

# Design and Fabrication of Bamboo Slicer

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**Abstract:** *This article details the creation of mathematical models based on experimental data for slicing bamboo using a flywheel powered by a human. Cutting the bamboo sliver using a human-powered flywheel motor included a number of dependent and independent variables. In order to produce the responses as an output, the independent variable sets were optimised in addition to being created and developed as part of the model. A total of 108 sets of readings were acquired for the experiment using the bamboo sliver cutting machine, which was created, constructed, and based on the principle of experimentation. In this work, the experimental results of three response factors, including the number of slivers, processing time, and resistive torque.*

**Keywords:** Bamboo, flywheel, cutting.

## I. INTRODUCTION

For both humans and animals, the bamboo plant is incredibly beneficial. This plant can be used to produce toys, musical instruments, hotels, tea shops, furniture for homes, and other decorative products.

This device can split bamboo longitudinally, producing several slices. Chisels that have been hardened and crushed make up the bulk of this device. Base, Table, and Motor The design and construction of a bamboo cutting machine is an excellent option for cutting the bamboo into various slices.

This is employed in light weight wood cutting industries, it is utilised in wood decorative works, and various designs It is an important project. It is utilised in a wide variety of decorative items. The undertaking is manufactured. The machine for cutting bamboo slivers, which is powered by

## II. DESCRIPTION OF COMPONENTS

i) Chisels (Slicer): A chisel is a tool that can be used by hand, a mallet, or mechanical power to carve or slice hard materials like wood, stone, or metal. Even the name "wood chisel" refers to a particular grind of the blade on the end of the tool. Some chisel variants have handles and sharply edged blades made of metal or wood. The material is sliced while using a chisel by driving the blade into it. In addition to pushing with the hand, the driving power can also be applied with a mallet or hammer. In industrial applications, a hydraulic ram or falling weight (known as a "trip hammer") may be used to push a chisel into



Fig:1

i) Frame: Mild steel is typically used for the frame. It has the strength to withstand any kind of load when it is in use. The frame is fitted with all other components. The support of varied light loads is assisted by the frame. Frame displays a pleasing aesthetic loop. Every machine ought to have needed a sturdy structure. Because the frame balances the load of another machine, the material used for the frame should be very strong. Our project's framing plays a significant significance. The vertical support of the frame is where the vertical pulley and sprocket are placed. Our project was assembled in large part and mounted on a frame

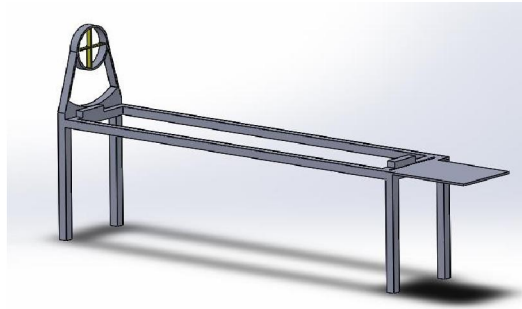


Fig:2

i) Two types of fasteners with threaded holes are nuts and bolts. Nearly always, nuts and a corresponding bolt are used to join two or more pieces together. The two partners are held together by compression of the held-together components, thread friction between the two partners, and a slight bending of the bolt. There are several different head designs for screws and bolts. The tool that will be used to tighten them fits perfectly with these. Certain bolt heads lock the bolt into place rather than allowing it to move, necessitating the use of a tool solely on the nut end. The first bolts had square heads that were produced in a forge. They are nevertheless very extensively dispersed.



Fig :3

i) Shaft: A spinning machine component known as a shaft is utilised to transfer power from one location to another. A tangential force applies the power to the shaft, creating a torque (or twisting moment) inside the shaft as a result. The power to numerous machines connected to the shaft is made possible by a setup inside the shaft. Pulleys, gears, and other components are attached on it in order to transfer power from one shaft to another. The shaft bends as a result of these members and the stresses placed on them. In other terms, we may say that a shaft is employed for both torque and bending moment gearbox.

