IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

ACCIDENTS AND DISASTER MANAGEMENT IN FIREWORK INDUSTRIES

RadeepKrishna RadhakrishnaNair P.B.V.N.Sumanth B.Manikanta C.Srujan Kumar

Kalasalingam Academy of Research and Education, Krishnankoil, Srivilliputhur, Tamil Nadu

ABSTRACT: In Virudhunagar District, especially in Sivakasi, the fireworks industry is thriving. However, in this sector, workers are not provided with sufficient safety measures to ensure their safety when working. Employees working in the fireworks industry face a significant risk to their safety and well-being. There have been many health problems as a result of poor air quality. The employees' wellbeing is paramount in the fireworks industry. Officials from the state and federal governments can assist in the implementation of a safety mechanism in fireworks units in Sivakasi to ensure that the industry is free of mishaps. As a result, the study's primary goal is to discover safety mechanisms in the fireworks industry.

The safety instrument should be very important, according to the factories act, because the employees' safety is very important. A lot of fire disasters are occurring in the fireworks industry, so now is the time to define the safety materials and the employees' well-being. Since the survey was conducted in Vijayarangapuram, which is near Sivakasi. The overall demographic was 250 hires, and the researcher took 30 samples from the population as a result of this. This research was predominantly driven by the needs and well-being of the employees. More safety measures, such as gloves and face masks, are required, according to the majority of people.

Keywords : Fireworks industry, IoT ,Node MCU

I. Introduction

The term "safeguarding" refers to the absence of risk, injury, or harm as well as personal security. Employee protection is the most critical factor, according to the Factory Act. Acting with explosives, dust, and working without safety materials is not safe for workers, according to the act. Employees would work peacefully in the workplace if the factory provides them with protection. It would also have an effect on the employees' health and well-being. Many health problems will arise as a result of the safety issues with fireworks, and it will also have an effect on their livelihood. The study's main goal is to learn about the protective measures that workers in the fireworks industry take.

Industrial engineering is a branch of engineering that deals with the design of productive work environments, machinery, and industrial layouts. Improper fireworks handling can result in a variety of serious injuries and long-term effects, including eye damage and burns. It's important to take the time to learn how to stay safe and productive while accompanied by fireworks displays. The goal of this study is to learn more about employee safety in the fireworks industry. The term "well-being" refers to a person's desire to appreciate at ease in their surroundings. Well-being is a result of safety. The experience of fitness, pleasure, and success is referred to as well-being.

II. Literature Survey

The objective of this research is to look into the industrial safety and well-being of firework workers in Sivakasi. There have already been a lot of studies undertaken for the thesis. In his article titled "Fireworks unit blast kills Two near Sivakasi," Sreenivasa Ragahavan (2011) reported that two men were killed and four others were seriously injured when a chemical mixture exploded in a fireworks unit near Sivakasi in South Tamil Nadu. When the factory foreman went into the storage room where the chemicals were stored and opened the sacks to disperse them to the workers who were assembling the fireworks, an accident occurred.

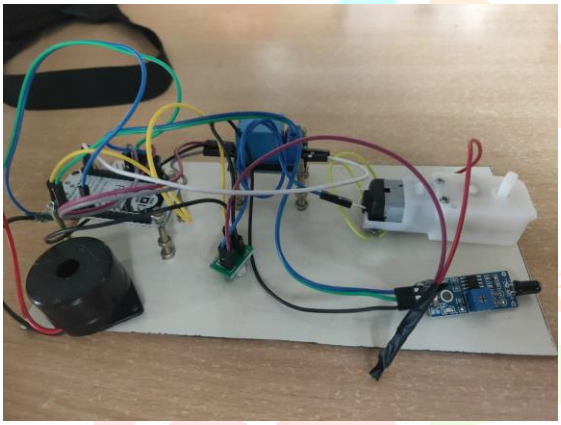
As per Sayeedul Islam et al., in their article "Analyzing Vulnerability of a Community to Fire Hazard: A Case Study of Ward 72," compiled on April 27, 2011, urban fire incidents have a high likelihood of occurring, particularly during the dry season. Although the Fire Service and Civil Defense (FSCD) has fire danger information, no further mentionable vulnerability or risk assessment has been conducted for this hazard. As a precaution, a fire hazard prone area that has not been assessed for this hazard could catch fire, resulting in numerous human deaths and financial

losses. It would have a negative impact on the country's economy.

