INTERLOOPING PROCESS OF DIODE CONTINUITY CLAMPING VOLTAGE CHECKING MACHINE WITH TERMINAL RIVETING AND SCREWING MACHINE

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ABSTRACT - The process of interlooping the diode continuity clamping voltage checking process machine with the terminal riveting and screwing process machine. This process is interlooped by changing its hardware and software. The software used to control this process is plc programming. Nowadays, technology is well developed but some of the industries still operated by manual effort, automation or semi-automation. Industries main aim is to increase the production rates by decreasing the workstation in the assembly line.

KEYWORDS: Hydro pneumatic press machine, pneumatic press machine, interlooping, ladder logic, sensors, single fixture, tuning screw.

1. INTRODUCTION

In horn manufacturing industries, they are using separate process for diode clamping voltage checking, terminal riveting and screwing machine. Here we have to inter loop the diode clamping voltage checking with the previous process of terminal riveting machine. Pneumatic press machine is used for diode clamping voltage checking and hydro pneumatic press machine is used for terminal riveting and screw insertion. Here we have to inter loop these two process by using plc programming, this combined process is helps to reduce the cost , man power and line balancing for the manufacturing of horn. Thus the project of interlooping process of diode continuity checking process will be an effective work for the industry. In this modern world, manufacturing is more and more competitive if the companies want to survive, they want to update their self and efficiency. In today's manufacturing environment, companies are looking forward to improve their production by a new redesigned assembly line by inter looping these two processes. The results shows that the bottleneck time (crimping stage time)reduced from 23.04to 16.65seconds and production rates increased by inter looping diode clamping voltage checking with hydro pneumatic riveting and screwing machine.

2. CONCEPT OF WORK STUDY

Work study becomes one of the most important method to improving production and efficiency. During the implementation of work study, some kind of factor which may affect the production efficiency we have to eliminate the overtime consumption by inter looping the process. Work measurement is helps to work out a time standard for fulfilling a job with economical methods. The main aim is to reduce the time and increase the production

3. PROBLEM IDENTIFICATION

The horn manufacturing company produces the several types of horn for automobiles. smart tone horn has 14 assembly stages.

In assembly line two labours are required to operate the two fixtures which involves in the assembly of terminal riveting, tuning screw insertion and diode continuity clamping voltage checking measurement.

This cause's time delay in the manufacturing because it will be a separate process needs manual effort.

Inter looping these two processes will be increasing the efficiency of the assembly line and it will leads to reduce the work load to the operator.

4. EXISTING SYSTEM

4.1 HYDRO PNEUMATIC TERMINAL RIVETING MACHINE

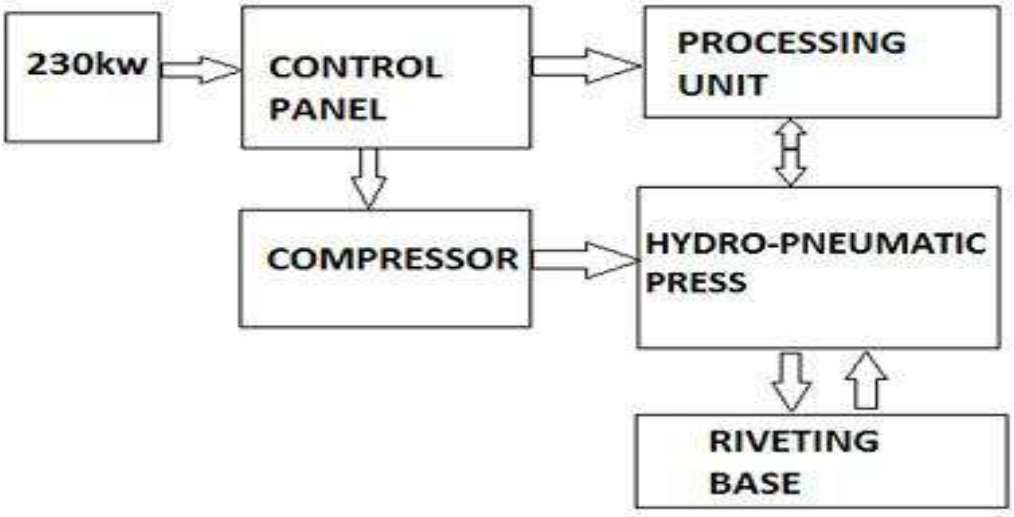
In day-to-day life the requirement to be met by the quality of motion of actuators used in many machine and frequently extremely high. Either high speed has to combine with slow operation or movement which are regular has to be very accurate. So after survey all different eras our goal is achieved by combining hydro pneumatic system.

