

## Design and Fabrication of Drilling Fixture for Jet Broaching Machine

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**ABSTRACT:** Broaching is a machining process that uses a toothed tool called a broach to remove material; there are two main types of broaching linear and rotary. In rotary broaching machine the broach is rotated and pressed into the work piece to cut on axisymmetric shape. In our project, we use Jet Broaching Machine to drill holes in a column. In Boiler Auxiliaries Plant the jet broaching machine is usually carried by two personals which increase the setting time, operating cost and labour cost, So to overcome this problem we have designed a fixture which reduces all the costs and reduces the manpower requirement.

**Keywords:** Broaching; Toothed Tool; Axisymmetric Shape

## 1 Introduction

The high level of quality and reliability of its product is due to the emphasis of design, Engineering and manufacturing to international standards .then the turbine generator column will be mounted on one side ,the length of the this column is 35 meters .another such column will be attached to it and the length of the entire column is 105 meters. if the TG column will be joined together with the help of bolt and nut and no welding operation is carried out for joining of the column and this column is mainly used in power house assembly.

As studied earlier the methods used for the drilling operation had various demerits and the cost of operation, labour charges, setting time and usage of man power is more, which affects the overall production charges. We recommended to change the mechanism of the fixture which is turn reduce the operation cost ,labour charge ,setting time ,man power and operating time.

### 1.1 Product and Processing

- (ESP) Electrostatic precipitator.
- (APH) Air pre heater.
- (FANS) ID fans & FD fans.

### 1.2 Other Products

- Desalination plant.
- Wind electric generator.
- Heat exchanger.
- Fabric filter.

### 2. Problem Identification

- More cycle time required to complete the drilling operation.
- Low productivity.
- Customer commitment delay.
- Maintenance cost is high.

### 3.Objectives

- Increasing productivity
- Simplifying the work for operator.
- Reduce operator's fatigue.
- Increasing the quality
- Reducing the cycle time.

### 4.Difficulties While Performing Drilling Operation



This is the basement of the TG column which will be mounted on the ground on one side, the length of this column is 35 meters. Another such columns will be attached to it and total length of the entire column is 105 meters.



The above image shows two columns which will be joined together with the help of bolt and nut and no welding operation is carried out for joining of these columns.



The plate which is mounted on the column using bolt and nut is an attachment which is used to drill holes in the correct position and the plate will be removed after drilling process is over.



This is the picture of entire column which is of 105 meters length, the column consists of flange splices which are used to mount the column with other structures with the help of bolt and nut.



The plate which is mounted on the column using bolt and nut is an attachment which is used to drill holes in the correct position and the plate will be removed after drilling process is over.

A drilling operation performed in a TG column by jet broaching machine using two personals and at the time of power fail the machine will get demagnetized and it will fall down on the ground

## 5 Modelling

It is the method we have planned to rest the machine on top of the plate. It is also having up & down motion by just rotating the top plate, if we rotate in clockwise direction then stand will move downwards and if we rotate in anti-clockwise direction then stand will move in upward direction.



### 5.1 3-D View of Fixture

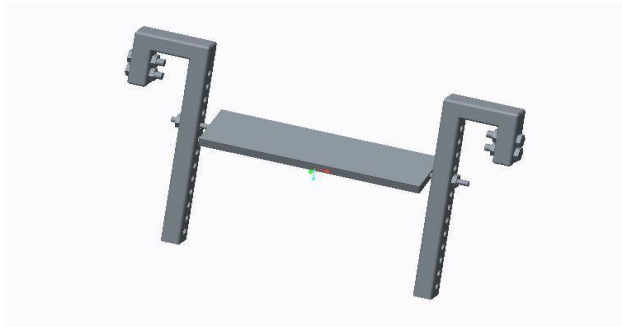
Among these methods the best alternative is fourth method. In this method the stand can be hung on the Job and the machine can be placed on the plate and the drilling operation is carried out.

The main advantage in using this method is, it reduces the setting time and minimizes manpower.

of various text books, handbooks and from websites, the expected results are satisfactory and fulfills the requirement of the organization and also benefits the individual in gaining knowledge and creative ideas for the future work.

Thus, we succeeded in designing the FIXTURE FOR JET BROACHING MACHINE by overcoming all the practical difficulties and factors in the designing field. We also gained the company's satisfaction over the simplicity of the product. This FIXTURE is only named for its simplicity and adds profit to the company.

Compared to the previous method the implementation of new method reduces the operating cost by 2.3 times and setting time by 2.5 times, which in turn reduces the breakdown of the machine and increases the profit of the company.



### 6. Improvement in Future

[1]. In this Project we have developed some implementation ideas in future.

[2]. We can provide rack and pinion mechanism that makes it easy to perform drilling operation and to provide sliding motion by using bearing.

[3]. Extension of the stand that has the capability to carry two such machines which reduces the setting time and operation time.

[4]. Automation by using robot to perform drilling operation in lesser time.

### 7. Conclusions

According to our material selection and the calculations using the formula based on the reference

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