International Journal of Research
*eISSN: 2348-6848* & *pISSN:* 2348-795X *Vol-5 Special Issue-13*
International Conference on Innovation and Research in Engineering, Science & Technology
Held on 23rd & 24th February 2018, Organized by Tulsiramji Gaikwad Patil College of Engineering & Technology, Nagpur, 441108, Maharastra, India.

# "Fabrication Of Single Drive Four Way Hacksaw Machine"

ASHWIN N , MOHD HARIS , RIZWAN D , RIZWAN K , SHUBHAM B

(Department of Mechanical Engineering, TGPCET, Nagpur)

**GUIDED BY:-** Prof. A.C. Fulzele

## ABSTRACT

There are many industrial applications where round bar or square bars are required to be operated on different machines to make machine components such as Shafts, Bolts, Screws etc. This needs more and more number of pieces to be cut for mass production of those components. To achieve this goal the 4-way hacksaw machine is developed. This paper proposes the model of 4-way hacksaw machine which is able to cut four pieces simultaneously without any jerk and minimum vibrations. The model implies conversion of rotary 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 bars of different materials at same time and will be helpful in many industries due its compatibility, reliability and efficiency.

An AC motor is used to bring about the reciprocating motion required for cutting the work-pieces. There is a self-weight attached with the reciprocating mechanism to provide the necessary downward force required for penetration of hacksaw blade in to the work-piece.

When a single piece has been cut by the mechanism the cyclic operation again provided if the specified number of work-pieces has not been cut. The objective of this work is to automate the conventional hacksaw machine in order to achieve high productivity of work-pieces than the conventional hacksaw machine using.

International Journal of Research
eISSN: 2348-6848 & pISSN: 2348-795X Vol-5 Special Issue-13
International Conference on Innovation and Research in Engineering, Science & Technology
Held on 23rd & 24th February 2018, Organized by Tulsiramji Gaikwad Patil College of Engineering & Technology, Nagpur, 441108, Maharastra, India.

**KEYWORDS** : Quick return mechanism, single phase electric motor, Hacksaw frame, Material holding Vice.

## 1. INTRODUCTION

In present days we are living in 21st century which is known as technology century. In now a day's every person are trying to save money as many as possible. Even industries are trying to save money which gets spend on buying machine which is high costly and for different operation, different machine, means saving gets reduce. And in now a day's machine is very important part of industries. Without machine development of industry is not possible. Mainly machine are known as heart of industries. Without machine it is impossible to make any product rapidly. For rapid production, industries are buying many new machines for different operation. So for new machine company spend lots of money for rapid development.

In present condition many electrically operated 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 single piece of bar at a time. For industries to achieve the mass production, it is necessary to cut bars with high rate. So it is impossible to depend upon conventional single frame power hacksaw machines and need the improvement in technology and design of such machines. With the help of this 4-way power hacksaw machine the four bars can be cut simultaneously to get high speed cutting rate and to achieve mass production for maximum profit in related companies. As this machine overcomes all the limitations and drawbacks of conventional hacksaw machines, it is also helpful for small scale industries due to its simple working and operating conditions along with its compatibility, efficiency and affordable price.

# LITERATURE SURVEY

- International Journal of Research in Advent Technology, Vol.3, No.4, Design and Fabrication of Automated Hacksaw Machine" (April 2014). E-ISSN: 2321-9637

Gives an idea about the various components required for fabrication of the proposed model .

These Components will help to get smooth working condition and future automation of different mechanical actions as well as linkages.

- International Journal of Innovative Research in Science,Engineering And Technology, ISSN: 2319-8753, volume 2, Issue 6, June 2013. Material selection and testing of hacksaw blade based on mechanical Properties"

This paper presents Testing of different material blades like High Carbon Steel, Low Alloy

Steel, Bi-metallic blade, High speed Steel blades for their hardness, Cutting time performance, Wear Resistance, Tensile Strength and performance under buckling.

- International Journal of Innovative Research in Advanced Engineering (IJIRAE) ISSN: 2349-2163 Volume 2 Issue 1 (January2015) Selection of Material for Hacksaw Blade

This paper presents In Technical Institutes the failure rates of blades are increased because of lack of experience, knowledge and improper selection of material. The Failure rate of Blade can be controlled by proper selection of material. The improper selection of materials may result in loss of productivity and efficiency.

## 3. WORKING PRINCIPLE AND COMPONENT USED

This project consists of single phase vertical electric motor rigidly placed at the center of metallic foundation provided. The shaft of motor rotates at 90-100 rpm with the power 2HP. The circular disc is mounted on the shaft of motor with the help of key and key slot arrangement. The eccentric point on the plane of disc is provided such that the desired cutting stroke is achieved (around 4-5 inches). One end of each connecting rod is pivoted at this eccentric point by the use of suitable bearing. Another end of each rod is connected to the hacksaw blade fame with the help of universal joint to get vertical and horizontal Degree of Freedom of rotation for the proper cutting operation. The hacksaw frame slides on the guide ways provided.

When motor is ON and disc starts rotating, due to the reciprocating motion of hacksaw frame the bar is cut which is firmly fixed in vise. The automatic feeding of coolant is provided to reduce heat generated due to friction which also avoids the jerk.

### 3.1 Main Components used:

**1) AC Motor:**

The reciprocating motion of the Hacksaw blade, which is where the cutting process takes place, is produced with the help of an AC motor, which operates by a simple crank mechanism to convert rotary motion in to reciprocating motion.

