



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

# IJIRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**

# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 6, June 2021

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

**Impact Factor: 7.512**

9940 572 462

6381 907 438

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# Future Scope for Automation in Centerless Grinder

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**ABSTRACT :** This paper report are design of autoloader center less grinding To reduce the man power during the total process of Top Link Crank Shaft. To reduce the Muri. Due to manual loading process production is depend on operator. , Delay for loading job or excess pressure applied on job during Grinding, Incomplete grinding, Chances of accident , Extra load on centre less grinding machine (Grinding Wheel, Control Wheel & Carbide Plate).

## I. INTRODUCTION

Centre less grinding is widely used in industry for precision machining of cylindrical components because of its high production rate, easy automation, and high accuracy. 20X -carbon infiltration steel is a common alloy steel that is usually used in mechanical engineering using centerless grinding process Center less grinding is a process for continuously grinding cylindrical surfaces in which the work piece is supported not by centers or chucks but by a rest blade. The work piece is ground between two wheels. The larger grinding wheel does grinding, while the smaller regulating wheel, which is tilted at an angle, regulates the velocity of the axial movement of the work- piece. Center less grinding can also be external or internal, traverse feed or plunge grinding. The most common type of center less grinding is the external traverse feed grinding

**Objectives:-** Replacement of One operator by Auto loading System ,Total operator for the process 7 no's reduced by 6 nos. ,Quantity of production improved by 200 no's per day, Quality improved due to equal pressure during grinding operation., Chances of accident avoid ,No Extra load on centre less grinding machine(Grinding Wheel, Control Wheel & Carbide Plate) Life of carbide plate improved.

## II. A REVIEW ON

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During operation there is chance of overlapping of rods that damages the grinding wheel or stops the operation, for that purpose pneumatic proximity sensor is attached. Output of sensor placed nearer to the grinding machine, input attached to the cylinder. Mainly pneumatic proximity sensors involve the use of compressed air, displacement or the proximity of an object being transformed into a change in air pressure. Low pressure air is allowed to escape through a port in front of the sensor. This escaping air, in the absence of any close-by object, escapes and in doing so also reduces the pressure in the nearby sensor output port. However, if there is close-by object, the air cannot so readily escape and result is that the pressure increase in the sensor output port. The output pressure from the sensor thus depends on the proximity of objects. Here, in this case inductive proximity sensor is used. It can be used for the detection of metal objects and is best with ferrous metals

Thermal variation in machine tools greatly affects the dimensional tolerances of work pieces and causes various defects in manufacturing process. For preventing thermal distortion that makes to substantial improvement in quality, manufacturing efficiency and energy saving



III. METHODOLOGY

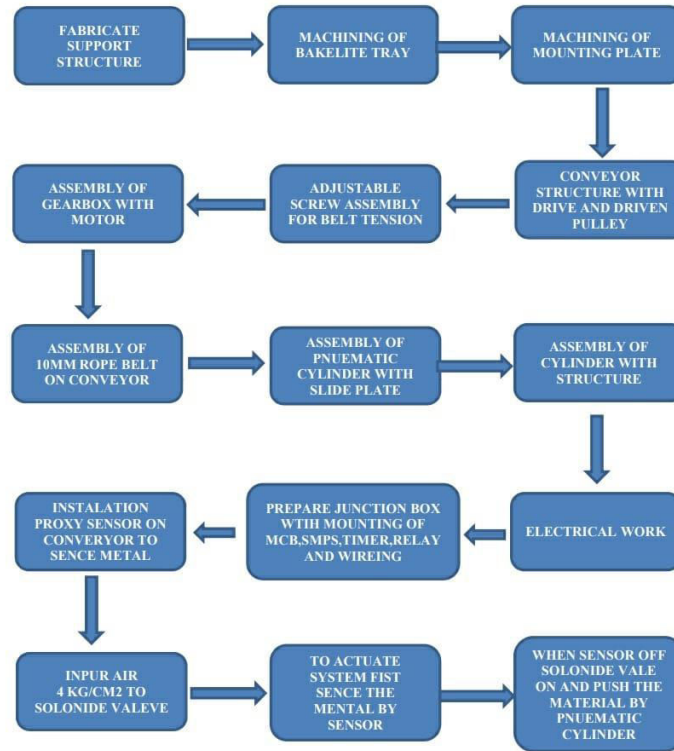


Fig no: 1 Methodology

IV. PLANNING AND PROCESS

List of components used in auto loading assembly:-

Fabricated structure:-

Backlit sheet this is used to avoid marking on grinding surface. The bulk quantity of material loaded in a tray in that case material slide on surface of tray it makes because marking on grinding material. to avoid a friction between two metal surface we are using backlit sheet it is hard machine able light in weight .

