

Industrial Work Optimization for Part Loading Process

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Abstract— The work optimization refers finding optimal value or identify the best possible option, our industrial project did the work optimization in roots industries, the main objectives of the work is to minimize the human effort, which is done on the part handling process, initially the housing which is the part of the horn, is loaded by the labour in the pallet, in very normal way, In this condition time consumption is more, and high human effort too, according to the problem identification using of “Auto Rotate Table With Multiple Guide Liner” is the best solution to avoid that cons and also one labour is enough to manage two or more workstations, hence we considerably reduce the labour pay, by this we can obtain the efficient work for this part loading process.

Key words: Industrial Work Optimization

I. INTRODUCTION

Its objective is to promote automation and collaboration between optimization specialists, industrial partition and management scientists so that important practical industrial and management problems can be addressed by the use of appropriate, recent advanced optimization techniques.

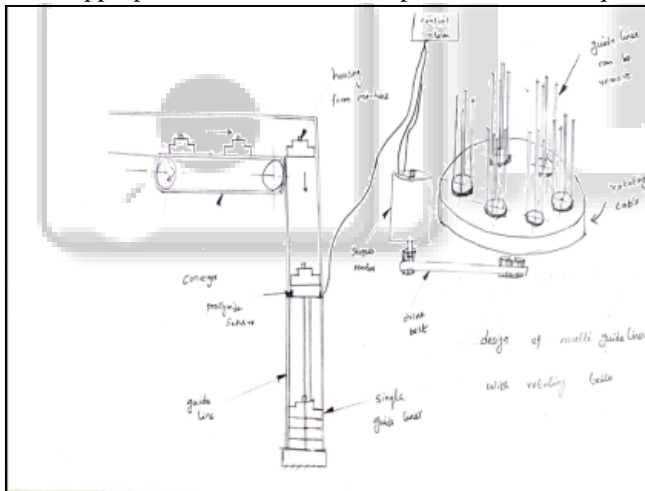


Fig. 1:

The handling of material must be performed safely, efficiently, at low cost in timely manner, accurately without damage to the material. The cost of material handling is a significant portion of total production cost estimating average around 20-25% of total manufacturing cost, so direct cost of material handling cannot be measured. The main factor attributing the material handling cost is wasted time.

The second major cost added to material handling is labour cost. In addition increasing labour and time compensation costs make material handling alternative more desirable. Here we planned to reduce the human effort and labour pay too by installing the “Auto Rotate Pallet with Multiple Guide Liner” at press shop in Roots industries. This proposal will definitely eliminate the wastes and improved in growth.

II. METHODOLOGY

AREA OF SELECTION

PROBLEM IDENTIFICATION

PLANNING

COMPARISON

ANALYSING

DESIGN IMPLEMENTATION

A. Area of Selection

In industry having many problems in every line, hence identify the abnormality where it is happen and study about occurrence of abnormality, then we decide it can be resolved or not, this is the way to find area where we are going to do the project, In our project we found the abnormalities in press shop regarding part loading on pallet from the conveyor.

B. Problem Identification

Problem identification provides the platform for investigating a broad range of interventions and generating options. Without automation there lead to human error and high employee cost, therefore we committed to solve this concerns through focussed on automation.

C. Planning

The process of thinking about the activities required to achieve a desired goal. It is the first and foremost activity to achieve desired results. It involves the creation and maintenance of a plan, such as psychological aspects that require conceptual skills. we studied how to solve the concern, how to analyse, calculate, Research all the things related upon the problem.

D. Comparison

We actually takes place the comparison between manual and automation work performance in Roots industries, for example: Automation Testing uses automation tools to execute test cases. In manual testing, test cases are executed by a human tester and software. Automated testing is significantly faster and accurate than a manual approach.

E. Analysing

An analysing technique is a procedure or a method for the analysis of some problem, status or a fact. Analytical techniques are usually time-limited and task-limited. They are used once to solve a specific issue. Consider all parameters including data are required to find the solution.

F. Design Implementation

The plan contains an overview of the system, a brief description of the major tasks involved in the implementation,

the overall resources needed to support the implementation effort (such as hardware, software, facilities, materials, and personnel), and any site-specific implementation requirements. After finalizing the five steps design will be implemented.

