

A Review of ‘Improved Automated Conveyor with Auto Separated System for Oil Packaging Industry’

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Abstract- In shell India oil industry requires improvement in their existing system for sorting the defective oil cans on the basis of their weight because improved quality of products, improved production rate, reduce cost of production. Today higher speed of the operation and accurate weighting of packages during crossing a conveyor belt has been getting more important in the food and distribution industries. Automation is the use of control system like a computer or robot for handling different process and machinery to replace a human being and provide a mechanical assistant. Meanwhile, Automated Conveyor system it has ability to sorting defective products and improved the quality of products and This is not only reduces manual effort, time consume, but also more time for marketing prevents danger which might occur which human being work-in hazardous environment. Today Sorting of an object based on a weight basis is an integral requirement of most of the industry, which turns production line more effective ended up with great profit to industry.

Index Terms- Conveyor Belt, Mechanical Arm , Geared D.C Motor, Industrial Scalar ,Sensor, Conveyor Pulley,

1. INTRODUCTION

Conveyor belt scales are most important for the production of a great variety of prepackaged product the main aspect of this project is to increase the accuracy and speed of the checking weight of job in industry and accept or reject the job as per predetermined standard set by industry based on scalar and pneumatic system.[1] There are various types of weighing machine are available in the market. This weighing machine are not suitable for the industrial application, because the every industry required automatic weighing control machine are the weighing machine should have automatic control of weight in order to accept or reject the job as per standard weight.[3] This problem sort out by stating design of production lines. Introduction to the increasing level of automation, automatic control technology application in the production of quantitative packaging more and more in food, fertilizer, oil bottle packaging are widely used in industry. Automation system nowadays chosen to overcome this problem and more our design system produces efficient and productive results.

2. EXISTING SYSTEM

Major headings should be typeset in boldface with the words uppercase. In Existing System Some Following Problems are:

In Shell India Marketing Pvt. Ltd at present automated weighing conveyor is used for measuring the weight of the oil bottle cartridge.

This weighing conveyor only weights the oil bottle cartridge and compare the weight manually with the standard predetermined weight of oil bottle.

Automated Filling System might filled bottle underweight or overweight, which is sealed and then shift to weighing conveyor and there after if the weight of the cartridge of weighing conveyor according to prescribed standards, then it will accept and transported to packaging otherwise rejected, Which might turn into losses.

3. LITERATURE REVIEW

The automated sorting machine using conveyor belt is integral part of manufacturing industry in many fields is a very complex process. Conveyor belt has ability to detect the object of different sizes having different specifications. Sorting system not only increases the production rate of manufacturing industry, but also reduces the effort of material handling reducing overhead expenses. [6] The objects of different sizes are passed through the sensors and the object having specified size is sorted and other will be terminated. The belt is driven by circular roller drive circuit unit which is controlled by microprocessor and load cell. This modification in object detection system has led to increased in the production volume of the manufacturing industry since these sorting systems replaced by human error detection unit. Also the accidents on the shop floor can be reduced since human operator on manufacturing shop floor had been reduced. The Programmable logic control unit is a special type of microprocessor based controller used

for application which includes electrical controller including pneumatic system and load unit cell for pressure and weight measurement.[10] Automatic conveyor system is a controlled by servo motor control unit with the aids of pneumatic and load unit cell helps in managing and controlling the object detective mechanism at the same time maintaining the efficiency of the shop floor of the manufacturing enterprise & quality of the products which improved overall production attribute of manufacturing set up.[9]

4. PROPOSED SYSTEM COMPONENTS

This proposed system gives the convenient approach of automatically detecting the weight of oil bottle on the conveyor system using a plc for high reliability and fast operation without interruption. This System checks oil bottle weight with load unit cell and if this weight is accurate with predetermined set the value in microprocessor control unit then this can goes for packaging otherwise terminated for new volume filling.

4.1 List Of Components

(1) Conveyor Belt:

The conveyor belt consists of two cylindrical roller wheels operated by servo motor which serves the function of pulleys, with a continuous loop of oil bottles which is to be measured is maintained. [13] The conveyor belt rotates over cylindrical wheels .one of the wheels is powered by a DC motor, moving the belt and the oil bottles on the belt forward. Here, the conveyor DC motor receives power and signal from the plc through the rectifier and load cell measured weight accurately.

