**ABSTRACT:**

The aim of this study was to examine fire safety measures and their viability in buildings, the required measures are technology based. Buildings should be designed in such a way that occupants can escape by themselves in case of fire. However, case-studies shows that occupants often are found incapable to escape in time and often times undermine precautional measures required to avoid or escape fire. The study methodology was based on incident evaluations and real-life experiments, such as unannounced evacuation drills. The possibilities of virtual reality for studying human behavior in fires are so far hardly adopted by researchers. Nevertheless, since in virtual environments test persons can be faced with the phenomenon of fire in a safe way, Data was also collected from books, magazines, journals and related articles, the application of a behavioral assessment and research tool in virtual reality is expected to be a valuable supplement on the existing research methods. In general little information is known about actual human behavior in an event of fire outbreak. Therefore, it is better to let the fire safety of buildings be based upon actual human behavior in fire. It is important to enlighten occupants on safety measures to be taken during fire outbreak in and around their buildings and other fire prevention methods to adopt for their safety. The study recommended suitable fire safety measures in accordance to best practices after due evaluation of existing fire safety measures as it applies to users and the effectiveness of these measures.

1. **INTRODUCTION:**

Fire is one of mankind’s greatest discoveries but can also be a great source of danger in accidents. On average 8 in 1,000,000 people are killed every year in Europe and more are hospitalized due to fire. This risk has fortunately been addressed by governments which have continuously adjusted fire safety strategies. As a positive result, in the past 30 years the amount of fire deaths dropped by 65% in Europe. Buildings notably represent an important part of the places where fire has fatal consequences. Therefore, numerous national and regional fire safety regulations have been put in place targeting buildings specifically. Plastics are used in a wide and growing range of building and construction applications, from durable pipes and window frames to state of the art insulation solutions. 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
fire safety facilities enable independent and adequate fire response performances by the building’s occupant. In practice, it appears that the measures currently required by law do not always provide the support people need in burning buildings, consequently, understanding how individuals behave in an event of fire. Fire evacuation is essential if we are to bring fire safety measures into line with occupants needs during an incident. So far as building safety is concerned, the study highlights that some of the assumptions about the existing paradigm of fire safety in building are not consistent with the knowledge set out in the literature. Fire safety has always been and continues to be a major objective for the plastics industry and an integral part of product design and manufacturing. Over the years, our industry has increased efforts to develop plastic materials, products and construction solutions with lower ignitability and limited impact on fire spread that have contributed to the ongoing reduction of fatalities, injuries and property damage due to fire.

FIRE SAFETY NEEDS
2.1 To provide an adequate level of fire safety in buildings and other structures consideration needs to be given to a whole range of connected design and use aspects. Prevention of fires is an important component of this system and it relies for its effectiveness on the safe installation and use of heat producing and energy consuming devices as well as the safe conduct of operations which may involve hazard of ignition. Precise rules for this purpose are outside the scope of this Code but reference is made to the need in various sections as appropriate.

2.2 An important aspect of fire prevention is concerned with the human responsibility in ensuring that accidental fires are not allowed to start. Training and education at all levels plays an important part in this and the management responsible for a building has a responsibility to ensure that people in the building understand the risk attached to various activities they undertake.

2.3 If a fire does occur it is essential that occupants become aware of it as soon as possible and have awareness of the actions they need to take to move to a place of safety. This requires a knowledge of the safety provisions which have been made and an easy identification of the route to follow to reach safety outside the building. In large and complex buildings this may be a progressive process through areas of increasing safety. It is not normally expected that the occupants will use on-site facilities to control a fire but where these are available it is possible that use can be made of them to tackle a small fire and extinguish it.

2.4 Un-aided evacuation of occupants may not be possible under all cases and provision may need to be made for the rescue services to give assistance particularly where the occupant mobility is below normal.

2.5 In addition to the safety of occupants within a building where a fire occurs,
the safety of others in adjacent buildings is also important. The adjacent building may be physically attached to the building on fire or it may be located a short distance away. The separation of buildings should be such that there is little chance of fire in one of the buildings spreading to the next. This consideration also requires attention to be paid to the hazard that may be created when high rise buildings are involved in a fire. The maintenance of the stability of the building can be critical and this demands higher standards to be applied compared with similar occupancies in low rise buildings.

