Advance Technique In Automation of Mixturing Unit

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Abstract- *In this era of industrialization, technological revolution is fast shrinking the need of human's to assist machinery. Sorting of the products in the industry is very difficult task and continuous manual sorting creates issues. It is very desirable to create a machine that identifies the object meets certain criteria. In order to hold out the promise of timely delivery of product, high tech automated production is essential. The concept of automation is so versatile that it can bring radical development in almost every field. Keeping view of present requirements, this project proposes a filling management system for industries which is a complete application of automation. The notable thing about this project is its high degree of flexibility. A prototype of mixturing material system, controlled using arduino is proposed. This system provides the provision of mixing as per standard quantity of materials in any proportion. Also it warns the operator in the event of any fault. The controller to control the automatic operation of this machine. Arduino is selected as the controller because it is easier to learn and the compact size makes it easier to attach it with the system.*

Keywords- Arduino Uno (ATmega328), Permanent Magnet DC Motor, Relay Driver IC (ULN2003), Load Cell, Material used for PVC pipe such as Calcium, Color, carbon, titanium, resin, master batch.

I. INTRODUCTION

Nowadays, the competition is so intense that the efficiency of the product is regarded as the key to success. The efficiency of the product includes the speed of the production, lowering material and labor cost, improving quality and decreasing the rejection. Taking all the things under consideration this project is developed which is very useful for industries. Agricultural market offers opportunities that can be transformed into success only by those companies that have technology to take it beyond competition. High degree of flexibility is its prior need. Also industries face many other challenges. The pressure to continually increase production volumes has stressed older systems and has increased maintenance requirements. For manufacturers, this creates two problems: higher costs and increased downtime. Production managers are being challenged to reduce cost, wastage and downtime. New technologies are required that will reduce labour usage, increase energy efficiency and minimize downtime in high-speed production environments. Increasing competitive pressures, ever more stringent legal regulations, rising costs of commodities and energy and consumers whose preferences are subject to rapid change agro companies today are forced to increase their flexibility and operate with maximum efficiency at the same time. The key to this problem is an integrated process approach. After all, if all processes are perfectly coordinated with each other and reliable communications have been established between all parts of the manufacturing plant, it is much easier to address the big challenges. In small industries, the refilling system usually operates in manual mode and even this is true for some other industries also. Literature suggests that Arduino are being used in these industries as it brings a cost effective solution for controlling the process. The system developed in this work is a complete mixing material management system for industries. It provides flexibility with reliability. It also provides an extra advantage of production flexibility and ability to extend or modify an existing plant.

II. PROBLEM STATEMENT

The company who Manufacturing the PVC pipe& pump as per ISI standards. If there is small variation while mixing the material then whole pipe considered as scrap.

Objective:

Develop an Automatic Mixturing material unit with deduction mechanism using controlling equipment (Arduino, sensors).

Automatic mixturing process for different gauges of pipes as per ISI standards

Summary

This topic describes the proposed system developed for mixing material management system for industries. The key to this problem is an integrated process approach. It provides flexibility with reliability. The simplest way to assess the effects of mixtures of material is to add the effects of the individual substances to each other. In general, experiments show that substances do not enhance each other's action. If there is still an enhanced effect, this will usually be small. Therefore, the concept of concentration addition is useful to estimate the adverse effects of mixtures of pesticides. As a

client, the ministry of VROM wanted to map out which new developments in the field of assessing the effects of pesticide mixtures are of importance.

Therefore, the study also describes the methodological improvements that can refine the risk assessment of mixtures. It is now possible to determine the effects of substances when they are used consecutively instead of simultaneously. This concept is relevant for pesticides because these substances are often used in succession. Further, the so-called species sensitivity distributions are now also applicable to mixtures of substances. These species sensitivity distributions describe the variation to which a group of different organisms is sensitive to the effects of substances. On the basis of these distributions, it is determined what concentrations are safe for the environment. For this method, however, a lot of data are required about the adverse effects of substances on organisms, which are usually not available.

