

“FIRE SAFETY EVALUATIONS OF RESIDENTIAL BUILDING”

Submitted in partial fulfillment of the requirements
of the degree of

Bachelor of Engineering (B.E)

By

LABBAI ABDUL HAKEEM (16CE21)

ANSARI MOHD UMAIR MOHD MAZHER (17CE13)

KHAN ABRAR AHMED NASIR AHMED (16CE15)

SAYYED AMEENUDDIN ALLAUDDIN (17DCE69)

Under guidance of
Prof. FIROZ NADAF



Anjuman-I-Islam's
Kalsekar Technical Campus

Department Of Civil Engineering

School Of Engineering And Technology

Anjuman-I-Islam's Kalsekar Technical Campus

**Plot No. 2#3, Sector-16, Near Thana Naka, Khanda Gaon,
New Panvel, Navi Mumbai. 410206**

2020-2021

CERTIFICATE



Anjuman-I-Islam's
Kalsekar Technical Campus

Department of Civil Engineering,
School of Engineering and Technology
Anjuman-I-Islam's Kalsekar Technical Campus
Plot No. 23, Sector – 16, Near Thana Naka, KhandaGaon,
New Panvel, Navi Mumbai. 41026

This is to certify that the project entitled “**Fire Safety Evaluation of Residential Building**” is a bonafide work of **LABBAI ABDUL HAKEEM (16CE21), ANSARI MOHD UMAIR MOHD MAZHER (17CE13), KHAN ABRAR AHMED NASIR AHMED (16CE15), SAYYED AMEENUDDIN ALLAUDDIN (17DCE69)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of “Bachelor of Engineering” in Department of Civil Engineering.

Prof. FIROZ NADAF

Guide

Dr. Rajendra B. Magar
Head of Department

Dr. Abdul Razzak Honnutagi
Director

Project Report Approval for B. E.

This project report entitled “*Fire Safety Evaluation of Residential Building*” by of *Labbai Abdul Hakeem (16CE21), Ansari Mohd umair Mohd Mazher (17CE13), Khan Abrar ahmed nasir Ahmed (16CE15), Sayyed Ameenuddin Allauddin (17DCE69)*, approved for the degree of “*Bachelor of Engineering*” in “*Department of Civil Engineering*”.

Examiners

1 _____

2 _____

Supervisors

1 _____

2 _____

(Director)

Date:

Declaration

We declare that this written submission represents our ideas in my our words and where others ideas or words have been included, We have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

LABBAI ABDUL HAKEEM
16CE21

ANSARI MOHD UMAIR MOHD MAZHER
17CE13

KHAN ABRAR AHMED NASIR AHMED
16CE15

SAYYED AMEENUDDIN ALLAUDDIN
12CE40

Date:

