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Fire Safety Management in Hotel LE Temp Fort, Trichy

KEYWORDS: Effective and Safe Fire Fighting, Rescue the Occupants, Promote Fire Safety Management.

P. BALAMURUGAN
Department of Civil Engineering, Periyar Maniammai University, India

Dr.S.SENTHAMILKUMAR
Professor & Head, Department of Civil Engineering, PMU, Thanjavur

ABSTRACT *"Planning and preparation are often the key to safety in the event of a fire or any other emergency. The lessons learned in an emergent situation are often critical to prevention of damage in future emergencies. Fire protection and suppression systems were created with safety in mind; these systems fulfill some basic needs including detection, notification and suppression of fires. Alarm systems are obviously structured to notify occupants of a building in the event that a fire occurs. They also serve to summon the assistance of firelighters should an emergent situation occur. Alarm systems were not always required in commercial manufacturing plants. A majority of older structures in fact had very few protective structures in place to ensure the safety of occupants and firelighters. There standards have changed however in contemporary times. Use of fire alarm systems often goes hand in hand with fire suppression systems. Which act to reduce the severity of a fire once started. In some instances, in the case of a small fire, a fire suppression system may be all that is necessary to put a fire out."Fire in buildings can have a severe impact in terms of both human safety and potential economic loss. This is especially true in case of fires of such severity that the building structure is damaged. Concrete buildings are traditionally regarded as safe in fire situation as concrete is non-flammable and exhibits highly insulating material properties.. Fire safety management of Hotel buildings are very interesting and challenging work. That it why I taking this project.*

1.1. INTRODUCTION

It is true that every building contains something which will easily catch fire and it is practically impossible to eliminate completely the chances of fire in a building. As a matter of fact, it is estimated that a fire breaks out every 37 seconds each day in America - a nation fully advanced in technology of building construction. It is equally true that no building material is fully fire-proof considering these fact, the International Fire Prevention Congress passed a resolution in 1903 recommending the use of term fire-resisting in place of fire-proof as applied to the building materials and constructions. Thus a fully fire resistant building is fully protected against any fire which may occur in its contents.

The main purpose of making a building fire-resistant is the protection of life, goods and activities within the building. It is estimated that nearly 15,000 people are killed by fire every year in our country. The direct and indirect losses are estimated as more than 1000 crores and yet, there is no comprehensive regulation to insure fire prevention.

1.2. REASON FOR THE THESIS

The most crucial aspect of a building's safety in the face of fire is the possibility of safe escape. An important precondition is that its fire safety facilities enable independent and adequate fire response performance by the building's occupants. In practice, it appears that the measures currently required by law do not always provide the support that people in burning buildings need. Consequently, understanding how individuals behave in the case of fire and fire evacuation is essential if we are to bring fire safety measures into line with occupants needs during an incident.

1.3. OBJECTIVES

- To protect the hotel building from the generation of fire.
- To prevent the spread of fire and smoke.
- To rescue the occupant.
- To allow effective and safe fire fighting.
- To promote fire safety management in Hotel Building.

1.4. SCOPE

- The strategy for carrying out fire safety management plan in Hotel Building.
- The design, installation and maintenance of the safety systems to protect people and property from fire.
- The provision of fire safety awareness and training to workers
- The establishment and maintenance of a comprehensive Building Fire Warden system.

1.5. LIMITATIONS

It is not too easy to carry researches in various buildings in this concern within the short period. So doing this project within our hotel campus.

1.6. METHODOLOGY

Experimental method is used in this project. In this method following approaches are handling.

1. Observation
2. Interview
3. Questioning

METHODOLOGY

3.1. INTRODUCTION

The methodology of this study presented under various sections such as

- Statement of the problem.
- Research questions
- Objectives
- Hypotheses
- De-limitation
- Definition of the key terms
- Experimental phases
- Sample of the study
- Data collections and Analysis

3.2. STATEMENT OF THE PROBLEM

We are not giving so much importance to hotel building and more over awareness of safetyness is also very limit. So in order to promote awareness and safety measures especially in during the time of fire fighting.

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3.3. RESEARCH QUESTIONS

- How can be motivate this awareness among workers
- How can be motivate this awareness among workers and staffs.
- How can be know that difficult areas in this concerns.
- How can be overcome the difficulties.
- What should be done to prevent and to protect from the fire fighting.
- What are the approaches to be conducted in order to achieve more.

3.4. OBJECTIVES

- To protect the hotel building from the generation of fire.
- To prevents the spread of fire and smoke.
- To rescue the occupant.
- To allow effective and safe fire fighting.
- To promote fire safety management in hotel buildings.

3.5. HYPOTHESES

- Safety measures in Hotel Building is poor.
- Awareness above the fire safety management among the staffs and workers are very limit.
- After this project there will be significant improvement take place among the hotel buildings.

