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TO MODEL AND FABRICATION OF PORTABLE WOOD LATHE MACHINE

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Abstract
Aim of a project fabricating a functional and efficient portable wood lathe machine. We will analyze as well as synthesize the different possible design solutions and concepts. We will carry out the analysis of different component part of the machine to determine their suitable dimensions based on loading and stresses. We will use available local material and tool from a workshop and make use of some machine tools in the college workshop. The material, labour and overhead costs will be determined to get the overall cost of a prototype. Essentially, the machine comprises the frame made of wood, with the headstock fixed in position the tailstock moves along the bed of the machine, and the tool rest mounted on a cross slide which can be moved both longitudinally and transversely on the bed. It is settled between the support and therefore the support. The mini lathe machine can reduce the capital cost of machining reducing the labour cost. The machine would be easy to handle because of its mobility and portability and can easily be maintained. Because of its portability and small in size it will consume less power than conventional lathes and at the same time will be simple.

Keywords: fabrication, portable wood, lathe machine, tools etc

Introduction

In recent times, when it comes to the choice of various designs and models demand for interior decorations and furniture has been increased. This has led to the design of a good number of machines that can be used by the craftsmen to create different wood designs amongst which are the wood lathe machine.

Objectives

To model and fabrication of portable wood lathe machine is justifying a simple way of cutting off wood at its best quantity at minimum cost of labour.

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Fig 1

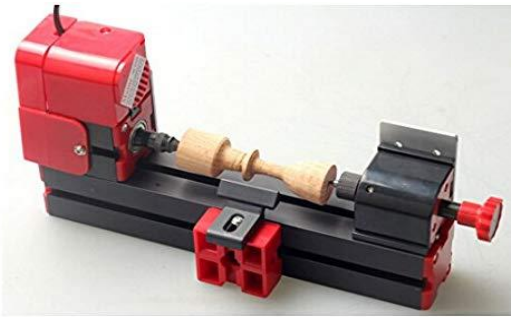

Fig 2

Literature review

The present project is about the Portable Wooden Lathe machine. We have found in a machining operation, vibration is frequent problem, which affects the machining performance and in particular, the surface finish and tool life. Severe vibration occurs in the machining environment due to the motion between the cutting tool and the work piece. In all the cutting operations like turning, boring and milling, vibrations are induced due to the deformation of the work piece, machine structure and cutting tool .Also a new approach is taken in which the system utilizes O as method to minimize the experimental work needed and to give a good evaluation of the designed monitoring system. The average dependencies of the proposed systems are compared with the pattern recognition capability of a back propagation neural networks and a logic classifier.

Statement of problem

The continuous quest to have the problems of man and his growing need solved has led to the establishment of factories and others industries, which necessities an intermediate technology**.** Moreover easy hand equipment which was utilized earlier are not used these days correctly for mass production.

In the same manner, the importation of wood lathe machine, as a substitute for these tools, likewise has failed to meet man's insatiable needs because of our unstable economy. Then, there comes the necessity for pressing attention to a stronger and regionally created wood shaping machine machine.

Purpose of study

The design and fabrication of wood the shaping machine machine aims among others factor at justifying an easy manner of scraping and separating wood at its highest quality at a minimum price of labour, in order that the money burden if individuals is reduced.

The simple design and fabrication of this machine, makes it viable, reliable and easy to carryout maintenance services at the minimized cost.

Scope of work

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Essentially, the machine comprises the frame made of wood, with the headstock fixed in position the tailstock moves along the bed of the machine, and the tool rest mounted on a cross slide which can be moved both longitudinally and transversely on the bed. It is settled between the support and therefore the support. In operations, the machine is restricted to solely a turning and cutting of any style of wood. Drilling operations can't be performed on the machine.

Dimensions and specifications

Below are the scale and specification as regards the fabrication of the wood shaping machine.

