Designing And Analyzing of Integrated SILO control process with Bottle Filling Assembly

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Abstract- *The Objective of our project is to design an monitor "PLC Based Plant Monitoring System". this work provide with lot of benefits like low power consumption, low operating cost, low maintenance, accuracy & many more. This project based on industrial automation & is a vast application used in many industries like milk, chemical, food & mineral water & many more.*

Filling is the tank that is carried out by a machine & this process widely used many industries. Bottle is controlled by using a controller known as PLC which is heart of all the system. The conveyor is controlled by DC motor has been selected for better performance the sensor is used for detection of bottle position ladder logic has been used programming of the PLC. The PLC used in this system is Siemens counting of bottles which are fill in shift. Temperature, flow, level, pressure, & density of a liquid is measure using sensors.

Keywords- Motor, conveyer belt, PLC, Water tank.

I. INTRODUCTION

In this project, we are focusing on producing an end product solution using SILO Process. Many of the bottles filling plants only have assembly of filling, Capping & Labelling but the actual product is manufactured either at different place or using different set of machines. In order to integrate both the processes in one machine, we have come up with this idea of SILO CONTROL & Bottle filling. In this case, we will produce a lemon juice automatically.

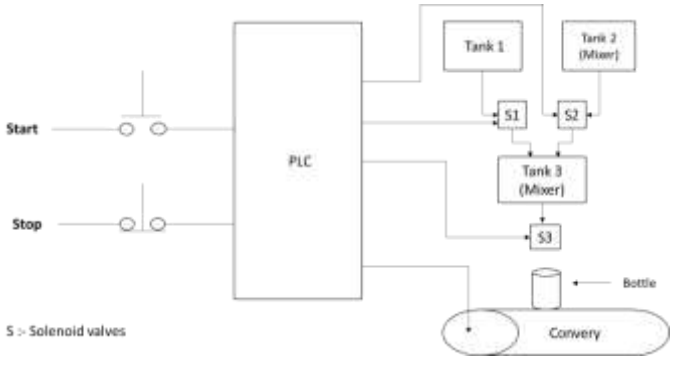
Industry automation becomes a spacious field in manufacturing which had important role in an extensive range of industries beyond manufacturing. Nowadays the rapid development of manufacturing and technology has led to an increase in production level.. Where the production managers are faced challenged to reduce the cost of the product with maintaining product quality within a time framework and due to the increased demand for on consumer products so competition among manufacturing companies has become dependent on cost, accuracy, time, and quality for that the key to such a problem is the use of integrated processes in the industry. Programmable logic controller (PLC) is extensively used in industrial automation and it act as a brain in industry application. PLCs in the industrial field are utilized to control a certain process in order to get better performance and higher accuracy to give more production in an efficient manner. This paper present, design and implementation water filling machine system for different sized bottles by using PLC.

Therefore our objective is to design and implement a PLC based automatic bottle filling system and to implement a low cost SCADA technology for this system in order to cover and investigate the procedures used to make a fully automated process and the main components of SCADA technology through the understanding of the bottle filling application.

II. PLC INTERFACING

In this Block Diagram there are three tanks are present. Tank first contains water and tank second contains lemon juice. When we push the start button then PLC get start and tank 1 will emits the water through solenoid 1(S1) and As the ratio of water the tank 2 will emits the lemon juice through the solenoid 2(S2) in tank 3.

In tank 3 the both liquid are mix continuously, after mixing conveyor motor will start and bottle comes toward S3. When that bottle came towards S3 sensor will detect the bottle position then solenoid3 that is S3 will be on and fill the bottle up to specific limit decided by that company .



after filling of bottle again conveyor will start and next bottle comes under solenoid 3 that fill bottle goes through counting sensor that sensor count the number of bottle fill in a day or

shift and display on LCD display like this process continuously done.

When we push the stop push button whole system will stop the working.

