

# Multiple Weight feeder Control through PLC

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**ABSTRACT:** This paper proposed the operation of weighing feeder through PLC. Currently, weigh feeder controlling is done by their indigenous controller. This controller is not reprogrammable so user depends on the manufacturer for maintenance. Due to limited input-output ports, a controller controls only one feeder at a time and that's why it requires additional hardware for proper operation it also increases its cost, to overcome this issue we implemented PLC instead of a controller due to its advantage of surviving in extreme condition including several heats, dust and temperature. The software reviewing are helpful in course of model updating. In this paper Ladder and block diagram are the most commonly used terminologies in the mainstream PLCs. SCADA system enables monitoring and the issuing of process commands in the controller.

**Keywords:** SCADA System, PLC etc

## I. INTRODUCTION

Weigh belt feeder is the piece of industrial control equipment used to gauge the mass or flow rate of bulk material travelling over a weighing section and placed in the feeder frame. Controller calculates federate of material and maintains the speed of the belt according to set point. Areas of Application: Steel, Cement, Fertilizers, Chemical & other Process Industries.

## II. METHOD

To overcome above problem we use PLC to control the operation of weigh feeder. PLC based system will provide deeper information of process by alarm, trend, event, report. These are helpful for maintenance and support PLC. One single Programmable Logic Controller can easily run many machines. In old days, with wired relay-type panels, any program alterations required time for rewiring of panels and devices. With PLC control any change in circuit design or sequence is as simple as retyping the logic. Correcting errors in PLC is extremely short and cost effective. Today's Programmable Logic Control memory is getting bigger and bigger this means that we can generate more and more contacts, coils, timers, sequencers, counters and so on. We can have thousands of contact timers and counters in a single PLC. Imagine what it would be like to have so many things in one panel. Prices of Programmable Logic Controllers vary from few hundreds to few thousands. This is nothing compared to the prices of the contact and coils and timers that you would pay to match the same things. Add to that the installation cost, the shipping cost and so on. A Programmable Logic Control program can be tested and evaluated in a lab. The program can be tested, validated and corrected saving very valuable time. When running a PLC program a visual operation can be seen on the screen. Hence troubleshooting a circuit is really quick, easy and simple.

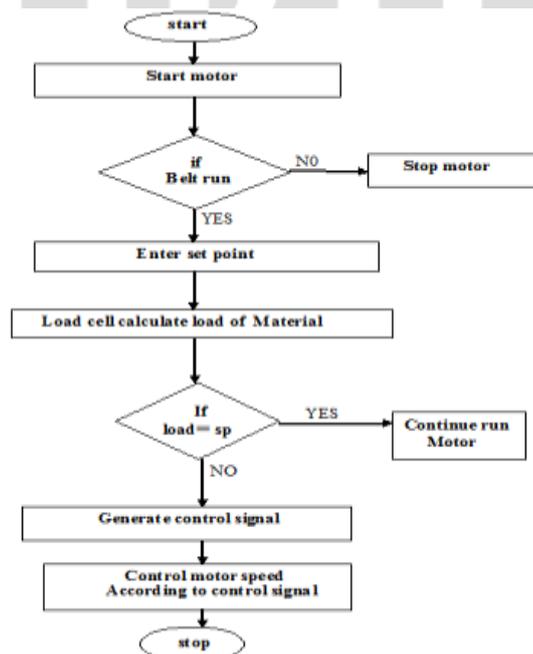


Figure1- Operation of PLC based Weight feeder

### III. PROPOSED MODIFICATION

Here we replace controller of weigh feeder with PLC. *Direct proxy* signal is connect to input module of plc. When we start the system and set the value of set point. Motor start running and load cell calculate the load of bulk material which is travelling over weighing section. load cell calculate the load in kg per meter. This is process variable of system when process variable is not equal to set point, at that time controller generate control signal. That signal control the speed of motor according to set point. When set point is equal to process variable at that time process is continue. Zero speed sensor are used to protect equipment, process and Belt sway switch is suited for belt breakage prevention and over falling prevention due belt sway and Pull cord switch also known as rope operated emergency switch is used as a safety switch to stop the conveyor belt in case of an emergency. These equipments are directly connected to PLC. Controller not display any information related to ZSS, BSS and PCS but PLC shows all information related to these switches and generat plc software to control operation of these switches.

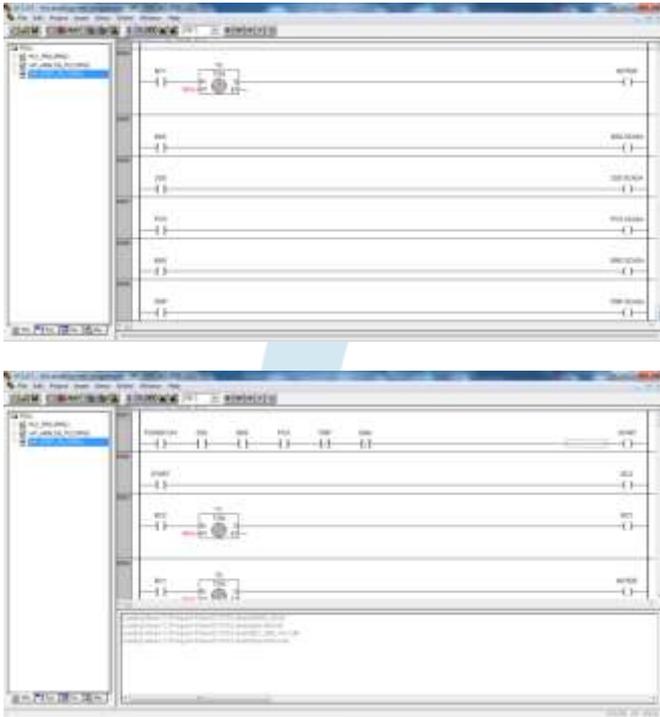


Figure 2- Ladder logic for Weight Feeder

### IV. Advantages of SCADA system

When SCADA system is applied properly it save our time. With SCADA, user can eliminate the need for site visits for inspection, adjustments and data collection. SCADA software enables user to monitor the operations in real time. It can also make modifications to the system, auto-generate reports and trouble-shoot. It also improve system performance and reliability by reducing the operation cost and improve the efficiency of the set-up.

