

# PORTABLE SURFACE GRINDING MACHINE ATTACHMENT ON LATHE MACHINE

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**Abstract** - Grinding is an important aspect while grinding the tool- job to the human effort is applied to grind the job by the ending with the human effort the point cut rate of accuracy is 0.5mm to 1mm. It cannot be acquired as expected grinding cannot be done for a long time and excessive heat is generated. The project AIMS for design and analysis on low-cost surface grinder attachment on a lathe machine. In this, we have removed the tool post and replaced it with the surface grinding machine attached to the lathe machine. It also considers the rigidity of design damping of aberration due to motor speed and stress analysis. A critical part of the design is analyzed on software and compared with theoretical calculations. So because of that, we're quite a good and smooth surface finish. Easy to handle as it's free to move and using the dial cut-rate and accuracy it can occur rate of the errors and the accidents can be reduced. It's safe to use under any kind of circumstances.

**Key Words:** Grinding, Rigidity.

## 1. INTRODUCTION

The project is designed to reduce the cost of grinding as well as for portable purposes. Manually operating on a job can get hard and also if the operator is not skilled or a newbie. It will eventually become even harder to finish the job with all accuracy or as per the requirements and sometimes the work piece gets out of shape or gets damaged. This simple procedure can become even more harmful when there is enough ignorance due to less experience without operators' knowledge.

As we know that there is no proper collector to collect the scrap which is produced while performing the task. That's why this project is based on the low-cost surface grinding attachment on lat machine using the portable grinding machine. So that it will reduce the cost of surface finishing and grinding and reduce the mistakes while working. Gives a better quality of surface finish and also reduces the efforts. Apart from that lathe machine is already having a collector so most of the waste will be collected in that. The biggest thing is in the design is that this grinding machine is portable, we can attach this grinding machine or manually on the lathe which should be already in existence at the workplace. The grinding machine is already available in the

markets but that contains two wheels which are used for grinder and another one is for generating a General working.

In old times the late machines were invented and used for all types of work on material like wood, metal, etc...it is expected to give proper shape. But after passing Some years CNC machines were invented. The turning operation of the working is mostly performed on the lathe.

Then forwarded for the grinding for the surface finish the proper surface finish to the depending upon the work piece metal. Required grinding wheel the grinding wheel is made of abrasive particles and bonding materials. These wheels are used for grinding machines. Also it requires proper force that's why motor is applicable for grinders. The main aim of the project research is to give high and good quality of surface finish to the consumer. Due to the high RPM of the motor causes the maximum vibrations during the operation during of vibration the dampers were used.

This attachment is usually designed for only shop floor machines and quality surface finish. So several practices were done to overcome the floors and make the machine precise. While designing what Matters the most was considered such as size shape with looks and handling procedure. So that it will be easier to operate by students as well as teachers or potential users. With most of the attention was concentrated on the rigidity of the machine. The attachment is simple and small, the appearance is different and also requires a few skills.

### 1.1 What is surface grinding?

The surface grinding is the process done on the flat surface to produce a smooth finish. And it is a widely used abrasive machining process.

### 1.2 Types of surface grinding

Four types of surface grinders are commonly used in industry:

- i. The Horizontal spindle (peripheral) surface grinders
- ii. The Vertical-spindle (wheel-face) grinders

- iii. The Disc grinders and double-disc grinders.
- iv. The Grinding wheels for surface grinders

## 2. OBJECTIVES OF DESIGN

The portability and compactness of the machine were the major objectives of design so that the machine thus design could be portable easily at Industries or small-scale workshops. Also, the machine had to be simple in design and construction such that it could lead to easy maintenance. Low-cost surface grinding attachment lathe machine using portable grinding machines is important to have an optimum usage of efforts accordingly the mechanism was designed. The conceptualized machine should also have the ability so that can exchange it with a tool post that is already, mounted on the lathe machine.

Hence the dimensions and the other design aspects were chosen accordingly.