Sekar (2010) found that the involvement of unregulated units located in residential areas endangering the possibility of explosion accidents is also cautioned in his study "Planning estate for fireworks industries in Sivakasi." As a result of the industrial estate planning, the damages to buildings caused by accidental fires during the manufacture of fireworks and matchwork goods are reduced.

III. Proposed Work

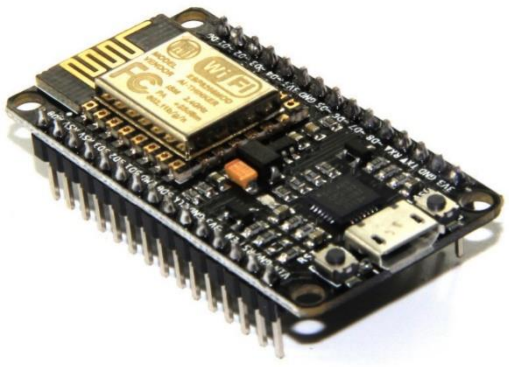
Firefighting, fire monitoring, and safety management systems are all relevant applications of IOT technology. In order to improve IoT-based fire protection in the firecrackers industry, various sensors for monitoring environmental parameters are placed. All of the sensor nodes are connected to the Node MCU microcontroller, and if any of them detects abnormalities in environmental parameters, a fire alert is issued. Once the fire is started, water is sprayed over the area, and the nodeMCU microcontroller sends a virtual SMS to the authorised person.



IV. Methodology

In the fireworks industry, unsafe working conditions and improper handling of flammable raw materials continue to endanger lives. 11 employees were burned at a fireworks factory in Tamil Nadu's Virudhunagar district last week. According to public records, at least 239 people have died and over 265 have been injured in 142 fireworks-related incidents over the last decade. Such tragedies have not been limited to Sivakasi, the world's fireworks city, where the majority of such units are based.Illegal cracker units operating in a few other areas of the state have also resulted in the deaths of a great amount of people. Manufacturing of firecrackers in unauthorised portable units, rough handling of chemicals by undertrained and unskilled staff, splashes or overloading of chemicals during the filling process, and operating outside permissible areas have all been reported as major causes of previous accidents in and around Sivakasi.

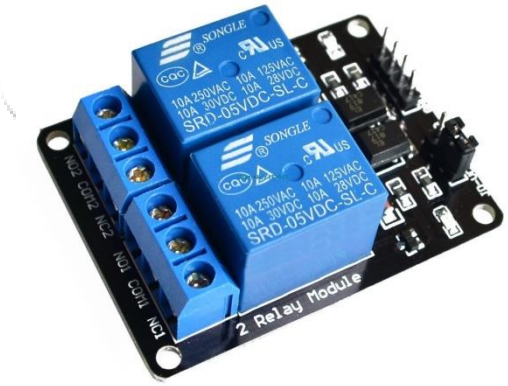
4.1 NODE MCU MICROCONTROLLER



MCU stands for microcomputer and is made up of an integrated circuit chip made of Metal oxide Semiconductor (MOS). It is mainly composed of a microprocessor and peripherals for input and output. It's commonly used in embedded software and other general-purpose software. Microcontrollers can be embedded into any automation and control system. It can be infinitely customizable and sized to fit the circuit.

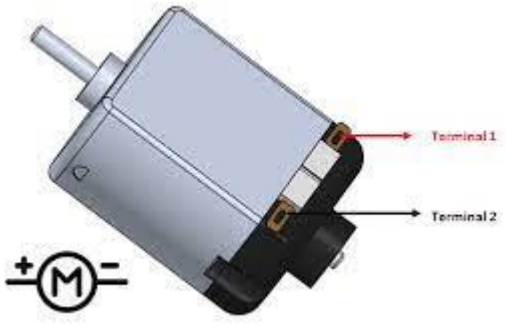
Node MCU is an open-source firmware and development kit for optimising and developing IoT products. It includes firmware that runs on Express if Systems' ESP8266 Wi-Fi SoC and hardware that is built on the ESP-12 board. Lua is the scripting language used by the firmware.