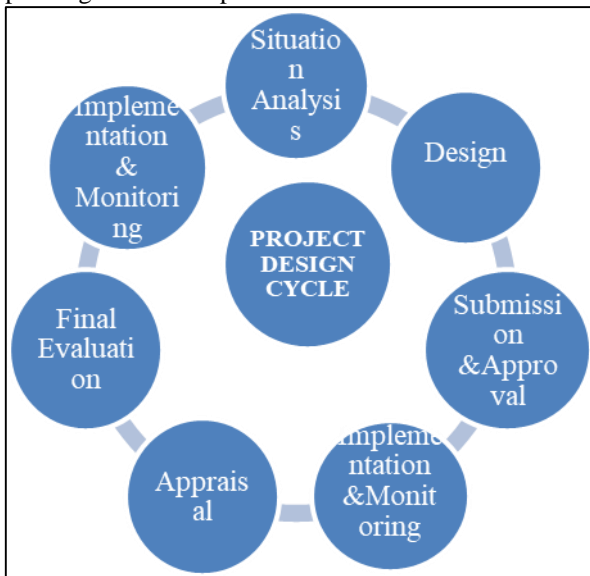


Fig. 2:

III. MAIN COMPONENTS OF AUTO ROTATE TABLE WITH MULTIPLE GUIDE LINER

- A. Stepper Motor
- B. PLC Control Unit
- C. Rotating Table
- D. Guide Liner
- E. Conveyor
- F. Proximity Sensor

A. Stepper Motor

A stepper motor is an electromechanical device that converts electrical power into mechanical power. Also, it is a brushless, synchronous electric motor that can divide a full rotation into an expansive number of steps. The motor's position can be controlled accurately without any feedback mechanism, as long as the motor is carefully sized to the application. Stepper motors are similar to switched reluctance motors.

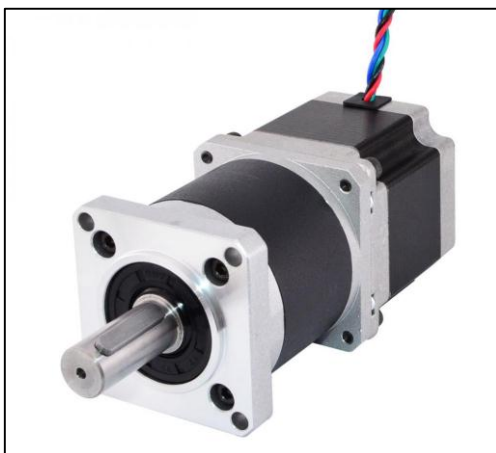


Fig. 3:

1) Types of Stepper Motor:

There are three main types of stepper motors, they are:

- 1) Permanent magnet stepper
- 2) Hybrid synchronous stepper
- 3) Variable reluctance stepper
- a) Advantages of Stepper Motor:
 - 1) The rotation angle of the motor is proportional to the input pulse.
 - 2) The motor has full torque at standstill.
 - 3) Precise positioning and repeatability of movement since good stepper motors have an accuracy of 3 – 5% of a step and this error is non-cumulative from one step to the next.
 - 4) Excellent response to starting, stopping and reversing.
 - 5) Very reliable since there are no contact brushes in the motor. Therefore the life of the motor is simply dependant on the life of the bearing.

B. PLC Controller

The PLC receives information from connected sensors or input devices, processes the data, and triggers outputs based on pre-programmed parameters.



Fig. 4: PLC CONTROLLER

Depending on the inputs and outputs, a PLC can monitor and record run-time data such as machine productivity or operating temperature, automatically start and stop processes, generate alarms if a machine malfunctions, and more. Programmable Logic Controllers are a flexible and robust control solution, adaptable to almost any application.

C. Rotating Table

It is a 360 degree rotating table which is supported on the ground, the stepper motor is used to provide rotary motion to the table, and the table supports the guide liner which carry the components for racking.

