



## Dual Side Shaper Machine using Quick Return Mechanism

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### ABSTRACT

One of the most important accessories used in machine tools with reciprocating cutting action, quick return strokes, and a constant driving crank angular speed is the quick return mechanism (QRM). This project makes use of the appropriate time by using a short return mechanism to illustrate the reduction in dual side machining time in shaping machines. A shaper machine can be modified at any workpiece and task, but it remains ideal throughout the return stroke. There is an idle stroke during the entire return action of this shaping machine. Reciprocating machines come in a variety of types for use in a wide range of sectors for handling small-scale tasks. To shape the tools, which can be angled, vertical, or horizontal, a shaping machine is specifically utilised. A dual shaper system is more effective than a single shaper since substances are created from both sides. Industries can achieve high production rates in a short amount of time and money with the help of dual shaper machines. Both the manufacturing rate and the time are decreased with the dual Shaper machine. With the aid of a quick return mechanism, a dual-side shaper machine is created for this job. The tool's linear motion, which shapes the material arranged on the vice from both sides, is produced by the motor's rotating movement. Similar to the crank and slider, the rapid return mechanism also turns rotary motion into reciprocating action, but the forward reciprocating motion occurs more slowly than the return stroke. A chain and sprocket help to attach the DC motor to the device. The entire device is built upon a sturdy metal framework.

**Keywords:** Quick return mechanism, reciprocating motion

### 1. Introduction

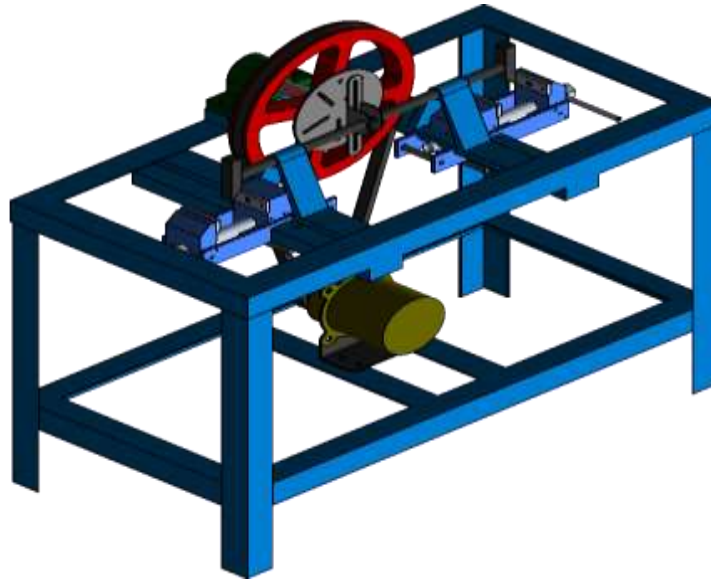
The industries have diverse forms of reciprocating machines for performing device operations on small sizes of mission. A shaping device is specifically used for shaping the device, which may be horizontal, vertical or inclined. In a dual shaper machine, substances are fashioned from each components, which makes it extra powerful than the standard shaper. dual Shaper machine facilitates industries to attain immoderate manufacturing expenses in a minimum quantity of time and value. dual Shaper machine reduces manufacturing prices as well as time. in this project, a dual-component shaper machine is designed with the assist of a quick return mechanism, the rotary motion of the motor is converted into the linear motion of the device which shapes the material set up on the vice from each sides. the quick move back mechanism converts rotary motion into reciprocating motion, but in contrast to the crank and slider, the ahead reciprocating movement is at a slower rate than the return stroke. DC motor is hooked up to the mechanism with the assist of a chain and sprocket. The complete mechanism is built on rugged steel

A Shaper is a shape of tool device that makes use of the linear relative motion between the work piece and a single-point reducing tool to device a linear device path container and the peak of the tool can be a device holder this is set up on a ram the ram slides to and fro above the work. on the front forestall of the ram is a vertical device slide that can be adjusted to both aspect of the vertical plane alongside the stroke axis. This tool slide holds the clapper box and device post, from which the device can be placed to cut a at once, flat ground on the top of the workpiece. The device slide permits feeding the tool downwards to deepen a cut. The tool slide allows feeding the tool downwards to deepen a cut. commonly, a single-point cutting tool can be utilized in those system gear. within the route of the ahead stroke of the device, the job may be machined and at some point of the backward stroke of the tool, the tool is probably idling. To obtain this, the reducing device are set up over an association called a clapper area. In special phrases, the cross again strokes are useless and a non-machining stroke dual installed double net page sided reciprocating shaping mechanism is provided this is customary inside the form of an acute isosceles triangle wherein the lowest is opened to the floor and each cutting mechanism is bent or deformed along the longitudinal axis to form to a conical form at the same time as turned around about the centre axis of the isosceles triangle.