SCADA systems are equipped to make immediate corrections in the operational system, so they can increase the life-period of your equipment and save on the need for costly repairs. It also translates into man-hours saved and personnel enabled to focus on tasks that require human involvement. Further, the auto-generated reporting system ensures compliance with regulatory principles. Data is continuously recorded in system so user do not to have read manually and report reading on daily basis. When alarm came out and it can be often avoided in this condition SCADA shows the degree and nature of problem.

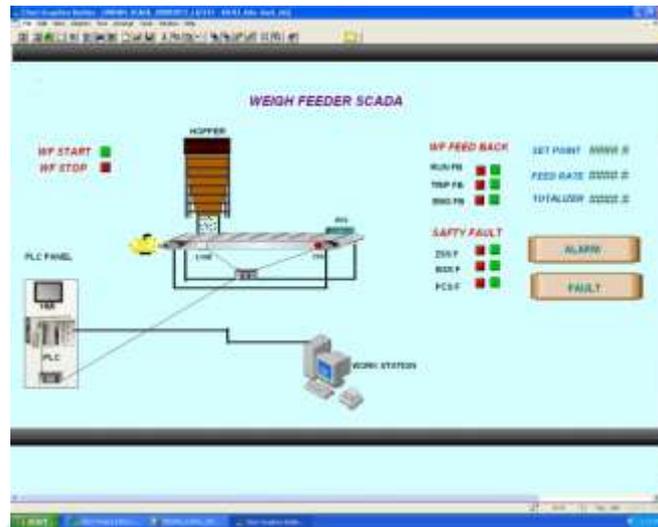


Figure 3- SCADA of system

### V. Calculation

For example

Speed = length of belt/time taken in one revolution

If belt length =10 meter

Time taken =10 sec

Then speed =1m/s

If belt speed at 50Hz =1.0 m/s

Capacity of weight feeder =300 tph

Then kg/m at 100% load

Set point (tph) = kg/m\*speed\*3.6

300 = kg/m\*1.0m/s\*3.6

kg = 83.33 at 100% load

At 100% load weight per meter =83.33 kg

So,

speed is by represented by  $\text{rpm} \div (8.33 \times 3.6)$

### VI. Result

Here we use PLC instead of controller. We also use single plc input for multiple physical input (buttons/sensor etc) at same time and there is no need for electronic circuit like drivers or multiplexers just use a relay for each physical I/O. PLC shows status of ZSS, BSS and PCS switches. The software revisions are helpful in eliminating the rewiring of hardwired controls whenever the process is changed or new models are introduced. We can slightly change the program and operate multiple weight feeder using single PLC. It also show the status of all switches and panels. Report generation is easy and we also store result in memory for future use.

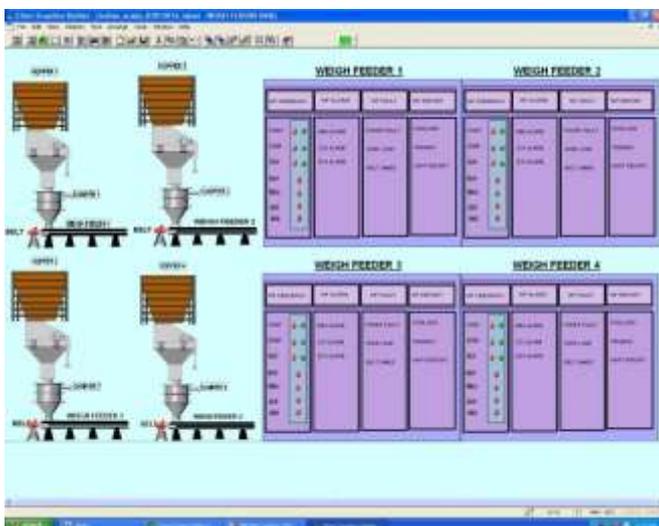


Figure 4- SCADA of Multiple Weight feeder

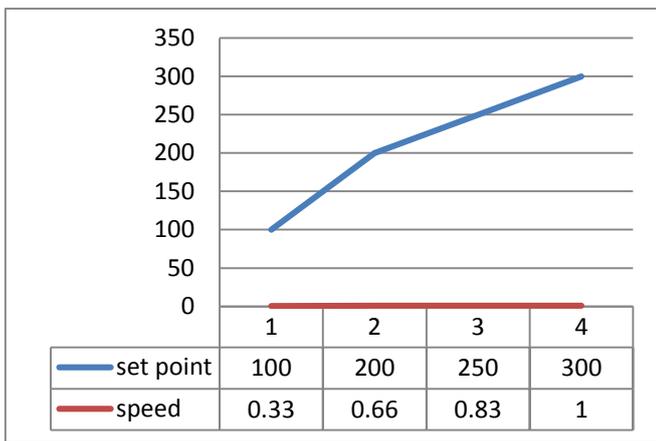


Figure 5- Setpoint vs Speed

Table-1 Different values of speed according to setpoint

Set point (tph)	Speed (m/s)
100	0.33
200	0.66
250	0.83
300	1.0

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