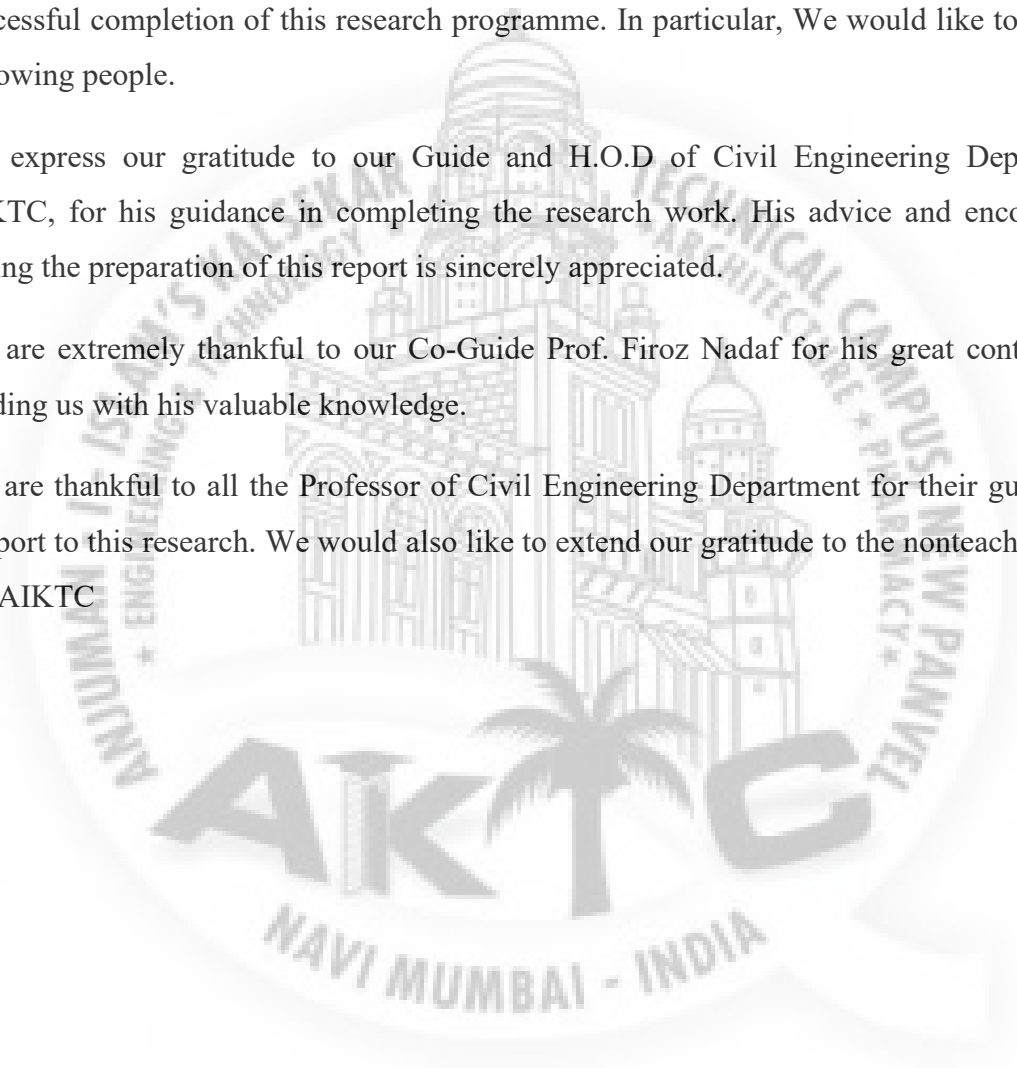
Acknowledgement

We would like to express our sincere appreciation to all those who contributed to the successful completion of this research programme. In particular, We would like to thanks the following people.

We express our gratitude to our Guide and H.O.D of Civil Engineering Department of AIKTC, for his guidance in completing the research work. His advice and encouragement during the preparation of this report is sincerely appreciated.

We are extremely thankful to our Co-Guide Prof. Firoz Nadaf for his great contribution in guiding us with his valuable knowledge.

We are thankful to all the Professor of Civil Engineering Department for their guidance and support to this research. We would also like to extend our gratitude to the nonteaching staff of the AIKTC



Abstract

Increasing demands of the new millennium for sustainable and durable structures, and the limited available resources, have awakened the need for safety of the building. Safety factor of the buildings are depending upon the importance factor of the buildings. The more the importance factor the more safety factor. One such safety factor i.e., fire safety is totally of neglectful in most of the residential building and become a threat and danger to the occupants if accidentally building catches fire. One has to see the capability of existing building to fight with fire. One also has to see construction of the building has followed the standard with respect to fire safety by doing fire safety audit.

For the present work one residential building has been selected. Fire safety audit list were prepared by referring IS codes. Due to pandemic permission was not granted to do fire safety audit.

Keywords: Fire Safety Audit.