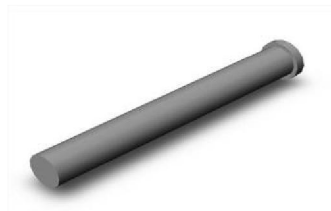


Fig:4

i) Pedestal Bearings: A pillow block is a pedestal that supports a rotating shaft by using the proper bearings & attachments. For pillow blocks, cast iron or cast steel is typically utilised as the housing material. A pillow block is a common name for a housing with an integrated anti-friction bearing. A pillow block is any mounted bearing where the mounted shaft is in a parallel plane to the mounting surface and perpendicular to the centre line of the mounting holes, as opposed to various types of flange blocks or flange units. A pillow block may be in contact with a variety of rolling objects, including a ball, a metallic or synthetic bushing, a tapered roller, a cylindrical roller, or a spherical roller. The kind of pillow block depends on the kind of rolling element. These are not "Plummer blocks," which are bearing housings delivered empty and often designed for greater load ratings with a separate installed bearing.



Fig:5

**Free wheel:** In mechanical or automotive engineering, a freewheel or overrunning clutch is a device in a transmission that disengages the driveshaft from the driven shaft when the driven shaft rotates faster than the driveshaft. Despite being wrongly referred to as a freewheel, an overdrive is unrelated..

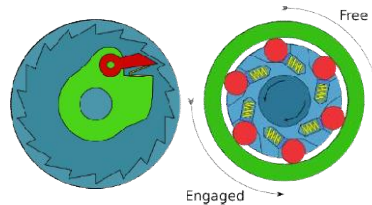


Fig:6

The condition of a driven shaft spinning faster than its driveshaft exists in most bicycles when the rider stops pedaling without a freewheel, the back wheel of a fixed-gear bicycle propels the pedals forward. The simplest freewheel mechanism consists of two spring-loaded discs with sawtooth edges rubbing against one another, like a ratchet. The driven disc rotates at the same speed as the drive disc because their saw teeth lock together when they revolve in the same direction. If the drive disc slows down or stops rotating, the teeth of the driven disc slip over the drive disc teeth and continue rotating, creating a distinctive clicking noise proportional to the difference in speed between the driven gear and the (slower) driving gear.

**Chain drive:** In belt and rope drives slipping may occur. Steel chains are used to prevent sliding. The chains are made up of number of rigid links which are hinged together by pin joints in order to provide the necessary flexibility for wrapping round the driving wheels. The toothed wheels are known as Sprocket Wheels or simply Sprockets. As a result, the chain and sprockets are forced to move in unison without sliding, which guarantees an ideal velocity ratio. When the centre distance between the shafts is relatively close together, like in bicycles and motorbikes, the chains are mostly employed to convey motion and power from one shaft to another, agricultural machinery, conveyors, rolling mills, road rollers etc.

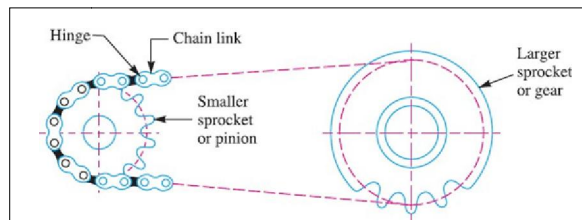


Fig:7

The chains may also be used for long center of up to 8 meters. The chains can handle power up to 110 kW and speeds up to 25 m/s. In some cases, higher power transmission is also

**Sprocket:** Sprockets are used in bicycles, motorcycles, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc. Perhaps the most common form of sprocket may be found in the bicycle, in which the pedal shaft carries a large sprocket-wheel, which drives a chain, which, in turn, drives a little sprocket on the back wheel's axle. Additionally, early vehicles were mostly powered by a sprocket and chain system, which was substantially adopted from bicycles.

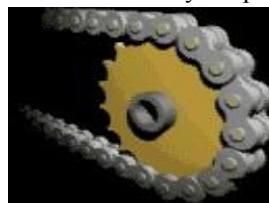
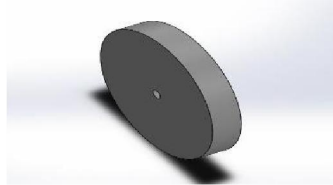


Fig:8

Sprockets are of various designs; a maximum of efficiency being claimed for each by its originator. Sprockets typically do not have a flange. To keep the timing belt centred, certain sprockets used with timing belts feature flanges. In

situations where slippage is prohibited, sprockets and chains are also used to transmit power from one shaft to another, with sprocket wheels serving in place of pulleys and sprocket chains taking the place of belts or ropes.

