

Fire Safety Management in Construction

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Abstract

Fires throughout the world during construction of buildings and its refurbishment are becoming more common. As a result of this people are killed and injured and loss of property has also occurred. In this paper an attempt has been made to study the various safety measures that can be adopted during construction against fire hazards. This paper discusses broadly about the definition of fire, fire protection plan, escaping of the workers, fire fighting, equipments and other precautionary measures to be provided during construction.

INTRODUCTION

Every year there are many fires throughout the world on construction sites and in buildings undergoing refurbishment. As a result of these, people are killed and injured, property is irretrievably lost, including structures of historic interest, and commercial and industrial organizations suffer severe disruption to the smooth running of their businesses.

The construction industry's performance might have been improved over the past few years but the rates of death, serious injury and ill health for construction site workers have still not been taken into consideration. When construction activities are not adequately controlled, children and other members of the public can also be killed or injured, and property adjacent to construction sites can as well be put at risk – for example, FROM A SITE FIRE LARGE ENOUGH TO SPREAD OFF-SITE.

All parties concerned in a project, of whatever size, should work together to ensure that adequate but practical measures are introduced during the design and planning stages to achieve the highest standard of general fire precautions are introduced to ensure the maximum level of protection to the contractors and the structure during the construction or refurbishment operations.

The potential dangers of FIRE are particularly concentrated and severely destructing on many construction sites, where activities includes fire work which in turn lead to a circumstance of FIRE ACCIDENT.

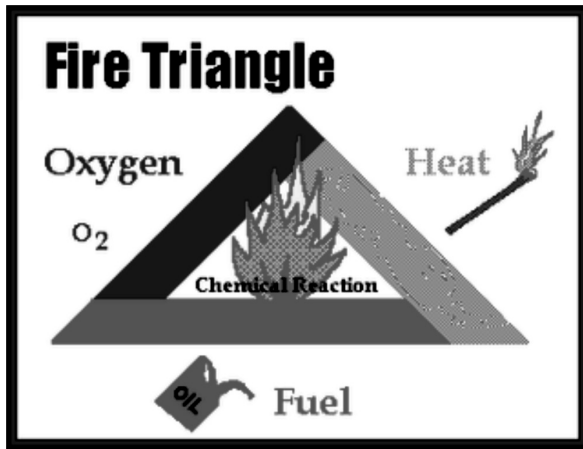
FIRE

Primary aspect of managing a fire safety is to look into the possibilities and causes of a fire accident. The three major components of a FIRE are

- A source of ignition
- Fuel
- Oxygen.

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Oxygen is abundantly available in the atmosphere and it is important to take care of the other two components. The Engineer, Mason or a worker, whoever it may be, should make sure that there are no fuel substances around and a source of ignition of fire.



Taking into account the possibility of occurrence of a fire accident in spite of taking care about the components of FIRE, one has to be ready with a plan minimize the possibility. A FIRE PROTECTION PLAN is what it is named as.

Fire Protection Plan

The Fire Protection Plan shall include the following:

1. Procedures for reporting emergencies to the Fire department.
2. Procedures for emergency notification, evacuation and relocation of all persons in the building under construction and on the site.
3. Procedures for hot work operations, management of hazardous materials and removal of combustible debris and maintenance of emergency access roads.
4. Floor plans identifying the locations of exits, exit stairs, exit routes and portable fire extinguishers.
5. Site plans identifying the designated exterior assembly areas for each evacuation route.
6. Site plans identifying required fire apparatus access roadways and on-site fire hydrants.
7. The name and contact phone number of the person(s) responsible for compliance with the Fire Protection.

Water supplies

In the case of large projects, or those where structures are being constructed predominantly of combustible materials (such as timber) the fire brigade should be informed and provisions for water supplies agreed before work commences on site.

Adequate water supplies for fire fighting must be available.

- Rising and temporary mains must be provided where planned;
- Water supplies should be tested periodically;
- It may be necessary to move the fire brigade inlet point to rising mains as work progresses.