2.6 The stability of a structure is dependent on the likely severity of a fire within that building. This is controlled not only by the amount of the fuel or the fire load but also its burning characteristics and the availability of air for combustion. A simple system divides buildings into categories on the basis of their use and adds factors of safety to take account of the size of the building. A single building can sometimes have areas with differing potential fire severities and where these can be clearly identified it is necessary to separate them by structures of adequate fire resistance.

2.7 Ideally if a fire starting in one part of a building can be contained, the hazard becomes controllable. In practice this may not be possible due to demands in connection with the use of space. However in all buildings certain parts because of their importance must be separated by fire barriers to either prevent a fire entering those areas or a fire within those areas spreading to other parts. This is termed as essential compartmentalization. In addition it is also necessary to reduce the risk due to large spaces and impose additional requirements for compartment sizes. Where required compartments should have well defined boundaries, preferably following the normal divisions in a building.

2.8 The maintenance of the integrity of such compartment boundaries is critical and strict control is needed to ensure that these are not breached by inadequate separation. This is particularly the case where pipes, ducts and other services penetrate compartment boundaries.

2.9 It is normally assumed that adequate levels of fire safety are achieved by the construction of the building and facilities provided within the building. However in buildings of a large size where large number of people may be present the fire service rescue facilities can play an important role in preventing disasters. It is therefore necessary to make suitable provisions for the fire brigade access to and within the building.

2.10 Achievement of fire safety requires an integrated approach to the provision of safety measures and their maintenance in good order. Constant vigilance is needed to ensure that fire does not become a problem for the occupants of a building.
2. PREVENTION OF FIRE

The objective of measures for fire prevention is to reduce the probability of a fire starting in a building or premises. Studies of fires have shown that most accidental fires start from three main causes;
(a) Malfunctioning of equipment
(b) Misuse of heat sources
(c) Human error

By paying attention to simple precautions it is possible to reduce the chance of a fire starting and thereby increase fire safety. The Code is not intended to provide full details of these precautions as they are properly dealt with in other standards and specifications. It however draws attention to these in general terms to provide a basis for more positive actions.

As far as the prevention of human error is concerned it is primarily a question of education and management. It is in the interests of the owners and managers of premises to ensure that the building occupants are aware of fire hazards and are encouraged to be careful in the handling of heat sources and equipment to avoid a fire starting.

3.1 Enforce good housekeeping practices; this includes implementing routines for the regular removal and disposal of waste;
3.2 Establish and maintain out-of-hours inspection and security procedures, including means of preventing arson;
3.3 Carry out routine checks, inspections, and tests, including monitoring the maintenance of heat generating equipment that could cause fires, chafing of cables, self-heating of cables due to electrical resistance and checks on fuel supplies and storage.
3.4 Issue and control work permits and associated procedures;
3.5 Instruct and supervise contractors and sub-contractors carrying out construction and maintenance operations within the building;
3.6 Avoid conditions leading to gas and dust explosion hazards;
3.7 Maintain integration with other systems (e.g. ventilation, communications).

REQUIREMENTS:
3.8 All fixed equipment which generates heat or utilizes energy, such as heaters, cookers, refrigeration units etc., shall be installed according to the provisions contained in the standards dealing with their use in buildings. The equipment shall be maintained in good working order and no repairs or modifications shall be carried out by unqualified people.
3.9 All operations which can be potentially hazardous shall be carried out in a safe manner by staff trained to undertake such operations
3.10 Operations which require the use of flammable materials shall be controlled so that only a small quantity of material necessary for the operation is present and the rest is kept in a safe place from which it can be withdrawn as needed. Such materials shall be stored in a separate protected place with
limited access to specified personnel.
3.11 There shall be a ban on smoking in those areas where flammable materials are present e.g. in stores, factories using or producing such materials. In such cases special facilities shall be made available for the staff who need to smoke.
3.12 Smoking and the use of naked flames should also be prohibited from premises where a fire can cause special problems for the escape of people, such as cinema, theatres, hospital wards, public transport etc. Notices shall be displayed to draw attention to the prohibition on smoking and where the ambient light conditions are poor the notices shall be illuminated.
3.13 Cooking appliances using bottled gas should be properly installed with connections made to a good standard, if possible the cylinder shall be located in a protected place at a safe distance from the appliance. Spare gas cylinders shall be kept in a safe place away from the appliance.
3.14 In organizations where more than 20 people work the management shall draw attention of the staff to the danger of a fire and hold regular drills and instruction courses to advise them of the safe measures to use. Large organizations shall have specially appointed people with responsibility for safety.

