

Designing and Manufacturing of Portable Polishing Unit for Pipe Mill

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Abstract - Now days there is only machine available which can polish single diameter pipe. Variable diameter cannot be polished by this machine. In this polishing unit we are modifying that single polishing machine can polish different diameters pipe at single unit machine with good surface finish overall circular pipe with optimum speed and also better finish of welded joints. Polishing is a more aggressive process while buffing is less harsh, which leads to a smoother, brighter finish. A common misconception is that a polished surface has a mirror bright finish, however most mirror bright finishes are actually buffed. Polishing is often used to enhance the appearance of an item, prevent contamination of instruments, remove oxidation, create a reflective surface, or prevent corrosion in pipes.

Key Words: Cylinder, Belt(Zircon emery), Roller, Pipe.

1. INTRODUCTION

Polishing is one of the oldest processing method used to generate smooth and shiny surface. This smoothness is obtained by rubbing the surface with the help of belt and roller mechanism. Now a day conventional machine is not applicable for polishing different diameter of pipe .If the diameter of pipe is change the aliment in conventional machine is required to change and they are consumed more time and money.

Now a days it is necessary to increase production rate continuously in order to achieve higher production rates with minimal of human input, there is need to develop innovative machinery to cater the above needs. Polishing operation is mainly done on the face of the components which is similar to polishing with the view to improve the surface finish of the components. The polishing operation is presently done by mounting an abrasive belt on the rollers of Nickel chromium coating and feeding this rotating belt against the weld surface.

2. LITERATURE REVIEW

1.Donald C. Zipperian. [2018] He has published paper on "Metallographic specimen preparation Metallographic is the study of a materials microstructure". In general, minimizing the damage early in the micro structural preparation stage by choosing the correct abrasive, lubricant, and equipment parameters, the steps required to highlight the representative materials microstructure obtained by following the basic preparation guidelines outlined in this

paper. Planar Grinding - or course grinding is required to plenary the specimen and to reduce the damage created by sectioning. The planar grinding step is accomplished by decreasing the abrasive grit/ particle size sequentially to obtain surface finishes that are ready for polishing.

2.C. Y. Wang, X. Wei, and H. Yuan [2018] conducted experiments on polishing of "Ceramics Tests were carried out in a special manual grinding machine for ceramic tiles". Two grinding wheels were fixed in the grinding disc that was equipped to the grinding machine. The diameter of grinding disc was 255 mm. The rotating speed of the grinding disc was 580 rpm. The grinding and polishing wheels are isosceles trapezoid with surface area 31.5 cm² (the upper edge: 2 cm, base edge: 5 cm, height: 9 cm). The pressure was adjusted by means of the load on the handle for different grinding procedures. A zigzag path was used as the moving trace for the grinding disc. To maintain flatness and edge of the ceramic tiles, at least one third of the tile must be under the grinding disc.

3.Mr. Junmo Kanga, Andrew Georgea, Hitomi Yamaguchia(2018) in 2012 stated that A high speed multiple poletip finishing system has been developed for "Finishing capillary tubes and finishing experiments" have been performed with tube revolutions up to 30000min⁻¹. In the single pole-tip system, the magnetic abrasive is stable and performs efficient surface finishing up to 30000min⁻¹. Conversely, the magnetic abrasive and tool lapse into unstable conditions in the multiple pole-tip system at high transmitting media is pipe, pipe has both internal and external surfaces. The fluid is making direct contact with internal surface. Various research is done on the finishing of needles and surgical equipment's with diameter 2mm(outer). We are now dealing with the internal surface finishing of pipes of diameter upto 18mm to 20mm. The internal surface of pipe is important for fluid transmission, the finish plays important role in observing fluid behavior. The internal surface of pipe can be effectively finished with the magnetic particles and magnet with abrasives like iron carbide. The method is very easy and can be achieved to high surface finishing. In this project we are dealing with pipes except magnetic materials

4.He Wang et.al. (2017) had discussed the "Rotation and Revolution polishing method which was published in Journal Precision Engineering" volume 50(2017)515-521 in which they introduced rotation and revolution polishing methods to increasing demand for high quality optics and higher precision polishing techniques by Preston Principle