The role of the person responsible for fire safety

The person responsible for the fire safety management system and inspections on a construction site must:

- Ensure that all procedures, precautionary measures and safety standards as laid down in the site fire safety plan are clearly understood and complied with by everyone on the site;
- Ensure that a system for the issuing of hot work permits is established and monitored;
- Conduct weekly inspections of escape routes, fire safety signage and temporary emergency lighting (where applicable);
- Carry out weekly tests of the site fire detection and alarm devices installed on site;
- Carry out weekly checks of fire fighting equipment, fire brigade access and fire fighting facilities;
- Carry out weekly checks of the routing of temporary electrical cables, the housekeeping on site and the storage of combustible waste materials;
- Conduct periodic fire drills to ensure that everyone on site is aware of the procedures and reacts appropriately. This includes rehearsing the procedure for alerting the fire brigade;
- Liaise with the local fire brigade and invite them to undertake site inspections and familiarization tours where appropriate;
- Liaise with site security personnel where they are employed;

- Ensure that a proper maintenance regime for fire protection equipment is instituted, including the keeping of a written record of all checks, inspections and tests;
- Maintain a written record of training of site operatives and of all fire patrols and fire drill procedures;
- Where appropriate, appoint a sufficient number of fire marshals who should be properly trained to assist in the evacuation of the site and take first aid fire fighting measures where it is safe to do so.
- During an emergency, execute those duties required for the safe evacuation of everyone on site, ensuring that all staff and visitors report to the assembly points;
- Take action to promote a fire safe working environment at all times.

Small- and low-risk sites only require very simple plans, but higher risk sites will need more careful and detailed consideration, including:

1. An emergency plan, which should be available before work starts;
2. A responsible person to look after the fire precautionary plan and ensuring that everything is at place.
3. A perfect execution of the plan which ensures that proper positions are taken by the assigned people.

Further, general FIRE precautions should be taken at the event of fire accident and those can be listed as below.

A. ESCAPING OF THE WORKERS

1. Ladders may be suitable for simple projects for small numbers of able-bodied, trained staff.
2. On complex or multi-storey projects temporary proprietary stairwells should be used if reasonably practicable. It may be possible to sequence the building to commission early the permanent stairs to be used as an escape route.
3. Exit onto scaffold, if deemed part of escape plan, should be easily accessible, i.e. not through a window opening unless it is designed for the purpose, with easy access, or full height with the panel removed or balcony opening.

4. Escape routes and exits should be kept clear and clearly signed (never locked when people are on site).
5. Emergency lighting should be installed, if necessary, to enable escape. This is very important in enclosed stairways if normal lighting fails during a fire.
6. An assembly point should be identified where everyone can gather and be accounted for.



B. A FIRE ALARM SYSTEM

1. Check whether it is appropriate for the size of the building, number of storeys and complexity.
2. It should be heard by everyone working on site over normal background noise.
3. It is located so it can be activated immediately.
4. Manual bells are only used on very small sites if they can be operated away from danger.



C. FIRE FIGHTING EQUIPMENT

1. Should be located at identifiable fire points at each storey exit.
2. Serviced and maintained by a competent person.
3. Those carrying out hot work should have appropriate fire extinguishers with them and know how to use them.
4. In high-rise buildings where there is a need for fire protection, consideration should be given to installing equipment such as dry risers as the building progresses.

Smoking

A 'no smoking' policy must be established on the site with the exception of designated areas where smoking will be allowed.

Where a smoking shelter is provided it must be:

- Subject to a specific fire risk assessment;
- Constructed of non-combustible material;
- Where practicable, sited at least 10m away from any building or structure (20 metres on a site where a predominantly combustible structure is being erected);
- Provided with suitable metal ashtrays and a separate metal waste bin with a fitted metal lid;
- Provided with a suitable fire extinguisher.

The immediate area around the shelter and the shelter itself should be kept clear of combustible materials including windblown debris and vegetation.

Over time, an increased understanding of the many factors that contribute to the risk of fire has led to positive developments in the fire protection of commercial structures. Improvements in public fire protection systems and services, as well as increased use of private active or passive systems through fire-protection and loss-control engineering, has meant an overall decrease in the cost of fire. Effective undertaking of the above mentioned precautions along with an overall knowledge of safe construction practices will decrease the number of fire accidents in construction sites.

REFERENCES

1. Fire prevention on construction sites. Joint Code of Practice 7th edition Construction Confederation and Fire Protection Association May 2009; ISBN 978 1 9027 9064 0.
2. Safe maintenance, repair and cleaning procedures. Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance L137 HSE Books 2003 ISBN 978 0 7176 2202 3.
3. Storage of full and empty LPG cylinders and cartridges Code of Practice 7 UKLPG March 2004.
4. Fire safety risk assessment – sleeping accommodation Department for Communities and Local Government 2006 ISBN 978 18511 2817 4.