**FIRE GROWTH CONTROL**
4.1 The purpose of measures for fire growth control is to ensure that were a fire to start in a building it will not develop so rapidly as to prevent people from making their escape.
4.2 Hazard to occupants of a building is caused by the products of combustion of a fire and the heat which is produced. If the rate of heat generation is reduced there is a corresponding reduction in the quantities of smoke and other toxic products that may be released and consequently the risk to occupants can be minimized.
4.3 Fire statistics indicate that most fires start in contents and consequently the presence of less flammable contents is the first line of defense. However it is not possible to control contents in all buildings and such control may be restricted to only those occupancies where special problems exist.
4.4 Once the fire reaches the surfaces of the room enclosure their nature has a strong influence on its rate of growth. Easily ignitable surface materials and those which release large quantities of smoke can create special difficulties for the evacuation of occupants and could invalidate the provisions made for this purpose. The main contribution is made by wall and ceiling surfaces, in some cases the control of floor coverings may be needed for additional safety.
4.5 It is important to ensure that nothing is done during the use of a building, by over-coating or decoration which impairs the performance of surfaces as originally provided.
FIRE SUPPRESSION EQUIPMENT

The following protection systems are desirable where resources allow:
- An automatic sprinkler system (fire suppression system): This should be designed, installed and maintained to the relevant standard;
- A smoke ventilation system: This may be manually or automatically operated.

5.1 Sprinkler systems

An automatic fire suppression system should be provided in accordance with the relevant standards. It is recommended that the system should be installed and maintained by a contractor who carries appropriate third party accreditation.

Water is used to suppress most fires, so an adequate water supply is crucial to fire service operations. The supply must deliver an adequate amount of water through a distribution system to the locations needed. The system can serve manual firefighting (typically through fire hydrants), fire standpipe systems, fire sprinkler systems, other water-based suppression systems, and non-fire needs (industrial, commercial, domestic, etc.) Municipal water supply systems (including the distribution system and hydrants on public land) are generally under the jurisdiction of a local water authority. Municipal systems also feed water to private property for both fire and non-fire needs. The private property line is usually the boundary between the public portion (under the water authority) and the privately-owned portion. Property owners are primarily responsible for the private portion; however, designers and contractors share responsibility during the design and construction phases, respectively. Private water supply systems are those contained fully on private property — for example, when the water supply consists of an on-site tank, pump, and piping system. The on-site system may feed private fire hydrants and/or building suppression systems. In rural and suburban areas where a municipal water supply system is not available, static water sources such as lakes, ponds, cisterns, fountains, and swimming pools are often used. Pumpers draft water from static water sources to pump water through hose lines. The capacity of static water sources should take into consideration the frequency of drought conditions in accord with applicable codes or insurance standards.

The relevant hazard classification of the system for use in high bay pharmaceutical warehouses is typically defined as 'ordinary hazard' (OH3 (BS EN 12845) or OH2 (NFPA 13)). Wet pipe sprinklers should be used in high bay warehouses – this means that the sprinkler network is fully charged with water at all times. The use of the alternative dry pipe system could result in an unacceptable time delay between the activation of a bulb and the flow of water through the sprinkler head. Where the goods are stored in pallet racks the provision of in-rack sprinklers as well as roof level sprinklers is recommended. The sprinkler bulbs in the in-rack sprinkler heads activate at a much lower
temperature than those at roof level; consequently the firefighting water is discharged in a more localized area. This means that the fire can be contained with a lower amount of water damage than would be expected from the discharge of roof level sprinklers. In cold climates, the installation may require protection against freezing if the pipework passes through unheated spaces. Freeze-protection can be achieved using anti-freeze liquid or electrical trace heating. Where sprinklers are installed in cold rooms or freezer rooms, dry pendant drops should be used. With this arrangement, sections of dry pipe serve the relevant risk area and the actual flow valves are located outside the cold store. This prevents the water in the system from freezing.

