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A Review Paper on Modification in Worktable of Belt Grinder

Vatsal P. Patel¹, Jayesh P. Patil², Burhanuddin M. Ranalwala³, Pankaj R. Rathod⁴, Nishil S. Shah⁵, Umang N.

Vadukiya⁶, Dr. Jignesh G. Vaghasia⁷

^{1, 2, 3, 4, 5, 6}Student, ⁷Professor & Head of Department, Department of Mechanical Engineering, Shree Swami Atmanand Saraswati Institute of Technology, Surat (India).

Abstract: In most of the industries grinding is the final stage of finishing process. Grinding is a machining process which uses an abrasive wheel or belt type cutting tool. This grinding machine is used in various industries for finishing of work pieces and give high surface quality. Grinding with wheel or belt type cutting tool is used for different precision applications such as deburring in foundries and constructions, polishing, engraving and cut-off grinding. Our project provides flexible worktable through which angular grinding with better surface finish can be obtain. Also less force is generated through this arrangement which in turn provides firm gripping.

Keywords: Belt Grinding, High Surface Quality, Flexible Worktable, Angular Grinding, Firm Gripping.

I. AIM & OBJECTIVE

Aim of development is to increase safety and efficiency of Belt grinding machine by providing angular attachment which will thus increase the productivity.

II. OBJECTIVES

- A. Increase Productivity.
- B. Uniformity of grinding surface is possible.
- C. Accuracy in angular grinding can be achieved.
- D. Firm gripping is possible.
- E. Less chances of slippage of work piece.
- F. Less skilled worker required.

III. INTRODUCTION

Grinding is one of the oldest manufacturing techniques ever used by humans. Although the process is to a great extent driven by centuries of experience, it is still an important process and represents a vital field of cutting-edge research. Cost, productivity and quality have been major target parameters for several decades. A comparison between grinding and hard-turning is available and has shown superior reliability and quality for grinding.

Belt grinding is one of the most effective ways for finishing machining with higher dimensional accuracy and better surface quality and very suitable for producing work piece surfaces with complex geometrical shapes, such as free-form surface blades. At present, marine propeller blades are grinded by hand due to the complexity of its shapes, which wastes too much time and efforts.

In belt grinding when grinding efficiency is reduced then belt can be easily replaced and is more economical as compared to abrasive grinding in which dressing procedure is to be carried out which is time consuming and tedious procedure. There are less casualties in belt grinding compared to abrasive grinder wheel, safety of belt grinder can be largely improved if designed properly.

IV. LITERATURE REVIEW

Konrad Wegener et al, (2017) had explained the detailed study of grinders. The various key points like characteristics of grinding machines, classification, trends in development of abrasive processes, grain technology, cost, market developments, maintenance, digitization, trends for grinding machine, grinding machine material structures, machine concept and simulation, adaptive and Mechatronics system for grinding, energy efficiency, trends in auxiliary devices, special machine developments such as ultra-precision machines and its principle applications[1].

- A. Kyle Odum , Mara Celeste Castillo, Jayanti Das, Barbara Linke, “Sustainability analysis of grinding with power tools”, 6th CIRP International Conference on High Performance Cutting in 2014, This paper discuss issue relating to the power supply, occupational Health hazard and advertised sustainable feature of abrasive power tool and abrasive media option in market today. The most common power sources are electricity through the universal motor are lightweight easy to control, and have desirable operating characteristic. It will operate at less than 50% efficiency due to friction between commutator and brush in a universal motor cause wear and limit inspection of motor. Also, another sources of motor are Brushless Permanent magnet motor which have very high efficiency 80-90% more than universal motor.
- B. J.F.G. Oliveria, E.J. Silva, C.Guo, F. Hashimoto,” Industrial Challenges in grinding, Manufacturing Technology” in 2009, This paper aims at the analization of grinding technology development research as per industrial demand. The author have totally focused on the grinding challenges in industries. The very important driving force development of grinding are automotive application.
- C. A. Robert Henry, R. Anbazhagan, A. Kevinraj, M. Sudhargar, G.S. Nivas, “Design and Fabrication of Abrasive Belt Oblique Grinding Machine”, Vol.5, Special Issue on 8, May 2016, This paper highlights on belt grinding machine also it will explain the material used in a belt grinder. In next step it will explain abrasive process: An abrasive is material that is used to shape and finish a work piece through rubbing which lead to part of work piece being worn away. In final stage it will discuss on Grit, Grate and structure: The grains, commonly called grits, have rough edge, often terminating in point which will decrease surface area and increase localized contact pressure.
- D. Lubica ELEKOVA, Zdenko LIPA, “Comparison of Conventional and Structured Abrasives”, in 2009, this paper described two type of abrasive belts. First one Conventional abrasive belt and structured abrasive belt. Structured abrasive are increasingly used in practice, due to, this abrasive saves and reduces working time and guarantees cutting costs.

