Review on Paper Automatic filling Machine using advance Cypress Microcontroller

[1]Mr. Sanjay Sudhakar Mahajan, [2]Dr.A.J.Patil, [3]HOD R.R.Karhe,

[1]Research Student, [2]Professor, [3]Incharge H.O.D.
Department of Electronics and Telecommunication Engineering,
S.G.D.C.O.E., Jalgaon

Abstract: **As per the traditional modeling point of view this system was proposed by manual intervention that this system was manual operated. So by recent era moving towards the globalization advancement in automation this system can give a benefit towards the industrial sector. This modeling includes the aurdino based device for time ON/OFF of valve for the mixture of component with a sequential manner with acquiring less time. Hence we can pre conclude due to rush time management system this resin making machine can go further for front step towards automation.**

1. INTRODUCTION

In this project, we are going to make a Resin Machine for Capacitor Insulation. A machine has to be developed and constructed, which should be integrated with valve, controllable using specific electronic device (microcontroller) and custom software. There are three tanks oil tank, powder tank and hardner tank.

The proportion of oil, powder and hardner are in proportion of 100:10:27. The oil is heated by heater up to 60 degree Celsius. The LM35 sensor is used to sense the temperature. The valve is automatically control by giving time limit to each of them. First oil and powder are filling in a tank in proportion of 100:10 and mix with help of motor and resin is formed. In this process motor is automatically control by giving time limit.

This formed Resin is mix with Hardner in proportion and then pass through a helical mixer and Capacitor insulation is formed in a tank. In this project all valves and motor are automatically control by giving time limit in sequential manner. Because less time is required and accuracy get increases. Also system is formed less numbers of man powers is required and hence increases the speed and efficiency of production.

2. LITERATURE SURVEY

2.1 Microcontroller Based Automated Water Level Sensing and Controlling: Design and Implementation Issue

In this paper we introduce the notion of water level monitoring and management within the context of electrical conductivity of the water. More specifically, we investigate the microcontroller based water level sensing and controlling in a wired and wireless environment. Water Level management approach would help in reducing the home power consumption and as well as water overflow. Furthermore, it can indicate the amount of water in the tank that can support Global Water types including cellular dataloggers, satellite data transmission systems for remote water monitoring system. Moreover, cellular phones with relative high computation power and high quality graphical user interface became available recently. From the users perspective it is required to reuse such valuable resource in a mobile application. Finally, we proposed a web and cellular based monitoring service protocol would determine and senses water level globally.

2.2 Development of PLC based controller for bottle filling machine.

The growth in Food industry and Healthcare industry has seen a rapid increase in demands of beverages as well as medicines. Precision while filling these beverage containers is required. Non-precision will not only lead the economic loss in the beverage industry but also a danger to consumer health in healthcare industry. A typical manufacturing facility of this kind will require precision as well as velocity in filling operation, to achieve both manually is tedious task. Also to operate manually in hazardous chemical industries is safety concern to workers. To make automated bottle filling machine to achieve both accuracy and speed in filling, is requirement of the time. This can be achieved by help of PLC programming and PID controller. This paper describes the application of PLC programming and PID controller in the field of bottle filling operation. In this paper PLC is used along with various sensors as input to the system and valves are used as output to the system. This paper describes about logic developed to sense the position of bottle on the conveyor and its condition, that is whether it is filled or not. This will give accuracy of the amount to be filled and will drastically reduce the cycle time to fill one bottle ultimately resulting in any goal of any manufacturing facility that is quantity with quality.

This paper also describes about the parameters like level and flow of a liquid to be controlled. These parameters are to be controlled with the Programmable Logic Controller (PLC) and the whole process is further controlled by SCADA. PID controller is used to minimize the error. A Human Machine Interface (HMI) can be used so the user can change the set values of different parameters as required.

2.3 A Review Paper on PLC Based Automatic Fly Ash Brick Machine

Production of ash brick is an alternative utilization of fly ash. A most important part of the Fly Ash Bricks plant is Pan Mixer and molding machine. This study mainly focused on the Brick Molding Mechanism. . There are so many methods for molding of bricks, but here we have used only hydraulic compression method which is more efficient and reliable method. The pressing machine has three sets of brick moulds which are 120º apart from each other. One set of mould receive the mixture, then it is compressed and finally two bricks are made in one revolution of this machine. This paper is basically based on the saving of unnecessary economic losses and provided safety for plants workers and increases the efficiency of bricks industry. For this we have implemented this mechanism through Programming Logic Controller (PLC).