3. SUMMARY OF LITRETURE REVIEW

1. Design and manufacturing portable setup internal surface finishing of pipes successfully completed. It is concluded that this model is working properly under required condition with good surface finish. It is successfully able to give smooth surface finish having diameter upto 20mm.
2. Internet searches and visits to the shops gave the same picture of the availability of products on the market. Therefore, it is evaluated that the mapping has covered the market.
3. They get upto range of 10-15micro surface finishing using this bar polishing machine.
4. They dealing with the internal surface finishing of pipes of diameter upto 18mm to 20mm.

4. PROBLEM STATEMENT

Now a day polishing machine the steel pipe is polished with the help of a belt which is driven by two metal rollers. For polishing pipes of different diameters different polishing machine was required. This system was not able to adjust different diameters, so it was difficult and inconvenient for using different machine for different pipe diameters. The polishing machine which was when fixed on a line was unable to use on another line since it didn't have a diameter adjustment as well as it was not portable. Portability is also one of major issue which was faced

5. OBJECTIVES

- Providing polishing convenient way for diameter adjustment.
 - To make it portable.
 - Optimum material removal.
 - To obtain better finishing.
- Overall time of production is reduced

6. METHODOLOGY

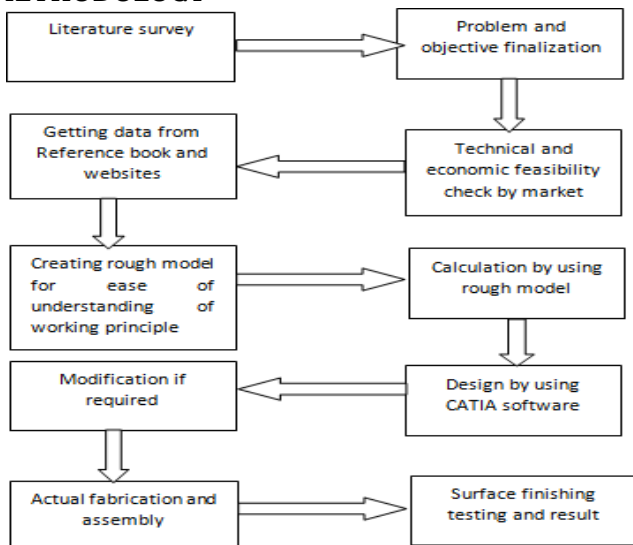


Chart-1: Flow Diagram of Methodology

7. DESIGNING OF MODEL

The various parts required for project is design and assembly of the same is created in CATIA & Autocad. For knowing the working principle animation of same is created.