3.6. DE-LIMITATIONS

- This study is confined to the Hotel building at Trichy.
- This study is concerned mainly with safety measures from the fire fighting and to promote the awareness how to manage at the time of fire fighting.
- This investigation adopts questionnaire, observation and interview method these are also comes within the experimental method.

3.7. DEFINITIONS OF THE KEY TERMS

FIRE SAFETY MANAGEMENT

Have a competency to prevent and to protect fire risk and have the awareness about it.

HOTEL BUILDING

Building with valuables

- Television
- Computers
- Utensils
- Documents
- Furnitures
- Kitchen equipments
- CC TV System

3.8. EXPERIMENTAL PHASES

OBSERVATION

- Observing the hotel buildings at Trichy.
- Collecting data by asking questions by observing the structure of the building and collection of books, number of journals and also find out the awareness about the fire safety management among the workers building by asking questions, interviews and observations.
- Collecting the datas and find out the merits and demerits of the hotel building.

3.9. SAMPLE OF THE STUDY

Hotel Building at Trichy and find out the quality of the building.

3.10. DATA COLLECTION AND ANALYSIS

By observation by asking questions and interviewing the persons who are working in the concerned buildings.

By asking following questions to them in order to know their awareness on fire fighting.

AREA STATEMENT

Ground Floor	: 440.12 square metre
First Floor	: 676.11 square metre
Second Floor	: 676.11 square metre
Fire Extinguisher	: 02 (Lightex Multi Purpose Dry Powder) at every floor

GROUND FLOOR FURNITURE DETAILS

Computer	: 10
Wooden Display Rack	: 06
Fan	: 10
Dining Table	: 6'0" x 4'0" – 20 Nos.
Chairs	: 80
Wooden round table	: 01

FIRST FLOOR FURNITURE DETAILS

Fan	: 23
Cot	: 30 Nos.
Chairs	: 30
Wooden round table	: 01

JOINERY

Windows	: Aluminium frame with glass shutter
Doors	: Flush Doors
Partition	: Aluminium frame with glass shutter

SECOND FLOOR FURNITURE DETAILS

Fan	: 23
Cot	: 30 Nos.
Chairs	: 30 Nos.
Wooden round table	: 01

DATA ANALYSIS

Calculation of number of units of exit width and subsequently the number and width of exit required for a given number of persons.

$$\frac{N}{40 \times T} = U$$

Where N = Number of persons
T = Time factor in minutes
U = Number of units required

$$\frac{U}{4} + 1 = E$$

Where E = Number of exits or Stairs required
Where a fraction of 0.75 or over results, the next whole number is used.
Where a fraction of 0.5 or over results, the next whole number is used.

Ground Floor

N = Number of Persons = 120
T = Time factor in Minutes = 2 ½

$$U = \frac{N}{40 \times T}$$

$$U = \text{No. of units required} = \frac{120}{40 \times 2\frac{1}{2}}$$

U = No. of units required = 2.4

$$E = \text{No. of exists (or) stairs required} = \frac{U}{4} + 1$$

$$E = \text{No. of exits (or) stairs required} = \frac{2.4}{4} + 1$$

E = No. of exits (or) stairs required = 0.6 + 1
E = No. of exits (or) stairs required = 1.6 @ 2.0
N = Number of persons = 120
T = Time factors in Minutes = 2 ½

$$U = \frac{N}{40 \times T}$$

$$U = \text{No. of units required} = \frac{120}{40 \times 2\frac{1}{2}}$$

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$$E = \text{No. of exists (or) stairs required} = \frac{U}{4} + 1$$

$$E = \text{No. of exits (or) stairs required} = \frac{1.2}{4} + 1$$

$$E = \text{No. of exits (or) stairs required} = 0.3 + 1$$

$$E = \text{No. of exits (or) stairs required} = 1.3 \text{ @ } 2.0$$

DATA ANALYSIS

As per National Building code 1983 Part IV Fire Protection commended 1997 exits shall be so located that the travel distance on the floor shall not exceed the distance fire below

Sl. No.	Group of Occupancy	Maximum Travel Distance Construction	
		Types 1 & 2 (m)	Types 3 & 4 (m)
5	Business (E)	30.0	30.0

As per data collection building length is 28.78m. So our building length is in safe mode.