2.4 Automatic paper vending machine

The usage of paper is inevitable and its demand is increasing steadily particularly in the places such as educational institutions, government offices, etc. At the same time, time is a precious thing that one does not want to waste in any way. In stationary shops it is quite difficult to buy papers during rush time period and the counting of the paper depending on the requirement would cause further time delay and there is a chance for the error in the manual counting of paper. To avoid these problems, this project titled "Automatic Paper Vending Machine" is proposed to deliver the paper to the public by using the sensors and microcontrollers based on the Mechatronics principles. It will be more cheap and economic for the bulk production and it will be very useful for the college and school students. Here it is designed to deliver sheets by inputting the respective coin in the system. It will help us to save more time and manual work will be nullified.

Projected inwards past the turbine axis at a certain distance, giving a positive torque to the shaft, thus helping it to rotate in the direction it is already travelling in.[4]

As the aerofoil moves around the back of the apparatus, the angle of attack changes to the opposite sign, but the generated force is still obliquely in the direction of rotation, because the wings are symmetrical and the rigging angle is zero. The rotor spins at a rate unrelated to the wind speed, and usually many times faster. The energy arising from the torque and speed may be ex-tracted and converted into useful power by using an electrical generator.[5]

3. METHODOLOGY

3.1 Block Diagram of Resin Machine.
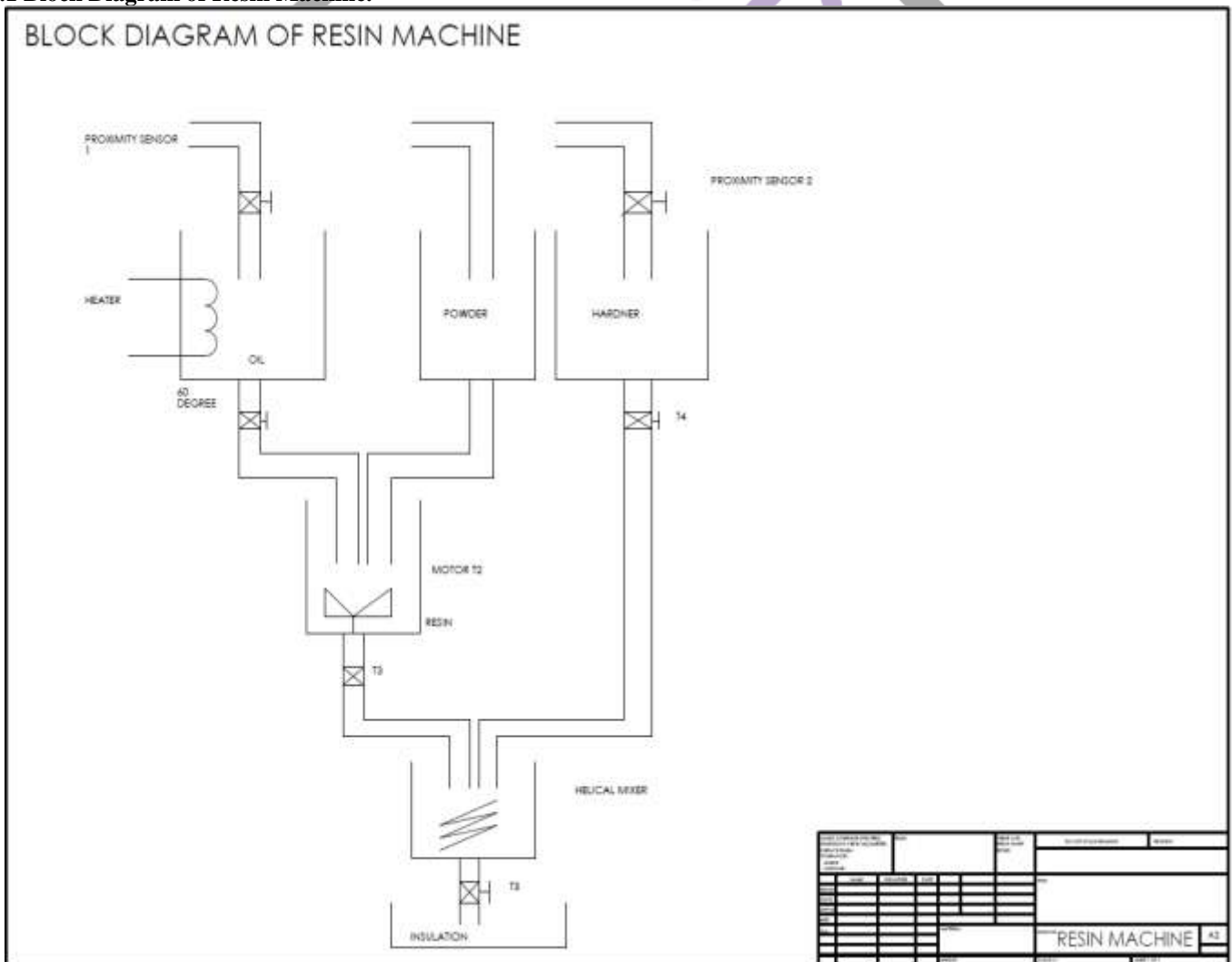
BLOCK DIAGRAM OF RESIN MACHINE

There are three tanks oil tank, powder tank and hardner tank. The proportion of oil, powder and hardner are in proportion of 100:10:27. The oil is heated by heater up to 60 degree Celsius. The LM35 sensor is used to sense the temperature. The valves are automatically control by giving time limit to each of them. Proximity sensor 1 is used to sense the oil. Proximity sensor 2 is used to sense the hardner. First oil and powder are filling in a tank in proportion of 100:10 and mix with help of motor and resin is formed. In this process motor is automatically control by giving time limit. This formed Resin is mix with Hardner in proportion and then pass through a helical mixer and Capacitor insulation is formed in a tank.

ATMEGA 2560 microcontroller is used to operate the machine. LM35, proximity sensor 1. Proximity sensor 2 are connecting with ATMEGA2560. 5V power supply is given to the ATMEGA 2560. Relays are used to operate the valves and motor.

