

Manufacture and Testing of Belt Grinding Development

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ABSTRACT

The lack of utilization of belt grinding, especially in the world of education due to a lack of public understanding of the workmanship of belt grinding. This study discusses the process of developing belt grinders from the manufacturing stage to testing. The purpose of this research is to develop belt grinders from existing forms, to maximize their function. The belt burrs resulting from this development have three functions, namely the vertical, adjustable angle and horizontal cutting functions. This belt burrs are also equipped with speed control. With the development of these belt grinders, it is hoped that it will add to the public's insight into the belt grinding function and better assist the work of grinding, especially grinding finishing.

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1. INTRODUCTION

The progress of science achieved by humans has enabled humans to create new and useful technology [1]. The process of industrialization and modernization of life is accompanied by the increasingly widespread application of advanced technology, which among others is increasing rapidly using a variety of machines and mechanical work equipment that is run by motor drives [2]. Mechanical devices that are powered and are usually used to fabricate metal components from a device are called [3].

In the world of education and industry, there are still many machine tools which are considered to be lacking in terms of utilization, including belt grinders. Burrs are mechanical processes that cause high temperatures and chemical reactions on the surface of workpieces [4]. Belt burrs are considered to have very limited functions, this results in most people preferring to use other types of grinding in metalworking.

Belt grinding machine is technical equipment that has effectiveness and efficiency that is quite good in the process so that it can produce a smooth surface of the workpiece. The development of belt grinders is considered very much needed by the author, this is expected to be able to increase people's desire to use this belt grinding machine. The development of belt grinding is done by adding some workmanship functions to the pre-existing belt grinding model.

The development of the belt grinding is expected to be able to improve the function of the belt grinding. The aim of this research is to create and test a prototype of belt grinding development and provide information on the development of belt grinding models in the academic environment especially in the Mechanical Engineering Department of the Fakultas Teknik Universitas Negeri Padang.

2. METHOD

The research method used is a type of experimental research. The experimental research method is a way to find causal relationships (causal relationships) between two factors that are intentionally caused by research by eliminating or reducing or eliminating other disturbing factors [5]. The object of the research under study is the belt grinding machine that has been carried out by the developer with the making of which has been done and carried out the testing process. The testing process of belt grinding machines is carried out by grinding process to look into the feed produced by belt grinding as a result of this development with three types of test materials, namely Stainless Steel, ST 37 Steel and teak with the same engine speed and time.

The test material used in this study was made to have the same size on the touch area of the belt sharpening media, so that accurate testing results were obtained.

3. RESULTS AND DISCUSSION

The results of this study are in the form of a tool/model of the development of belt grinding used for various purposes of refining and scanning and data from the test results. One of the main steps of this research is the manufacture of belt grinding machines from the development designs that have been made one by one until this belt grinding machine can function properly. The making is done by the initial stage, namely cutting the Steel ST 37 material using a cutting grinder and welding process using electric welding and using electrodes with a diameter of 3/4 inches. Electric arc welding is the process of connecting metals with the use of electric power as the heat source [6]. Electrodes serve as filler metal elements in the material to be welded, for that the electrode type selection must be adjusted to the metal to be welded [7].

The next step is the manufacture of belt grinding shafts. Components of mechanical devices that function to transmit rotationally and power motion are called shafts [8]. The next stage is followed by making pulley belt grinding and connecting the sandpaper belt. After all the components are complete, the assembly process is carried out and painting processes are carried out to protect the belt grinding from corrosion. The protective coating is a coating which aims to protect the coated metal from corrosion attack [9]. The study has 2 results, namely, in the form of a tool from the development of belt grinding machines and data from the test results, the following are the results of research that has been done:

3.1 *Belt grinding development machine that has been made*

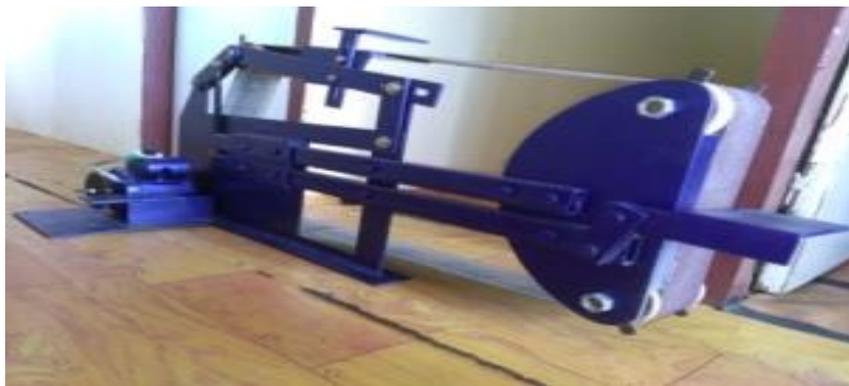


Figure 1 : Belt Grinding Machine That Has Been Made

3.2 *The results of testing the belt grinding machine using the test material mentioned.*

Tests are carried out by adjusting the rotation speed of the belt grinding machine and grinding process for 1 minute. Variations in engine speed to be used are 2700 RPM, 2000 RPM and 1500 RPM. The following is a graph that shows the results of testing that has been done based on the testing material:

3.2.1 *The results of testing the thickness of feeding belt grinding machines on wood testing materials*

The above graph shows the results of testing belt grinding machines on wood testing materials (teak). Teak (*Tectona grandis* L.f.) is one of the most sought after wood species because it has a unique style and is strong, elegant, stable, durable and easy to work with [10]. The graph above shows the higher the speed of the belt grinding machine, the deeper the thickness of the feeder produced with the testing time for 1 minute. This is because of the higher the speed of the belt grinding machine, the deeper the results of feeding the grinding machine produced.