Ladder Diagram

```
PROGRAM PLC_PRG
VAR
        START AT %IX0.0: BOOL;
        SVA AT %QX1.0: BOOL;
        STR1 AT %QX1.1: BOOL;
        SVB AT %QX1.2: BOOL;
        T0: TON;
        AB: TIME;
        STR2 AT %QX1.3: BOOL;
        T1: TON;
        CD: TIME;
        CONV AT %QX1.4: BOOL;
        T2: TON;
        EF: TIME;
        SVC AT %QX1.5: BOOL;
        T3: TON;
        HI: TIME;
        STOP AT %IX0.3: BOOL;
        PROXY AT %IX1.0: BOOL;
        DRAIN AT %IX0.4: BOOL;
END_VAR
```

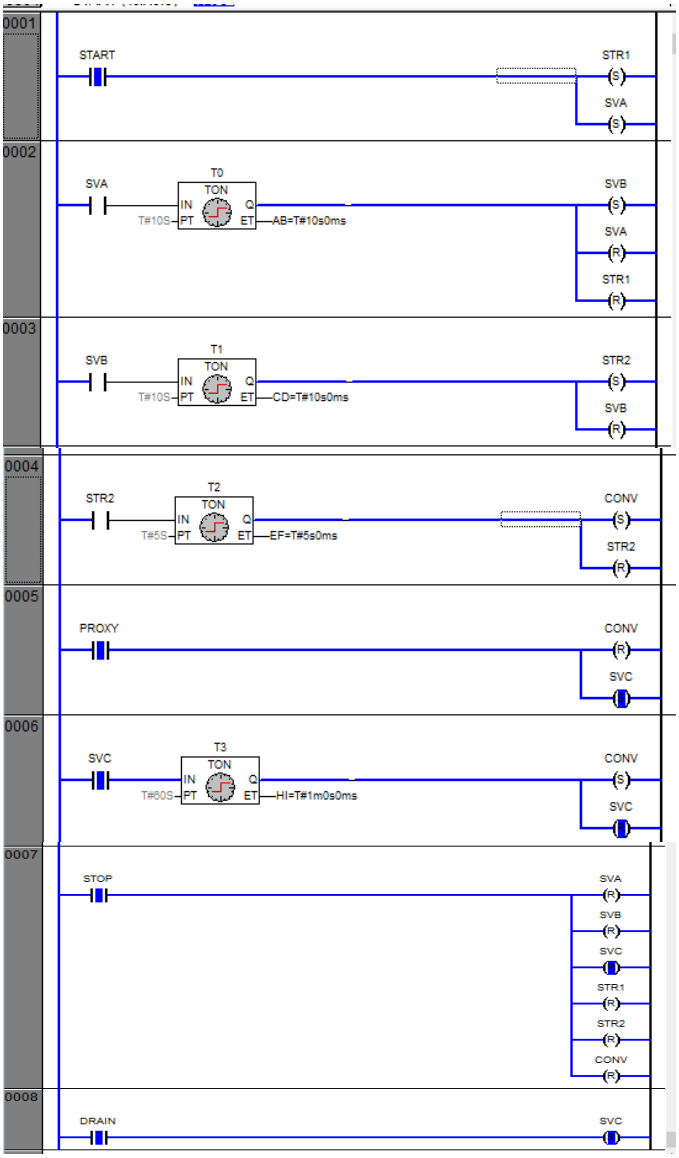


Fig8. Ladder Diagram

III.RESULTS AND DISCUSSIONS

we studied the system specification and compared the different company bottle filling plants with our subject and also we studied the literature survey a conclude that the we can make the system which perform two work at a time so that it can reduces the man power and cost of the plant.

So that we made this system which can perform two task at a one plant. So we control the flow of liquid using timer we can also use the flow meter before the values. Due this we control the flow and we mixed two liquid at a constant rate. So that the quality of liquid should be same. In this project we also add the scada system which uses for the control the system through the remote location. By this system we can do the two work at one place and scada is best for control.

IV. COMPARISON TABLE

To improve the performance of this PLC based bottle filling system, SILO inverted for mixing is introduced .As seen from the table.

Mapro solution	**Our Solution**
Liquid mixing is in different plant	Liquid mixing is in same plant
Take a long time	Take a less time
Required so many people	Required low human power
Speed of filling is low	speed of filling is high
The ratio is not fixed for mixing	The ratio is fixed for mixing

Table 1 Comparison table

VI. CONCLUSION

Integrated SILO control process with Bottle Filling Assembly machine system by detecting bottles by using PLC has been developed and implemented. The PLC is used in this system to get more productivity with less time high reliability for and flexible in work. The system is designed to working with change in time of bottles filling by simply change the program. The ladder diagram language is used in this paper because this language is very useful and has a lot of functions so that most of the industrial application uses this language.

Organizations develop information systems to meet important business objectives such as improving competitiveness, increasing productivity and efficiency, accelerating growth, supporting innovation and reducing costs. And also we can make the two processes at a one place so that we reduce the man power and cost. One plant can be perform the two processes so that length of conveyer will be reduces.

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