## 3. PROBLEM STATEMENT

- i. While grinding the tool / job with human effort it is very difficult for a worker to grind the job
- ii. While grinding with human efforts the point cut rate or point of accuracy (0.5 to 1mm) cannot acquired as expected
- iii. Grinding cannot be done for a long time as excessive heat is generated in output end.
- iv. Poor surface finish generated and output smooth finishing is not done

## 4. SOLUTION

The project aims design and analyze low cost surface grinder attach on lathe machine in that we have removed the tool post and replaced that with surface grinder machine attached on lathe machine so because of that we acquired good and smooth surface finish. Easy to handle as it's free to move and using the dial.

Cute rate and accuracy is can be occurred.

Rate of errors and accidents can be reduced.

## 5. COMPONENTS

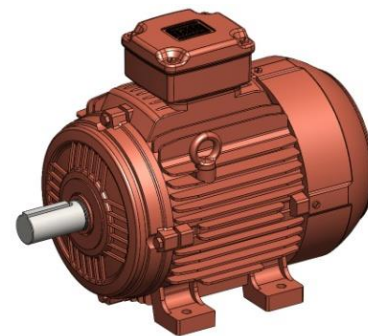
### 5.1 Grinding Wheel :

Grinding wheel is the wheel that used for the the grinding purpose it contains Abrasive grains and layers of fiberglass bonded into wheel shape by another substance. Abrasive Wheel act as a grinding tool used for removing the chips from the workpiece and grinding wheels are used for many purposes like grinding and machining operations.



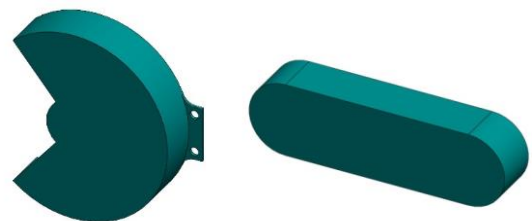
### 5.2 Motor :

The electric motor is a device that used to convert electrical energy into mechanical energy.



### 5.3 Casing :

A covering case is that protects something while performing the task.



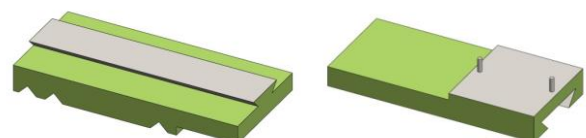
### 5.4 Belt :

A belt drive is used to transfer the power from input shaft to output shaft.



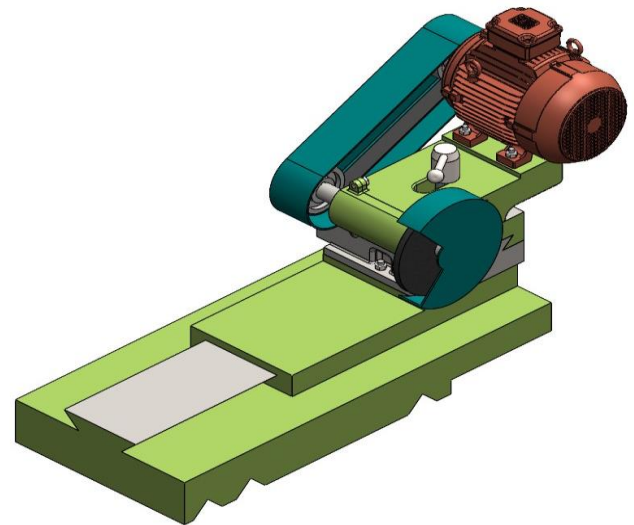
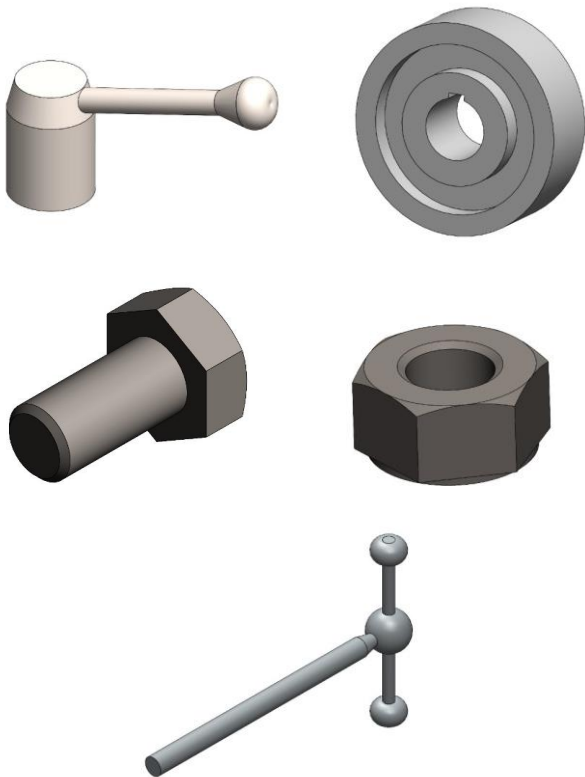
### 5.5 Base plate :