4.2 Relay Board



The relay module is an electrically controlled switch that can turn on or off a circuit with far higher voltage and/or current than a microcontroller can manage. There is no relation between the microcontroller's low voltage circuit and the high power circuit. Each circuit is shielded from the others by the relay. Each of the module's channels has three connections: NC, COM, and NO. The jumper limit may be set to high level effective mode, which closes the usually open (NO) switch at high level input, or low level effective mode, which does the same except at low level input, depending on the input signal trigger mode.

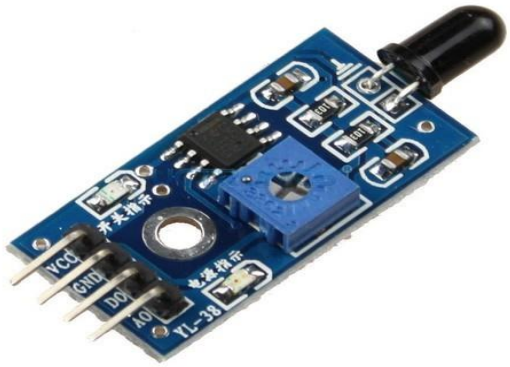
4.3 Dc Motor



Almost every mechanical innovation we see is accomplished by an electric motor. Electric machines are a form of energy converter. Electrical energy is converted into mechanical energy by motors. Hundreds of machines that we use on a daily basis are powered by electric motors.Direct Current (DC) motors and Alternating Current (AC) motors are the two types of electric motors that are commonly used. The DC motor and its operation will be discussed in this report. Also, a gear DC motor's operation.

A direct current motor (DC motor) is an electric motor that operates on direct current. The functioning of any electric motor is based on electromagnetism. When a current-carrying conductor is put in an external magnetic field, it encounters a force proportional to the conductor's current and the strength of the external magnetic field. It's a machine that transforms electrical energy into mechanical energy. It is based on the fact that a current carrying conductor in a magnetic field is subjected to a force that causes it to rotate relative to its original location.Field windings and armatu are used in a practical DC motor to provide magnetic flux.

4.4 Flame Sensor



This Flame Sensor can be used to detect fire source or other light sources of the wave length in the range of 760nm - 1100 nm. It is based on the YG1006 sensor which is a high speed and high sensitive NPN silicon phototransistor. Due to its black epoxy, the sensor is sensitive to infrared radiation. Sensor can be a great addition in a fire fighting robot, it can be used as a robot eyes to find the fire source. When the sensor detects flame the Signal LED will light up and the D0 pin goes LOW.

There are different types of flame detection methods. Some of them are: Ultraviolet detector, near IR array detector, infrared (IR) detector, Infrared thermal cameras, UV/IR detector etc.

We're using an infrared (IR) flame sensor for this project. The YG1006 sensor is a high-speed, high-sensitivity NPN silicon phototransistor. It can detect infrared light with a wavelength of 700nm to 1000nm and a detection angle of about 60 degrees. A photodiode (IR receiver), resistor, capacitor, potentiometer, and LM393 comparator are all part of the flame sensor module's integrated circuit.

By adjusting the onboard potentiometer, you can change the sensitivity. With a digital output, the working voltage ranges from 3.3 to 5 volts DC. Flame or fire is indicated by a logic high on the output.

VII. References

[1].Azhagurajan,A. (2005): Study on Explosive Waste Disposal With A Case Study on Fireworks Waste, Journal of Industrial Pollution Control, 21, pp 43-50

[2].Chaudhari.,Srivastava., “Moitra and Desai., Risk of domestic accidents among under five children” , The Internet Journal of Family Practice, Vol.7 ,No.1,2009,pp-500- 502.

[3].KarunairagavanK.(2016),information literacy on working conditions and safety measures among the workers of match and fireworks industry in Tamilnadu a study.

[4]. Mashreky., Bari., Sen., .Rahman.,Khan and Rahman.,“Managingburnpatients in a fire disaster: Experience fromaburnunit in Bangladesh”, The Journal ofFiresafety,Vol.43,Issue No.3,March 2010,pp-131-135.

[5].Narasimhalu K and SathyaMurthyG.(1991),An Economic study of the problem and prospects of firework industries in Sivakasi Block of Virudhunagar District. Dancy Publication, April 2005, p.4.