

DOUBLE DISC LAPPING MACHINE

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ABSTRACT

An engineer is always focused towards challenges of bringing ideas and concepts to life. Therefore, sophisticated machines and modern techniques have to be constantly developed and implemented for economical manufacturing of products. Advanced researches approaches a topic of actuality in the machine manufacturing field, by combining the modern trends in the manufacturing processes (surfaces' lapping) in processing some special materials (ceramics, composites) in conditions of minimum cost/ maximum quality, with modern technologies. Machine lapping is meant for economic lapping of batch qualities. In machine lapping, where high accuracy is demanded, metal laps and abrasive powder held in suitable vehicles are used. Bonded abrasives in the form wheel are chosen for commercial lapping. Machine lapping can also employ abrasive paper or abrasive cloth as the lapping medium. New machines and techniques are being developed continuously to manufacture various products at cheaper rates and high quality. So, we are going to make a machine for Double Disc Lapping Machine and make it multipurpose & should be used as Micro Finishing machine is simple to maintain easy to operate. Hence, we tried our hands on "Double Disc Lapping Machine." Lapping machine is one of the principal machines in industry. It is mainly used as the name indicates to micro polishing the material surfaces.

Keywords: Micro Finishing, Lapping, both sides, low-cost machine.

1. INTRODUCTION

Quality of surface is an important factor to decide the performance of a manufactured Product. Surface quality affect product performance like assembly fit, aesthetic appeal that a potential customer might have for the product. A surface is defined as the exterior boundary of an object with its surroundings, which may be any other object, a fluid or space or combination of these. The surface encloses the object's bulk mechanical and physical properties. Lapping and polishing is a process by which material is precisely removed from a work piece (or specimen) to produce a desired dimension, surface finish, or shape. The process of lapping and polishing materials has been applied to a wide range of materials and applications, ranging from metals, glasses, optics, semiconductors, and ceramics.

1.1. PROBLEM STATEMENT:

The lapping is the major operation performed in industry, and to perform this operation in manpower is require which results in to high cost of production, more time require to complete the operation, affect the accuracy of product so that system we are trying to do a work on new system in lapping/polishing. The lapping machine available can perform the work of lapping at only one side & after doing lapping second side is to turn for lapping which loss time, efforts & cost of production. We are trying to make a new machine for reduce problems in existing system. The statement of project is "design & fabrication of double disc lapping machine" for the lapping of different sizes of cylindrical machine parts as per requirements for industry.

1.2. OBJECTIVE:

1) To reduce the efforts & man power during machining.

- 2) To maintain the accuracy in lapping process.
- 3) This type of m/c provides work practically at low cost, low maintenance, low capital investment in less space.
- 4) To performed the most rigid operation with high speed at a time for both side of job surface.

1.3. SCOPE:

The scope of this machine to perform the most rigid operation with high speed at a time for both side of job surface for the lapping of different sizes of cylindrical machine parts as per requirements for industry.

2. DESIGN

This project work will first introduce the background of the study. Present the Design constraints that influence on the use, efficiency and benefit their impacts on machine. After that machine part design all different existing machine assembly units will done to make a probable machine model.

