

# **Chapter I**

## **INTRODUCTION**

### **Project Context**

We are in the century where people want quick and fast information through devices that we have and exist, a world that runs through innovations which made our life easy.

“You don’t know what kind of fire you’re going to have, - You want to be covered”

-Judy Comeletti (2015)

One of the most important and useful inventions of our modern time is the smoke detector. According to Houston (2015) “The most valuable thing is the smoke detector which is designed to sound the alarm when fire breaks out.” New York City Council (2016) a veto proof that majority of the people in New York City signed a law that would push residents to install a kind of smoke detector that might be more likely save lives than the usual type that can be easily found in cities. This causes us to create a system called Mobile Based Fire Detection System Using Smoke and Temperature Sensor, this serves as a security for fire prevention when this phenomenon occur.

This Mobile Based Fire Detection System has its purpose to cater the users who are away from their firm’s most likely establishment owners in Tangub City. This is one of the modified fire alarms which was innovated to be more easy to operate and useful especially in investigation purposes for it provides details of the location where the incident first started. It also provides temperature alert, even if there’s no electricity, the device still works up to the range of its battery timeframe.

This system is made for prevention from any destruction caused by fire, most especially in our city. Tangub City needs a system which can help establishment owners in protecting their firms. In this case, it helps the researchers to realize a system that is really accessible and reliable for fire prevention.

## **Purpose and Description**

The main idea of Mobile Based Fire Detection System is to help establishment owners in times of fire incident. It provides information through the predefined messages and gives alert on its degree of temperature. It informs users for temperature precautions and for the people's safety like fire incident.

One of the technologies invented by the inventors through science and their study is the Fire Alarm which is used as a signal for users to prevent fire that causes destruction of property and even death. This Mobile Based Fire Detection System is installed with Subscriber Identity Module (SIM) card that sends messages to the contact users if the sensor detects smoke within the range of 450 Parts per Million (PPM) the standard value of the device to detect smoke.

The purpose of Mobile Based Fire Detection System is to warn the users who are away from their premises if fire is igniting in their establishments. Users can receive messages and calls from the system device depending on how many registered mobile numbers are programmed in the system. In that way, users will be notified in case of emergency and for them to have an immediate action to prevent a worst scenario. The system also will notify the Bureau of Fire Protection (BFP) along the city or the province for them to be aware that there is an incident occurring within the vicinity.

## **Objectives of the Study**

The Mobile Based Fire Detection System is a system that aims to increase the way of information that uses call and text in alarming processes in case of fire incident.

1. To have a quick notification of fire alarm when users are not around in the establishment.
2. To aware the users via SMS and call through the use of Global System for Mobile communication (GSM) Shield that is installed in the fire alarm if the smoke is detected within the range of the alarm.
3. To have a proper coordination between the users and the Bureau of Fire Protection along the City or within the province to prevent damages caused by fire.
4. To have an easy access system and a reliable source of information.
5. To have an automatic temperature degree cautions through Liquid Crystal Display (LCD).

## **Scope and Limitation of the Study**

### **Scopes**

1. The device used an Uninterrupted Power Supply (UPS) as a back-up to operate in smoke detection.
2. The smoke detector has a programmed numbers where the fire alarm information is to be sent.
3. With a volume of smoke 450 PPM the device will alarm.
4. The device has only one (1) microcontroller that has the ability to process the signals from the sensor which are connected and put into some portions inside the premises in determining a smoke or a fire.
5. It provides temperature cautions within the time interval through an LCD display.
6. Provides quick notification to the users through SMS and call notification.
7. Provides a reliable way of notification to the users that receives call diverts from the system.

## **Limitations**

1. The device must be properly placed for the sake of nuisance alarms.
2. The smoke detector only detects specific distance from the area where it was placed.
3. If there's no electric source, the device will still work through the reserve power of its battery that works along with a time frame of 4hrs.
4. The Subscribe Identity Mobile (SIM) must have a load for messaging and calling services.
5. The SIM must have a maintained load balance.

Transactions not mentioned above are beyond the scope of our system.

## **Chapter II**

### **REVIEW ON RELATED LITERATURES AND RELATED STUDIES**

This chapter presents the different researches and related studies necessary in providing information through understanding of the concepts and functions of the Mobile Based Fire Detection System.

#### **Related Literatures**

Smoke detector is a relatively modern device that was first invented over a century ago and took over eight (8) decades to reach the market. Since their introduction to public in 1975, smoke detectors have become an essential device in most homes and businesses and have been credited in reducing life lost due to fire by fifty percent (50%).