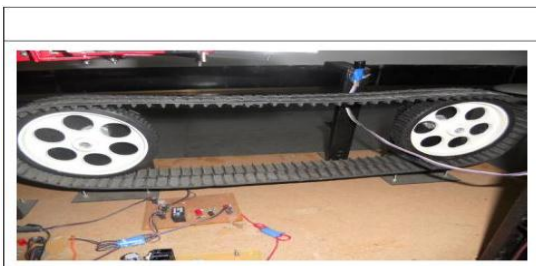


Fig. 1. Conveyor Belt

(2) Programmable Logic Controller:

A programmable logic controller (PLC) is an industrial computerised control system that continually evaluates the weight of oil can as an input parameter of the proposed design and makes a conclusion based upon a set programming microprocessor to control the output results .[1] The input sensing devices are fed to the input module which acts like an optical isolation to load cell which is connected to the main device CPU and memory

unit. [13] The monitor who acts like a programming device where it displays the given weight of oil can on load cell and compared it with determined weight set by plc and finally the entire system is connected to the output devices where the actual weight calibrated to detect the correct weight of oil bottles.

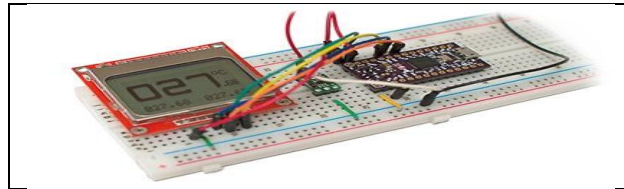


Fig. 2. Programmable Logic Controller

(3) Sensor:

A sensor is a device that converts the data (Analog) into data that a computer can understand using ADC (Analog to Digital converter).[7] Some sensors are mechanically controlled, but most sensors are electronically operated receives a voltage signal that can be converted into an accessible output signal detected by the operator. Sensors are used in as detecting agent in the measurement unit of manufacturing industry as well daily stuffs. There are also wide applications of sensor in today's rapid growing world, which include electronically operated cars, machines, aerospace, medicine and robotics.



Fig. 3. Sensors

(4) Geared D.C Motor

The Geared Motor is 30 RPM Side Shaft 37mm diameter compact DC Gear Motor is suitable for small robots or automation systems, motor runs smoothly from 4V to 12V and gives 30 RPM at 12V.Motor has a 6mm diameter for excellent coupling. The motor must accelerate the filler mechanism in the direction the bottles are moving, match their speed, and track the bottles. After the bottles have been filled, the bottles go for induction sealing, and then onward goes for packaging.[1]

(5) Indicators:

Indicators are used to monitor the system attributes to prescribed value or state condition and acts as an indicator signal, accident signal, fault signal if it is not accordance with system design.

- Green indicator: To indicate the oil can weight is accurate.
- Red indicator: To indicate oil can weight is not accurate to set the value.



Fig. 4. Indicator

(6) Load Cell :

A load cell is a transducer it used to convert a force into an electrical signal. The electronic signal can be a voltage change and frequency change depending on the type of load cell. Load cells are used for a quick and precise measurement. It's Compared with other sensors, load cells are relatively more affordable and have a longer life span. A Strain Gauge is a device used to measure the strain of an object. Resistive load cell is working on the principle piezo-resistivity. When a load/force/stress is applied to the sensor , it changes its resistance. The object is deformed by a fool is deformed, causing its electrical resistance to change. At the heart of electronic scales or weighing machines is a sensor called load cell.



Fig. 5. Load Cell

Usage of load cell is doesn't limit to electronics scales; they are used to load testing machines, industrial scales, flow-meters. Load cells are highly

accurate transducers which provide the user with information are not generally obtainable by the other technology due to commercial factors.

(7) Mechanical Arm:

A mechanical arm is a machine that mimics the action of the human arm. Mechanically arm is composed of multiple beam connected by hinges powered by actuators. One end of the arm is attached to a firm base while the other has a tool. They can be controlled by humans either directly or over a distance. The arm is comprised of segments connected by rotary and linear joints. These linear joints allow for the controlled movements. Tasks are utilizing by robot arms depend on the accuracy and repeatability. These applications typically require repetitive motions. Tooling is attached to the end of the robot arm to move and position, otherwise manipulate a part. The work area envelope is the area a robot arm can reach within its normal ranges of motions. The Maximum payload is the highest amount of weight a robot arm can safely carry and manipulate. This arm is pressed to the correct weight oil bottle for packaging, in case oil can weight is not standard prescribe value the this arm is pressed to the oil bottle for rejection platform.

