



## Labour Safety and Protection System Using Magnetic Handgloves

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### ABSTRACT

This system is specially designed for the benefit of the workers. The cutter machine is very risky work as the workers always do their work near the high speed motors. By implement of this protection the worker can work securely under the working days as well as maintenance day. The power loss also can be reduced. Under the normal operating condition, the worker works on the machines. If any of the worker close very near to the machines and conveyors than the deactivated sensor get activated and stops rotation of motor and a the alarm circuit get activated to inform the other workers. And there is also a provision of activated sensor which is provided for activating machine again. The activated sensor can used for starting of if the machines are in deactivated mode. For stopping and avoiding the accidents situation this system is designed. The wireless circuit is the need of the time. But the more advancement in the technology the risk also goes on increasing for the safety and security purpose the circuit must be made safer so that the information or the property could be saved. This plays a very important role in protection of workers in the industries.

**Keywords :** Transformers, IR sensors, DC motor, activated and deactivated sensor.

### I. INTRODUCTION

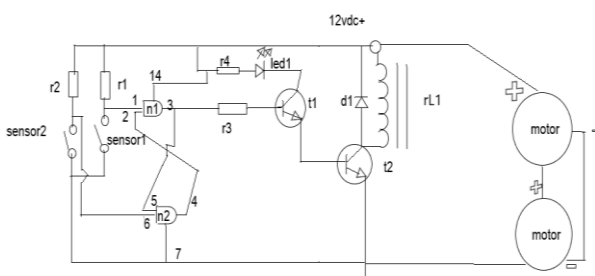
Due to rapid industrialization, industrial workers are exposed to several types of hazards and accidents. Every year lakhs of workers are injured due to mechanical, chemical, electrical and radiation hazards and it leads to partial or total disablement. So in recent years, greater attention is given to health and safety due to pressure from government, trade unions, labour laws and awareness of employers. The efficiency of workers depends to a great extends on the environment in which the work. Work environment consists of all the factors, which act and react on the body and mind of an employee. The primary aim is to create an environment, which ensures the greatest ease of work and removes all causes of worries. Occupational health and safety is a

discipline with a broad scope involving many specialized fields.

The real-time monitoring system is useful for the primary safety measures. The recent advancements in wireless sensor network leads to advancements in wireless communications. The various sensors at the location sense the environment and provide the recent activities or condition of the underground coalmines [1]. 'Electrical safety in the workplace' refer to electrical safety for all workers and general safety for electrical workers. 'Falls, slips, and trips' caused between 28% and 33% of the injuries from 2011 to 2016 and 'Contact with object or equipment' was responsible for 25% to 34% of nonfatal electrician injuries. This paper gives the information that electricians are killed by exposure to electricity,

falls, transportation accidents, contact with objects or equipment, and violence and to reduce rates of such deaths higher numbers of electrician fatalities in recent years emphasize safety in all manner of works [2]. Most of the common magnetic sensing methods have been described and the underlying physical principles governing their operation have been highlighted. A varied set of applications that exploit specific characteristics of these sensors was also described. The future trends in magnetic sensors should be discussed from these same two perspectives—physics and applications [3]. The function of pickup unit is distinguishing the electricity system whether ready has breakdown, when the electricity system operate normally, this unit does not start, causes the protection not to work; when the electricity system breakdown, it causes the protection work immediately. The phase abrupt current and the phase-phase abrupt current's range of variation wider than that ordinary load's about 0.6 time [4]. Coal mine accidents will generally be divided into class 8 of gas, water disaster, roof, fire, transportation, electrical, blasting, and other incidents based on cause of the accident. In this paper, cluster analysis is used to discuss the number of coal mine accidents, the type of accident and casualties in areas of 25 provinces in recent years in order to find the provinces between the coal mine accident types of similarity [5].

## II. METHODOLOGY



**Fig 1.** Wireless Magnetic Field Circuit for Hand Glows with Motors and Cutter

### 2.1 Bridge Rectifier

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with single component bridges where the diode bridge is wired internally. In actuality, free electrons in a conductor nearly always flow from the negative to the positive pole. In the vast majority of applications, however, the actual direction of current flow is irrelevant. The 12v Ac supply is converted into the 12DC by this rectifier. It mainly consist of four diodes.

### 2.2 Filter

The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode ray and similar electron tubes, which require very little load current from the supply. The capacitor filter is also used where the power-supply ripple frequency is not critical; this frequency can be relatively high. The capacitor (C1) shown in figure 4-15 is a simple filter connected across the output of the rectifier in parallel with the load. The capacitor is act as filter for the each circuit. Due to use of this capacitor the ac components blocked and dc components are bypassed.

### 2.3 Reed Switch

A reed switch is an electromagnetic switch used to control the flow of electricity in a circuit. They are made from two or more ferrous reeds encased within a small glass tube-like envelope, which become magnetized and move together or separate when a magnetic field is moved towards the switch. The switch effectively works like a gate, or a bridge, in an electric circuit so when the two reeds are in contact,

electricity can flow around the circuit operating a device. Unlike mechanical switches they do not require something or someone to physically flick them on or off, they are controlled completely by invisible magnetic fields. Two types of reed switch are used for activation and deactivation of machines under fault and normal condition.