1. Total length of the machine35inches
2. Total height of the machine 8 inches
3. Width of the machine 11 inches
4. The electric motor BLACK + DECKER
   - Rpm2900 rpm
   - Drill Capacity 13 mm
   - Power500 watts
   - Voltage 5 volt
   - Current 8 amps

5. The space between the bed rails
   - Maximum13inches
   - Minimum7inches

6. Diameter of the headstock pulley 0.47 inches / 12mm
7. Diameter of electric motor's pulley 0.39 inches / 10mm
8. Width of tailstock 9 inches
9. Maximum length of work piece 10.62 inches / 27cm
10. Minimum length of work piece 8.6 inches / 22cm

Material selection

We are using wood to make a prototype. In any lathe machine the gray cast iron is used, but gray cast iron is not available in all locations and it's cost is also high and the weight is high compare with wood. In case we use the gray cast iron the machining and labor cost is increasing more than the wood machining cost. Just we are introducing new way of wood lathe that is tail stock is movable and head stock Is fixed to compare the other lathe's. For this project wood is perfect material to make a prototype if we use gray cast iron the machining and CNC machining cost and time tacking is high. So that we are choose wood to make a prototype of wood lathe machine.

Model and analysis

Model in solid works 2016

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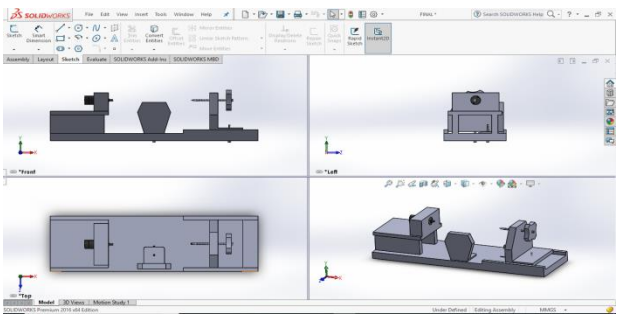
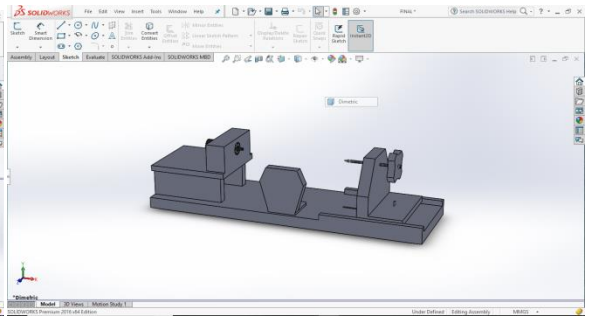
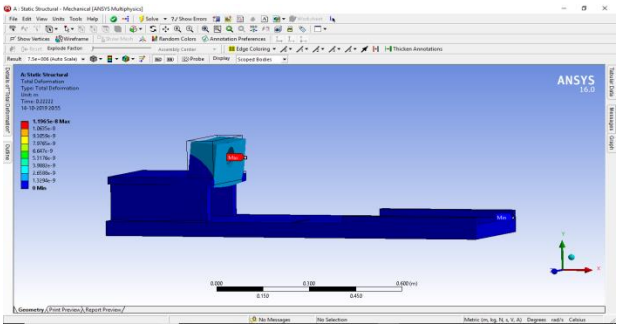
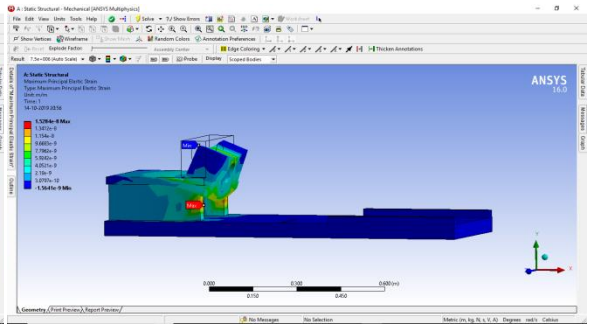