#### 1.1 Working

The work piece is fixed at the machine table on maintain fixed among the machine vice. The single-point cutting tool held properly in the tool submit is established on a reciprocating ram. The reciprocating motion of the ram is received by means of a quick return mechanism. because the ram reciprocates,

the tool cuts the material at some point of its forward stroke. all through return stroke, there may be no cutting motion and this stroke is known as idle stroke. The forward stroke of one side of the machine is the return stroke of any other side of the machine One half cycle gives the forward stroke to one work and the return stroke to another work. another half cycle gives the return stroke of the first work and the forward stroke of the subsequent work. accordingly, the machining takes place on both works in one complete cycle



**Fig. 1 - (a) Dual Side Shaper Machine Image**

### ***1.2 Problem Statement***

Each industry for a excessive amount of time, money, and effort. And a waste of industry time and labour charges than the change of A dual side shaper is a machine that is used to shape and eliminate metal from a work piece and to system a single process with a single point cutting tool, work is simple because at a time operating identical time identical work production charge is high and time waste is minimized and labour cost is minimum therefore it can't be applied for massive production costs. The work could be machined for the duration of the forward stroke of the device, and the device may be idle at some point of the reverse stroke. both sides of shaper machine shaping operations are possible to make use of idling time and enhance productivity at the same time as reducing price and production time. any other advantage is that there are fewer transferring elements than in a conventional machine. We can also make minor adjustments to our assignment "design of dual Slider Shaper device" and fix every other tool put up to conduct the dual operation.

### ***1.3 Components of machine***

1. DC motor
2. Shaping Tools
3. Chain
4. Sprocket
5. Metal frame
6. vice

## **2. Illustrations**

### ***2.1 Mechanism***

The quick return mechanism is the inversion of a single slider crank chain. the primary cause of this mechanism is to convert the rotary motion of the crank into the reciprocating motion of the ram. This mechanism has a one-of-a-kind velocity of ram in the forward stroke and inside the reversed stroke. in this mechanism, the motion of the reverse stroke is quicker than the forward stroke. The mechanism is typically used in applications where the velocity of the device on the return stroke is not huge. therefore, the quicker motion of the ram, all through reverse stroke enables to reduce the total machining time.

Those mechanisms are used in dual-side shaper machines that are used to cutting strokes very fast operating within the machine due to the fact use this mechanism machines depend on a quick return mechanism

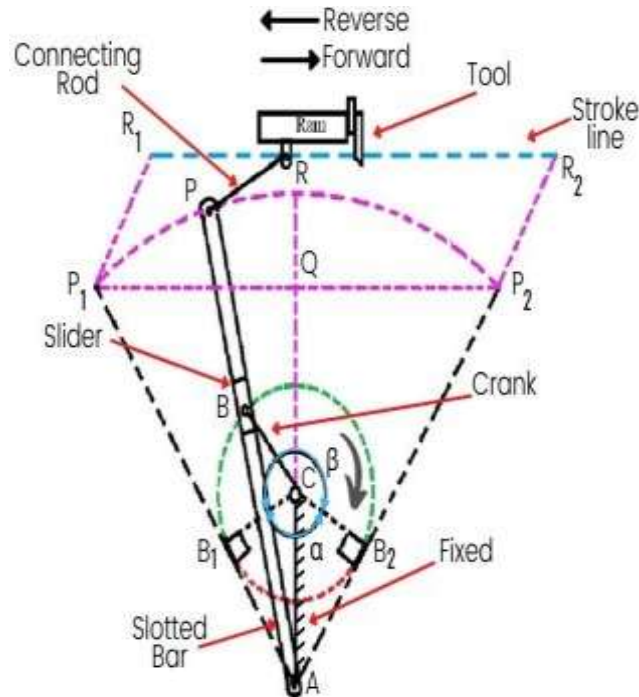


Fig. 2 - (a) Quick Return Mechanism

### 3. Equations of the quick return mechanism

**Time for the forward stroke** = Time to cover angle  $\beta$  by crank

**Time for the return stroke** = Time to cover angle  $\alpha$  for the crank.

But from the above figure, as  $\beta > \alpha$  and the crank has constant angular velocity.

Time for forward stroke  $>$  Time for return stroke

Now the relation between the time for the forward stroke and the time for the return stroke is given by,

$$\text{Time for forward stroke} / \text{Time for return stroke} = \beta / \alpha = \beta / 360 - \beta \dots \dots \dots (1)$$

### 4. Applications

1. To generate straight and flat surfaces
2. To smooth rough surfaces
3. To make gear teeth
4. To make keyways in pulleys or gears

### 5. Conclusion

The paper is a dual-side shaper designed and modified of model This dual-side shaper machine is used to manufacture components similar to a standard shaper machine. However, the machining time required for this dual shaper is less as compared to the normal shaper. Hence, the production rate is increased in the dual-side shaper machine when compared to the normal shaper. The designed dual shaper has been used for only trial production. In the future, it will be used for commercial production in industries

### References

1. M. K. Maricela, K. Ka decode saran, A Dual Side Shaping Machine for Industrial Applications, International Journal of Modern Studies in Mechanical Engineering (IJMSME) Volume 3, Issue 3, 2017, PP 40-48 ISSN 2454-9711 (Online).

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2. Shadab Husain, Mohammad Shadab Sheikh, Can Crusher Machine be using Scotch yoke Mechanism, IOS Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320- 334X PP 60-63
  3. D. Anbazhagan, M. Kanagaraj, S. Kannan, M. Sivakumar, G. Vijaykumar, "Design and Fabrication of Dual Side Shaper Machine Using Scotch Yoke Mechanism", IJADR and Innovative Ideas in Education, Vol-4 Issue-2 2018.