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## Design & Fabrication of Quad Processing Machine

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### ABSTRACT

In this project, the quad processing machine for cutting, shaping, grinding and drilling machines is kept to be in same attachment. This eliminates the risk of material handling and to the machine table. This unit is driven by 0.25 H.P. three phase motor of 1440 rpm. This is linked with the cast-iron (CI) slider. This enables the slide to get the rotation movement into reciprocating motion having a stroke length of 75mm. The head of the slotting can be tilted to be getting the shaping machine at a desired angle. The head is welded to the slider at the bottom edge. In this machine there can be one operation will be done which is slotting or shaping operation. In the tool head, a slot & tapped holes are provided for holding the tool. According to the height of the job the head can be moved up or down by means of column and can be fixed using a clamp provided. If a table with a machine vice having longitudinal moment is attached to the machine, the setup can be used for machining slots and shaper in small jobs like pulleys etc. Instead of MS sheet, if CI is used for body and other parts it will have longer life, less friction, better lubrication and the production cost will also be low. This machine can also be used for production of small washers by punching if suitable dies and brake arrangement are fixed.

**Keywords— Quad Processing Machine – Drilling, Cutting, Grinding, Shapping**

### 1.Introduction

Industries are basically meant for production of useful goods and services at low production cost, machinery cost and low inventory cost. Today is this world every task has been made quicker and faster due to technology advancement but this advancement also demands huge investments and expenditure, every industry desire to make high productivity rate maintaining the quality and standard of the product at low average cost in an industry a considerable portion of investment is being made for machinery installation. The quad processing machine for cutting, shaping, grinding and drilling can be used to make slots in work piece without moving the job to the work table. The slotter is used for cutting grooves, key ways and irregular surfaces both internal and external, for handling large and awkward work pieces, for cutting internal or external gears and many other operations which cannot be conveniently machined many other machines.

### 2.Literature review

The literature review focuses on the literature study done on the review of related journal papers, articles available as open literature. This literature covers the contribution given by different researcher in the field of filling machines and their performances. The papers focused on multipurpose machines different types, out of that which is better as per applications also their different components of multipurpose machines.

a. K. A. Adedeji, N. A. Raji, E. O. Oyetunji and B. Ishola ,2020, “Design and fabrication of a motorized rice hulling machine”, Journal of Mechanical Engineering Research: Rice is one of the most important cereal crops in the world. This paper presents the design and performance evaluation of a rice hulling machine fabricated for removing chaffs from paddy rice as the consumer’s demand for rice requires the most hygienic, easy and less time-consuming process. The machine is powered by a 3.0 H.P. 950 rpm electric motor via a V-belt mechanism which delivers the power requirement to the shaft on which the hulling cylinder is mounted. Performance evaluation of the machine shows that its efficiency is within the range of 83 to 88%, the 9 hulling capacity is within the range of 22 to 25 kg/h and the maximum efficiency is at 5 kg paddy rice hopper loading which is about 60% of the

hoppers' volume. Design & Fabrication of Quad Processing Machine [1] Karthi V, [2] Arun G, [3] Dinesh kumar M, [4] Eshwar M, [5] Ajith S [1] Assistant Professor Mechanical Engineering, SNS College Technology, [2, 3, 4, 5] Under Graduate Mechanical Engineering, SNS College of Technology [2] arungobal7@gmail.com, [3] dineshkumarking647@gmail.com 2

b. N. Sessa Sai Anirudh, V. N. Sai Chaitanya, M. Venugopala Rao and N. Rupesh,2020, "Quad Blade Hacksaw Machine Operated By Sliding Crank Mechanism", International Research Journal of Engineering and Technology: Work done in this project is to develop a modernized quad blade hacksaw machine with less stress full operation for cutting wood, metal and plastic materials. Effort has been made to develop a hack saw to improve the performance by making it a motor driven two-way hack saw machine. In this rapid emerging industrial era, the utilization of power Hacksaw machine is wide. Time and labour play a serious role in production process this will be overcome by using this sort of automatic machines. The semiautomatic hacksaw machine can be made use of at any of the industries like pump manufacturing industries that involve bulk number of shafts that have to be cut frequently. The range of size of work-pieces which will be cut using the automated hacksaw machine are often varied by changing the blade size c. More Abhishek, More Akshay, Mulik Pradip, Virkar Laxman and Shahapurkar, A. S,2017, "Automatic profile cutting machine", International Journal of Development Research: Now a day's manufacturing industry are continuously developing. Many types of equipment are used to work easily like computerized motion control, advanced cutting system, logical software program in order to achieve the mass production rate and to grab quality of standards in today's competitive market. In automated profile cutting of sheet metals of different thickness this machine will provide required shape after the cutting operation. As compare to different cutting machine available in the market this machine required a much lesser capital cost which makes this mechanism an economical for small and medium scale industry. In this machine a profile template is provided which will be able to cut sheet metal in any shape i.e. profile required. As this machine is meant to provide a copy of template profile. The mechanism includes simply supported, hinged supported arms joined together with a nut and bolt.

