate in one plane and can be raised or lowered in vertical direction . These drill machine is type of general purpose machine whose main application is to drill holes of the required dimensions needed. These type of mechanical equipment is widely used in production and manufacturing industry the different application that these machine can do includes boring holes, countersinking & grinding. these machine is widely used in industry to work on large work pieces which are been fixed on jigs and fixtures.



Fig 1:- Radial Drill Machine

Specifications:

Batliboi
BR 615

Arm
length=1.5 m

Column
diameter=384.6 mm

Power=5.6 Kw

RPM=1800 rpm

Its arm, column and base are built rigidly with help of reinforcement ribs. It helps in reducing distortion and give machine long life [2]. It can perform 60mm drilling in solid steel. Spindle speed can be pre selected. Drill head and arm swivel consist of electro hydraulic clamping. A spindle bearing arrangement is provided to counter rough boring operation. Its quill and spindle are balanced with counter weight. Drill head and arm are automatically lubricated. Speed of spindle and feed can be varied. Function of automatic disengagement of power feed at required depth of drilling is provided [2, 3].

Some product requires different drilling operation. For this purpose different drilling tools are required. After using the tool the worker has to place that tool on table and another tool is fitted on machine for further operations which was consuming a lot of floor space. Also to pick up the tool the worker had to bend at regular interval. Due to this repetitive task of placing tool at given space & picking up another tool to perform further operation. The chances of fatigue to the worker increases which reduces the performance of the worker. Lowering the efficiency of worker directly affects the industry. It also affects his decision making ability. It is also difficult for the newly appointed worker to perform that repetitive task as efficient as that of the experienced worker.

2. MULTI TOOL HANDLING ATTACHMENT

To decrease the floor space requirement the tool need to be place adjacent to the machine. The place should be in the reach of the worker. Also the worker should be able to vary the distance of the tool from his according to his comfort. The best solution for this is use of multi tool holding attachment. Here the multiple tools holding attachment can be fixed on the column of the radial drill machine.

At a time four tools can be placed on the tool holder. The attachment can revolve about the axis of the column of the radial drill machine. As it is connected on the radial drill machine column, it hanging and reduces the required floor space. Also the revolving ability of the attachment, operator has freedom to vary the distance of tool from the Machine as per requirement to do the operation Smoothly.

2.1 DESIGN OF ATTACHMENT

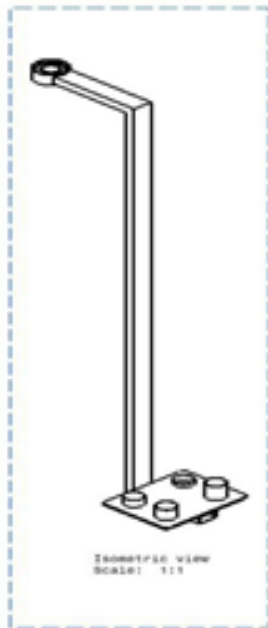


Fig 2:- Tool Holder

Fig. 2 shows the part of the attachment that has four holes on which the tool will be placed. It is connected to vertical rod perpendicularly. This vertical rod is used to connect tool holding plate and the fixture [4, 5].

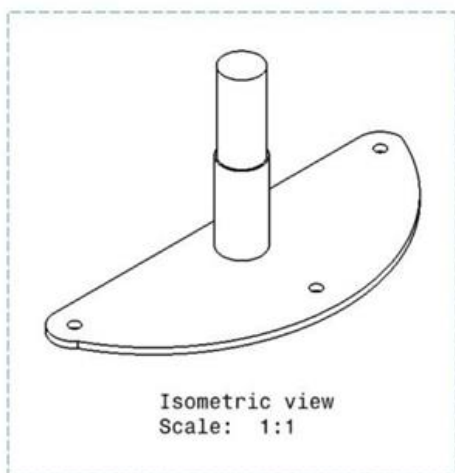


Fig 3:- Tool Fixture

Fig.3 shows the fixture which will be attached on the drill machine column. The column consists of three screws

in which the fixture will be fitted with help of nuts. The attachment is then fitted on this fixture.

2.2 DIMENSIONS OF ATTACHMENT

Rectangular Hollow pipe

- i. Length : 6 Ft. 7"
- ii. Thickness : 3 mm
- iii. Width : 25.56 m

Metal Rod

- i. Length: 8 inch
- ii. Diameter: 40 mm

Base Plate

- i. Thickness: 6 mm (1.2 Ft. * 1.2 Ft.)

