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Design and Fabrication Autoloader for Center less 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 (for loading the 0.750 kg's part one by one in centre less grinding manually). 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

A. Autoloader

Autoloader is a versatile term in mechanical term that can refer to any sort of tool or resource that helps to automatically load or handle material.

The meaning of autoloader has changed over the years. In legacy systems, the autoloader was commonly known as a robotic mechanism that could automatically load physical tape spools or cartridges.

Now a days, to meet the customer demand within time with higher accuracy is the major task. To satisfy the customer demands and for better performance Automation play an important role for various types of industrial like production, manufacturing, engineering, automobile, medical, defense, aerospace and space etc. The automotive industry is the most common user of industrial robots. as it involves a wide variety of tasks such as manufacturing and assembly which involves operations such as welding, cutting, painting, etc. a typical automotive industry consists of body shop, paint shop, chassis line and a final assembly line .in the body shop with the sheet metals the outer structure of the vehicle is formed, by the help of robots for spot welding, and material handling, and in addition the robots are also used to apply adhesives and sealer during the assembly. The vehicle body is transferred to the paint shop and where it goes through various process such as cleaning, electroplating, priming, and final painting, and clear coating where usually all this process is carried out by manipulators for high accuracy, and the manipulators are controlled by programs, next the painted vehicle is brought to the assembly line, where various parts are assembled on the

B. Center Less Grinding

Is a machining process that uses abrasive cutting to remove material from a work piece Center less grinding differs from centered grinding operations in that no spindle or fixture is used to locate and secure the work piece the work piece is secured between two rotary grinding wheels, and the speed of their rotation relative to each other determines the rate at which material is removed from the work piece Center less grinding is typically used in preference to other grinding processes for operations where many parts must be processed in a short time

C. 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 ot 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. LITERATURE REVIEW

Piyusha P. Jadhav* , Sachin V. Lomte, Sudhir Surve

Three Dimensional grinding Model is described by analytical methods. The model includes a parametrical description of all grinding gap elements and their kinematics and enables the determination of optimal regulating wheel form. Moreover, the model can be used in a simulation tool that creates an interactive virtual environment, places all grinding gap elements in the defined set-up and visualizes the process

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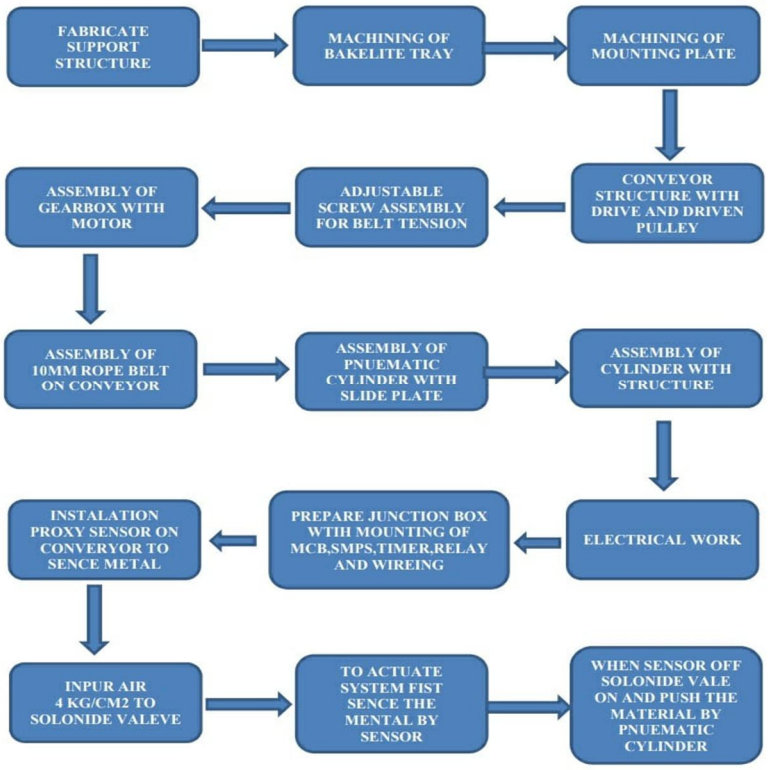
[1]. Thermal variation in machine tools greatly affects the dimensional tolerances of work pieces and causes various defects in manufacturing process. For preventing thermal distortion that makes to substantial improvement in quality, manufacturing efficiency and energy saving

[2]. 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 .

