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Mini Belt Sander Machine

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ABSTRACT: The Mini Belt Sander Machine is a machine which can do multiple operation like Grinding, Sanding, Surface cleaning, Wood grinding, Fileining and Edge preparation of tool beet. It is used in large quantity in industries and as well as in fitter shop and Workshops. The market price of the machine is up to 20000-25000/- . Our aim is to designed this machine in affordable cost up to 9000-1000/-.

KEYWORDS: Mini Belt Sander Machine, Adjustment spring & Tool holding stand.

I. INTRODUCTION

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. Abrasive belt grinding is a kind of grinding tool with special form, which needs straining device and driving wheel and to make abrasive belt strained and moved at high speed, and under certain pressure, the contact between abrasive belt and work piece surface can help to realize the whole process of grinding and machining. Belt grinding is a rough machining procedure utilized on wood and different materials. It is commonly utilized as a completing procedure in industry. A belt, covered in rough material, is kept running over the surface to be handled so as to evacuate material or create the ideal finish. This Belt Grinder machine is designed using CATIA V5. It consists of 0.5 HP motor which is fundamentally rotates the pulley attached to it, along with a mini grinder, grinding paper and an abrasive belt grinder. The second pulley is attached to the wooden base vertically with the tensioner spring. Grinding paper is then fitted in pulley. To support the mini grinder a base frame is provided, it helps in grinding wooden material. Machine is designed using DC motor, spring, base Frame (support frame), abrasive grinder belt, coupling and a pulley. This machine helps to shape the material without putting much effort and getting better surface finish, and also getting larges area of belt for grinding operation than wheel grinding. Grinding is an abrasive machining process that uses a grinding wheel as the cutting tool. A wide variety of machines are used for grinding. Although mini belt grinding abrasive belt have stronger cutting ability than that on the grinding wheel. Yun Huang et al. presented 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 piece can be seen in the illustration on grinding. Compared to the grinding with wheels, involving non rigid wheel with belt grinding is another way to enhance the flexibility. In abrasive belt grinding Titanium alloy blade of aviation engine experiment, through the single factor experiment method, the influence of abrasive belt linear speed and work-piece feeding speed grinding quantity is discussed. In abrasive belt grinding Titanium alloy blade of aviation engine experiment, through the single factor experiment method, the influence of abrasive belt linear speed and work-piece feeding speed on the grinding quantity is discussed. A. Robert Henry et al. studied 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. Belt grinding is an abrasive machining process used on metals and other materials it is typically used as a finishing process in industry. The main objective of this project is to design and fabricate an abrasive belt grinding which can be used as versatile grinding machine, the work area can be rotated from 0 degree to 180 degree. The 0 degree work area can be used for bottom grinding of component, the 90 degree work area can be used for vertical grinding of component and The 180 degree work area can be used for top grinding of component. Huang presented the surface finishing and stock removal of complicated geometries is the principal objective for grinding with compliant abrasive tools. To understand and achieve optimum material removal in a tertiary finishing process such as Abrasive Belt Grinding, it is

essential to look in more detail at the process parameters/variables that affect the stock removal rate. The process variables involved in a belt grinding process include the grit and abrasive type of grinding belt, belt speed, contact wheel hardness, serration, and grinding force. Changing these process variables will affect the performance of the process.

II. RELATED WORK

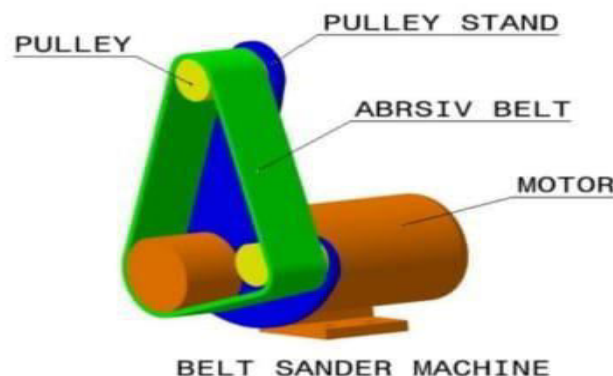
This project will help the workshops which use manual file to Fileining the work piece in the workshop and industries. This will reduce the time required to manufacture the component and will increase its accuracy. A belt sander or strip sander is a sander used in shaping and finishing wood and other materials. It consists of an electric motor that turns a pair of drums on which a continuous loop of sandpaper is mounted. Belt sanders may be handheld and moved over the material, or stationary (fixed), where the material is moved to the sanding belt. Stationary belt sanders are sometimes mounted on a work bench, in which case they are called bench sanders. Stationary belt sanders are often combined with a disc sander Belt sanders can have a very aggressive action on wood and are normally used only for the beginning stages of the sanding process, or used to rapidly remove material. Sometimes they are also used for removing paints or finishes from wood. Fitted with fine grit sand paper, a belt sander can be used to achieve a completely smooth surface.

Stationary belt sanders are used for removing non-ferrous metals, such as aluminum. Non-ferrous metals tend to clog grinding wheels, quickly making them useless for grinding soft metals. Because the small grooves in the sandpaper are opened up as they go around the arc of the drive wheel, belt sanders are less prone to clogging. Belt sanders are great power tools for removing old finishes, like paint and varnish, from furniture.

