

DESIGN OF DIGITAL SOLUTION TO CONTROL VARIOUS PARAMETERS OF MACHINE THROUGH IOT

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ABSTRACT:

The power press is an important machine tool which is used to change the shape of metal. In ancient times metal was shaped manually using hand hammers. Later on big hammers were used to press large quantities of metal at a time, or to press a thick metal work piece. A helper was specially required to swing the sledge hammer while smith positioned the work piece. Then after steam power and wind mills were utilized to operate the large steam hammers. Later on due to electrification, most of the power press now use electrical power or hydraulic power to obtain the required pressure. At the same time various types of dies were also discovered for use within the power press. Moreover advanced method and high accurate machines were also invented. Today the power presses are categorized based on the mechanisms either mechanical press or hydraulic press.

Keywords: Cost reduction, productivity improvement, man power reduction etc.

1. INTRODUCTION:

Hydraulic press is an instrument to deliver compressive power by methods for liquid. It relies on Pascal's rule that the weight all through an encased substance is consistent. By methods for hydraulic powered framework bigger powers can be delivered interestingly with mechanical and electrical frameworks. Such powers can be utilized for the press work application, for example, blanking, punching, puncturing, authoring, cutting and so on. Weight driven press is a gadget to make compressive power by strategies for fluid. It depends on Pascal's standard that the weight all through an encased component is enduring. By techniques for hydraulic fueled structure greater forces can be made curiously with mechanical and electrical systems.

MACHINE IDENTIFICATION:

Machine Name	Power Press
M/c Number	06
Tonnage	160 T
Make	ISGEC
Type	C
Shunt Height	400 MM
Stroke	200 MM
Motor HP	15 HP
RPM	2400

Table.1. Details of the power press and raw material

Press work is a method of mass production involving the cold working of metals, usually in the form of thin sheet or strip. Press working is one of the extensively employed methods of fabricating parts of intricate shapes with thin walls. Press working processes make use of large forces by press tools for a short time interval which results in cutting or shaping the sheet metal, since, press working does not involve heating of the parts, close tolerance and high surface finish can be obtained on the part. Since press can produce components at fairly fast rates, the unit cost of labor for operating the press is fairly low.

Press working powers are set up, guided and controlled in a machine alluded to as press. Consequently an endeavor has been made to atomize the procedure of press work utilizing Hydraulic instrument in press machine. The information sources and yields of the control framework including Hydraulic system exclusively mechanical, for example, pivoting shaft or responding plunger. The prime compensation of actualizing this framework is the development of the mechanical gadgets can be worked by methods for Hydraulic parts, for example, actuators to start the development which could be as switch to apply physically or by methods for changes to work naturally. Moreover, bearing control valves have been actualized to control the heading of cylinder developments and direct the equivalent.

2. LITERATURE SURVEY:**2.1.1 What is Cost and Cost Reduction?**

“An amount, that has to be paid or given up in order to get something. In business, cost is usually a monetary valuation of effort, material, resources, time and utilities consumed, risk incurred, and opportunities for gone in production and delivery of a goods or service”.[1]

“Cost Reduction is to be understood as the achievement of real and permanent reduction in the unit cost of goods manufacture or services rendered without impairing their suitability for the use intended”.[1]

There are some techniques/concepts is being studied to benefitting different areas of the organizations, also Identify the process which can reduce their cost and improve working environment.

2.1.2 What is TPM?

In 1971, Nippon Denso Co., Ltd. first introduced and successfully implemented TPM in Japan. They won the Japan Institute of Plant Maintenance (JIPM) PM Excellent Plant Award for their activities. This was the beginning of TPM in Japan. Since then, TPM has spread progressively throughout the world and established itself as a renowned cultural improvement programme First example of TPM used in Europe to deliver world class performance was by Volvo in Ghent, Belgium, who won the PM prize for their work in the paint shop. This was quickly followed in the early 1990s by other European automotive companies trying to close the productivity and quality gap to their Japanese competitors.[7] Unilever, Wrigley, Tetra Pak, Heineken and Arcelor Mittal.

