

Surface Belt Grinder for Keys -A Review

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Abstract: Machining processing industries have continuously developed and improved technologies and processes to transform finished product to obtain better super finished product quality and thus increase products. Abrasive machining is one of the most important of these Processes and therefore merits special attention and study. The objective of this work was to design, develop, evaluate, and demonstrate for use in the abrasive machining of metal Components, shaft keys, unfinished metal products. This study focused on belt abrasive Machining processes and included substantial background work, which provided a solid Base under tanding of the behavior of the abrasive and the different ways that the abrasive Machining process can be monitored. In addition, the background research showed that the abrasive belts can electively be cleaned by the appropriate cleaning technique. Thus, the system is able to super finish the shaft keys, coupling keys etc.

Keywords: Abrasive Marching, Finished product, shaft keys.

1. INTRODUCTION

In this advanced era of design and manufacturing we the students of mechanical engineering are expected enhance the quality of engineering by applying knowledge and skills that we have gained from this particular four years course. So in order to complete the project for last year of mechanical enggg. Course we consulted a company Our project Surface Belt Grinding Machine For Keys, is one of the type of machine use for purpose of grinding and finishing of shaft keys. As in case of our sponsored company, they required a machine for grinding and super finishing of shaft keys as per their convenience. Coated abrasive belt grinding is different from traditional machining of parts of identical materials. The difference is in the way of chip production, the order of specific cutting pressure encountered and surface integrity of machined parts. For better understanding, a detailed literature survey has been carried out. A resume of the same is presented in this chapter. The literature survey has been grouped into three subgroups as analysis of material, wear behavior of coated abrasives and evaluation of abrasive belt on different work pieces and coolants.

Abrasive belt grinding is a common finishing process in the metal and wood working industries. Coated abrasive belts are used in the same speed range as bonded wheels, but they are not generally dressed when the abrasive becomes dull (Ernest et al 1990). The wide spread application of coated abrasive belts and long standing operating practices have led to different kinds of quality requirements. The abrasive belt machining technique is more significant for precision machining and finishing, also used for roughing. They have reported that the performance difference between sol gel alumina grain and fused grains, it was observed, similar trend on material removal and belt wear for different work materials. Though the trend found to be same but the solgel grain gives more material removal, this is due more cutting points per grain. Precision grinding gives considerably lower material removal rates, but can engage large work piece volume in view of large work piece engagement areas possible. Thus wide belt machines can be used at in feed ranging between 5 and 10□m for economical machining of work piece having a width of more than 2000mm (Christian, 1990).

2. NEED AND SCOPE

The literature survey on belt grinding shows certain limited Understanding of material removal, wear and grinding process. The importance of belt related parameters in grinding and finishing of work pieces can be seen in the illustration on grinding Figure. Compared to the grinding with wheels, involving non rigid wheel with belt grinding is another way to enhance the flexibility. The aim is through systematic approach to optimize parametric setting to achieve the desired output and precision in Coated abrasive belt grinding.

Accordingly the objectives of the study are to:

Conduct a detailed study on grinding characteristics of coated abrasive belt grinding process and develop a methodology to maximize the output and usage of belt grinding.

Conduct experiments to study the belt properties and grinding parameters to arrive a systematic process to select belt and grinding parameters.

Analyze the data and develop statistical model considering Individual and interactive parametric influence on performance indicator.

3. GRINDING METHODS

Wide belt grinding is a familiar process in industry as well as home applications. There are several basic methods for belt grinding:[2]

- Stroke belt
- Platen belt
- Wide belt

In general there are three basic elements of the belt-grinding machine: work rest support, grinding head and a regulating head. These components differ for all the methods but in general the work piece is pressed between the grinding head and the rest support. The objective of the regulating head is to coordinate the belt pressure. Wide belt grinding One of the most common methods is wide belt grinding. The belt grinding process is variable by adjusting certain parameters such as belt speed, grinding pressure, feed speed, durometer of the contact drum, size of the contact drum and the abrasive belt that is used. The machines can be made for wet or dry operation. Furthermore, a wide belt grinding machine can be constructed with single or multiple heads. The first head is used for coarse grinding and the next heads gradually make a finer finish. Wide belt grinding is also used as a high stock removal method for special metals (e.g. stainless steel, titanium, and nickel alloys).[2]

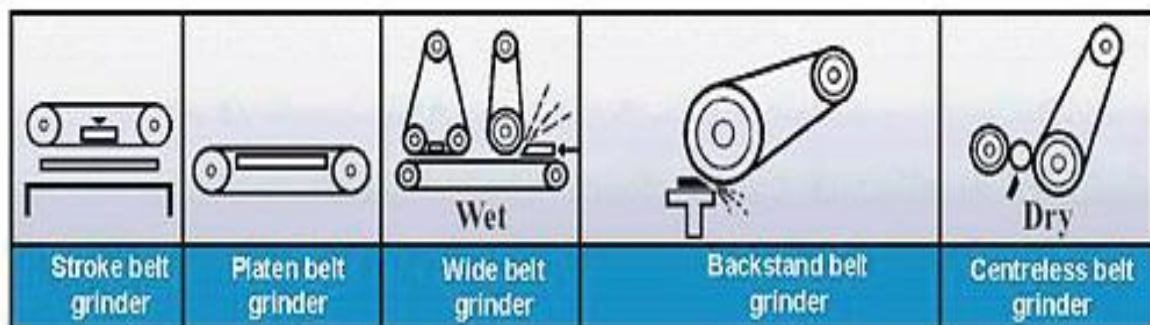


Figure 1: Grinding Methods

4. CHANGING VARIABLES

There are several objectives possible for grinding with coated abrasives. Among them is the right application (e.g. finish or stock removal), time saving and efficiency of the abrasive tool. To achieve the above objectives, it is essential to look in more detail to the variables which affect them. These include the work material properties, the grit and abrasive type of the grinding belt, belt speed, belt sequences, contact wheel hardness and diameter, serration, type of lubricant (or dry) and grinding pressure. Changing these variables will affect the performances of the belt grinding process. In the wide belt method, a contact wheel supports the abrasive belt. The selection of the contact wheel and abrasive to match the grinding parameters required for a specific operation is very critical. Stock removal generally requires a harder, serrated rubber contact wheel, and coarse grade ceramic abrasives. Finishing generally requires the use of a smooth faced contact wheel and fine grade abrasives. This PDF was generated via the PDL

