



‘MULTILEVEL OBJECT SORTING USING PLC’

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Abstract:

Low Cost Automation (LCA) can certainly play an important role in streamlining the sorting process for businesses. By utilizing DC motors controlled by a Programmable Logic Controller (PLC), the sorting process can be automated in a cost-effective and user-friendly manner.

It is true that with the increasing rate of production, there is little variation in the height, color, weight, and shape of the manufactured products. Therefore, it becomes important to ensure that the sorting process is precise and free from human errors.

The use of sensors in the sorting process can ensure that the products are sorted accurately based on their height variation. The conveyor belt system can be used to pass the products before the sensors, and the PLC can make decisions based on the sorting logic.

Overall, the development of a LCA system for sorting lightweight products can significantly improve the efficiency of the manufacturing process. With low maintenance costs, long durability, and ease of use, LCA systems can be a valuable investment for businesses looking to streamline their operations.

Keywords:

PLC, Low cost automation, Conveyor belt, Sorting, Object, Human, Sensor, Drive, Motor.

Introduction: Motive of this project is to create the electronic material handling system which can be used to deduct the efforts of workers and to reduce the time spent in inspection of the components, during their manufacturing. It also

deduct the efforts in transferring the components manufactured to another works place. The most appropriate reasons in installing of automatic system in industry are,

- i. Saving Man Power.
- ii. Improved Quality and Efficiency.
- iii. Increase consistency and Flexibility.

This automatic sorting machine has real tasks of sorting components according to their sizes. This automatic sorting machine also consists of conveyor belt, which deduct the efforts of material handling. Also both processes work side by side like material handling and inspection.

Construction Details:

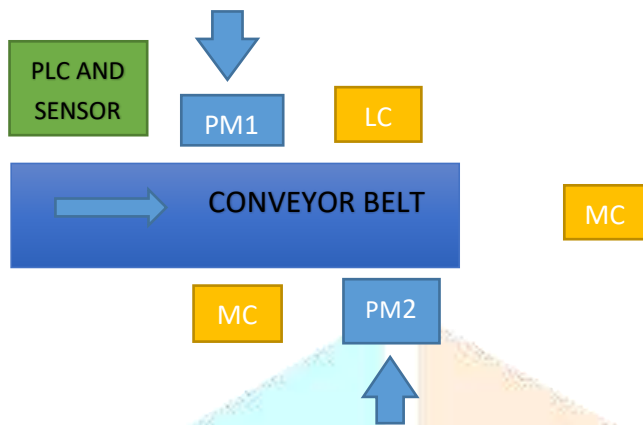
1. The model consists of the conveyor belt which is driven by electric motor.
2. The conveyor belt is Ascended on the M.S Steel frame which is fabricated using the angles and channels.
3. At the two ends of the fabricated frame, using bearings, two drum pulleys are bolted over which the belt runs.
4. For driving, the electric motor is used. For the speed reduction, the sub frame is mounted which have intermediate shafts.
5. This speed reduction system has two stage which consist reduction using belt pulley assemblies.
6. For the purpose of idling, the metal sheet is used which also work as scrubber to reduce the dust on the belt.
7. Then sensors are placed on the conveyor belt.

8. For wirings and electronic assemblies, the separate sheet metal block bolted on frame.

9. For the pushing and sorting, the pushing mechanisms are ascended on the frame.

10. Pneumatic cylinders are used in this mechanism which is operated by solenoid valve.

BLOCK DIAGRAM:



RESULTS:

The operation of the system has been done and got the sorting results as follows.

1. When sensor I is activated then cylinder I is operated which pushes the object away from the conveyor belt.
2. When sensor II is activated then cylinder II is operated which push the object away from conveyor belt.

CONCLUSION:

The study and improvement of PLC Controlled Multilevel Object Sorting System has been successfully performed. Thus the completion of project work take to a better results and let us to study the PLC system and also the various parts of the hardware used. This system can be completely used in industries.

FUTURE DEVELOPMENTS:

Below developments can be done in the system to increase the production rate and to minimize various cost.

1. Using high quality sensor we can increase the speed of the process.

2. Objects sorted can be eminent easily by improving extra circuit. It is also economical.

3. This system can be used to sort one or more than one object in one cycle by suitably changing the hardware and software of the system.

Also we can use such systems with some more modifications for various different types of inspection such as

1. The Inspection Parameter
2. Diameter, hole and diameter
3. Height
4. Thickness
5. Surface defect
6. Crack, burr
7. Roundness
8. Minor and major diameter
9. Chamfer angle etc.

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