III.STUDY AND SOLUTION

Fig1. Shows the block diagram of Advance Technique Used in Mixturing Unit for pipe industry. In this proposed project have four vessel containing four raw materials which are used for manufacturing PVC pipes. The required amount of material as per set value is to be fallen in main container from different vessel is controlled by relay circuitry. The opening & closing of vessel is carried out by using DC motor. As per requirement amount of material is to be set by using Arduino programming. With help of load cell which gives required quantity of material. This process is sequentially performed.

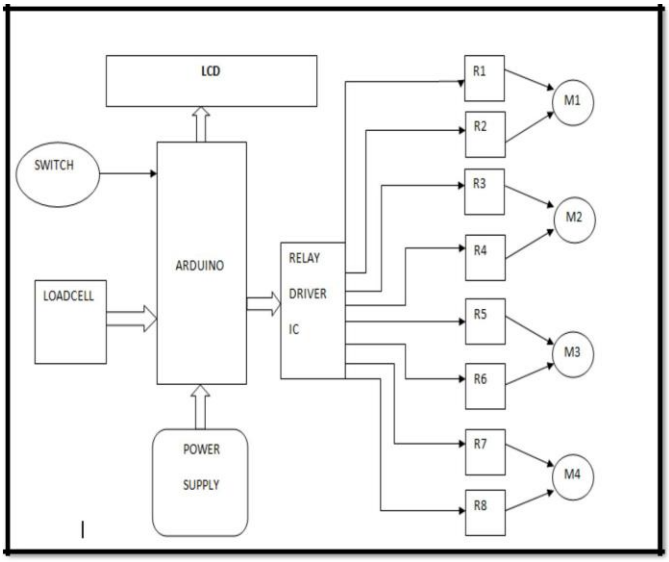

Fig 1. Block & Circuit Diagram of Proposed System

Microcontroller Arduino Uno (ATmega328) is used for motion control and object detection. The microcontroller works on the set of instructions that are preprogrammed and stored in the memory. It then takes the instructions from its program and one by one operates as the instructions and carries the required operations.

In this equipment the LCD which is used is 16X2 types. i.e. 16 characters two rows and two rows. The function of LCD is to display the status of events performed by the respective circuit or to display those resulting parameters which have to be displayed on the screen as per user requirement.

A relay is in electrically operated switch. Sugar cube relay use an electromagnet to mechanically operate a switch, other operating principles are also used such solid state relay. Relays are used where it is necessary to control a circuit by a low-power signal with complete electrical isolation between controller and controlled circuits. In this to rotate motor either in clockwise or in anticlockwise direction that is to control opening and closing of vessel valve by relay. Relay operates at 5V DC supply.

A load cell is a transducer that is used to convert a force into electrical signal. The most common use of this sensor is in weighing machine. Every weighing machine which shows weight has a load cell as sensing element. To sense the number of material is to be filled in container is to be standardized.

Following raw materials are used to manufacture the PVC pipes

Table 1.

Material	**Proportion**
Calcium	10Kg
Color+Carban + titanium	450Kg
Resin	125Kg
Master batch	2800Kg

This table 1. Includes hardware components with their data sheet and specification. Each and every component has its own specification and working principle that data required for completion for the proposed system.

In this proposed system coding is done by using Arduino 1.8.3. & this coding is simulated in Proteus 7