It is used to move the Grinding Machine In X and Y direction (Compound rest and Cross Slide )

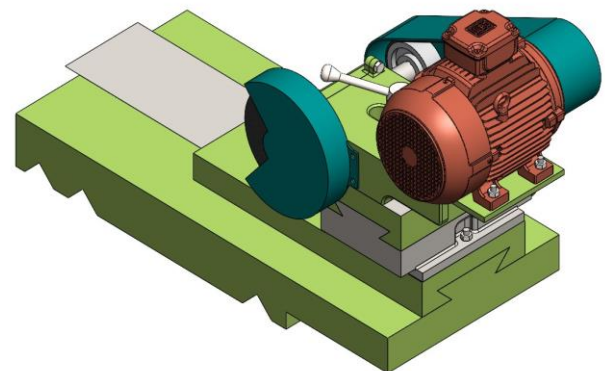


**5.6 Other components :**

Other components that used in the portable surface grinding machine attachment with lathe machine.



**6.1. Isometric View**



**Fig - 1: Isometric view of Grinding Machine**

**6. WORKING OF PORTABLE SURFACE GRINDING MACHINE ATTACHMENT WITH LATHE MACHINE.**

After removing the tool post from the lathe machine, a low-cost grinding attachment is attached to the lathe machine. Then the work piece is fitted in a chuck as usually, we fit work piece on chuck while performing a lathe operation. After the required adjustment, the compound rest and cross slide then turn on the switch and perform the task.

The existing bench grinder is fitted on the table and its mounting is fixed to the table.

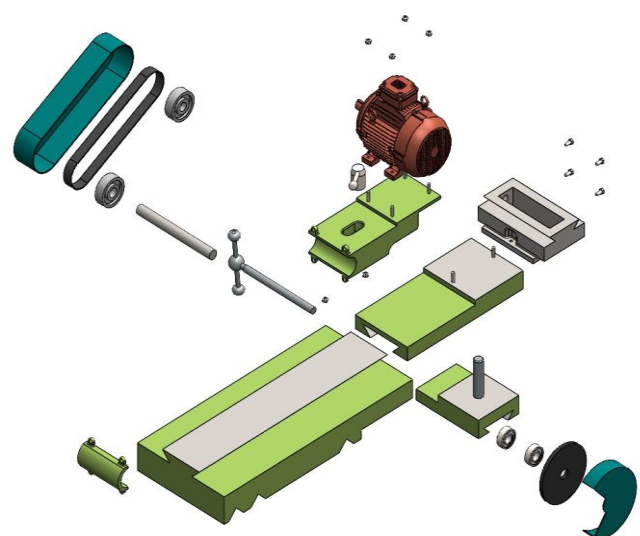
Sliding mechanism in X and Y direction is design for X and Y feed.

A Swiveling table can set the required angle of grinding with the help of protector and can be fixed at that angle by spring pressure.

The job can be slided and the length with given grinding angle can easily be controlled when job is mounted on the table.