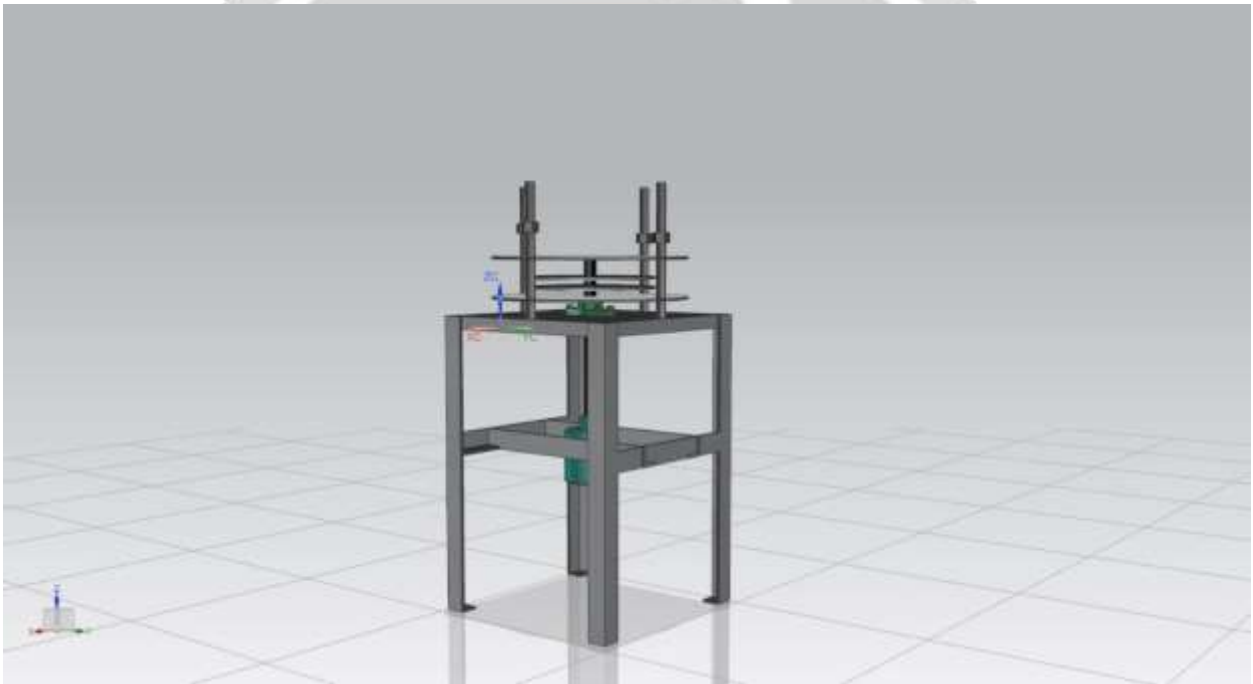


Figure 2.1 Double disc lapping machine

2.1. COST

TABLE -1 : Total Cost of Material:

Part Name	Material	Wt in kg	Rate / kg	Total Rate
Round plate Ø250 X3 mm	M.S	3	100	300
Round plate Ø200 X3 mm	M.S	2	100	200
Base Square Plates	M.S	2	100	200
Shaft	M.S	1	60	60
Supporting frame	M.S	8	60	48

TOTAL COST OF MATERIAL = 808 /-

TABLE – 2 : Cost of Machining:

Machine Name	Using Time (min)	Rate /hr	Total Rate Rs/-
Gas cutting	30	200	100
Lath m/c	35	500	300
Power Hacksaw	160	200	500
Welding	75	400	550
Grinding	30	100	50
Drilling	95	200	350

TOTAL COST OF MACHINING = 1,850/-

TABLE – 3 : Cost of Std Part:

Sr.No.	name	Qty.	Cost	Total Cost
1	Motor	1	1500	1500
2	VFD	1	700	700
3	Nut	8	15	120
4	Bearing	2	150	300
5	Big pulley	1	80	80
6	Small pulley	1	30	30
7	Belt	1	25	25

COST OF STD PART = 2,755/-

2.1.1 Cost of Transportation & Overhead = 1,500/-

2.1.2 Cost Of Project =

Cost of material + Cost of machining + Cost of STD part + Cost of transportation & overhead

= 808 + 1850 + 2755 + 1500

= 6,913/- Rs.

3. PROCESS OF WORKING

In lapping process, it consists of two M.S. plates, mounted on stand. In between two plates there is job holding fixture is place. The plates having lapping wheels are attached at top and bottom side of upper & lower plate. On the supporting frame we have mounted induction motor and with the help of belt the shaft with job holding fixture is rotate. When this job holding fixture is rotate with full speed friction takes places on the surfaces of jobs under processing and the mounted job gets polished by removal its chip of work piece gets super finish. The lapping plate's surface made with the abrasive material which is used for the lapping process. Plate alignment is important for lapping applications where flatness and parallelism of the specimen will easy. Specimen quality is a direct result of plate condition & alignment therefore proper maintenance of the lapping plate is crucial in preparing high quality specimens. Double-sided processing is a, batch-type method which uses rotary action of job holding fixture.

3.1 ADVANTAGES

- 1) Machine work on the low power consumption as compare to the old Lapping machine.
- 2) It provides multiple polishing sizes of the metallic Jobs.

- 3) The operation of the new lapping machine is well controlled.
- 4) Complex shapes can be finished as per requirement easily.
- 5) Very thin material can remove easily. 6) Well balanced system.

3.2 APPLICATIONS:

- 1) It is used for Surface finish for ball and roller bearings racers.
- 2) Surface finishing for Gears surfaces.
- 3) It is used in Engine valve finishing.
- 4) It is used in lapping of Press work dies.
- 5) It is used in metrology and quality department to obtain required surface finishing of job

4. CONCLUSION

Double-sided lapping tests were performed on the following substrates Lapping and polishing is a process by which material is precisely removed from a work piece (or specimen) to produce a desired dimension, surface finish, or shape. The process of lapping and polishing materials has been applied to a wide range of materials and applications, ranging from metals, glasses, optics, semiconductors, and ceramics. Lapping and polishing techniques are beneficial due to the precision and control with which material can be removed. Surface finishes in the nanometer range can also be produced using these techniques, which makes lapping and polishing an attractive method for materials processing. While concluding this report, we feel quite fulfill in having completed the project assignment well on time, we had enormous practical experience on fulfillment of the manufacturing schedules of the working project model. We are, therefore, happy to state that the in calculation of mechanical aptitude proved to be a very useful purpose.

5. REFERENCES

- [11] Khurmi And Gupta "Theory of Machine" Edition Reprint 2007. Page No. 106- 107.
- [12] Khurmi And Gupta "Machine Design" Edition 2005. Page No. 261- 280 And 558-570.
- [13] Design of Machine Elements: - Prof. V. B. Bhandari, Tata Mc. Grew Hill Publishing Co. New Delhi.
- [14] Workshop Technology, Hajara chaudhari.
- [15] Production Technology, R.K. Jain.
- [16] PSG Design Data Book.
- [17] Production Engineering, P.C. Sharma.
- [18] Production Technology, O.P. Khanna.
- [19] Tribological Research and Design For Engineering Systems.