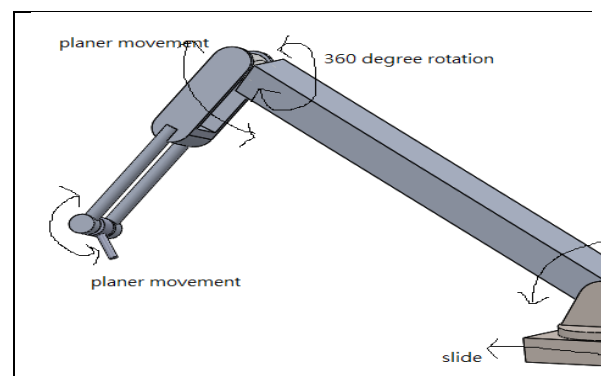


Fig. 6. Mechanical Arm

(8) Conveyor Pulley:

A pulley is a mechanical device used to change the direction of the belt in the conveyor system, to drive the belt, to tension the belt. The Modern pulleys are made of rolled shells with flexible end disks and locking assemblies [4]. a pulley at the discharge end of a conveyor belt; may be either an idler or a drive pulley. The larger diameter of pulleys in the system and is often lagged to increase traction and pulley life. A pulley at the tail of the belt conveyor is opposite to the normal discharge end; may be a drive pulley or an idler pulley. A snub pulley is mounted to close the drive pulley on the return side of the belt, the snub pulley's are primary job is to increase the angle of wrap around the drive pulley this increasing traction. May be lagged for longer wear life.

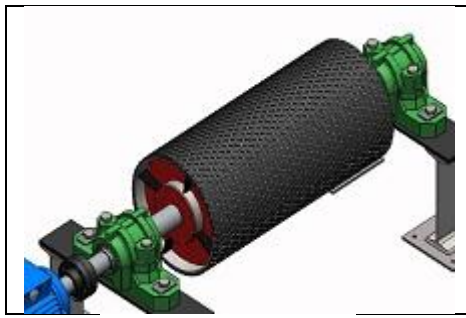


Fig. 7. Conveyor Pulley

The bend pulley is used for changing the direction of the belt, for running to the gravity take up. May be lagged for longer wear life. Take-Up Pulley is adjusted to idle pulley to accommodate changes in the length of a conveyor belt to maintain proper tension.

5. RESEARCH GAP, PROBLEM, CHALLENGE

The objective of this article has been aimed to report the work carried out by various researchers in the field production line and two big gaps between the untouched areas. After an elaborate scrutiny of the published work, the following number of gaps in the literature has been observed from the existing published work.

- In most of the research, the weighing machine is used for weight of the product. The weighing conveyor is used for the calculate the weight of the products. The automated conveyor system is used for the product travel one to another process. The sorting of defective product is used for various types of sensors.
- The sorting of defective product is used to computer vision system, this camera system is capturing the images, this images are rapidly processed and defects or quality attributes are quickly identified.
- The rejected products are removed from the production line for use the pneumatic cylinder. Pneumatic cylinder is pressed, this defected product from the production line.

The most of the research based on the using weighing conveyor for calculating the product and also use with pneumatic cylinder for use to purpose of rejection of products. Our aim is to use the industrial scalar is used to calculate the weight of products and mechanical arm is used to reject the products from production line, And also increase the production rate and reduce time for oil packaging.

6. CONCLUSION

To separate the defective oil cans and also increase the accuracy of oil can content oil. This modified system improved the quality of oil packaging. The modified design of production line reduces oil bottle travel, aids continuous production route without disintegration if any occur due to non meeting weights standard of the oil bottle cartridge which makes access to further industry to set their production line versatile. It will tackle the problem of the overhead expenditure cost of labour which received a high production gain which fulfilled the ultimate aim of industry. To increase the productivity, reduce cost of production, reduce cycle time.

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