

# Advanced Jig Saw Machine

Sagar Khataavkar<sup>1</sup>, Bhavesh P. Naik<sup>2</sup>, Siddhesh S. Pawaskar<sup>3</sup>, Ashish A. Gupta<sup>4</sup>, Khalidh Y. Murghay<sup>5</sup>

<sup>1</sup>Professor, Department of Automobile Engineering, Saraswati College of Engineering, Mumbai, India

<sup>2,3,4,5</sup>Student, Department of Automobile Engineering, Saraswati College of Engineering, Mumbai, India

**Abstract:** As we have selected “The Advanced 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 etc. 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. The other objective of making a project that number of students can understand working of “Advanced Jig saw machine”.

**Keywords:** Jig Saw Machine

## 1. Introduction

The jig saw machine is a mostly use for wood cutting. Various types of operations on wood by this machine. Like straight cutting, profile cutting, curves, circular holes and decorative cuttings are obtained by this machine.

History: In 1946 Albert Kaufmann, an engineer of Scintilla AG company in Solothurn, Switzerland, replaced the needle on his wife’s sewing machine with a saw blade. In 1947, after development of Kaufmann’s invention, Scintilla started producing jig saw under name “Lesto jigsaw”. In 1954 Scintilla was acquired by Bosch and in 1964 the name “Lesto” was replaced with Bosch. After some time many company was made this machine.

Due to cutting operation the waste material generated can harm the operator hence to prevent it introducing vacuum cleaner to suck all dust particles hence it will be a safety factor as advances in jig saw

Since control is an issue with jig saw machine for good control blade rollers are introduced It will have aligned the blade just above the sole plate

Jig saw work on a tool’s up & down motion and our design is innovative so we can cut the material very precisely and give any shape on job. For cut various type material we can use various types of blade.

The machine is usually made of many materials like cast iron,

M.S and other hard materials. Because to reduce vibrations and other unnecessary forces.

Features that are close together produce a problem because it may not provide enough clearance for the slide mechanism, which could result in another station. It can also be problematic to have narrow cuts and protrusions.

## 2. Literature Review

*Title: (X-Y Axis profile cutting machine) Haverford Township*

The present invention relates to reproducing devices or copying devices and particularly to pantographs other like. An object of the present invention is to provide pantograph for use with a heavy-duty metal-working or wood-working machine such as a milling machine other like. The different object present invention is to provide a pantograph or similar reproducing device

*Title: (2-d cutting profile) K. Zwick*

His invention relates to engraving and copying machine of type in which a pantograph system is used, a cutting tool and tracing point or stylus being mounted on the pantograph system. An object of the invention is to provide a generally improved and more satisfactory machine of this character, and particularly one in which heavy cutting may be accomplished with little or no exertion on the part of the operator, irrespective of the direction of the cut

*Title: (Automated jig saw machine)*

This paper involves the development of automated jig saw machine. The jig saw machine is used for cutting the wooden planks so as to get intricate profiles on it. In the conventional machine the operator has to cut desired profile on wooden sheets by providing manual feeding against the direction of reciprocating saw. Sometimes this operation results into serious accidents, inaccuracy in profiles, time consumption as well as loss of raw material. Hence in order to reduce the limitations of conventional machine a new concept is proposed here in which the efforts of operator are replaced by computer controlled signals.

*Title: (Dry sand seiving machine) Alodeji Akkani Ogunwole*

1. This paper reports on the design, construction and Testing of a dry sand sieving machine. The sample to be sieved is uniformly graded. The coefficient of uniformity is 1.11, thus the machine design does not sieve larger particles such as gravel. The slip calculated is 36% which enabled the proper

configuration of the V-belt. The theoretical efficiency of the machine calculated is 97%.

*Title : (Double guided roller).*

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.

*Title: (Electromagnetic jig saw), P. Kumar*

The magnetic saw effect, induced by the Lorentz force generated due to the application of a series of electromagnetic (EM) pulses, can be utilized to cut a metallic component containing a pre-existing cut or crack. By combining a mechanical force with the Lorentz force, the cut can be propagated along any arbitrary direction in a controlled fashion, thus producing an 'electromagnetic jigsaw', yielding a novel tool-less, free-formed manufacturing process, particularly suitable for hard-to-cut metals. This paper presents validation of the above concept based on a simple analytical model, along with experiments on two materials - Pb foil and steel plate.

*Title: (Design on multiblade cutting)-G. Gawthaman*

The aim of this project is to reduce the wood cutting time. In the design and analysis of single blade wood cutter we can feed the work piece on the feeder to cut single piece of wood into two. It will take long time for each operation. To reduce the operating time and to increase the productivity we are going to design and analysis the multi blade wood cutter instead of single blade wood cutter. In the design and analysis of multi blade wood cutter is to cut the large pieces of wood into small pieces (six). The bladed shaft is engaged in the motor at onside, and the other side of the shaft is to connect the small size pulley.

*Title: (Cutting angles)*

The cutting tool can have one or many (three for a saw tooth) sharp edges, with the fibre severing edge being the first to act and needing to be very keen. Depending on cutting process (green or dry wood), timber quality (knotty or not) and species (siliceous or not), the sharp edge should be resistant to heating, corrosion, abrasion or shocks. Depending on the end use of cut pieces, the tool wedge angle must sometimes be rather small (20° in veneer cutting), and thus be very sensitive to bending and shocks.

*Title: (Linear cutting by sawing), Joseph P. Domblisky*

In the present paper, the reciprocating sawing process is analyzed, and a model for linear cutting rate is developed. The resulting model is based on an orthogonal approximation of cutting at individual teeth and accounts for elastic and plastic indentation. Cutting rates obtained from an instrumented sawing fixture show good agreement with predicted results for the range of conditions considered. Cutting rate was found to

be proportional to thrust force and reciprocating rate though this behavior is influenced by edge radius and flow stress at higher levels. While it was not possible to decouple the effect of pitch and blade set, it was confirmed that coarser pitch blades do provide higher cutting rates.

*Title: (Sensors detect human body), Tawanda Mushiri*

This research paper explores the design of an automatic safety brake mechanism on a manual circular table saw machine which stops the blade from rotating when human flesh is detected in the blade proximity. Fatal injuries are occurring, human thumbs and entire hand cutting during operation when operator accidentally touches the spinning blade. It has become a matter of concern to develop the safety mechanism which can be retrofitted on old-model table saw machines used to train students at a university wood workshop. With this design it is possible to stop the spinning blade in 0.25 seconds.



Fig. 1. Jig saw machine

### 3. Conclusion

This project work has provided us an excellent opportunity and experience, to use our knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We are able to understand the difficulties in maintaining the tolerances and also quality.

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