IV. CODING

```
#include<LiquidCrystal.h>
#include<SoftwareSerial.h>
LiquidCrystallcd(12,11,5,4,3,2);
int a=0,b=0,d=0;
int c=0;
char w[15];
int wt1,wt2,wt3,wt4,wt5;
char z=0,chk=0,i=0,ok=0;
int b1=0,b2=0,b3=0,b4=0;
constint m1=6;
constint m2=7;
constint m3=8;
constint m4=9;
constint m5=A0;
constint m6=A1;
constint m7=A2;
constint m8=A3;
constint m9=A4;
void setup()
//put your setup code here, to run once:
pinMode(m1,OUTPUT);
pinMode(m2,OUTPUT);
 pinMode(m3,OUTPUT);
pinMode(m4,OUTPUT);
pinMode(m5,OUTPUT);
pinMode(m6,OUTPUT);
 pinMode(m7,OUTPUT);
digitalWrite(8,1);
digitalWrite(9,0);
pinMode(m8,OUTPUT);
pinMode(m9,OUTPUT);
digitalWrite(m1,LOW);
digitalWrite(m2,LOW);
digitalWrite(m3,LOW);
digitalWrite(m4,LOW);
digitalWrite(m5,LOW);
digitalWrite(m6,LOW);
digitalWrite(m7,LOW);
digitalWrite(m8,LOW);
digitalWrite(m9,LOW);
lcd.begin(16,2);
Serial.begin(2400);
Serial.print("z");
lcd.setCursor(0,0);
lcd.print("Automation In");

lcd.setCursor(0,1);
lcd.print("Mixturing Unit");
delay(1000);
lcd.clear();
}
void loop()
{
/*
put your main code here, to run repeatedly:
 a = digitalRead(7);
b = digitalRead(6);
d=Serial.read();
Serial.write(d);
if (a==1 && c==0)
{
c=1;
digitalWrite(8,1);
digitalWrite(9,0);
}
*/
}
voidserialEvent()
{
while (Serial.available())
{
charinChar = Serial.read();
if((inChar=='g') & (chk==0))
{
chk=1;
z=0;
}
else if((inChar=='K') & (chk==1))
{
chk=0;
lcd.clear();
lcd.setCursor(0,0);
for(i=7;i<z;i++)
{
lcd.write(w[i]);
}
wt1=(w[7]-0x30)*1000;
wt2=(w[9]-0x30)*100;
wt3=(w[10]-0x30)*10;
 wt4=(w[11]-0x30)*1;
 wt5=wt1+wt2+wt3+wt4;
lcd.setCursor(8,0);
lcd.print(wt5);
//w[7]=0x30;
//w[9]=0x30;
//w[10]=0x30;
//w[11]=0x30;
if(a==0)
{
if(b1==0)
{
lcd.setCursor(0,1);
```

```
lcd.write("mixture 1");
Serial.write('z');
digitalWrite(m1,HIGH);
digitalWrite(m2,LOW);
delay(50);
digitalWrite(m1,LOW);

digitalWrite(m2,LOW);
b1=1;
}
else if ((wt5>=250) & (b1==1))
{
lcd.write(' ');
a=1;
digitalWrite(m1,LOW);
digitalWrite(m2,HIGH);
delay(1500);
digitalWrite(m1,LOW);
digitalWrite(m2,LOW);
delay(2000);
}
}
else if(a==1)
{
if(b2==0)
{
lcd.setCursor(0,1);
lcd.write("mixture 2");
delay(2000);
digitalWrite(m3,HIGH);
digitalWrite(m4,LOW); delay (50);
digitalWrite(m3,LOW);
 digitalWrite(m4,LOW); b2=1;
}
else if ((wt5>=560) & (b2==1))
{
lcd.write(' '); a=2;
 digitalWrite(m3,LOW);
digitalWrite(m4,HIGH);
delay(1500);
 digitalWrite(m3,LOW);
digitalWrite(m4,LOW);
 delay(2000);
}
}
else if(a==2)
{
if (b3==0)
{
lcd.setCursor(0,1);
lcd.write("mixture 3");
digitalWrite(m5,HIGH);
digitalWrite(m6,LOW);
digitalWrite(m9,HIGH);
 delay(50);
digitalWrite(m5,LOW);
digitalWrite(m6,LOW);
b3=1;
}
else if ((wt5>=700) & (b3==1))
{
lcd.write(' ');
a=3;
digitalWrite(m9,LOW);
digitalWrite(m5,LOW);
digitalWrite(m6,HIGH);
delay(1000);
digitalWrite(m5,LOW);
digitalWrite(m6,LOW);
delay(2000);
}
}
else if(a==3)
{
if(b4==0)
{
lcd.setCursor(0,1);
lcd.write("mixture 4");
digitalWrite(m7,HIGH);
digitalWrite(m8,LOW);
delay(50);
digitalWrite(m7,LOW);
digitalWrite(m8,LOW);
b4=1;
}
else if ((wt5>=9 00) & (b4==1))

{ lcd.write(' '); a=4;
 digitalWrite(m7,LOW);
digitalWrite(m8,HIGH);
delay(1500);
digitalWrite(m7,LOW);
digitalWrite(m8,LOW);
delay(2000);
}
}
}
else if((chk==1) & (inChar!='K'))
{
w[z]=inChar;
z++;
}
}
}
```