5.2 Smoke ventilation systems
Automatic smoke vents are generally provided to assist means of escape from the building. By venting smoke build-up at high level, the occupants can escape from the building underneath the smoke layer in reasonably safe conditions. Additional manually operated smoke vents are generally provided to aid the fire and rescue service with smoke clearance once the fire has been extinguished. Where both sprinkler systems and smoke vents are provided in a building the interaction between them must be carefully considered. Research by Factory Mutual in the early 1970s, which remain relevant, showed that the provision of automatically operating smoke vents can cause delays in the operation of sprinkler systems. The reason for this is that automatic smoke vents open when triggered by smoke, whereas sprinklers operate when heat is detected. As smoke is generally detected more quickly than heat, Factory Mutual concluded that sprinklers would perform more effectively if there were no vents. Their reasoning was that the building would fill with smoke; this creates low oxygen conditions which limits combustion, allowing the sprinklers to extinguish the fire more effectively. However, where life safety is the predominant requirement and a smoke control solution is used to protect the escape routes within a building, current guidance requires the smoke vents to operate automatically; the vents will therefore activate before the sprinkler system. Alternatively, if the fire service response time is short, and the sprinkler system is provided with fast response heads, the smoke ventilation system may be activated by the flow switch in the sprinkler supply.

Some fire safety strategies
Fire protection equipment
Fire extinguishers, fire hose reels, fire hydrants, hydrant valves, fire blankets and fire protection systems such as automatic fire detection and alarm systems, automatic fire sprinkler systems and emergency warning and intercommunication systems.
**Automatic fire detection system**
A system of fire detectors installed in a building or other space which are connected to a control panel capable of providing an automatic warning when a detector responds to a fire.

**Automatic sprinkler system**
A sprinkler installation provided with a fusible link or other sensing device which responds to a fire and sprays water on the contents. The system requires sprinkler heads, water supply and suitable control valves.

**Automatic release mechanism**
A device which allows a door held open to close automatically on receiving a signal from a fire alarm system, or a detection system or a manually operated switch.

**Automatic self-closing device**
A mechanical device to close a door after it has been opened and released.

**Basement**
Part of a building below surrounding ground level which is intended to be used for accommodation, car parking or other purposes.

**Boundary**
Demarcation between buildings adjacent to each other or between a building and the center of a road, street or stream.

**Cavity**
Concealed space within building elements or between building elements, such as in a hollow wall or between a ceiling and a roof.

**Ceiling**
Underneath side of a floor, or a separate construction provided below a floor or a roof with a gap above.

**Circulation space**
Common space used by occupants of a building to gain access from a room to an exit or a stairway or a lobby. It may be a corridor or a foyer or an entrance hall.

Fire safety is the set of practices intended to reduce the destruction caused by fire. Fire safety measures include those that are intended to prevent ignition of an uncontrolled fire, and those that are used to limit the development and effects of a fire after it starts.
Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building. Threats to fire safety are commonly referred to as fire hazards. A fire hazard may include a situation that increase the likelihood of a fire or may impede escape in the event a fire occurs. Fire safety is often a component of building safety. Those who inspect buildings for violations of the fire code and go into schools to educate children of fire safety topics are known as fire prevention officers in order to educate them on fire safety.

