Original Research Paper

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Engineering

# PERFORMANCE EVALUATION OF JIGSAW MACHINE WITH KINEMATIC AND STRESS ANALYSIS

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| **Prajapati Pragneshkumar H.** | Student. |
| **Jansali Kashyap P.*** | Student. *Corresponding Author |
| **Mr. Prajapati Pankajsir R.** | Assistant Professor. |

**ABSTRACT** "The Jig Saw Machine" as a project work, it has helped us to understand the wood cut working, by all of the view like about its working capacity, the product which will it produce, what will be the difficulties in working of the machine, kind of safe working, working reliability, number of operations that can be performed with this machine. Jigsaw machines are common cutting tools and used in a large scale in wood working industries. The main problem with jigsaw usage is imprecision cutting due to blade deflection and human handling method. In this paper, a new design of second guided roller for the jigsaw to avoid blade deflection is introduced. A steel arm which holding the second guided roller and a platform with a guided fence are also presented. The cutting finding with and without using this tool is compared and reported. It is found that the jigsaw paired with this tool is able to cut a better straight line with a smooth cutting surface.

**KEYWORDS :** Motor, Blade, Wood, PVC Pipe, Switch

## INTRODUCTION

A Jig saw is a one type of a saw, which cut the wood in different shape. It cut different shape with finishing. It works on stock of blade. The blade is cut profile cutting, curves circle and other complicated part. It works on slides .the mechanism is crank rod link mechanism. This mechanism gives up & down motion to blade. We use pulley in proper ratio to control rpm of motor. And finally this machine is cut wood precisely with finishing. As the work-shop is having mechanical work press, it is also feasible to make the parts as dimension & working point of view. So it may prove an additional advantage of having such kind of machine. Jigsaw machine is one of the most important components of the family of hand tools. Jigsaw is widely used as a portable power tool, which can cut straight or curved slots or parting off effectively. It can also make bevel cuts. In addition to wood cutting, jigsaws are capable to cut steel, fiberglass and aluminum etc, which make jigsaws very versatile tool and valuable tool in the general purpose workshops. The jigsaw machine generally available with a cutting saw made up with high speed steel (for metal cutting) or high carbon steel (for wood cutting). It is driven by a high speed motor. Conversion of rotational motion of crank to reciprocating motion of blade is done by a saber saw mechanism.

**Figure 1:** Jigsaw machine Figure

**Sources: www.googleimages .com/jigsaw machine**

## INDIAN JIGSAW INDUSTRY:

**Table – 1 General Details**

| PARAMETER | VALUES |
|---|---|
| Rated power input (W) | 580 |
| Power output (W) | 350 |
| Cutting thickness (Wood) (mm) | 60 |
| HCS (AISI 1065 Carbon Steel) | 490Mpa^16 |
| Teeth Per Inch | 14 |
| Material Thickness | ¼" |

**Source: Jigsaw Industry**

## APPLICATIONS OF JIGSAW MACHINE

**Applications:**

It can be used to make both straight and curved cuts in a wide variety of materials,includingwood , particleboard, plywood , plastic , metal etc. Variable speed improves the quality of cut through various materials and tasks. Universal blade clamp holds both U&T shank blades. Integral dust blow feature keeps the line of cut clear. Dust extraction to keep the work place clean.Sightline channel makes following a line easier.

**Case Study:**

A new technique to avoid cutting problems using jigsaw especially blade deflection has been described. The usage of the second guided roller for the jigsaw shows very good cutting result. The quality in term of straight line cutting of the wooden piece is enhanced further by adding the guided fence on the platform.

## CONCLUSIONS:

Jigsaw is a portable power tool that can cut curves very effectively.It can complete the job faster than the hand-held coping saw.Woodworkers mainly use it to make a straight curved cut for woodworking projects.Assembly is precisely modeled in Autodesk Inventor.The main Essence of the work involves evaluation of a jigsaw machine.With help of powerful simulation tools results can be predicted on the basis of some initial assumptions.All the results generated can be useful In deciding the cutting ability of machine before actual cutting.So, failure of the machine can be prevented.

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