//delay(100);

V. RESULT

Figure 2. Represent the initial condition of proposed project. At the movement of starting project title is displayed on the LCD.

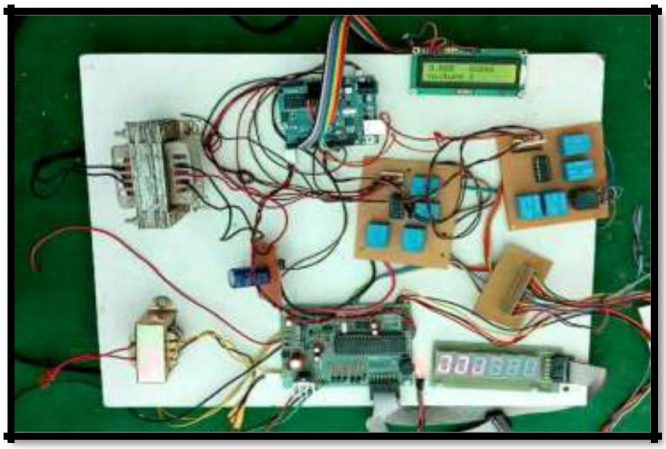

Figure.2: Initial Condition of Proposed Project

Figure 3. Indicates the Opening of vessel valve. After initializing valve of vessel open & material is fall in main container.

Figure.3: Opening of Vessel Valve

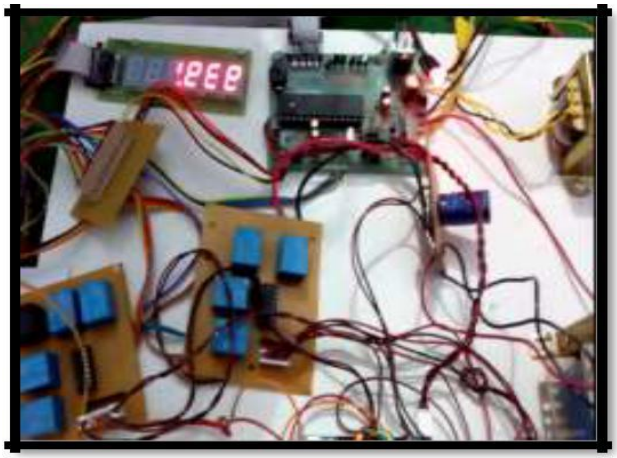

Figure.4: Displaying Material Quantity

Figure 4. Illustrated weight of material on seven segment display. When material fall into main container it measures with the help of load cell & it gives signal to load cell amplifier which amplifies signal to display accurate value on seven segment display.

The final result of the project is quite satisfactory. The relay will work well and it able to detect nicely and the sequence of operation will also done in proper direction. DC motors work well in cases of opening and closing of valve. The LCD display also shown to display correct amount of material with its desired value.

Table 2. Results

Material	Amount (gram)	Delay (Second)
PVC	125	50
Master Batch	280	1500
Calcium	100	50
Resin	450	1500
	Total Amount=955	

VI. SUMMARY

The project includes that overall system performs well as programming and fills the container with four materials in appropriate range. The movement of the opening and closing of valve will smooth without any noise.

VII. APPLICATION

The proposed system is useful were accuracy matters most. This system is useful for any kind of material mixing while manufacturing products. Following are the applications

were this proposed system is very useful for mixing the material.