5. EXPERIMENTAL SET UP

Steel we are working over the sponsored project, we explain the experiment set up with help of proposed drawing. In our project we will make the rectangular frame according to our size, after making the frame of the we place the 4 bearing over the frame with the help of nut-bolt arrangement. Then shafts are placed inside the in bearing and also the rollers are over the shaft. After placing the shaft belt will wound over the rollers, with the help of motor we give the rotary motion to the machine.

6. PARTS OF SURFACE BELT GRINDING MACHINE

Rollers:

Rollers are used to drive the abrasive or emery paper belt further on which specimen will be rough polished. These can be made up of plastic, rubber or steel depending upon the type of usage.

Drive System:

We can apply two type of driving system depending upon the distance between the driving and driven shaft. This can be of following two types.

Belt Drive:

It is a loop of flexible material used to link two or more rotating shafts mechanically. Belts may be used as a source of motion, to transmit power efficiently, or to track relative movement.

Electric Motor:

An electric motor uses electrical energy to produce mechanical energy. Here it will be used to rotate the shafts on which rollers are mounted.

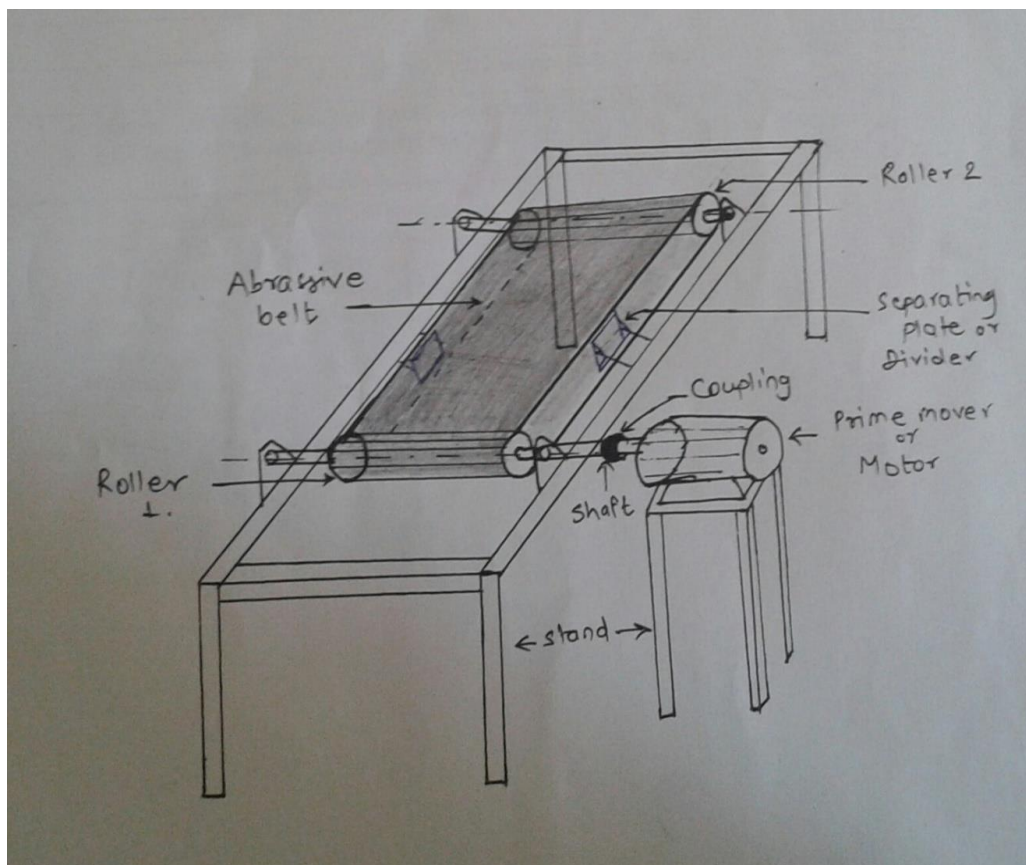


Figure 2 : Proposed Drawing of Machine Structure.

7. WORKING

That type of grinding machine is generally used for polishing the small metallic component like washer. In that machine abrasive belt fitted on the two roller. The coupling is used for transmission of power from electric motor to the roller shaft. As the first roller rotated then second roller rotated with same speed because of abrasive belt wound over the surface. When we keep the any small part on abrasive belt & apply the pressure over the surface of the belt, then the small component polished. Because of that machine good quality of glassing also obtained for good look component. The abrasive belt is available in various sizes in the market. Belt grinding machine may be dry belt wet belt or combination belt. Belt grinding machine is used for heavy stock removal or for light polishing work depending upon the type of belt grade used.

8. CONCLUSION

Steel we are working over the project, As per the problem identified during survey in company, case study of problem, and also with help of research papers, international journals; we conclude that Surface Belt Grinding for key is effective than wheel grinding. And it can full the accuracy for super finishing of key which required for company as per their design. Also we can use the surface belt grinder in college and we can obtain the different super finishing quality with the help of using different grade abrasive belt.

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