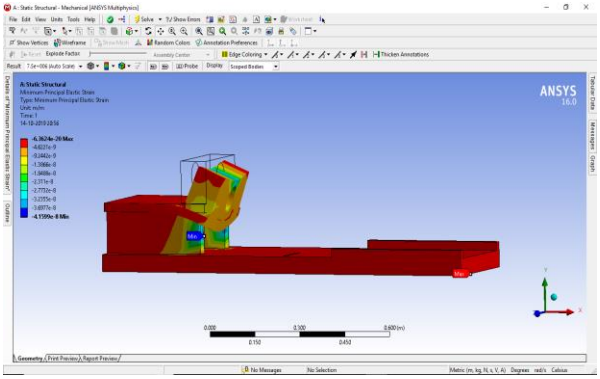


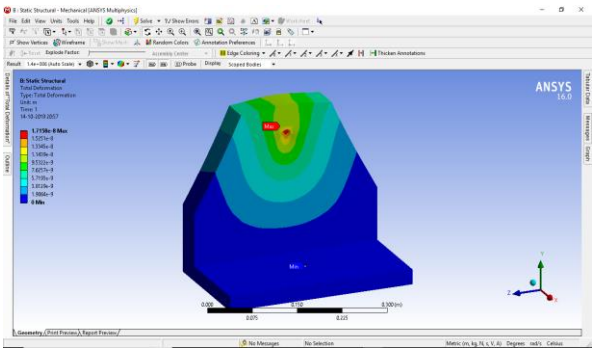
Analysis





Total deformation **Maximum Principal Elastic Strain**





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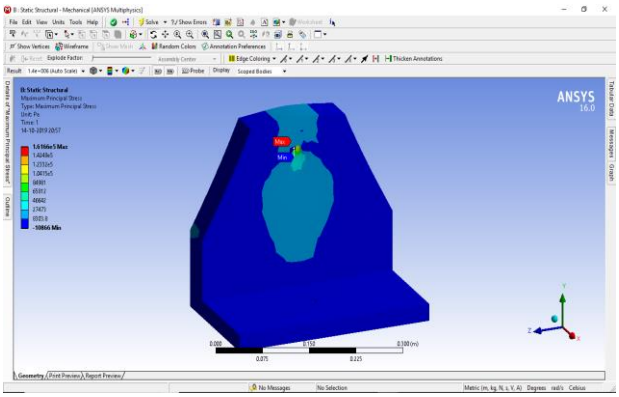

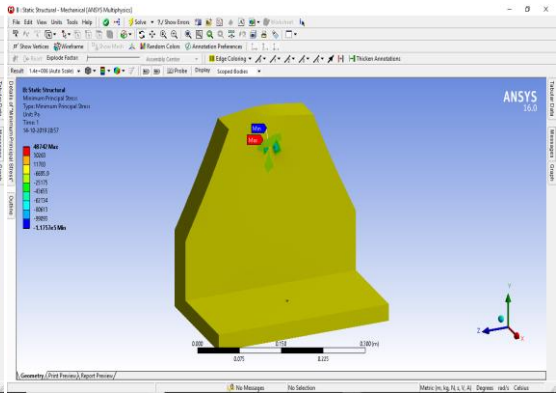

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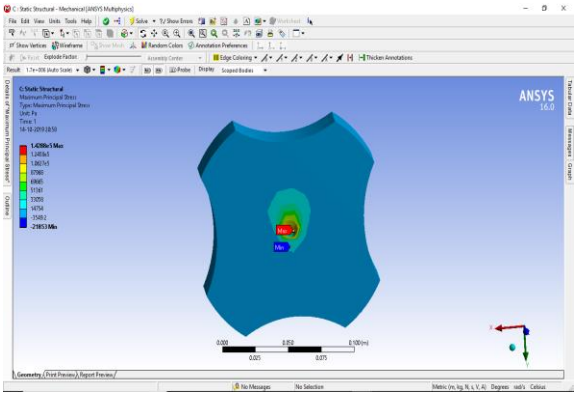
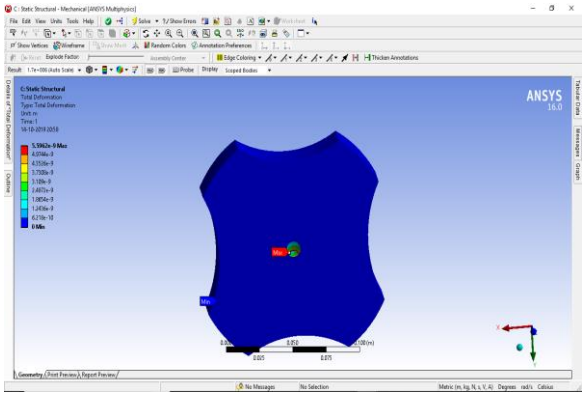