The quantity of water required for extinguishing fires (i.e. fire demand) is not more than 5 to 10% of the total demand. The following empirical relations are used for determining the fire demand CQ in litres per minute.

i) Based on population

a) National Board of Fire under writers formula: According to this formula.

b) $Q = 3860 \sqrt{P} [1-0.01 \sqrt{P}]$

Where P = Population in thousands

No. of Occupants = 360
No. of Staff = 040
Total = 400
= 0.40 Thousands

$Q = 3860 \sqrt{0.40} [1-0.01 \sqrt{0.40}]$
= 2426 litre

Quantity of water required for Fire demand = 2426 litre

b) Freemans Formula: According to this formula

Q = 1135 [P/5 + 10]
Where P = Population in thousands
No. of Occupants = 360
No. of Staffs = 040
Total = 400
= 0.40 Thousands
Q = 1135 [0.40 / 5 + 10]
= 11440 litre

Quantity of water required for Fire demand = 11440 litre

c) Kuichling's Formula : According to this formula

Q = 3182 √P
Where P = Population in thousands
No. of Occupants = 0360
No. of Staff = 0040
Total = 0400
= 0.40 Thousands
Q = 3181 √0.40
= 2013 litre

Quantity of water required for Fire demand = 2013 litre

d) Burton's Formula : According to this formula

Q = 900 √P

Where P = Population in thousands

No. of Occupants = 0360
No. of Staff = 0040
Total = 0400
= 0.40 Thousands

Q = 900 √0.40
= 570 litre

Quantity of water required for Fire demand = 570 litre

e) Buston's Formula : According to this formula

Q = 5663 √P
Where Q = Quantity of water in litre
P = Population in thousands
No. of Occupants = 0360
No. of Staff = 0040
Total = 0400
= 0.40 Thousands

Q = 5663 √0.40
= 3582 litre

Quantity of water required for Fire demand = 3582 litre

So, we can take maximum quantity of water for fire demand for library=11440 litre.

ii) Based on the nature of materials

Insurance Service Office formula

$F = 3.7 \times c \times \sqrt{A}$

F = Fire flow in litre / second

C = Coefficient of depending on the inflammability of the type of construction.

- 1.5 for inflammable materials as wood
- for ordinary construction
- 0.6 for fire resistant construction

As total floor area in all storeys of a buildings in sq.m.

F = 3.7 x c x √A
F = Fire flow in litre / second
C = Coefficient of depending on the inflammability of the type of
construction (1.0 for ordinary construction)

Area Statement for Hotel Building:

Total Floor Area : 1792.34 Square metre
A = Total Floor Area in Square metre
F = 3.7 x 1.0 x √1792.34
= 157 litre / second

Hose reel length :

Length of Building	-	40 m
Width of the Building	-	20 m
Height of the Building	-	10 m
Total	-	70 Metres
Hose reel length	-	70 Metres

Ladder Height

Total ladder height required for hotel building = 12 metre @ 20 metre

Rope Length

Total length of wire rope required for hotel building : 20 metre

RECOMMENDATIONS

- There is only one passage in every floor. This is not sufficient one. During the time of firing more than one passage is needed then only save the life.
- As per code number travel distance is within the limit. According to National Building Code 1983 Part - IV Fire protection commended 1997 the sufficient travel distance is maintained correctly.
- Equipment should be serviced within the due date.

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- Fire safety rules should be strictly enforced.
- Signage boards should be marked every floor
- Battery back up should placed at the time of firing even the failure of electricity save the life.
- Insurance coverage in the building and the materials of the building should be covered.
- It is recommended that open wiring system should be followed.
- Every floor in library building must have a hose reel with a length of 150M.
- Ladder should be placed in the building have a height of 20M.
- The persons who are working in the hotel should have knowledge about fire fighting equipments effectively.
- At the time of emergency necessary telephone number should be available in order to contact the concern officer.

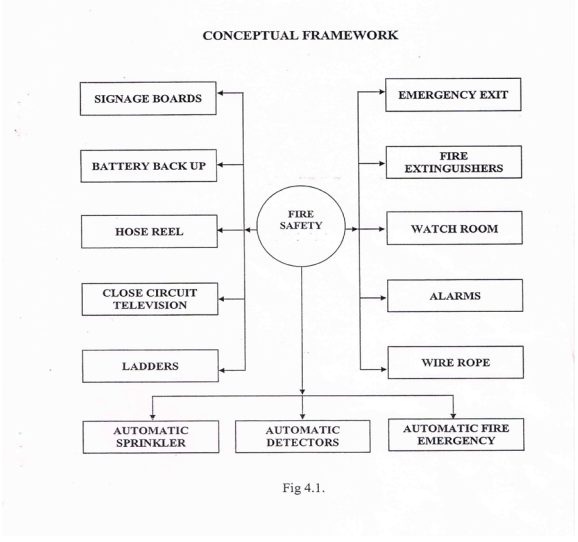

Fig 4.1.

CONCLUSION

- The present study was carried out only with limited sample. The sample size may be increased in order to generalised the findings.
- The investigation can be extended to other floors.
- This project helps to promote the quality of hotel building also developing awareness on fire safety management among the workers and staff & also improving the building structures.

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