Hollow Pipe

- ii. Diameter: 44 mm
- iii. Length: 1 Ft.
- iv. Thickness: 3 mm

Bearing (Ball Bearing)

- i. Diameter : 35mm

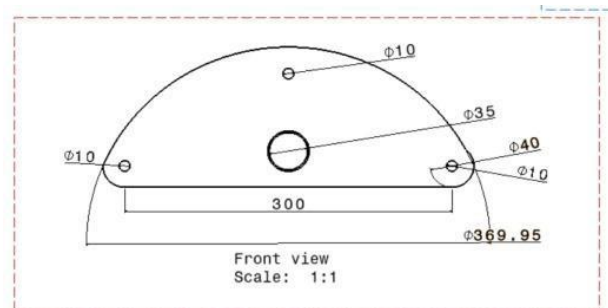


Fig 4:- Top View Of Fixture

Fig. 4 shows the right side view of the attachment. The three holes present on it are those through which the screws present in the column will be fixed. In center there is a upright bar having the thickness of 35 mm. on this bar the tool holder will be fixed.

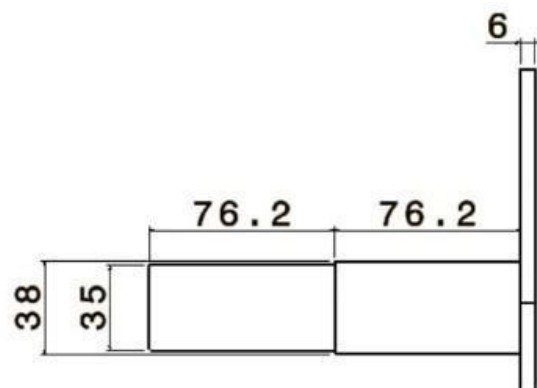


Fig 5:- Right Side View Of Fixture

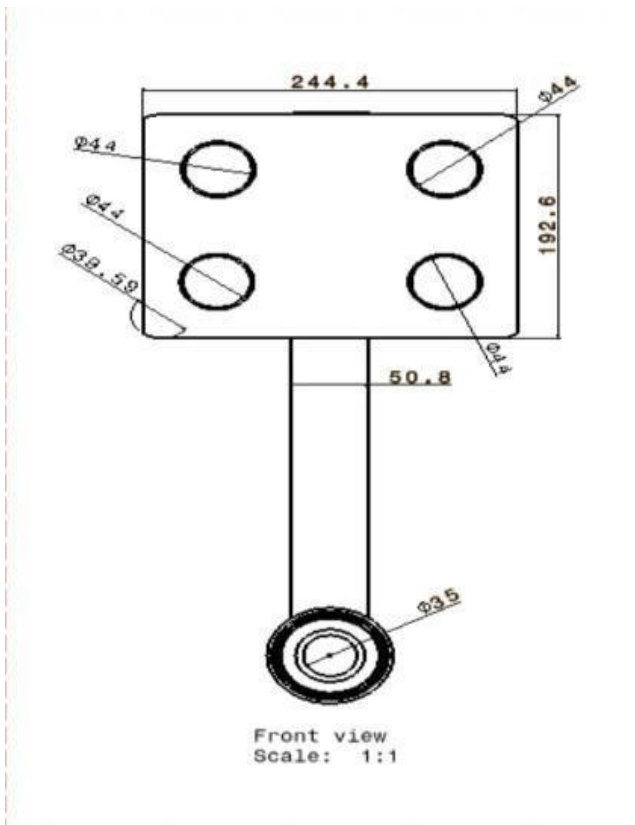


Fig 6:- Top View Of Tool Holder

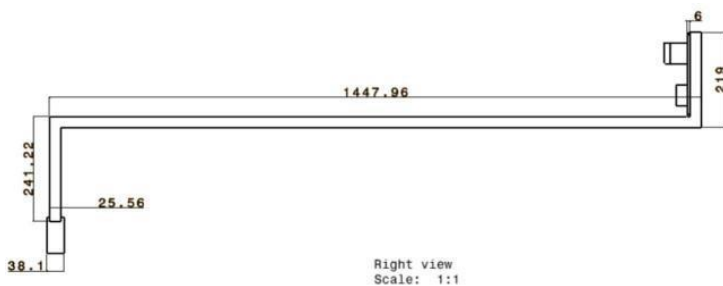


Fig 7:- Side View Of Tool Holder

The fig.8 show how the multi tool holding attachment will look once the fixture and tool holder are assembled together. The fixture and tool holder will be assembled with each other with the help of ball bearing having internal diameter 35mm and outer diameter 62mm. the internal side of bearing will be fixed on fixture, on its upright rod and the outer side will be fixed in the hole provided on top of the tool holder.



Fig 8:- Final Attachment After Assembly

3. CONCLUSIONS

This design goal is achieved as the above mentioned design contributes to reducing fatigue among the workers. The design is efficient enough not to interfere with the smooth working of machinery. It is a less complicated design. By this tool holder, we made an option for different companies to design tool holder according to their need.

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