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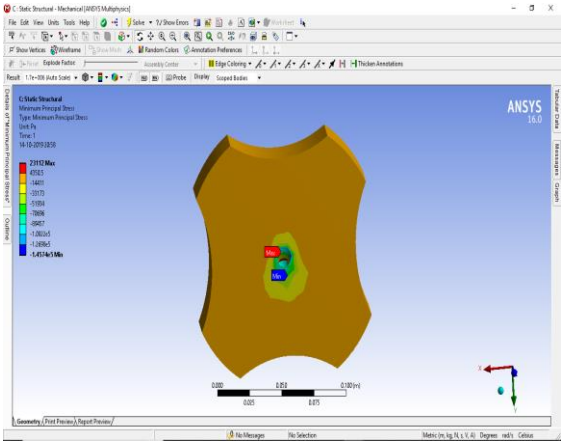
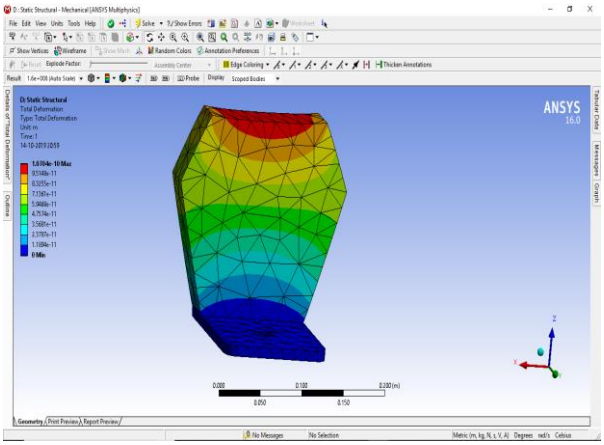

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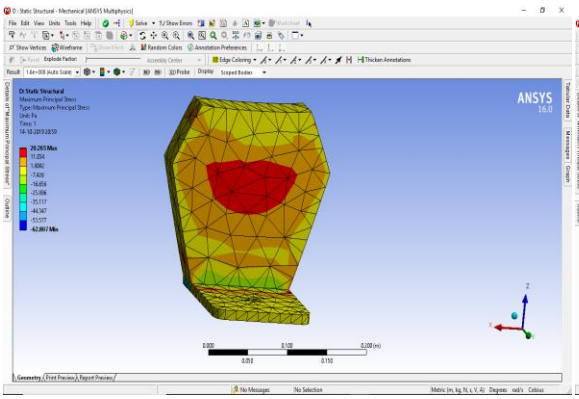
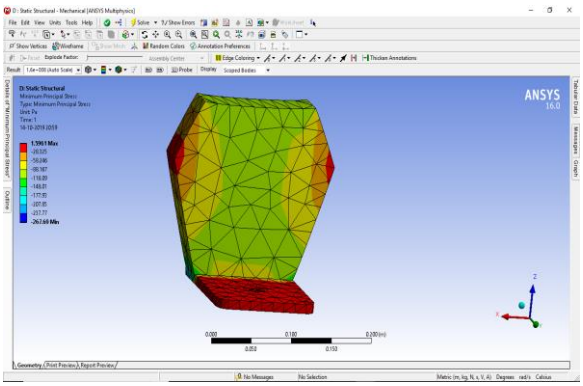

Maximum Principal Elastic Strain Minimum Principal Elastic Strain

Assembly procedure

Stage -1 (base/bed)

1. First we are going to take wooden blocks according to the above Dimensions and specifications.
2. Then after make a base by using respected tools(length-35inchs,width-11inchs,height-8inchs)

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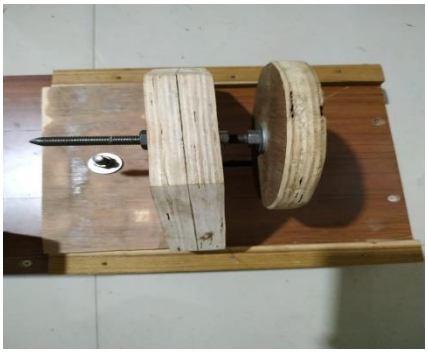
Stage -2 (head stock)

1. Now we are going to make a base like a block (length-10inches,width-8inches,height-5inches)and to kept on the bed at a side and it is stable.
2. On this base we are going to place a hand drilling machine and it is fixed by the wooden clam which is made by hand and fixed tritely.