V. PROJECT WORK

- 1) *Making Sliding and Angular Attachment:* Sliding Arrangement of slot type structure is made for adjusting the pulley. Angular attachment with Allen key bolt is made on shafting for providing angle to the worktable.

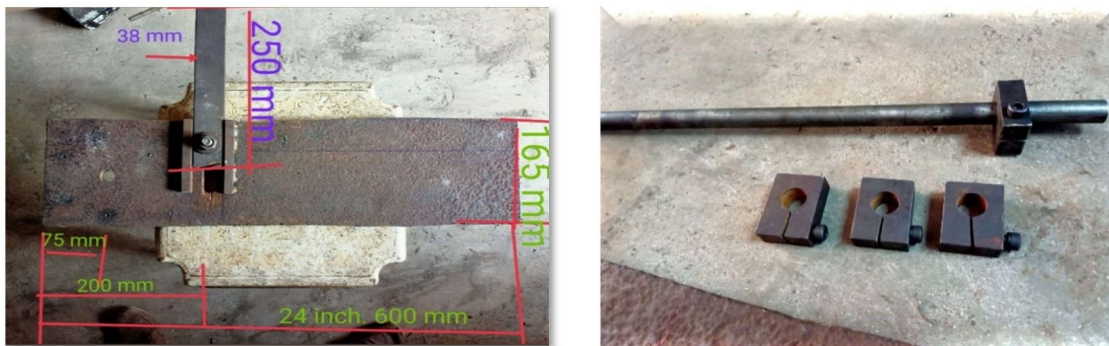


Figure 1 Sliding and Angular attachment

- 2) *Assembly and Testing:* Assembly of different component was done according to design and then testing was done to analyse the problem found and various measures were taken for solving that problem.



Figure 2 Assembly and Testing

3) *Working*: Various operation were performed on the work piece and required Angle on the workspace can also be easily obtained.

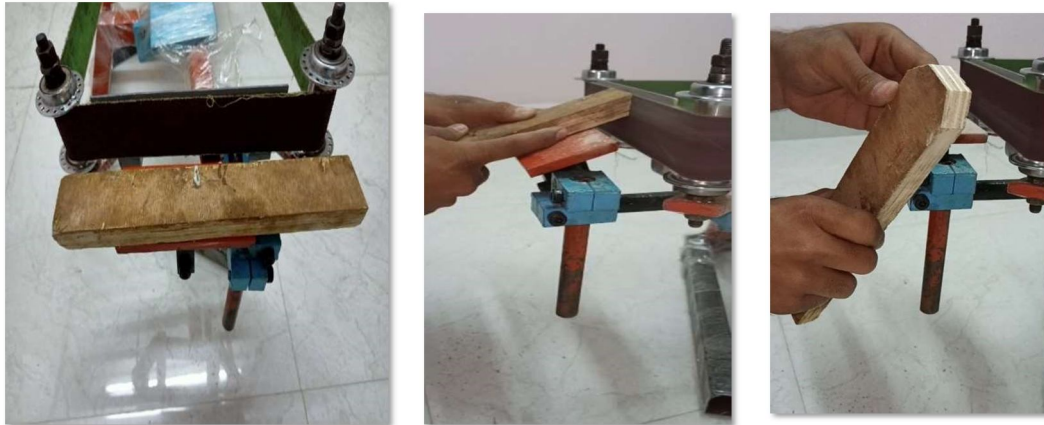


Figure 3 Working

VI. DESIGN AND DEVELOPMENT OF PROJECT

We have designed model such that the worktable can move freely in any angular requirement thus providing flexibility in operation, large work piece can be easily grind which may be either vertical or horizontal, there is uniformity in grinding surface obtained providing accuracy of work piece, there is very less chance of slippage of work piece as there is firm gripping on work piece due to flexible worktable.



Figure 4 Final Model

VII. CONCLUSION

From different research analysis we can design the belt grinder which can precisely grind the work piece without imbalance between two consecutive grind surface with firm gripping and safety, also grinding on different surface angle is possible.

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