ISSN No:-2456-2165

Semi-Automatic Ceramic Sleeve Surface Finishing Machine

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Abstract:- In present surface finishing system ceramic sleeve is finished using single point cutting tool on lathe machine which is oriented towards labour intensive & heavy reliance on operator skill. This process consumes more time and there is a lot of wastage of material.

This paper presents an approach to develop a system in which automation in a motion of workpiece and grinding wheel by using mechanical devices such as induction motor, pneumatic cylinder and sensors.

The outcome of a new system should be decreased cycle time of surface finishing, increase in production rate, a decrease in wastage of material, precise surface finishing, less interference of worker in a machining process.

Keywords:- *Ceramic sleeve, automation, surface finishing.*

I. INTRODUCTION

To attain a smooth polished appearance & to improve the cosmetic and aesthetic appeal of ceramic sleeve surface finishing process is important. It helps to compete with the quality of a product in the market.

Surface grinding is used to produce a smooth finish on a workpiece. This process is widely used surface finishing process in which a grinding wheel cuts chips of metallic and powder form from a ceramic material workpiece, making a smooth surface.

There are 3 types of surface finishing rough average and super finish. In rough grinding, machines are generally used to remove a large amount of material from the workpiece and in super finishing uses finer abrasive grit sizes, and produce surfaces with fine or low roughness average & mirror-like surfaces [1]. As, per industrial requirement, we selected average grinding machining in which neither large MRR is required and nor super finishing required.

To achieve desired results and motion we can modify some other machine and automate by using a pneumatic cylinder, sensors, valves, induction motor and electronic control panel[3].

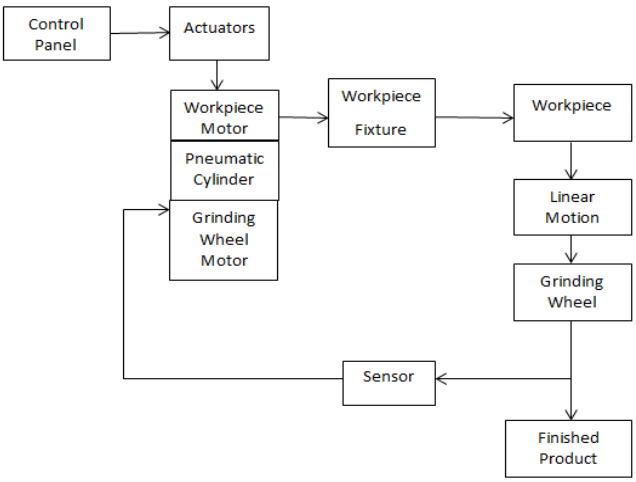
II. PROBLEM DEFINITION

Performance and reliability of ceramic sleeve are strongly influenced by damage introduced during machining. Surface finish and machining damage are especially sensitive to small changes in machining conditions. Present ceramic machining practice is oriented towards labour-intensive & heavy reliance on operator skill. This process also consumes more time. As individual worker handles several tasks of the whole process, it affects the fulfillment of product demand. Currently, Cycle time of surface finishing is 1 min/product & production rate is 480 products per day.

III. PROPOSED METHODOLOGY

We have worked on data given by company as well as found by our investigation and research on an internet. We have done research for finding out various arrangements for placement of different components for our system. Firstly, we have to design a workpiece fixture. Then set the rpm of a grinding wheel and job. After that, we have to activate pneumatic cylinder mechanism and achieve linear displacement of a job within range. Machining of a job by means we need to maintain contact between grinding wheel and workpiece and then observe material removal rate and cycle time.

IV. PART IMPLEMENTATION



V. CONCLUSION

Setup can put forth for full automation, which leads to enhancing production rate so the mechanisms or machining setup can be claimed to use for continuous mass production to fulfill the need of various consumers holding different requirement and expectations from a product.

Cycle time would be probably reduced to 4 products/min and production rate will increase 4 times present production rate i.e. 1900 products per day.

VI. ACKNOWLEDGMENT

A project is a golden opportunity for learning and self-development. We consider ourselves very lucky and honored to have so many wonderful people who lead us through in completion of the project.
First of all we would like to thank our parents who are our true inspiration .It is all their love and hard work which makes it possible for us to study and work without any hardships.

Our grateful thanks to Shree Gurudatt Industries Pvt. Ltd. for sponsoring the project.

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