According to a report of National Fire Protection Agency (NFPA) (2016) in Rail Fire and Smoke Standards, “the enhancements anticipated for the 2017 version of NFPA 130 (Levit 2016) that closed stations should be protected by fire alarm systems. New consideration, on sound level requirements revolving around emergency communication for first responders, protection of enclosed combustible insulation at establishment station, inclusion of additional electronic equipment in heat load analysis.”

Rendering to an article statement of Community Safety and Reliance Department (2017) in Fire Detection Alarm Systems and Equipment in Buildings, they stated that automatic fire detection and alarm systems are designed to warn building occupants of a fire situation. These systems generally use smoke alarms, heat or flame detectors to detect the outbreak of fire and to alert building occupants and the fire service. Fire alarm systems must be heard by the building occupants in all parts of the building.

## **Related Studies**

This study includes the co-related studies of the mobile based fire detection system that may give importance and development to this study. This provides an overview and how the design is developed and further gives the researchers a concise understanding of the advantages and disadvantages that may take place in the design of the hardware.

### **Wire chubbedwards photoelectric smoke detector**

A **photoelectric smoke alarm** comprises light-emitting diode (LED) and a tiny sensor that's calibrated to document minor alterations in the light beam produced by LED. In regular circumstances, the light stays steady and clear. However, when smoke particles enter the air, the light beam gets obscured. Based on the photoelectric smoke alarm type, the sensor would either account the light that scatters due to smoky conditions, or may register an unexpected obscurity in the light beam. When the photoelectric smoke alarm's sensor registers air particles; it activates a loud alarm that could be a whoop, beep, or any other noise that easily grabs nearby human attention. The sound is basically an indication that the people occupying the fire zone must exit the place at the earliest time or find out the smoke's origin.

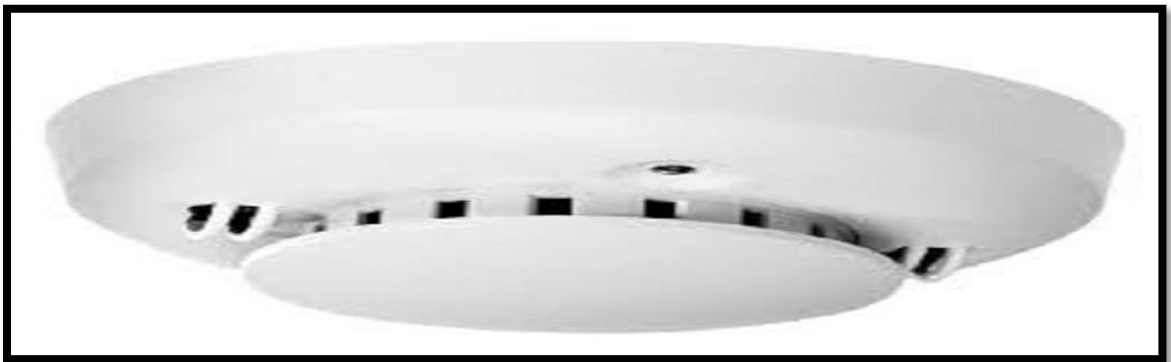


Figure 1. Wire Chubb Edwards photoelectric smoke detector



## **Addressable Simplex True Alarm Smoke Detectors**

Addressable system allows the exact location of an alarm to be plotted on the Fire Alarm Control Panels (FACP). A graphical representation of the building is provided on the screen of the FACP which shows the locations of all the detectors in the building.



Figure 2. Addressable Simplex True Alarm Smoke Detectors

## Commercial Smoke Detectors

This can be connected to the security alarm or fire alarm systems controlled by fire alarm control panels. This is the most common type of detector, and usually significant and more expensive than single-station battery-operated residential smoke alarms. This is used in most commercial and industrial facilities and other places such as ships and trains.



Figure 3. Commercial Smoke Detectors

(An integrated locking mechanism for commercial building doors. Inside an enclosure are a locking device, smoke detector and power supply.)

## **Chapter III**

### **DESIGN AND METHODOLOGY**

This chapter includes the design and methodology of Mobile Based Fire Detection System. It discusses the hardware and software specification of the system and it also shows the flow of the system that corresponds to the process.

#### **Methodology**

The Mobile Based Fire Detection System is a system that provides a faster way of notification through predefined messages and call alerts. This study involves the ideas of other people throughout its source here in Tangub City. We also conducted random surveys and a follow-up interview to our proposed respondents typically the establishment owners and some establishment handlers in Tangub.

To put the study in reality, the researchers prepared a questionnaire for the 20 respondents who are the establishment owners here in Tangub City.

The result answers to owner's realization to the system if they need it as to its process, accessibility and reliability during emergency.