4. COMPONENTS:

4.1 ATMEGA 2560 MODULE:

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 15 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

4.2 SOLENOID VALVE:

A solenoid valve is an electromechanically operated valve. The valve is controlled by an electric current through a solenoid.
Here, in this case a two-port valve is used in which the flow is switched on or off. It basically works as an actuator for the system.

A solenoid valve has two main parts: the solenoid and the valve. The solenoid converts electrical energy into mechanical energy which, in turn, opens or closes the valve mechanically. The signal to open or close the valve is given by the master controller. This type of valve relies on a differential of pressure between input and output as the pressure at the input must always be greater than the pressure at the output for it to work. If the pressure at the output, for any reason, rise above that of the input then the valve would open regardless of the state of the solenoid and pilot valve.

4.3 LCD 16X2

LCD display is an inevitable part in almost all embedded projects and this article is about interfacing 16×2 LCD with PIC microcontroller.16×2 LCD module is a very common type of LCD module that is used in 8051 based embedded projects. It consists of 16 rows and 2 columns of 5×7 or 5×8 LCD dot matrices. The module were are talking about here is type number JHD162A which is a very popular one. It is available in a 16 pin package with back light, contrast adjustment function and each dot matrix has 5×8 dot resolution.LCD pins are VCC, VEE, RS, R/W, E, DB0 to DB7.The steps that has to be done for initializing the LCD display is given below and these steps are common for almost all applications.
- Send 38H to the 8 bit data line for initialization
- Send 0FH for making LCD ON, cursor ON and cursor blinking ON.
- Send 06H for incrementing cursor position.
- Send 01H for clearing the display and return the cursor.Sending data to the LCD.

The steps for sending data to the LCD module are given below. I have already said that the LCD module has pins namely RS, R/W and E. It is the logic state of these pins that make the module to determine whether a given data input is a command or data to be displayed.

4.4 RELAY BOARD

These are optically isolated relay modules having 5 Volt cube Relays. The relays are driven by aOpto-coupler which provides isolation between your Micro-controller, Arduino or Raspberry Pi & the relay thus making this module better that the modules having transistor or ULN2003 IC as drivers.

