LEVEL MEASUREMENT USING PLC FOR CONTROLLED APPLICATION

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Abstract: The high sensitive semiconductor gauge is used for the level control of liquid is designed and realized by PLC Programming. The gauge is connected at the bottom of the tank. The strain gauge output is changed according to the water flows upside or downside. The output is noted by the bridge detector. The signal is produced by signal training system and a comparison is done sensed by PLC module. The status of level inside the tank is altered and relates by PLC programming, the controller response also be altered. The profits of system, elaborated in this research are to understand the need of energy efficient controller.

Keywords: Stress, Level, PLC, strain, energy.

1. INTRODUCTION

This work signifies the pressure measurement of liquid using strain gauges kind sensor placed the at the bottom position of a tank. The response of strain gauge totally depends on the pressure of the liquid [1]-[3]. If the value of strain gauge overlapped the threshold value then the solenoid valve will be control the operation related to closed or open mechanism [2]-[4]. This configuration used high gauge factor related semi-conductor based strain gauge and wheat-stone oriented gauge configuration which offers a greater sensitive [5]-[9]. High sensitivity sensor is good for practical purpose.

The relationship which provides help between various parameter

$$E = S / e$$

Where E= Elasticity
S = Stress
e = Strain

$$e = (\Delta l - l) / l$$

$$S = F / A$$

Where F = Force
A = Area

$$GF = (\text{Strain in resistance}) / (\text{Strain in length})$$

Where GF = Gauge Factor

Liquid Pressure = liquid height x g x liquid density

2. SENSORS REQUIRED FOR STRAIN GAUGE

In a standing object as the any exterior force is applied so the development or the effect of stress and strain. Stress becomes the different as the object's inner repelling forces, and the strain is clearly defined in terms of the displacement and deformation that arise.

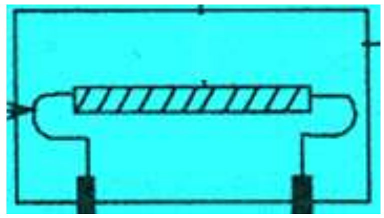

Fig 1: Semiconductor strain gauge.

Fig. 1 signifies the semiconductor based strain gauges construction which is linked with a gold pointer. The main benefit of utilizing a semiconductor gauge is its superior sensitivity in comparison with other strain gauge structure. The response of the bridge is associated with the signal conditioning system. The signal conditioning system produces the analog signal and converted into digital signal using the comparator circuit or system. Comparator is used for producing the logic either 0 or 1, in accordance with threshold value. The output response of strain gauge is appears through the null detector.

3. DESIGNING OF HARDWARE APPARATUS

Fig. 2 represents the block diagram module of controller which is used for liquid level measurement. Actually, the situation when outputs of strain gauge are crossed the convinced voltage level known as threshold then logic is one i. e. high. As the logic goes to one, the input of switch become turns on. So the PLC programming has rung preparing goes to failure.

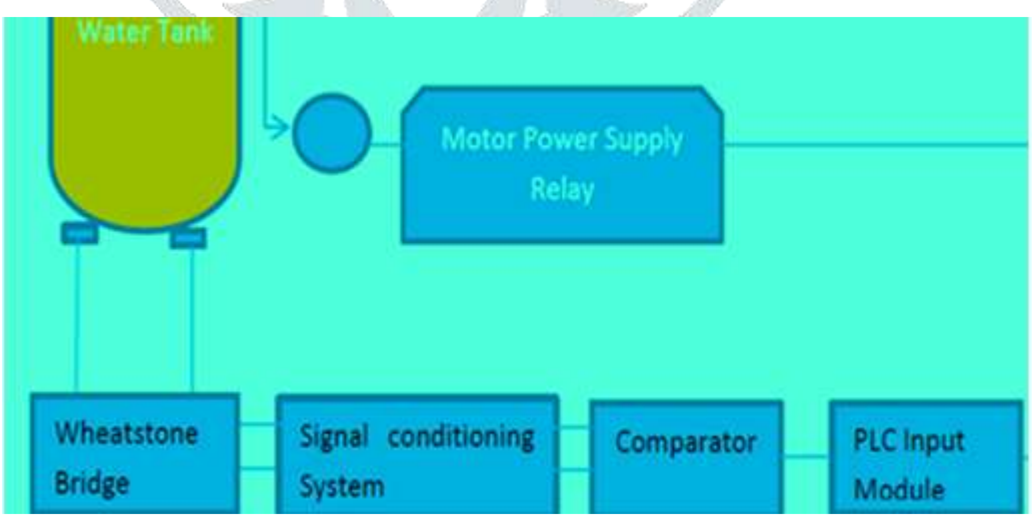

Fig 2 Block diagram of liquid level controller

At this duration the PLC response energies to fails and interrupts the supply which is given to the motor input. The hardware of micrologix PLC shown in Fig. 3.

Fig 3 Hardware of PLC

5. ANALYSIS OF RESULT

The measurement reading of the null detector is shown in Table 1.

TABLE 1
Experimental result of the system

S.	Bridge output, mV	Threshold limit, mV	Valve Status (Solenoid Control)
1	0	450	Open
2	79	450	Open
3	179	450	Open

TABLE 2
Experimental result of the system

S.	Liquid Pressure at bottom P=p*g*h		Change in resistance, mΩ	Time, AM
1	399	h=0.1	49	10.00
2	880	h=0.15	64.9	10.15
3	1299	h = 0.2	85.8	10.30

The pressure of water at the bottom level of H_2O tank is shown in Table 2.

6. Concusion

I n this study we are analyzing a system used PLC and provides longer life and consumes low power and provides the protection from the overflow of water.

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