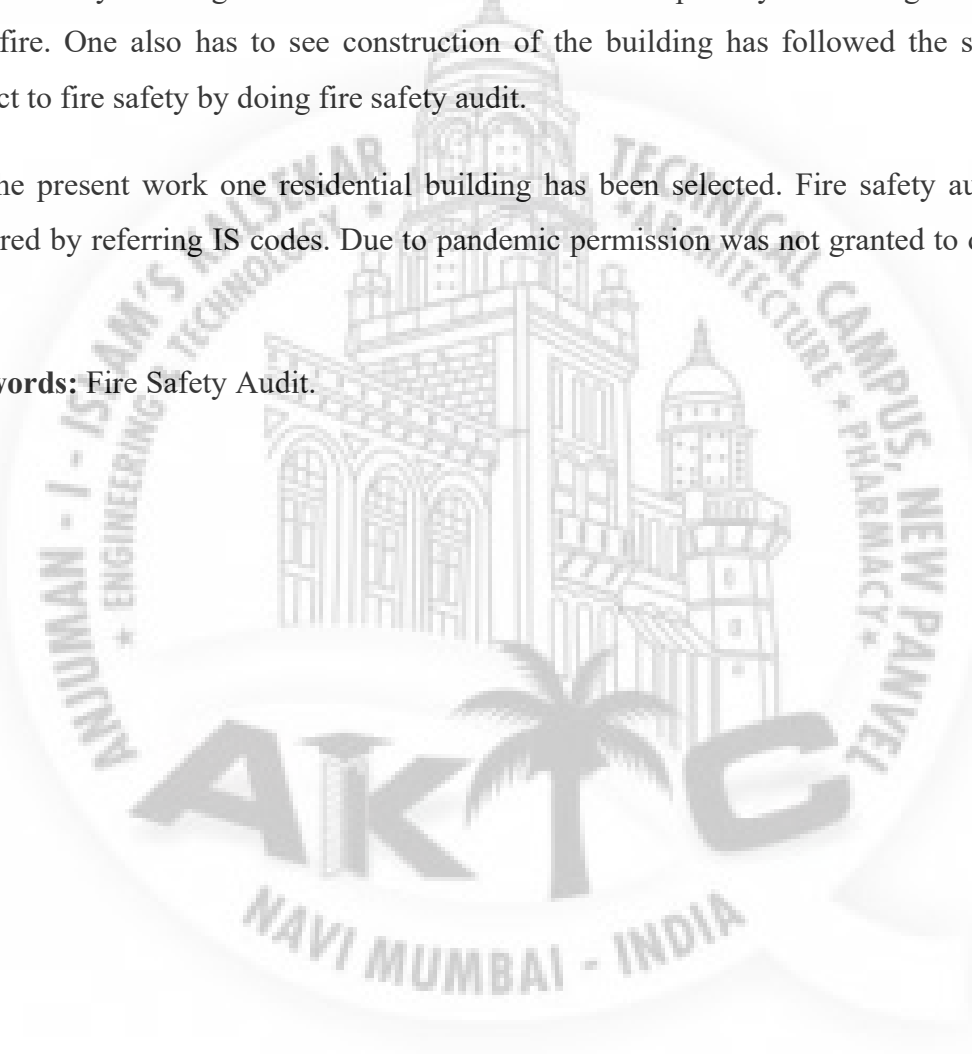


Table of Content

Certificate	ii
Project Report Approval for B.E.	iii
Declaration	iv
Acknowledgement	v
Abstract	vi
1. Introduction	1
1.1 General	1
2. Literature Review	6
3. Methodology and Conclusions	12
3.1 Identification of Type of Fire	12
3.2 Siting & spacing Detectors	13
3.3 Fire Alarm	13
3.4 Fire sprinkler	13
3.5 Fire Exits	14
3.6 Conclusion	15
4. References	16



Chapter 1

Introduction

1. General

The occurrence of any fire has the potential to cause severe damage to both life and property. A Fire Safety Audit is the most effective tool for assessing the fire safety standards of your facility. It helps the owners to identify areas where improvement can be made and develop an action plan, in addition to emergency preparedness and mock drills. Elion fire safety consultant are carrying out regular Fire Safety Audits for High Rise.

Buildings, Hotels, Banks, Small, Medium and LargeScale Industries and more. Our team carries out fire safety audit as per various IS standards such as the Standard for Automatic Fire Detection and Alarm System, Code of Practice for Selection, Installation and Maintenance of Emergency Fire Extinguishers, National Building Code, 2005,Code of Practice for Fire Safety of Buildings and all the other relevant safety standards necessary to

identify all hazards requiring corrective & preventive actions. We also help you to prepare emergency plans for fire safety and conduct mock drills.

The main focus of these fire safety audits is:

- Identification & control of ignition sources in areas where flammable chemicals are stored / handled / transferred.
- Review of chemical compatibility in storage areas and to suggest appropriate fire loss control measures
- Review of electrical hazard which are potential causes of fire
- Review of fire detection measures adopted & to suggest suitable improvement measures
- Review of the various active (fire hydrant, sprinkler, portable fire extinguishers) and passive fire protection requirements for chemical storage and handling areas and to suggest improvements as necessary
- Review of Fire Alarm system and emergency fire system of plant
- Review of contractor safety awareness (chemical spill, fire fighting, emergency communication, knowledge of plant hazards & safety regulations) and to recommend suitable improvement measures to enhance contractor safety
- Review of safety awareness and safety training requirements (training identification and efficacy) of employees with respect to hazards present

Chapter 2

Literature Review

Evaluation of fire Safety by David Rasbash (2004)

It is considered with three aspects of fire safety measures – performance, effectiveness and reliability. Fire represents a severe hazard in both developing and developed countries and poses significant to life, structure, property and environmental safety.

High Rise Security and Fire Life Safety by Geoff Craighead (2003)

In this case, property removal controls in the building main lobby will not be totally effective unless other measures are incorporated into the security program.

Review codes and standards pertaining to required security measures.