Stage -3 (tail stock)

3. The tail stock part is made (length-15inches,width-8inches, height-7inches) by wood and it is fix at opposite side of the head stock.
4. This tail stock is moving in the horizontal to the lathe machine and not exceed from the bed.
5. The tail stock have a hole at the top and it carries a bolt and it is use to hold the work piece tritely.



Stage -4 (tool post)

6. The tool post is made (length- 8inches,width- 4inches,height- 6inches) and fix at the center of the bed at one side and it movable in vertical direction of the bed.

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Total assembly

Safety guide

When wood lathe machine is operating, it is important to wear certain personal protective equipment (PPE). Loose consumer goods mustn't be worn, all jewelry ought to be removed, and long hair ought to be tied back. excelsior generated throughout turning will have to be compelled to be sporadically removed.

• Eye protection could be necessity once wood shaper operations. There square measure many PPE obtainable for eye protection similar to safety specs, glasses and visors, a number of that feature intrinsic respirators. though all of those square measure adequate, for the very best level of protection, a visor that protects the whole head from mud and rubbish ought to be worn.

Ear protection - Compared to other power tools, a lathe is a quiet machine. Ear protection should be used if noise is excessive; this may be due to motor (fan) noise from a shop dust collector, or the combination of wood and tool being used.

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- **Hand/skin protection** - Gloves should not be used with rotating equipment, since there's always a risk of getting tangled in the machine. Nevertheless, some woods provide splinters that not only puncture skin, but also cause festering sores and/or skin irritation. Polishes and finishes used in woodturning can also be harmful or irritant to skin, often containing organic solvents such as methanol, turpentine and toluene. This subject continues to be debated in the community.

- **Foot protection** - Protective footwear, often leather steel-toe boots, is required for any type of shop activity.

A good way to check the safety before starting the lathe is 'SAFER':

- S - Speed - check the rpm speed, slower for big, heavy things, faster for smaller lighter things. Most authors recommend always starting at slow speeds and re-setting speed to low at end of session.
- A - Aside - make sure you are standing to the side of the blank's 'firing line' (not in front of the wood).
- F - Fixings - check that the wood, tool-rest, tail-stock etc. are correctly attached.
- E - Eye protection - make sure you're wearing sufficient eye protection.

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- R - Revolve - Check that the wood can turn around without encountering any obstructions, such as the tool rest, by rotating it by hand.

Safe usage of a lathe also depends on the operator's choice of proper techniques for the lathe, tools, and wood.

Cost report

Material cost

S.No	**Material**	**Quantity**	**Cost**
1	Wood	5feet	400
2	Bolts& Nuts	5 pairs	25
3	Drilling Machine	1 piece	1200
4	Tools	6piece	300
5	Nails	100 grams	50

Labor cost

S.No	**Material**	**Labor cost**
1	Wood	100
2	Bolts& Nuts	5
3	Drilling Machine	80
4	Tools	40
5	Nails	20

Overhead cost

S.No	**Material**	**Overhead cost**
1	Wood	500
2	Bolts& Nuts	30
3	Drilling Machine	1280
4	Tools	340
5	Nails	70
6	Miscellaneous	280
7	**Total**	**2500**

Conclusion

In this project a study has been done on mini lathe machine to know about its portability, reliability and cost reduction. The fabricated model of the design will be portable, cost efficient and can be assembled and dismantle according to the use which will increase the mobility of the machine and can be easily carried. The ordinary workers who can't afford the conventional lathe machine can buy this portable mini lathe machine and can perform their machining operation effectively. The mini lathe machine can reduce the capital cost of machining reducing the labor

cost. The machine would be easy to handle because of its mobility and portability and can easily be maintained. Because of its portability and small in size it will consume less power than conventional lathes and at the same time will be simple.

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