Conveyor structure is used to tray to center less grinder , conveyor rope used to carry the material and slide after overloading , conveyor drive Gear box & Motor used to 0.25 HP motor with warm gear box of output 10 RPM, Pneumatic Cylinder with 5” Stroke used to lift the material from tray and transfer it to conveyor , solenoid valve is used to actuated by séance for movement of the cylinder up and down , proxy sensor used séance the material and actuated solenoid valve , SMPS convertor is used to AC power to DC power to input supply of solenoid valve , sensor ,timer , relay, MCB used to isolated,



V. EXPERIMENTAL SET-UP OR MODEL DESIGN DESCRIPTION

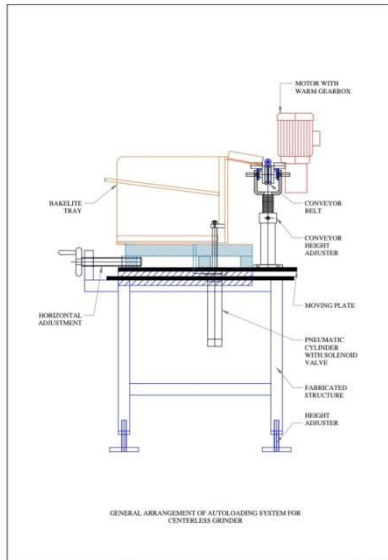


Fig no:2 full setup model

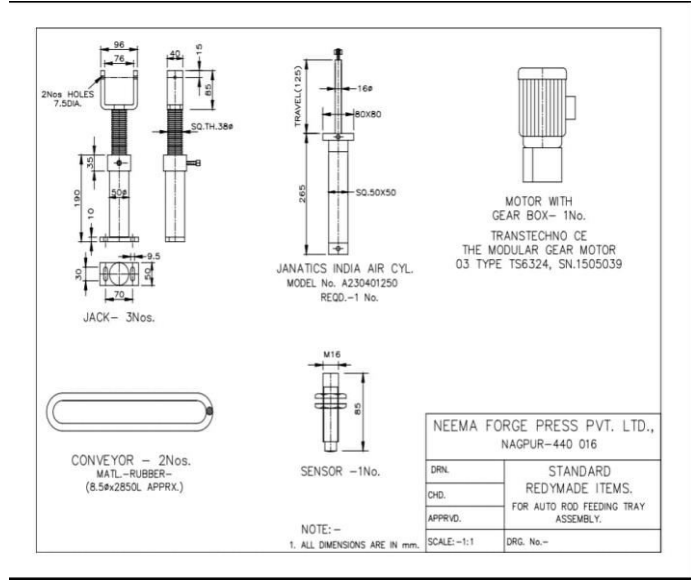


fig no:3 assembly of model

For automatic loading of components from the center less grinding machine mainly requires the mechanism. The mechanism mainly consist of inclined plate for placing of the rods, pneumatic cylinder for lifting of rods and belt drive for transporting of rods up to the work rest blade. Developed mechanism as shown in above figure.

The modeling tool Auto Cad used for parts and the assembly modeling of center less grinding automation

VI. RESULT AND DISCUSSION

Benefits projected / Impact of Project (Quantified) :-Total man power required 6 no for production 1200 no’s of Top Link Crank Shaft. Autoloader tray carrying 100 no’s of Top Link (Approx wt 75 kg's) . One operator eliminate from loading operation. Only helper required to load Autoloader tray 12 times in a 8 hr. (Approx time 60min in 8 hr). Cost of one operator Saved (Rs 15,000 /month & Rs 1,80,000 / Year Saved), Quality improved due to equal pressure during grinding operation , Chances of accident avoided , No Extra load on centre less grinding machine (Grinding Wheel, Control Wheel & Carbide Plate) Life of carbide plate improved.

SR NO	DESCRIPTION	UNIT	BEFORE	AFTER
1	Total operation time	Min	3.45	3.367
2	Total Holding or Delay time	Min	592	192
3	Total Transportation time	Min	44.67	16.67
4	Total Inspection time	Min	0.167	0.167
5	Total Distance Travelled	Meter	46	46
6	Total no of Operator	Nos	3	3
7	Total No of Helper	Nos	6	3

Table no: 1 before and after cycle time of machine

**Observation:-**

- Total Process time is Same
- Delay time reduced by 400min because the once the tray loaded by 60 nos the operator can move to bring next lot without holding machine
- Before helper was engaged to transport the material 240 nos
- (30 nos in one tray )
- After operator can bring the material and load in tray one in 40min
- Operator is now free from loading operation he can check alternate piece and do the setting in grinder
- Total saving of 3 helpers and the delay time of oiling can be eliminated by manpower saving

**VII. CONCLUSION**

- In the present work center less grinding machine has been automated. Automatic loading and unloading of center less grinding machine system is designed as per drawings. An automatic loading and unloading of center less grinding machine has resulted into the following conclusions. By automating the center less grinding machine reduced the labor cost i.e. two operators were required for this grinding machine. One operator at loading of rods and another operator at unloading side. Increase in the production rate around 360 parts/ hour. Reduction in the manufacturing lead time. Automation helps to reduce the elapsed time between customer order and product delivery, providing a competitive advantage to the manufacturer for future orders. By reducing manufacturing lead time, the manufacturer also reduces work-in-process inventory
- In our system if we go with selular layout we can reduce lead time of production. It may cause inventory turn ratio increase

**VIII. FUTURE SCOPE**

- Today, robots can perform a slew of functions without considerable human intervention. Automated technologies are not only executing iterative tasks, but also augmenting workforce capabilities significantly. In fact, automated machines are expected to replace almost half of the global workforce
- In top link crank shaft process is rod cutting, inspection, point grinding, identification punching, slot cutting, inspection, transfer by trolley, loading in tray, grinding, inspection, cleaning, oiling , packing
- We found botalneke was loading in center less grinder, and focus on loading system
- Future scope will be auto loading, auto inspection, auto cleaning
- Automated inspection

**IX. ACKNOWLEDEMENT**

The author wish to thank Mr. Dinesh parwe for their guidance. This work was supported in part by grant from department of mechanical engineering

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Table no: 5



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7.512**

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