COMMON FIRE HAZARDS

Some common fire hazards are:

1. Kitchen fire from unattended cooking, such as frying, boiling and simmering.
2. Electrical systems that are overloaded, resulting in hot wiring or connections, or failed components.
3. Combustible storage areas with insufficient protection.
4. Combustibles near equipment that generates heat, flame, or sparks.
5. Candles and other often flames
6. Smoking (cigarettes, cigars, pipes, lighters, etc.).
7. Equipment that generates heat and utilizes combustible materials.
8. Flammable liquids and aerosols.
9. Flammable solvent (and rags soaked with solvent) placed in enclosed trash cans.
10. Fireplace chimneys not properly or regularly cleaned.
13. Household appliances-clothes dryers, curling irons, hair dryers, refrigerators, freezers.
14. Chimneys that concentrate creosote.
15. Electrical wiring in poor condition.
16. Leaking Batteries.
17. Personal ignition sources-matches, lighters
18. Electronic and electrical equipment

3. FIRE PROTECTION EQUIPMENT

3.1 Equipment Maintenance

The owner of a prescribed building must make sure that all installed equipment is maintained, so that it performs to the standard to which it was originally designed. The owner or occupies of a building, in which fire protection equipment is required to be installed must have the equipment tested maintained and repaired by a permit holder and keep a record of all testing and maintenance worked carried out including the type, date and result of any test.
the name of the person undertaking the test, the name and certification of the person carrying out any maintenance or repair, the date it was carried out and any maintenance or repair work required.

3.2 Permit Holders

All permit holder are obliged to service fire protection equipment in accordance with the Australian standards. For systems such as automatic sprinkler systems etc.

3.3 Permit Exemptions

A person may install a portable fire extinguisher, fire blanket or standalone smoke and/or heat alarm not connected to a monitoring system, and replace batteries in these smoke and/or heat alarms, without a permit. An authorized plumber may install, maintain and repair a fire hydrant or hydrant value without a permit.

4. ACCESS TO EQUIPMENTS AND WATER SUPPLIES

4.1 Fire protection Equipment.

The owner or occupier of a building must ensure that reasonable access by fire fighters to any fire protection equipment or essential services is available in or on the ground of:

a. The building or
b. A place in which 4.2 (below) applies

4.2 WATER

An owner or occupier of the following must ensure that a suitable water supply for fire-fighting is available.

a. A building, timber yard, yard or unfenced land, situated within a city or town boundary used for the storage of more than 10 tons of combustible material for commercial purpose;
b. A wharf or nearby land used for the storage of goods in transit, or
c. Land used for the storage of hazardous and flammable material.

5. EXIST EXIT SIGNS AND LIGHTING

The owner or occupier of a prescribed building must ensure;

a. Locking devices are not fitted on a door forming part of any required exit.
b. Access to doors, corridors or fire escape that form part of an emergency exist or exit route are not blocked restricted or made narrow;c. Exit signs and emergency lighting operate effecting and are clearly visible at all times, and
d. Ceilings, walls, floors and stairs of a fire exit, or path of travel to an exit are only covered with the right materials.
6. FLAMMABLE MATERIAL COVERINGS

An occupier must not decorate a prescribed building with flammable materials in such quantity or in such a way as to constitute a fire hazard.

7. PRECAUTIONS

7.1 Hot work.

Hot work includes grinding, welding, thermal or oxygen cutting or heating, and other related heat-producing or spark-producing operations. Before commencing hot work in a building a person must;

a. Inform the owner or occupier of the building of their intention to carry out hot work, and
b. Perform all hot work in accordance to the rules.

7.2 Potential fire

An occupier of a workplace where dust, gas or hazardous residue is produced that has the potential to form an explosive mixture, may prepare rules for persons within that workplace so as to minimize the chance of a fire or explosion and submit them to the chief officer for approval.

8. BUILDING FIRE SAFETY

Building fire safety comprises a “package” which incorporates construction methods mechanical and electrical devices, management practice and organized human response tailored to reduce the impact of fire upon the occupants, the building, its contents, the attending firefighters and any neighboring property. In the context of building fire safety, fire impact is considered to be any threat to life and may include adverse environmental impact from toxic products stored on the premises.