**2) Base:**

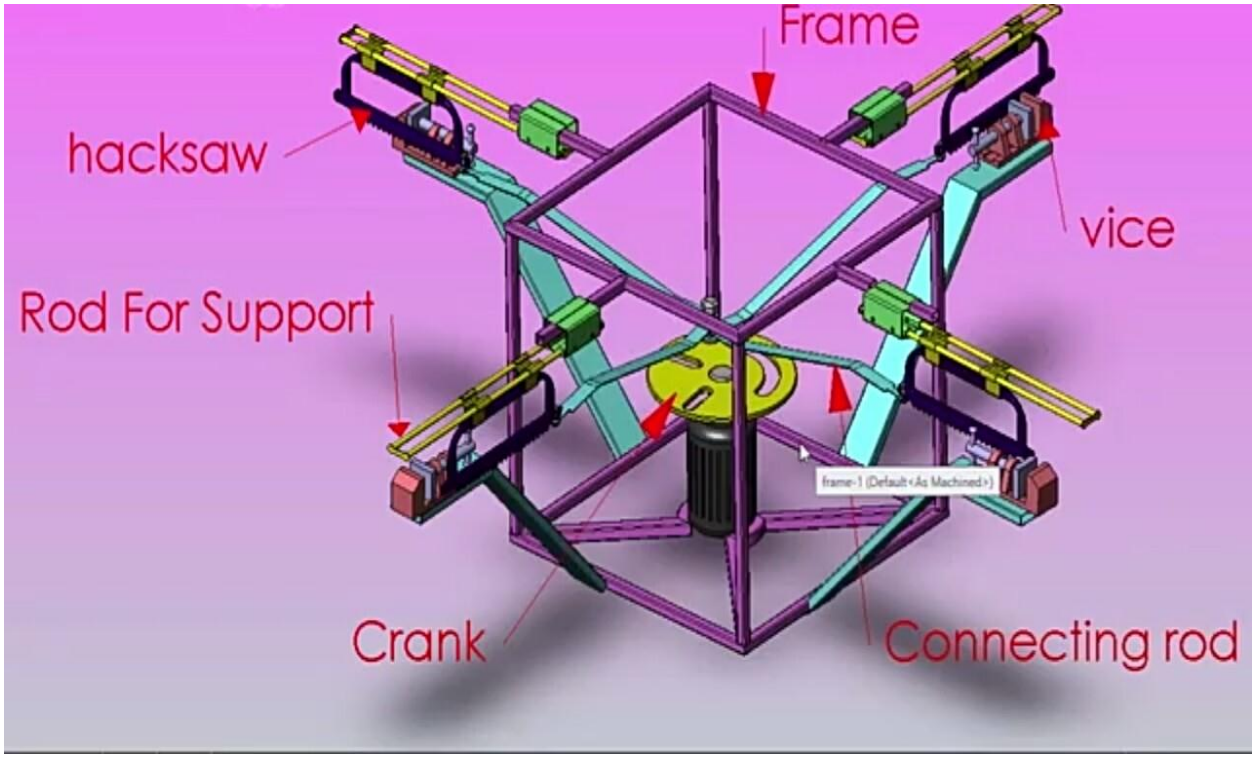
The base of the saw usually contains a coolant reservoir and a pump for conveying the coolant to the work. The reservoir contains baffles which cause the chips to settle to the bottom of the tank. A table which supports the vise and the metal being sawed is located on top of the base and is

usually referred to as part of the base.

**3) Vise:**

The vise is adjustable so that various sizes and shapes on metal may be held. On some machines the vise may be swiveled so that stock may be sawed at an angle. The size of a Power hacksaw is determined by the largest piece of metal that can be held in the vise and sawed.

## CONSTRUCTION




## Advantages:-

- Multi cutting operation are performed at one time.
- Our machine is used Return stroke (with worth) mechanism.
- The return stroke of machine is utilized as cutting operation.

- Easy to change tool.
- All operation performed by one motor.
- Compact in size .Low manufacturing & maintenance cost

## Disadvantages:-

- Lubrication is necessary to all gear and tool.
- Chances of slippage due to belt drive.
- Can be used only in small scale industry and village.

## Future Scope:-

- By further development it can also be used in big industry.
- Automatic feeding mechanism for material can be introduced by using limit switches or
- Automatic lifting up mechanism for frame when cutting operation is finished to introduce next portion of bar for cutting.

## REFRENCES:-


- D.V.Sabarinanda, V.Siddhartha, B. Sushil Krishnana, T.Mohanraj , "Design and Fabrication of Automated Hacksaw Machine", International Journal of Innovative Research in Science, Engineering and Technology, ISSN (Online): 2319-8753, volume 3, April 2014.

- Prof. Nitinchandra R. Patel, Mohammad A.Vasanwala, Balkrushna B. Jani, Ravi Thakkar, Miteshkumar D.Rathwa, "Material selection and testing of hacksaw blade based on mechanical properties", International Journal of Innovative Research in Science, Engineering and Technology, ISSN: 2319-8753, volume 2, Issue 6, June 2013.

- O.Cakir, A. Yardimen, T. Ozben, "Selection of cutting fluids in machining processes", Journal of Achievements in Materials and Manufacturing Engineering, volume 25, Issue 2, December 2007.

- Dr. V.P. Singh, (2007)"Mechanical Vibration", Page no. 145-12 R.S.Khurmi, J.K.Guptal, (2012)"Theory of machines", Page no. 143-168 PSG College of Technology, (2007) "Design Data Book",

- V.B.Bhandari, Design of machine elements, Year 2007, Page no. 5-7 & 20-39 Walter E. Burton, (1964), "Homemade Power hacksaw for less than $20", Popular science, Feb 1964. Micro, Small and Medium Enterprises Development Institute, Project profile on hacksaw blade manufacturing", NIC code: 28939, ASICC code: 71303, 2010-11. Bradford Dittmer," Build a power hacksaw from washing machine parts".