This is a 4 channel Relay Module with output relay contacts of 10 ampere at 250 volts. You can use it easily with any Micro-controller, Arduino or Single Board Computers (SBC) like Raspberry Pi and Beagle bone. You can even use this module with digital IC's like LM555 of HT12D.

Features of 4 channel 5 volt Relay Board
- Size: 75mm (length) x 55mm (W) x 19.3mm (height);
- Weight: 60g;
- PCB Color: Blue;
- board four weeks with four screw holes, hole diameter 3.1mm, easy to install and fixed;
- Relay selection of quality loose music relays, SPDT. A common terminal, a normally open, one normally closed terminal;
- optocoupler isolation, good anti-jamming;
- Low pull, high release.Energisation status indicator light, release status LED is off;
- VCC for the system power, JD_VCC for the relay power. Default hair 5V relay, plug the jumper cap to;

☐   Relay Maximum output: DC 30V/10A, AC 250V/10A
☐   Wiring: VCC: positive power supply system GND: System power supply negative IN1 – IN4: relay control ports

Applications of 4 channel 5 volt Relay Board

☐   Support all Micro-Controller
☐   Industrial sector
☐   PLC control
☐   Smart home Automation

4.5 ULN 2803 IC

The eight NPN Darlington connected transistors in this family of arrays are ideally suited for interfacing between low logic level digital circuitry (such as TTL, CMOS or PMOS/NMOS) and the higher current/voltage requirements of lamps, relays, printer hammers or other similar loads for a broad range of computer, industrial, and consumer applications. All devices feature open–collector outputs and freewheeling clamp diodes for transient suppression. The ULN2803 is designed to be compatible with standard TTL families while the ULN2804 is optimized for 6 to 15 volt high level CMOS or PMOS.

4.6 PROXIMITY SENSOR

Proximity Sensor is used to detect objects and obstacles in front of sensor. Sensor keeps transmitting modulated infrared light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades.

5. ADVANTAGES AND APPLICATION

5.1 ADVANTAGES
☐   Fully automated system thus reduce the human labour.
☐   Save time
☐   More accuracy

5.2 APPLICATIONS:
☐   Educational experiment.
☐   Industrial used.

CONCLUSION

The proposed resin machine is fully automated and is controlled by using microcontroller. Time slot is provided for each process and after that next process can be perform. All process is done in sequential manner. Thus, by implementation of this model efficiency is increased. Complete system is automatic. The accident cases also reudce.

REFERENCES

[1] S. M. Khaled Reza, Shah Ahsanuzzaman Md. Tariq, S.M. Mohsin Reza 'Microcontroller Based Automated Water Level Sensing and Controlling: Design and Implementation Issue 'Proceedings of the World Congress on Engineering and Computer Science 2010 Vol I WCECS 2010, October 20-22, 2010, San Francisco, USA

[2] Bhupendra Singh1, ArunKumar2 'A Review Paper on PLC Based Automatic Fly Ash Brick Machine 'International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 -0056 Volume: 03 Issue: 01 | Jan-2016 www.irjet.net p-ISSN: 2395-0072 © 2016

[3] Shantanu l. Kulkarni, m. Elango 'DEVELOPMENT OF PLC BASED CONTROLLER FOR BOTTLE FILLING MACHINE' Novateur Publications international journal of innovations in engineering research and technology [ijiert] issn: 2394-3696 volume 3, issue4, apr.-2016

[4] Kamalanathan.P, Villupuram, Tamilnadu, India, Mohamed Aamir. M, Kalaiselvan. P, Associate Professor, Department of Mechanical Engineering, IFET College of Engineering, Villupuram, Tamilnadu, India. 'AUTOMATIC PAPER VENDING MACHINE' International Journal of Science, Engineering and Technology Research (IJSETR), Volume 4, Issue 4, April 2015 634 ISSN: 2278 – 7798 All Rights Reserved © 2015 IJSETR

[5] Arif Ozkan, KerimCetinkaya, 'Process Automation and Mixture Filling System Design', Journal of Engineering Research and Applied Science, Volume 1(2), December 2012, pp 98-106

[6] D. Baladhandabany, S. Gowtham, T. Kowsikkumar, P. Gomathi, 'PLC Based Automatic Liquid Filling System', International Journal of Computer Science and Mobile Computing, Vol. 4, Issue 3, March 2015, pg.684-692