III. METHODOLOGY

- Always wear a dust mask and protective eyewear when sanding with a belt sander, even if there is a dust extractor fitted to the machine.
- Don't push down on the sander. Let it do its work by using its weight and cutting ability.
- Make sure to sand the surface evenly and overlap between runs, a pro tip is to mark a pencil line randomly through the piece and to make sure that there are no markings visible when finished sanding.
- Allow, at most, half of the belt over the edge after each pass, but make sure not to let it dip down as this will cause the edging to become chamfered in an unwanted position.
- If you are using a corded belt sander, this must be out of the way to avoid tripping or in a worst-case scenario, electrocution.
- Clean your belt regularly with a cleaning stick to prolong its working life and avoid serious clogging problems. Especially when sanding veneers and other glued surfaces.

IV. DESIGN AND MANUFACTURING



A] BELT SANDAR MACHINE

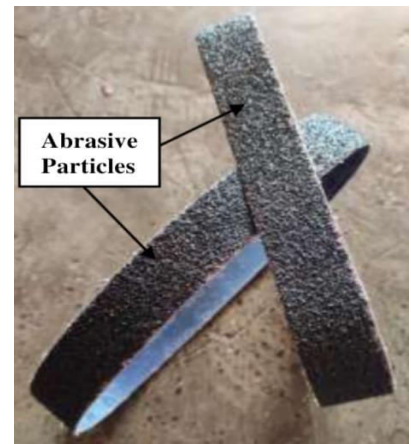
A] This machine is manufacturing by mine belt sender machine in used by small industry in component plane surface grinding and good finishing.



B] MOTER



C] PULLEY



D] ABRESIVE BELT

B] This motor is 0.5 HP and motor surface cutting and shaft is long connecting to pulley in welding and pulley is rotating on belt.

C] This pulley manufacturing 2 fiber pulley and 1 aluminum pulley in material to round piece in lathe machine using in operation facing turning drilling finishing and baring insert the medal hole in bearing inner dimeter 12 mm in connect to 12 mm shaft.

D] This abrasive belt is material grinding and put in pulley in rotating in speed and component connect to abrasive belt and remove the material and ready to product.

V. CONCLUSION

Grinding is an abrasive machining process that uses a grinding wheel as the cutting tool. A wide variety of machines are used for grinding. Although mini belt grinding abrasive belt have stronger cutting ability than that on the grinding wheel. But as wheel grinding is having some disadvantages in form of time required to finish the surface, material removal rate, surface finish obtained etc. To over such disadvantages this vertical abrasive belt grinding machine is designed using Solid works software to overcome disadvantages of wheel grinding machine. Also this machine helps too grand or to finish the surface using abrasive belts which to be mounted on this designed machine. Due to this abrasive belts used maximum area of belt is comes in contact with workpiece due to which material removal rate or surface finish rate is more in less time as compared to wheel grinding machine.

REFERENCES

1. **Marija Matejic et. al. [1]** Setiawan, S., Arwizet, K., Syahri, B., Ambiyar, A., Darmawi, D., & Yufrizal, A. (2018). Design and Testing of Belt Grinding Development. Teknomekanik, 1(2), p.p. 38-42.
2. **Nguyen Thuan et. al. [2]** M.Chandrasekar, B.Logesh, D.Ramachandran, G.Gnanasekar, P.Karuppaiah; Design and Fabrication of Abrasive Belt Grinding; International Journal of Creative Research Thoughts.
3. **Harshal G.Suryawanshi et. al. [3]** Kyle Odum , Mara Celeste Castillo, Jayanti Das, Barbara Linke, Sustainability analysis of grinding with power tools, 6th CIRP International Conference on High Performance Cutting, CIRP 14 (2014) 570-57. [2] Konrad Wegener, Friedrich Bleicher, Peter Krajnik, Hans-Werner Hoffmeister, Christian Breecher, Recen
4. **Manoel Cléber de Sampaio Alves et. al. [4]:** ASSOCIAÇÃO BRASILEIRA DE NORMAS TÉCNICAS. NBR 7190: projeto de estruturas de madeira. Rio de Janeiro, 1997.
5. **Rahul Khadtare et. al. [5]** H. Huang, Z.M. Gong, X.Q. Chen, L. Zhou, "Robotic grinding and polishing for turbine-vane overhaul", Journal of Materials Processing Technology, 127, 140-145, 2002
6. **Maciej Sydor et. al. [6]** . Rogoziński, T.; Hlasková, L.; Wieruszewski, M.; Očkajová, A. Particle-Size Distribution of Dust Created during Sanding the Modified Ash Wood. Ann. WULS SGGW For. Wood Tech. 2015, 90, 162-166.



7. **Alexey Beskopylny et. al. [7]** N. Troke, C. Logar-Henderson, N. DeBono, M. Dakouo, S. Hussain, J. S. MacLeod, P. A. Demers. American Journal of Industrial Medicine, 64(5), 338–357 (2021)
8. **Hanumanta Narayanrao Balpande et. al. [8]** H. Huang, Z.M. Gong, X.Q. Chen, L. Zhou, “Robotic grinding and polishing for turbine-vane overhaul”, Journal of Materials Processing Technology, 127, 140–145, 2002.
9. **Vlasev et. al. [9]** БДC EN 10056-1:2017: Structural steel equal and unequal leg angles - Part 1: Dimensions, 23p
10. **Deng Ruixiang et. al. [10]** L. Yi, Y. Huang, G. H. Liu. Experimental research on the electrochemical abrasive belt grinding 0Cr17Ni4Cu4Nb stainless steel [J]. Advances in Materials Manufacturing Science and Technology, 2009, 626-627: 617-62



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