4.2 INTRODUCTION

A hydro-pneumatic tank contains pressurized air and oil in its operation and gives lower inlet pneumatic pressure with higher outlet hydraulic pressure. Hydro-pneumatic components combine the advantage of hydraulic (hydraulic flow easily controlled) with those of compressed air technology (fast power availability due to high operation speed). In these by control process the quantitative motion of the actuator is determined, and the hydraulic circuit qualitative properties are achieved by influencing the oil flow (low-vibration) and the pressure. Hydro-pneumatic system contains two component hydro-pneumatic pump and cylinder.

4.3 BLOCK DIAGRAM

A hydro-pneumatic press is a machine give higher outlet hydraulic pressure with lower inlet pneumatic pressure utilizing both air and oil in its operation.



4.4 PNEUMATIC CIRCUIT DESIGN USING PLC

A programmable logic controller (PLC) is essentially a user friendly and micro-processor based a type of microcomputer, consisting of hardware and software, designed to control the operations like Industrial equipment and processes. An important advantage of the PLC is, it can be easily programmed and we can reprogram also. PLC has very big impact on Industrial control and instrumentation due to its high reliability and flexibility in the design and implementation stages. In recent years, PLC are being used in place of electromechanical relays or it can operated logic controllers to control fluid power systems. Modern days PLCs are developed into a sophisticated and highly reliable to control the system component capable of performing complex mathematics functions and operated at a fast microprocessor speed with a low consumption of time.

4.5 PLC PROGRAMMING

There are various approaches for designing the program into PLC they are,
1. Ladder diagram based

2. Low level based on Boolean expressions

3. Functional blocks

4. High level language

Most of the programming methods used for PLC are based on their ladder logic diagram. Therefore the concept of ladder diagram is explained in the upcoming sections.
The PLC programming based on the use of the ladder diagram involves writing a program in a similar manner to drawing into a switching circuit. The ladder logic diagram is converted into PLC ladder diagram by using the conventions of the PLC ladder diagram and the constructions. This method requires the use of simple keyboard and the circuit design with the minimum graphic capability to display the symbols and representing components and their inter relationship between the ladder logic diagram. The components are two types, that is contact and coils. Contacts are used to represent input switches, relay contacts and the similar elements. Coils are used to represent load such as solenoids, relays, counters etc.

The programmer inputs to the ladder diagram line by line into the PLC memory with the circuit displaying the results for verification. The combining process of diode clamping voltage checking process with terminal riveting and screw insertion performed by PLC programming.

5. PROPOSED SYSTEM

The proposed idea is to focus on the application which will help the workers to do their work fastly and to increase the production of horn in the assembly line. The process of interloping the diode continuity clamping voltage checking process machine with the terminal riveting and screwing process machine. This process is interloped by changing its hard ware and the software.

The hardware is changed by changing its fixture. The software used here is the PLC programming. The PLC program of both the machine is changed and a new PLC program is done for the interloped process.

In the current smart tone horn assembly line, the tuning screw insertion and diode voltage measurement machines are founded in different workstations. But we have proposed a design to combine two workstations to a single workstation. By combine we have to alter some changes in standard operation procedure or create new standard operation procedure of machine.

6. WORKING PROCEDURE

Insert tuning screw in the fixture and place the horn housing assembly arrives from spool holder riveting workstation. Press green button in machine to start cycle. Load is applied on the housing assembly to lock it immovable by double acting pneumatic cylinder. Cycle 1 starts tuning screw is inserted in to horn housing assembly by pneumatic air gun under pre-determined default threads denoted during programming. After reaching pre-determined threads pneumatic air gun stop. Then Cycle 2 starts, in this cycle small pneumatic cylinder is used to open spool assembly. By this opening we can check the diode voltage for that horn assembly. The diode voltage is displayed in measuring device. The diode voltage is within the range of standard level horn is passed to next workstation to continue production. All the machine controls are controlled by using the PLC programming. Design of fixture with spring is most preferable because it doesn't need additional setup and it is a very simple setup. It is more efficient than existing process and easy to operate without fatigue to operator. Cost wise less and possible damage part is also less.

6.1 DIAGRAM

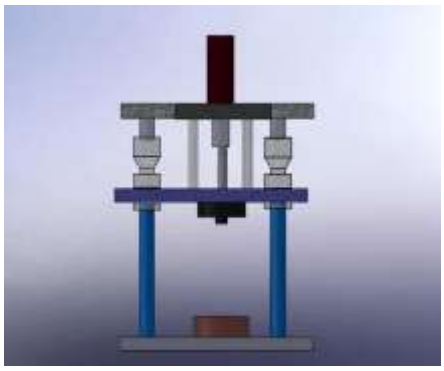


Figure-1 Diode clamping voltage checking machine with terminal riveting and tuning screw insertion

7. RESULT AND DISCUSSION

New design proposed system is more effective than the current production system in smart tone assembly line. It reduces the time delay and increases the production.

8. CONCLUSION

By implementing this process, time consuming activities in assembly line can be reduced. This process not only improves horn production in assembly line and human intervention also minimized. If the system will modified and used in assembly line leads to less consumption of time. Combining these two processes reduces the labour cost.

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