### *2.3 DC Brushed Motor*

A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable rotation. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. The rotation of the motor is reduced due to use of gear mechanism and the torque is also increased.

### *2.4 Transmitter and Receiver*

Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations. Hence, they are called IR LED's. Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye. There are different types of infrared transmitters depending on their wavelengths, output power and response time. A simple infrared transmitter can be constructed using an infrared LED, a current limiting resistor and a power supply

Infrared receivers are also called as infrared sensors as they detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation. Different types of IR receivers exist based on the wavelength, voltage, package, etc. When used in an infrared transmitter – receiver combination, the wavelength

of the receiver should match with that of the transmitter.

### **III. ACTUAL WORK**

The power supply will be step down from 230volt ac to 9 volt dc and the on the dc source the receiver circuit will be attached to the cutter mechanism or say roller. The motor will be connected to the receiver circuit. Many times it happens while working the chances of getting an accident can happen so for avoiding whenever the workers hand or the body moves really very close in contact to the machine there might be chances of damages to the body parts so for protection this circuit is used. If the person comes in close contact of the sensor frequency really very close the frequency based circuit automatically will stop the machine and the machine, also will be stopped automatically only when the workers hand that means the person moves away from the receiver circuit the machine will start automatically only when the workers move on another sensor by first carefully seeing that the workers who was fall on the machine or fall near the machine has safely move away from the machine. And also the invisible rays circuit will detect the workers movement in the danger zone will alert the workers or the staff by producing the sound or siren when the invisible rays is interrupted by the workers body or hand near the danger zone. And the siren will be automatically off when the workers body has moved out of danger zone. So this circuit is helpful in all terms. This is a wireless circuits. Working area will be less than 1 inch.

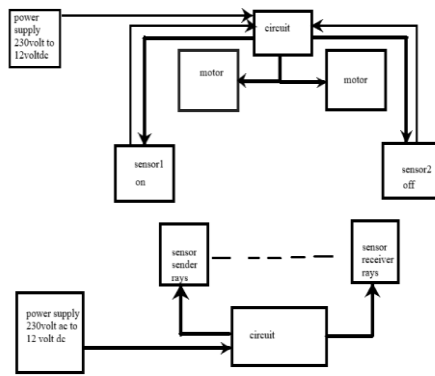


Fig 2. Block Diagram

**IV. PRACTICAL RESULTS**

The system get started by using the magnet and the reed switch. And when the worker who are working on the machine get protected when the worker hand slips. The alarm is also sounds the noise to alert other workers. The sensor deactivate motor when worker is near to the motor.

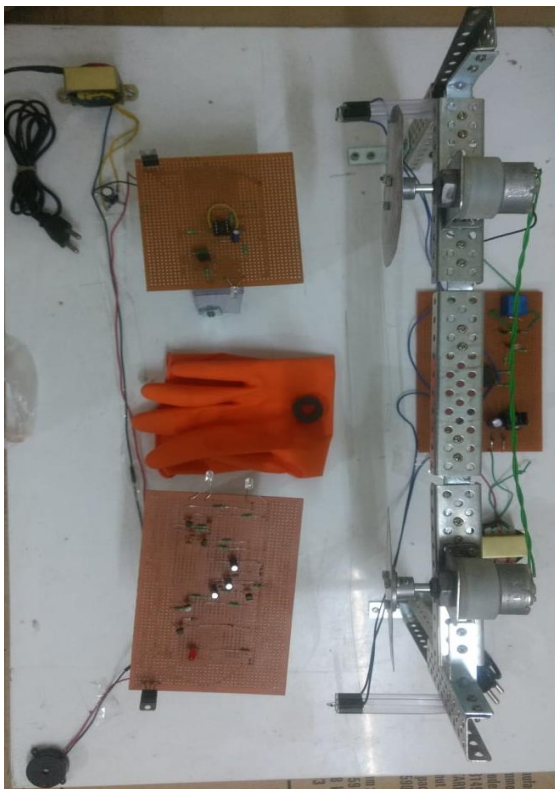


Fig. 3 Working Model

**V. APPLIANCES**

1. This system is specially designed for the benefit of the workers.
2. For stopping and avoiding the accidents situation this system is designed.
3. The protection and the safety of the workers these two norms are the most preferred norms in todays smooth and healthy working environment of the industry.

**VI. ADVANTAGES**

1. Wireless circuits.
2. Working on standard frequency and it is also an accident avoiding system.
3. The workers safety system can be made when they are working on the machine for high-speed cutter or motors.
4. Working on dc motor and gear system is also installed for the conveyor machine so that in case of switching off the cutter machine the blades will be stopped in fast moments.

**VII. CONCLUSION**

This system is use to provide a continuous power supply connected to the load from any of the four different sources i.e. solar, wind, mains and generator in automated mode in the absence of any source. The whole system is based on microcontroller Atmega16 which has low cost and efficient system. The particular components which has used give better maintenance and long period to the system.

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