**Flywheel:** A Flywheel is a mechanical device which uses the conservation of angular momentum to store rotational energy. It is attached to rotating shaft so as to smooth out delivery of power from a motor to machine. The material selected for flywheel is mild steel. Flywheel is attached to the pedal which will use to rotate that flywheel.



**Gear Box:** The Gearbox is called a gear transmission. It simply refers to the step of the gear and their casings. Gearbox are used to transfer the energy from one rotating power source to another.

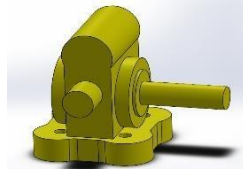


Fig:10

### III. DRAWING

**Isometric Front View:**

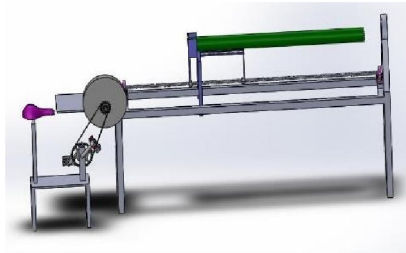


Fig:11

**Top View:**

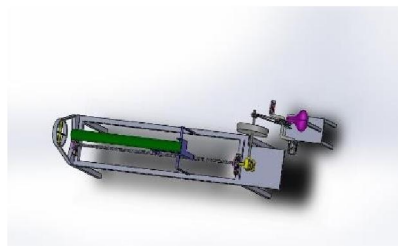


Fig:12

**WORKING PRINCIPLE:** Working is easy. As flywheel is rotate the lead screw. As soon as lead screw is rotate, nut starts moving forward direction along the lead screw i.e horizontal direction. Bamboo should place in between cutting blade and push plate by worker or operator. As nut moves forward it push bamboo towards the cutter and bamboo get spitted in several slices

### III. ADVANTAGES

- Maintenance is less
- It is environmental friendly as it does not add to the existing pollution level
- The transmission and distribution losses are minimized as the plants are located invariably in the rural areas.

**IV. APPLICATIONS**

- It Can be used for wood decorative works .
- It can used in light weight bamboo cutting industries

**V. COST ESTIMATION**

PART NAME	MAT	QTY	COST
ANGLES	MILD STEEL	3 KG	330
CHAIN SPROCKET	STD	1 SET	900
SHEET METAL	MILD STEEL	7 KG	770
SHAFT	MILD STEEL	8 KG	880
SQUARE TUBE	MILD STEEL	10 KG	1100
SPRAY PAINT	STD	1 NO	350
NUT BOLTS	STD	1 KG	120
PEDESTIAL BEARING	STD	2 NO	500
FLATS	MILD STEEL	3 KG	330
FLYWHEEL	STD	1 NO	420
GEAR BOX	STD	1 NO	750
HOLLOW PIPE BUSH	MILD STEEL	1 KG	110
MISCELLINOUS			500
<b>TOTAL</b>			<b>7060</b>

**Table No.1**

Direct Material Cost =7060 Rs Direct Labour Cost =800 Rs Other Expenses =500 Rs

Direct Cost = Direct Material Cost +Direct Labourcost

= 7060+800 = 7860 Rs

Total Cost

Total Cost = Direct Cost +Other Expenses

=7860+500 =8360 Rs

Total Cost of the Project = 8360 Rs

**VI. CONCLUSION**

It is concluded that Design and Fabrication of Bamboo Slicing Machine is a good choice to slice's the bamboo in to different slices. This is used for manufacturing of incense sticks, wood decorative works, It is used in light weight wood cutting industries, Different design can make It is the useful project. It is used in many varieties' decorative things. A lower cost machine can be fabricated for small scale farm holders in agricultural and rural areas. The machine will be designed in such way that it will require minimum space to install. The maintenance of the machine is not expensive.

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