This can be economic alternative for costly grinding machine for a given work

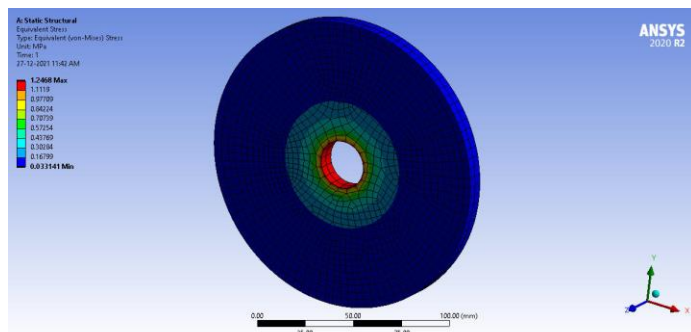
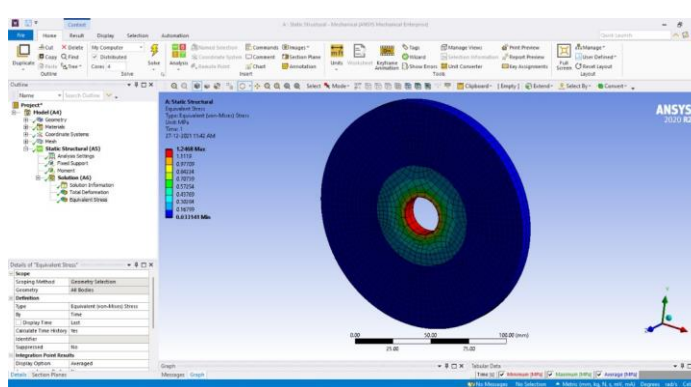
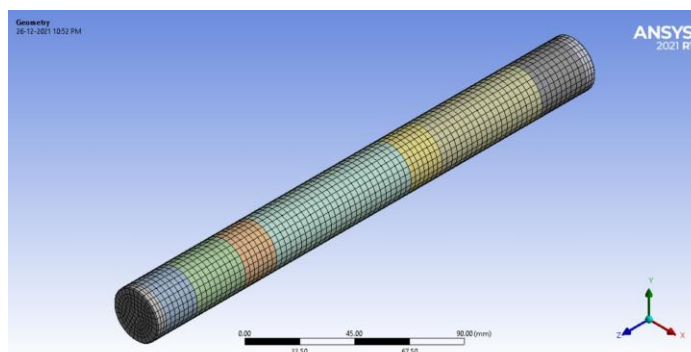
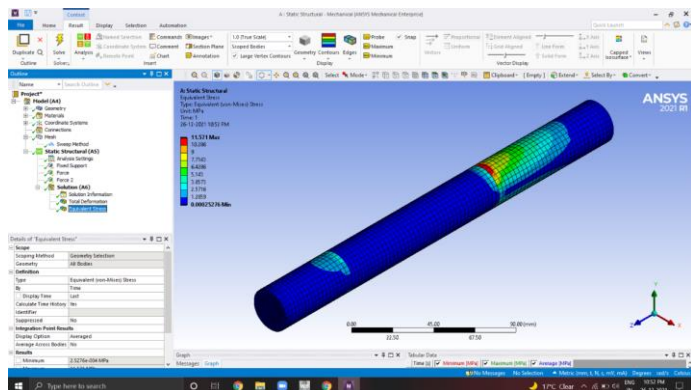
**6.2 Exploded view**



**Fig -2: Exploded view of Grinding Machine**



### 7. SIMULATION ON GRINDING MACHINE PARTS



### 8. CONCLUSIONS

The PORTABLE GRINDING MACHINES thus designed and fabricated is a unique, compact and portable plastic bottle shredder machine.

Hence we have come to end of the project on this topic we would like to share the experience our team while doing this project a very thanks to our dear HOD so for setting such target for us we enjoyed every bit of work we put into this project we do hope that our provides will be interesting and knowledgeable thank you

Our project can surely help to build new society with fewer amounts of injuries' around. This can surely help our new users to grow and breathe without worrying about ruining the job while working.

### ACKNOWLEDGEMENT

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