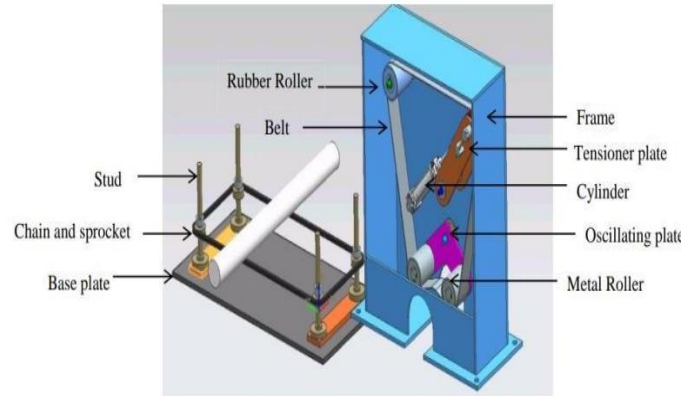


Fig -1: Assembly in CATIA V5

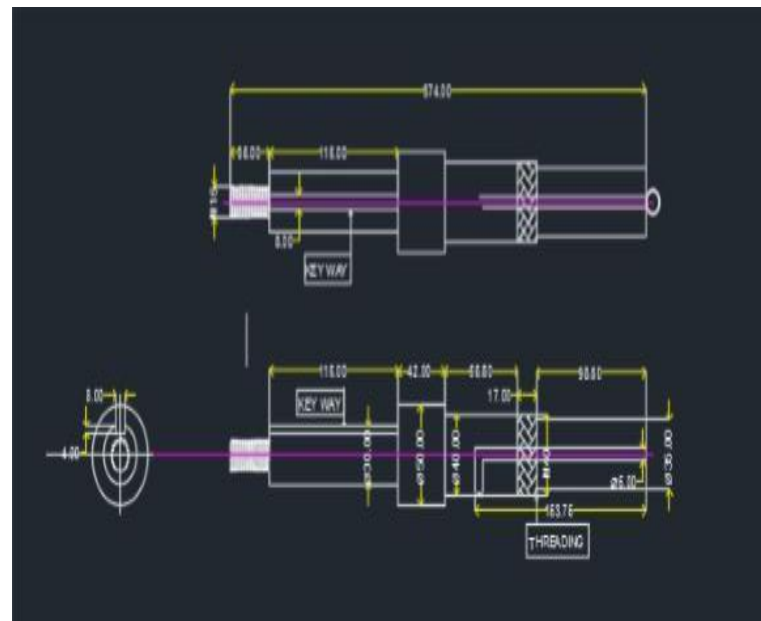


Fig.2: 2D diagram Rubber Roller Shaft on Autocad

8. EXPERIMENTAL SETUP

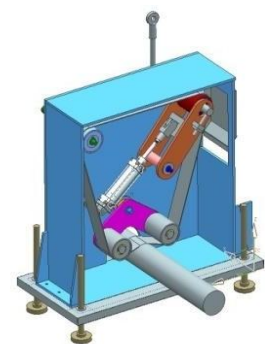


Fig -3: Actual Setup

Fig shows the schematic view of Polishing Machine. The welded joint is polished and very negligible material is removed due to circular motion of rollers and oscillating motion of oscillating plate. Also, the belt is passed from a roller having rubber coating to avoid slippage due to motion between rollers and belt. We get a well polished part according to our need and the burs due to welding i.e. argon welding or due to some other reasons are removed

9. EXPERIMENTAL PROCEDURE

1. Fit the Polishing Machine in Production line.
2. Start the Polishing Machine,
3. Pass the welded pipe into the Machine.
4. Polishing Belt is polish the welded pipe.
5. Then the belt is remove the brush from Pipe and polishing the pipe.

10. MATERIAL SPECIFICATION

Stud	MS Bright
Sprocket	MS Bright
Frame	MS Bright
Belt	Zircon emery paper
Rubber Roller Shaft	MS Bright
Rubber Roller	Rubber
Metal Rollers	MS Pipe

Table-1: Specification

11. ADVANTAGES & LIMITATIONS

1. Welded pipes are polished by less Material Removal Rate(MRR).
2. Most important it is portable.
3. Various diameters of pipe can be adjusted.
4. Previous machine was using flaps for polishing pipe surface and it was not cost effective so by using this machine we can save money.
5. While using flaps for polishing it required more time for changing flaps that time lose has been saved.
6. Emery paper belt used in machine has low cost as compare to other abrasive belt material.

LIMITATIONS

1. Polishing is used only for cylindrical shapes no any other shapes can be polished.
2. There is manual work of revolving handle to move base plate up and down with chain and sprocket.
3. Belt used has to change frequently.

12. CONCLUSION

There are a lot of inaccuracies present on the surface of workpiece after its manufacturing. So, from this project we intends to polish the welded steel pipes of different diameters by this machine. We get shiny and smooth surface

over welded joint. It also removes scratches from the surface of specimen. Negligible metal removed by using this polishing machine. Dimensional inaccuracies, uneven polishing are on the surface of workpiece are reduced from this project. Limitations of earlier polishing machine at small scale industries are overcome by our project. After using that machine there is no requirement of further machining and component can be directly used in assembly. Also, the limit of precise polishing at welded joint is obtained and So, from this project we get required smooth surface finish and remove irregularities from the surface.

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