Building fire safety cannot be defined as a “single system”, it relies upon a group of “sub systems” to form a complete “package”. More often than not, if one of the “sub system” is removed, the whole “package will collapse and the occupants within the building will face on unacceptable risk in the event of outbreak of fire. For simplicity the “package can be broken down into the following “sub systems”, comprising:

8.1 Occupant Training and Education

An essential part of any building fire safety system (probably the most important part) is training and education of the occupants in matters of the safety. Every conceivable device, can be placed in a building but if the occupants are ignorant of what a fire alarm sounds like, what are safe and unsafe work practices or where the exists are, then the devices will not achieve a fire safe building. All too often occupant training, fire drills and safe work practices (all required by the work Health and safety Act 2012) are overlooked or given only superficial attention. A management plan, addressing all of these facts together with what to do after fire has been extinguished to minimize its consequential effect, is very necessary if the overall fire safety system is to be effective.

8.2 Means of Escape from the building
This is an essential part of the fire safety system. A safe, illuminated, well identified way out of the building is required in order that the building occupants can escape a fire (or other). Emergency. Often more than one escape route is required so that occupants have an alternative exit if one cannot be reached because of smoke or fire. These exits be kept clear at all times. Storage of materials in exists is a common hazard and security problems are often overcome by gally locking fire escape doors which places the lives of the building occupants at risk if a fire occurs.

8.3 Fire Load

Fire load is a stem used to describe how much combustible materials is contained in a building and usually applies to the building contents. If the fire load is minimized then fire impact will be reduced. It is the fire load and how it is arranged (e.g furniture layout) or in the case of a storage area, how the combustible goods are stored which determines the rate of fire growth and hence, the rate of heat release from the burning materials. A large log chopped up into kindling wood presents the same fire load as the whole log, however, the kindling will quickly burn, releasing all its heat in a short time whereas the whole log (if it can be ignited in the first instance) will take long time to burn and release its heat. Storing combustible materials in separate piles with a space between each pile is one way to reduce the impact of a fire in its early stages (assuming that only one pile initially catches fire). This will also initially slow down the rate of fire spread (growth) in the stored materials because the fire will need to jump from pile to pile.

8.4 Ignition potential

Ignition potential describes the likelihood of a fire starting. There is no ignition potential in a bare room with no building services or people in it. Introduce people and you have an ignition potential, especially if the people smoke. People also make mistakes (human error). People, gas/electrical services, combustible materials, flammable liquids and tools of trade generate an ignition potential. If a room were full of all these things and the occupants was a compulsive arsonist, we would consider the ignition potential to be extreme. If we reduce the ignition potential, we reduce the risk of a fire outbreak.

8.5 Compartmentalization and Structural fire Resistance.

If the fire is contained within a room or space (known as a compartment) by the nature of its construction, its impact on other parts of the building will be minimized. Naturally the people in the compartment will need to get out before the fire effects them. A room of solid brick with no windows and a sturdy door would be a good fire compartment, because it would be difficult for the heat and smoke to escape. A room constructed of glass would be a poor fire and smoke compartment because as the fire grows, heat would shatter the glass
this letting heat and smoke out and fire to spread.

Compartmentalization is called a “PASSIVE” system (i.e. just by being there it inhibits the spread of fire). It relies upon structural stability, under fire conditions, the ability to withstand the effects of fire without collapse.

**8.6 Firefighting systems**

Firefighting systems are those which influence in the fire growth process. Such systems can be used by trained occupants or attending firefighters and include a fire extinguisher, fire hose reel, or fire hydrant. Other systems may be automatic such as a fire sprinkler system. Automatic systems are considered to be superior, because they do not rely on people to manually operate them. Firefighting systems are known as “DYNAMIC” systems because they do something, they actively intervene in the rate of fire growth. The greater the extinguishing capability of the system and the earlier in the fire growth period it can be applied, the lower the fire impact, hence, the preference for sprinkler systems by most fire engineers and firefighting professionals.