- Drugs manufacture industry
- Agro industry
- Chemical industry
- Food industry
- Paint industry
- Cable industry

VIII. BUSINESS PLAN& COMMERCIAL ASPECT

Business Plan:

Executive Summary:-

India is a developing country. Our country is investing lots of money on the industry to develop the industry level product and maintain the standardness of production .for the purpose the machine it deigned such way that it help to increase the production at less time . The main motto of this project to increase the production of industry and maintain the standard of product and with less wastage of material and in very less cost compared to existing machine. Our motive behind this creation was to reduce the effort of users immensely and also save them from undesired consequences that might arise due to improper way of using the material. The machine which is designed and fabricated is at less cost compared to existing system and will surely meet the requirements of customers.

Market Strategy:

Channels:
Direct: Directly selling to the customers by means of industry etc.
Indirect: Selling product through E-Commerce.
Future Plans: To manufacture the product with help of new technique and services.

Keys to Success:

After Delivery Services:
When our product is out and is being used by the consumer, in case of any performance issues then we shall provide them the necessary service and try to resolve the issue as soon as possible.

Assembly Technology:

To ensure the uniformity in spreading and light weight of the product, it is essential to utilize the latest and most efficient production machines. Meanwhile we will also be aware of recent trends and technological advancements which will ensure that we gain competitive advantage in the market.

Networking:

To grow and flourish in the market it is necessary that we maintain and develop good contacts in the market. Good and effective network will ensure that we get needy customers and improve our sales.

Capabilities and Competency:

A) Technological Competency:

The proposed model is technologically competent with others by providing new features with increased productivity and better technical benefits to meet the market requirement.

Business Management / Networking Skills:

Good business management qualities and planning skills which helps to initiate actions required to achieve the standardness, organizing techniques of co-ordination, arrangement, controlling etc. The capabilities of staffing and recruiting staffs through human resources and other qualities like leadership, communication, flexibility and motivation.

Entrepreneur Competency Enterprise:

An entrepreneur is innovative enough to bring the change in products and service, innovative enough to recognize the commercial value in the innovation, extract an economic advantage from it and ready to face any risk while providing product / services and diversify the risk in various streams.

IX. OBJECTIVES

The business strategy will around the need to provide uniformity in spreading and light weight of product to the farmers that need it and will also fulfil their requirements. This shall be taken into account by adequate training and recruitment of dedicated team, striving to meet the need of farmers. We intend to attain following objectives:

Continuously provide effective and good quality products in time and in budget.
Satisfy the customer needs all the time.
Ensure feasible and economical use of resources.
Minimize the inventory stock.

Contribute to our society and environment.

X. MISSION

We are committed towards the production and delivery of effective and efficient product to the consumer. Internally we will develop and maintain a good healthy environment within the workplace, where employees are encouraged to do effective work and respect the customer needs. Will try to seek fair and deserving profit, enough to keep the company moving and be able to face the challenges of these ever increasing needs of the market.

XI. SUMMARY

The "Advance Automation in Mixturing unit" would be a successful business as it stands true on its promises and purely upon its vision with dedication. It will meet the customers‟ expectations by providing reliable and satisfactory expectation of the customer.

XII. CONCLUSION

Nowadays in highly competitive industrial manufacturing, the management of the integrity of supply of a product from raw material to finished product through quality manufacturing is of very much importance. For the product bearing high quality and accuracy is mandatory. So this project of automatic mixturing unit is an excellent one because of its working principle and wide implementation. By applying the idea of this project an industry can easily get the required product with as per requirement. Though it has some limitations, but by having done some modification the proposed system can be implemented in wide range of application.

Future Scope:

This system can be utilized not only for pipe industries but also for other manufacturing industries such as Medicine Industries, Chemical Industries, Food Industries, Agricultural Industries, Civil Constructions Work, etc. which deal with mixing of different materials.

This project can be handle technical person as well as non-technical person also.

The value of material can be change as per requirement.

XIII. ACKNOWLEDGEMENT

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