Design Steel Structure for Fire Safety by Vankatesh Kodur (2009)

Designing a structure that would be able to sustain successively two of these accidental actions is of course not without an influence on the cost of the structure. Current fire protection measures lead to an unquantified level of fire safety in buildings.

Fire Safety Engineering Design of Structures John Wiley and Sons (2017)

This covers the installation of methods where by a fire may be detected, preferably at the earliest possible state. Implementing key measures that include improving fire protection features in buildings, proper regulation and enforcement of building code provisions.

Structural design for Fire Safety by John Wiley and Sons (2017)

This book is an introduction to the structural design of building elements exposed to fire. Significant implications for modelling of post-flashover fires, and have led to the development of the phenomenon of traveling fires.

Chapter 3

METHODOLOGY & CONCLUSION

3.1 Identification of Type of Fire

Most common causes of commercial fires are

- Cooking equipment -

Because of high cooking temperatures, flammable oils & grease may catch fire











- Heating equipment -

Depending upon climate, residential building require heat.

Mechanical equipment, furnaces, boilers are risk of overheating.

This in turn lead the fire

- Electrical & Lighting equipment –

		Ordinary Combustibles	Wood, Paper, Cloth, Etc.
		Flammable Liquids	Grease, Oil, Paint, Solvents
		Live Electrical Equipment	Electrical Panel, Motor, Wiring, Etc.
		Combustible Metal	Magnesium, Aluminum, Etc.
		Commercial Cooking Equipment	Cooking Oils, Animal Fats, Vegetable Oils

-
- Fire detectors are designed to respond at an early stage to one of the four major characteristic of combustion, heat, smoke, flame or gas.
- Single type of detector is not suitable for all types of premises or fires.

since each type of detector has its own advantages & disadvantage, final Choice will depend primarily on Speed of response required

- A. Need to minimize false alarms
- B. Nature of the fire hazard

3.2 Siting & spacing Detectors

- At the time of installation, every fire detector should be allotted an unique identification number.
- Heat detectors should be installed that the sensing element is not less than 25mm & not more than 150mm below the ceiling.
- For smoke detectors, the sensing element should not be less than 25mm & not more than 600mm below the ceiling
- Smoke detectors would give faster responses than heat detectors but be liable to give alarms.

- detector siting shall be such that a clear space 500mm is maintained below each detector.

GGBS is used to make durable concrete structure in combination with ordinary portland cement or pozzolanic material .to improve durability of structure uses of GGBS along with OPC in concrete is recommended in BS 6699:1986 , astm c989:1982, is 456:2000 and GGBS to OPC in the range of 25 to 70% shall be added to manufacture Portland slag cement as per is 456:1989 .

3.3 Fire Alarm

A fire alarm system warns people when smoke, fire, carbon monoxide or other fire-related emergencies are detected. These alarms may be activated automatically from smoke detectors, and heat detectors or may also be activated via manual fire alarm activation devices such as manual call points or pull stations. Alarms can be either motorized bells or wall mountable sounders or horns. A fire sprinkler or sprinkler head is the component of a fire sprinkler system that discharges water when the effects of a fire have been detected, such as when a predetermined temperature has been exceeded. Fire sprinklers are extensively used worldwide.

3.4 Fire sprinkler

- A fire sprinkler or sprinkler head is the component of a fire sprinkler system that discharges water when the effects of a fire have been detected, such as when a predetermined temperature has been exceeded. Fire sprinklers are extensively used worldwide
- The buildings where properly designed and maintained fire sprinkler system, over 99% of fires were controlled by fire sprinklers alone.

3.5 Fire Exits

A fire exit stair is a special kind of emergency exit, generally mounted to the outside of a building or occasionally inside but disconnect from the main areas of the building. It provides a method of escape in the occurrence of a fire or other emergency that makes the stairwells inside a building inaccessible.

3.6 CONCLUSION

- To achieve higher fire safety in Residential buildings whose functional use was changed, it is recommended to optimize the fire risk considering combustibility of building structures and building's fire height.
- The building should be divided into fire compartments if it is acceptable in terms of the building conservation. If it is possible, another emergency route with direct ventilation should be created.
- This route would also serve for firefighting intervention. The large roof spaces should be divided into smaller units using fire-separating walls overlapping the roof by at least 300 mm.



CHAPTER 4

REFERENCES

- 1). D J Rasbash, New Variation on an Old Theme, Inaugural Lecture, University of Edinburgh, 14th November 1974 by David Rasbash
- 2). High-rise security and fire life safety by Craighead, Geoff.
- 3). NFPA 72 – National Fire Alarm and Signaling Code – 2010 Edition. National Fire Alarm Association, 2009, Page 118, Subsection 24.4.1