

# AUTOMATIC BAR FEEDING AND CUTTING MACHINE

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## ABSTRACT

*Machining of a shaft requires the shaft to be cut to appropriate length and then put it on machining. Today it is a time consuming task as the process of cutting the bar to required length happens manually. This is not only time consuming but also erroneous marking may result in rejection of the job. Most of the industries use band saws or hacksaws as current equipment for the purpose of cutting operations. This process is not only slow but is also error some. The project deals with the concept of smart automated multi bar feeder and cutter. In this project a concept is proposed to feed multiple bars at once and cut it accordingly to length input given by input panel. The developed machine is smart mechatronic system which can automatically feed the bar to required length and accordingly cut it. The number of pieces as well as length to be cut can be altered using the control panel.*

**Keywords:** Buttons, Feeding, Bar cutting, Automation, Input panel, Length, Number of pieces etc.

## I.INTRODUCTION

Bar cutting is employed almost every industry. This includes small industries such as fabrication to very large industries from hydraulic to aerospace. This involves bars of different engineering materials, pipes of various diameters and shafts. Conventionally bar is measured of required length as per the application manually using tape or any other measuring instrument. Then the bar is mounted over the cutting machine and cut to required length. This is a time consuming procedure and requires effort for loading and unloading the bar on the cutting machine. The common cutting machines used in the industrial application are hacksaws, abrasive cutters, reciprocating hacksaws etc. Thus this is a lengthy procedure and involves the following steps:

- 1) Measuring the bar to required length and marking it.
- 2) Loading the bar on the cutting machine.
- 3) Setting up for the cutting procedure.
- 4) Cutting the bar to marked length.
- 5) Unloading the cut bar.

Also the bar which is cut may depend on the accuracy of the operator who is marking it and also the operator who is setting up the machine for cutting the bar. At present condition many electrically operated power hacksaw machines of different companies with different specifications are available for the use in shop floor. These machines are so precise that they can cut metal bars with minimum time made up of different materials but they have one and major disadvantage that those are able to cut at faster rate as well as these require manual intervention for every operation of bar to be cut. Also Bar cutting is not an infrequent industrial operation and needs to be done on regular basis. The bar once cut further involves operations such as turning milling and key way slotting on them. Thus a system needs to be developed which can handle the operation of bar cutting effectively in such a way that it requires minimum mechanical effort and carry out the bar feeding as well as cutting operation automatically. To overcome these advantages, this project involves designing and fabrication of automatic bar feeding and cutting machine (for fixed size of 16 mm), which not only saves the time but also is accurate as it is computerized. This involves developing a system in which user just enters the length of the bar to be cut using a keypad and the bar is fed and cut automatically.

## **II.LITERATURE REVIEW**

The actual implementation of the project it is very necessary to understand the current work done in this. Since this is a field of major attention a lot of research scholars have carried out different research work on this field. A few notables ones are mentioned below.

Prof. Iman Hajizadeh Chi-Ghun Lee (1992) studied 'alternative configuration for cutting machine in a tube cutting mill'. In this paper stock material exist as a continuous stream. They formulated and solved the new type of cutting stock problem and demonstrate that significant saving is expected when the new configuration is employed. The paper conclude that opening the end of the cutting machine they have shown numerically that the production time could be decreased by up to 44% such improvement would help production managers in tube mills reduce costs such as finished product inventory, labor cost [1].

Prof. Rushikesh Gadale et al,(2015) developed PLC based automatic cutting machine. . A cutting machine is available in various shapes and sizes, with small hand-held power cutting systems and to bench mounted and finally floor-mounted models. They showed procedures for maintaining, and proper setting up the work and methods of selecting various tools, and object holding devices to get a job done safely without causing damage to the equipment, yourself, or someone nearby [2].

Prof. Kshirsagar Prashant R. et al,(2015) proposed the model of multi-way hacksaw machine which is able to cut four pieces simultaneously without any jerk and minimum vibrations. The model implies conversion of shaft motion into the reciprocating motion for proper working of hacksaw. This model overcomes the limitations of conventional hacksaw machines which can cut single piece at a time. It is able to cut metal bars of different materials at same time and will be helpful in many industries due its compatibility, reliability and efficiency. Though there is lot of research work carried out on this field, majority of the expected work on automation of the present day practice to cut the bar is missing. Most of the papers focus of manual aspects of cutting which is least efficient as compared to automated bar cutting. Also the developed systems are manually operated which yet do not handle the errors occurred in cutting the bar manually [3].

### III.FABRICATION AND WORKING

This project involves automatic bar feeding and cutting machine. The bar is first fed into the machine automatically using the rollers mounted on the machine. The operator needs to enter the length of bar to be cut using the keypad provided on the machine. When the operator initiates the cutting procedure by pressing the switch, the bar starts feeding towards the cutter till the required length is reached. Thus this forms a fully automated bar feeding and cutting machine which can be used for the purpose of industrial automation. The entire approach towards the project can be divided into following modules. These modules work towards achieving the intelligent bar feeding and cutting machine.

- 1) The feeding mechanism.
- 2) The smart sensor assembly with feedback.
- 3) The microcontroller unit
- 4) The cutter assembly.

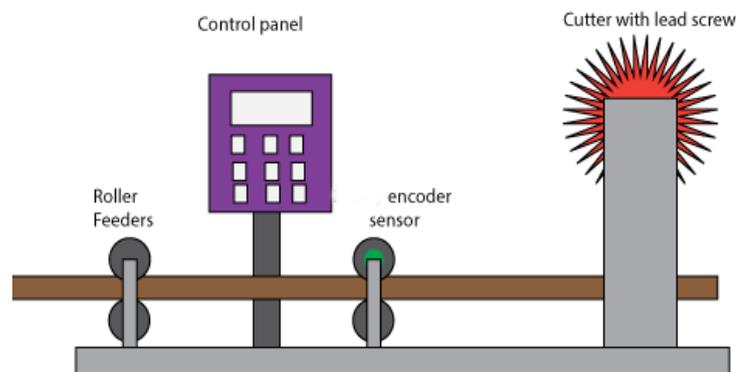


Fig. a 2D Diagram

As shown in the figure(a) the mechanical construction of the machine involves fabrication of the frame. The frame of the chassis houses all the other components of the machine. The dimensions of chassis frame are 11.78 x 5.08 x 4.32 (all dimensions are in meters). The machine chassis is fabricated in such a way that it consists of number of rollers which are present on the machine. The rollers are used for feeding the bar into the machine. Further the rollers consist of powered rollers as well as idlers. The power rollers are motorized which are used to feed the bar to required length. The machine also consist of cutter as shown in the figure which is used to cut the bar to the required length. The control panel shown in the figure is used to enter the length of the bar to be cut. Based on the length of the bar to be cut, and the input entered by the operator, the machine feeds the bar to the required length. Once the feeding is complete, the cutter is activated and cuts the bar. As the system is completely automated, this saves the time required in cutting the bar. Due to the microcontroller and feedback based cutting system, the accuracy in cutting is high as the system is computerized. This system is very cost

effective as compared to other automated. Machine can be used in bar cutting Industries. The limitation of this project we are fabricating this machine only for a shaft of 16 mm dimension.

#### **IV.CONCLUSION**

Thus this works provides an alternative to the existing automatic bar cutting machine, in terms of automatic the bar entry into the cutting apparatus ,eliminates power fluctuation and lesser initial investment. Time consumption is less when compared to manual cutting this work provide desired output.

#### **REFERENCES**

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