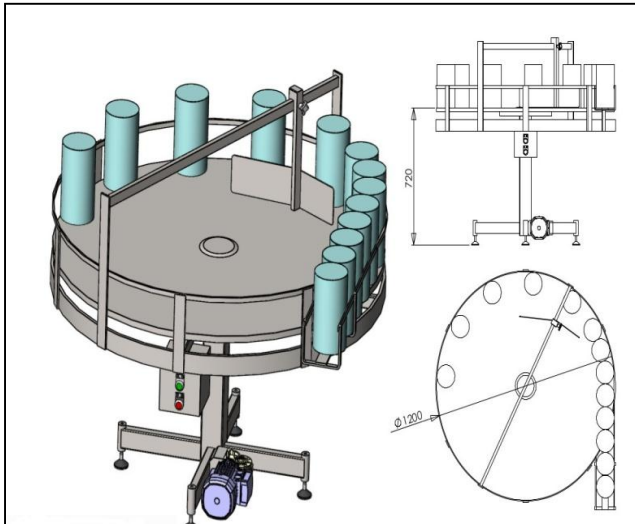


Fig. 5: Rotating Table

D. Guide Liner

It is the own design according to the operational condition, vertically positioned guides which provide racking of the finished component, Metal or nonmetal can be used to make the guide liner



Fig. 6: Guide Liner

E. Conveyor

The conveyor system works by using two pulleys that continually loop over the material that rotates over them. This is done with an endless procession of hooks, gears, buckets, and a wide rubber belt. The belt is then supported by a series of rollers along the path.



Fig. 7: CONVEYOR



Fig. 8: PROXIMITY SENSOR

IV. FINAL DESIGN

This design is our proposal for our Industrial project, Achieving optimization of an industrial work which is approved by industrial personnel's

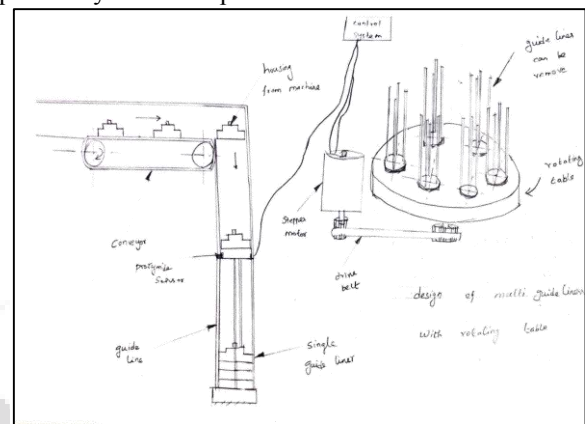


Fig. 9:

A. Proximity Sensor

A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target.

V. ADVANTAGES

- Automated production line by its ability to process more than one product style simultaneously. At any moment, each machine in the system may be processing a different part type.
- Increased productivity: Automation of manufacturing operations holds the promise of increasing the productivity of labor. This means greater output per hour of labor input. Higher production rates (output per hour) are achieved with automation than with the corresponding manual operations.
- High cost of labor: The trend in the industrialized societies of the world has been toward ever-increasing labour costs. As a result, higher investment in automated equipment has become economically justifiable to replace manual operations. The high cost of labour is forcing business leaders to substitute machines for human labour.
- Labour shortages: In many advanced nations there has been a general shortage of labour. Labour shortages also

stimulate the development of automation as a substitute for labour.

- Safety: By automating the operation and transferring the operator from an active participation to a supervisory role, work is made safer
- Improved product quality: Automated operations not only produce parts at faster rates than do their manual counterparts, but they produce parts with greater consistency and conformity to quality specifications.
- Reduced manufacturing lead time: For reasons that we shall examine in sub sequent chapters, automation allows the manufacturer to reduce the time between customer order and product delivery. This gives the manufacturer a competitive advantage in promoting good customer service.

VI. CONCLUSION

There are several research we taken out and find out the possible solution, we can improved the work optimization in industry and given proposal to install “Auto Rotate Table With Multiple Guide Liners”, it can be adopted in any industrial environment and cheap among other automation concept, According to the industrial work alternatives in future this equipment can be applicable for that too, because it is a programmable one, The report clearly shows how its working and described its beneficial things, finally the equipment is applicable for present condition as well as future alternatives in industry.

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