3. TOOLS USED:

1. Arduino board(UNO)
2. Ultrasonic Sensor
3. Relay
4. Power supply

4. BLOCK DIAGRAM OF SYSTEM:

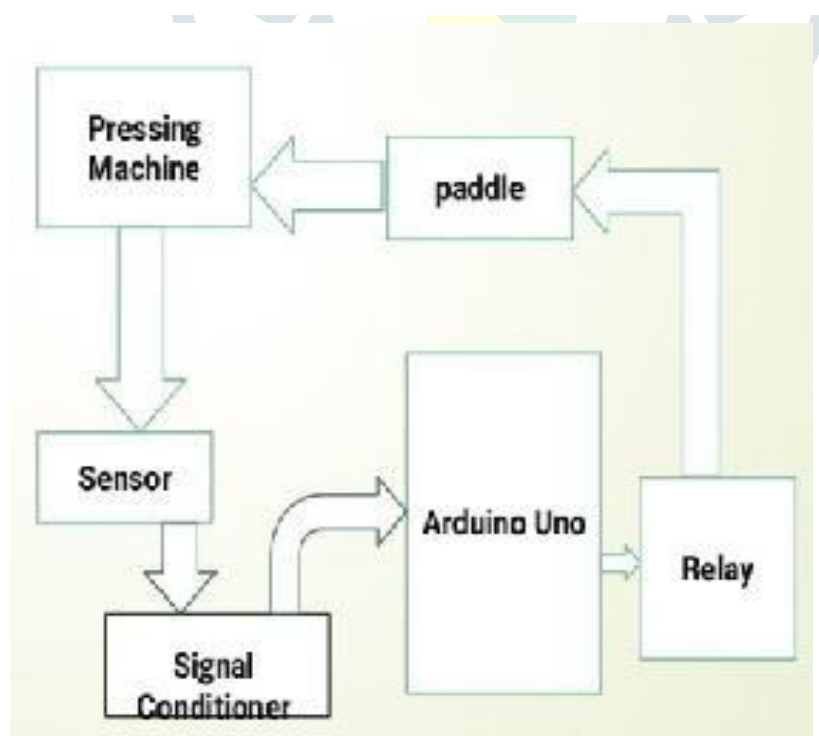


Fig 1: Block diagram of system

4.1 Description of proposed system:

Pressing Machine is used for punching operation of sheet metal. Stoppages occurs due to different reasons which result in reduction of productivity. Also there are different types of wastages involved such as waste of manpower, time and material. These problems need to be minimized to increase productivity.

4.2 Arduino UNO:

Features:

- Operating Voltage 0-5v
- 14 I/O Digital pins
- Operating Frequency 16MHz.
- SRAM 2KB, EEPROM 1KB
- DC Current per I/O pin 20mA

The Arduino Uno is a microcontroller board dependent on the ATmega328 (datasheet). It has 14 advanced information/yield pins (of which 6 can be utilized as PWM yields), 6 simple sources of info, a 16 MHz earthenware resonator, a USB association, a power jack, an ICSP header, and a reset catch. It contains everything expected to help the microcontroller; essentially associate it to a PC with a USB link or power it with an AC-to-DC connector or battery to begin. The Uno varies from every former board in that it doesn't utilize the FTDI USB-to-sequential driver chip. Rather, it includes the Atmega16U2 (Atmega8U2 up to rendition R2) modified as a USB-to-sequential converter. Amendment 2 of the Uno board has a resistor destroying the 8U2 HWB line to ground, making it simpler to put into DFU mode. Amendment 3 of the board has the accompanying new highlights:

- 1.0 pinout: included SDA and SCL pins that are close to the AREF stick and two other new sticks set close to the RESET stick, the IOREF that enable the shields to adjust to the voltage gave from the board. In future, shields will be good both with the board that utilization the AVR, which work with 5V and with the Arduino Due that work with 3.3V. The second one is a not associated stick, that is saved for future purposes. more grounded RESET circuit. Atmega 16U2 supplant the 8U2.
- "Uno" signifies one in Italian and is named to check the up and coming arrival of Arduino 1.0. The Uno and form 1.0 will be the reference renditions of Arduino, pushing ahead. The Uno is the most

recent in a progression of USB Arduino sheets, and the reference model for the Arduino stage; for a correlation with past forms, see the list of Arduino sheets.

Summary:

- Microcontroller ATmega328 Operating Voltage 5V Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V Digital I/O Pins 14 (of which 6 provide PWM output) Analog Input
- Pins 6 DC Current per I/O Pin 40 mA DC Current for 3.3V Pin 50 mA Flash Memory 32 KB

4.3 Ultrasonic sensor:

Features:

- Supply Voltage 5V
- Global Current Consumption 15Ma
- Ultrasonic Frequency 40k Hz
- Maximal Range 3 cm
- Resolution 1 cm
- Trigger Pulse Width 10us
- Outline Dimension 43x20x15

Specifications :

- Model: HC-SR04
- Working Voltage: 5V DC
- Working Current: 15mA
- Static Current: Less than 2mA



Photonic detector response time and sensitivity can be very high, but generally it is necessary to cool down to cut the thermal noise. The materials are semi-circumscribed with narrow band distance. Event IR Photon can cause electronic stimulation. In a photorectional detector, the resistance of the detector component is monitored. Photovoltaic detector has PN junction which shows photoelectric flow on light.

4.4 Signal conditioner:

In gadgets, signal molding means controlling a simple sign so that it meets the necessities of the following stage for further handling. Most regular use is in simple to-computerized converters.

In control designing applications, it isn't unexpected to have a detecting stage (which comprises of a sensor), a sign molding stage (where for the most part enhancement of the sign is done) and a preparing stage (typically completed by an ADC and a small scale controller).

5. RESULTS:

Production Rate Analysis:

Sr. No.	Production before completing project (per hour)	Production after completing project (per hour)
1	274	437
2	321	492

Table5.1 Production Rate Analysis

Quality Analysis:

Sr. No	1	2
Rejected piece (before) (per 1000 piece)	116	125
Rejected piece (after) (per 1000 piece)	80	76

Table5.2 Quality Analysis

BENEFITS OF THE PROJECT:

- Increase in productivity
- Increase in quality
- Reduction of manpower
- Reduction in wastage of material
- Reduction in wastage of electricity

- Reduction in cost of final product
- Increase in profit

6. CONCLUSION:

From this project we learned about the utilization of IoT gadgets and furthermore about Wi-Fi Module . We went over various sensors for parameter estimations like temperature, rpm, and fluid dimension. In next stage we will focus on interfacing of these sensors with Arduino Uno and get this information on specialized gadgets which is point of our venture.

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