III. METHODOLOGY



IV. PLANNING AND PROCESS

List of components used in auto loading assembly:-

A. 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 cause 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,

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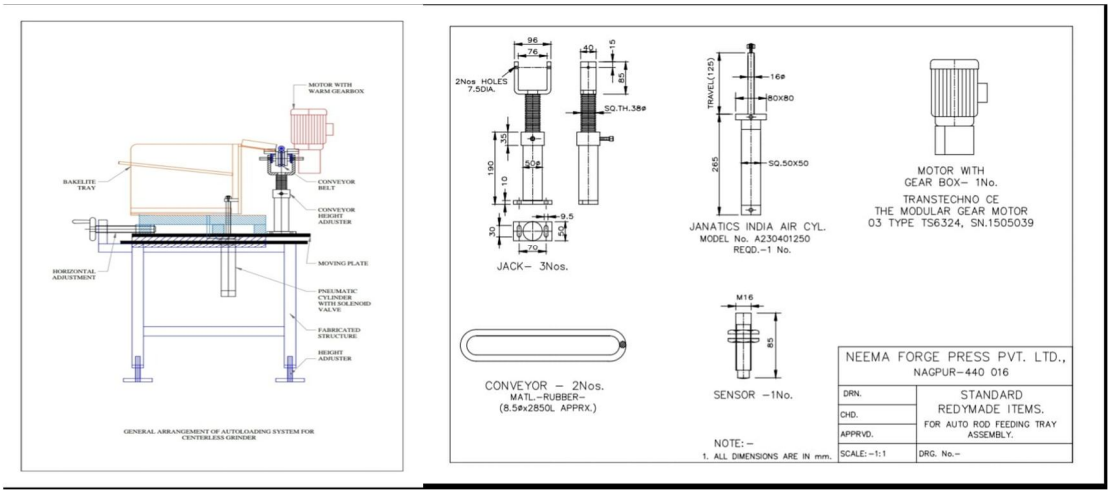
V. EXPERIMENTAL SET-UP OR MODEL DESIGN DESCRIPTION



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 avoide , No Extra load on centre less grinding machine (Grinding Wheel, Control Wheel & Carbide Plate) Life of carbide plate improved.

VII. FUTURE SCOPE

This project help to in future to Short time loading , Replacement of One operator by Auto loading System ,Total operator for the process 7 no's reduced by 6 no's , Quantity of production improved by 200 no's per day ,Quality improved due ot 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.

VIII. RESULT AND 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

IX. ACKNOWLEDEMENT

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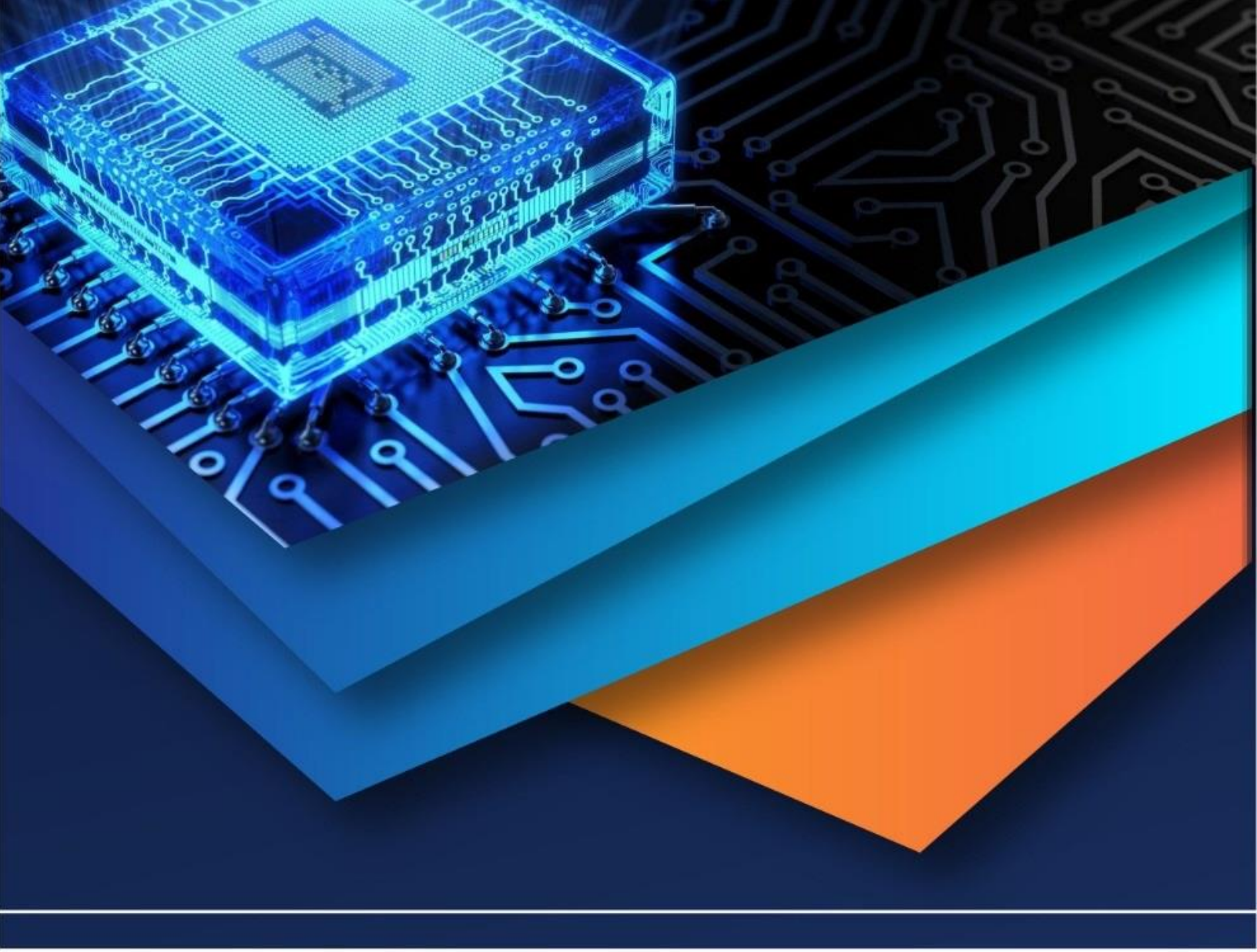

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