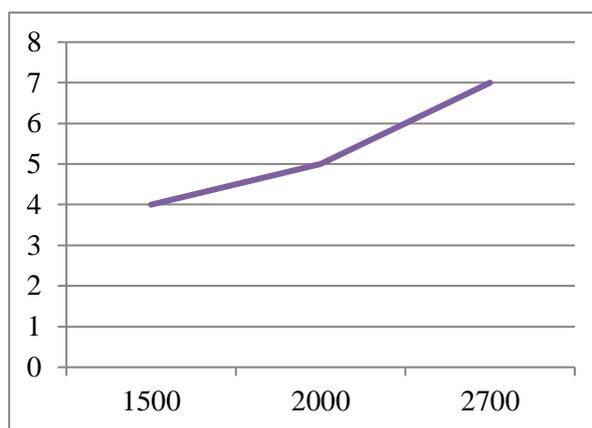


Figure 2 : Graph of wood material testing results in 1 minute

3.2.2 *The results of testing the thickness of feeding of belt grinding machines on ST 37 steel testing materials*

The above graph shows the results of belt grind testing with Steel ST 37 testing material. Steel is a mixture of iron and carbon elements, with a maximum carbon content of 1.5% [11]. The graph above shows that the higher the speed of the belt grinding machine, the more the results of the feed produced at the same processing time, which is 1 minute.

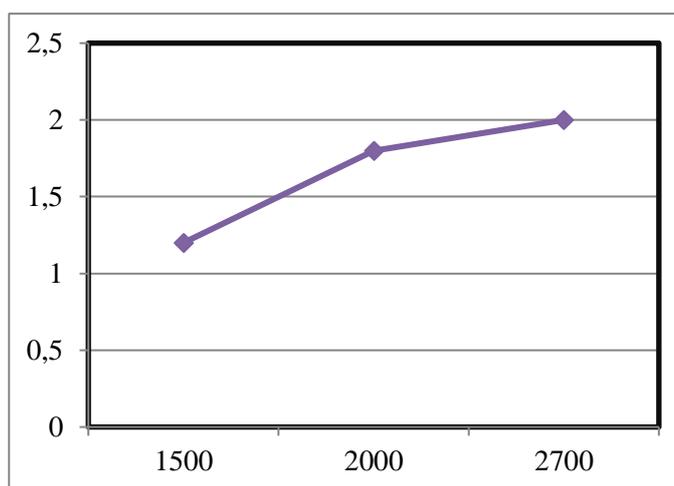


Figure 3 : Graph of testing results of ST 37 steel material with 1minute time

3.2.3 *The results of testing the thickness of feeding of belt grinding machines on Stainless Steel testing materials.*

The graph above shows the results of testing belt grinders using Stainless Steel testing materials. Stainless Steel is one type of steel that is resistant to corrosion because it has an alloying element of at least 8% chrome and 8% and 18% nickel [12]. The graph above shows the higher the speed of the belt grinding machine, the deeper the thickness of feed produced at the same test time, which is 1 minute.

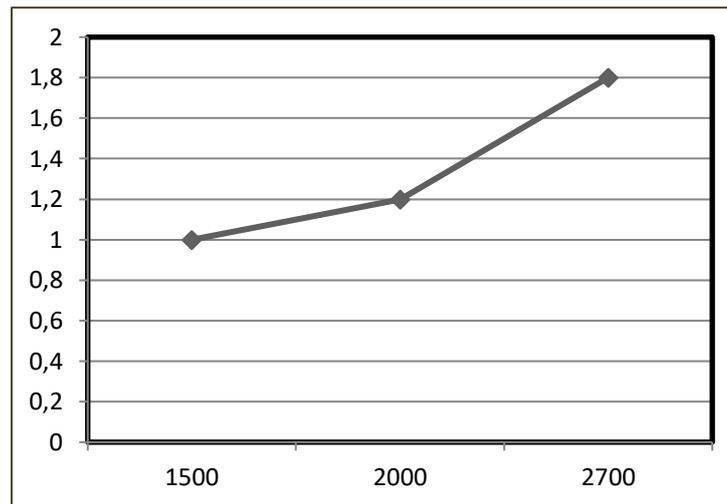


Figure 4 : Results of testing stainless steel material with a time of 1 minute

4. CONCLUSION

Based on the results of research that has been done, researchers have been able to make belt grinding machines with better and more functional functions than existing belt grinding machines. This belt grinding machine is very suitable for finishing grinding because of its lesser feeding ability and smoothness from the results of the workmanship.

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