**8.7 Fire Detection Alarm and Evacuation Warning systems.**

The simplest fire detection and alarm system is the residential smoke alarm now installed in most homes. The smoke alarm alerts the building occupants that a fire has been detected. A fire detection system may in addition to alerting occupants, automatically notify the fire brigade of the fire. If fire detection and alarm systems operate very early in the fire growth stage, building occupants may be able to extinguish a small fire. An evacuation warning system may be activated by a fire detection or firefighting system or manually by a chief fire warden for other circumstances such as a bomb threat. Many evacuation warning systems also have an intercommunication system such as a phone system and/or a public address system which can be used to pass information to the building occupants and fire wardens, who will orchestrate an orderly evacuation, or move occupants to safer parts of the building.

**8.8 Smoke Management Systems**

In many buildings occupied by the public, especially large buildings such as shopping Centres, smoke from a fire can spread and descend so as to block exits and make occupant escape difficult or, in the extreme, impossible. In such instances, the installation of a smoke management system, which will slow down the rate of smoke spread, is recommended. Such systems often involve exhausting the smoke at ceiling level where hot smoke will naturally collect due to its buoyancy (because it is hot it is lighter than the surrounding air). Other methods employ the opening of apertures in the roof or panels at high level in the walls of a building. Provided fresh air is allowed to naturally flow into the building below any smoke layer, these measures will permit the smoke to escape from the building rather than fill it up. Another way to stop smoke infiltrating from floor to floor in a multistory building is to pressure the non-fire floors with fresh air at a pressure higher than that of the fire floor.
EXIT SIGNS AND LIGHTING
The owner or occupier of a prescribed building must ensure:
6.1 locking devices are not fitted on a door forming part of any required exit.
6.2 access to doors, corridors or fire escapes that form part of an emergency exit or exit route are not blocked, restricted or made narrow;
6.3 exit signs and emergency lighting operate effectively and are clearly visible at all times.
6.4 ceilings, walls, floors and stairs of a fire exit, or path of travel to an exit, are only covered with materials that comply with the standard way of construction.
6.5 The minimum headroom at any part of an escape route shall not be less than 2 m, when passing through doorways this may be reduced by 100mm due to the depth of the door frame.
6.6 The minimum width of the escape route and exits shall not be less than 800 mm. The width shall be adjusted according to the number of people expected to use the route.
6.7 In assessing the width of the exit where a door is provided the width may be locally decreased by not more than 100 mm due to the door frame.

FIRE SAFETY TRAINING
7.1 Fire safety training: All employees should be given fire safety training by a person who is competent in the subject and who understands effective training methods. If relevant expertise is not available within the organization, an independent expert – for example from the fire brigade – should be engaged to provide training.
Fire safety training should start with induction training on the first day of appointment of new staff. There should be refresher training at least once a year to ensure that all staff are familiar with the fire precautions for the workplace and are reminded of the actions to take in an emergency. More frequent training should be given where there is a high turnover of staff, or a high risk of fire.
All staff, including part-time staff, security staff, cleaning staff and contractors should be trained and instructed in:
a. Risk awareness;
b. Smoking policy;
c. Basic fire prevention;
d. Good housekeeping;
e. The fire routine:
   − Actions to be taken when a fire is discovered or an alarm is heard;
   − Knowledge of the escape routes and exits, especially those not in regular use;
   − Raising the alarm and the location of alarm indicator panels;
   − Arrangements for calling the fire and rescue service;
   − Special provisions for assisting disabled people;
   − Location of fire-fighting equipment; − Selection and use of fire-fighting
equipment, including hand held fire-fighting equipment (in larger premises it may be appropriate to train specific staff instead of all staff);
- The importance of fire doors and the need to close all doors at the time of a fire and/or on hearing the fire alarm;
- Process shutdown and shutting down of non-essential equipment, stopping machines and processes and isolating power supplies if appropriate;
- Evacuation procedures.

f. Incident reporting procedures, including for “near miss” events and false alarms. A “no blame” reporting culture should be encouraged. Supervisory and other staff who have specific responsibility for fire safety should receive detailed instruction in their own duties and appropriate refresher training at least once, and preferably twice a year. Staff with particular responsibilities are likely to include: Department heads; Fire marshals or fire wardens; Floor supervisors; Security staff (including night security patrols); Engineering and maintenance staff; Receptionists and telephones.
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