### **3.Manufacturing process**

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.

### **4.Drilling**

Drilling is a cutting process that uses a drill bit to cut or enlarge a hole of circular cross-section in solid materials. The drill bit is a rotary cutting tool, often multipoint. The bit is pressed against the workpiece and rotated at rates from hundreds to thousands of revolutions per minute. This forces the cutting edge against the workpiece, cutting off chips (swarf) from the hole as it is drilled.

### **5.Operation**

The geometry of the common twist drill tool (called drill bit) is complex; it has straight cut teeth at the bottom – these teeth do most of the metal cutting, and it has curved cutting teeth along its cylindrical surface. The grooves created by the helical teeth are called flutes, and are useful in pushing the chips out from the hole as it is being machined. Clearly, the velocity of the tip of the drill is zero, and so this region of the tool cannot do much cutting. Therefore, it is common to machine a small hole in the material, called a center-hole, before utilizing the drill. Center-holes are made by special drills called center-drills; they also provide a good way for the drill bit to get aligned with the location

of the center of the hole. There are hundreds of different types of drill shapes and sizes; here, we will only restrict ourselves to some general facts about drills.

### **6. Inspection**

Critical appraisal involving examination, measurement, testing, gauging, and comparison of materials or items. An inspection determines if the material or item is in proper quantity and condition, and if it conforms to the applicable or specified requirements. Inspection is generally divided into three categories: (1) Receiving inspection, (2) In-process inspection, and (3) Final inspection. In quality control (which is guided by the principle that "Quality cannot be inspected into a product") the role of inspection is to verify and validate the variance data; it does not involve separating the good from the bad.

### **7. Assembly**

An assembly line is a manufacturing process (most of the time called a progressive assembly) in which parts (usually interchangeable parts) are added as the semi-finished assembly moves from work station to work station where the parts are added in sequence until the final assembly is produced. By mechanically moving the parts to the assembly work and moving the semi-finished assembly from work station to work station, a finished product can be assembled much faster and with much less labor than by having workers carry parts to a stationary piece for assembly.

### **8. Components**

- Motor
- Cam and cam shaft
- Pulley
- Bearing
- Crank shaft
- Bushes
- Frame stand
  - Clamping device
- Shaping tool.

### **9. Motor**

The motor is so chosen in such a way that it is used to drive the worm and worm wheel drive. The ratio has been reduced drastically of about 40:1 ratio. The motor selected is AC such that it needs to sustain single phase 15 amps. 32 An AC motor is an electric motor driven by an alternating current (AC). The AC motor commonly consists of two basic parts, an outside stationary stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft producing a second rotating magnetic field. The rotor magnetic field may be produced by permanent magnets, reluctance saliency, or DC or AC electrical windings.

### **10. Working Principle**

The machine setup consists of the AC motor which is driven from the power source. This makes the motor to run and the connected pulley and which runs the cam on the opposite side of the pulley, which is connected to the pulley through the shaft. This cam wheel has shaft or the crank rod or which is held at the eccentric position of the wheel. The eccentric shaft is connected to the guide which guides or changes the rotary motion of the cam shaft to the linear motion of the crank rod or the shaft. This shaft is connected at the end to the slotting tool.



### 11. Conclusion

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries. We are proud that we have completed the work with the limited time successfully. The “DESIGN AND FABRICATION OF QUAD PROCESSING MACHINE” system is working with satisfactory conditions. We can able to understand the difficulties in maintaining the tolerances and also the quality. We have done to our ability and skill making maximum use of available facilities.

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