

CHAPTER 8

OTHER SYSTEMS

8.1 EXIT LIGHTING & EXIT SIGN

8.1.1 Exit Lighting

- (a) Exits shall be provided with artificial lighting facilities to the satisfaction of the requirements under this Code.

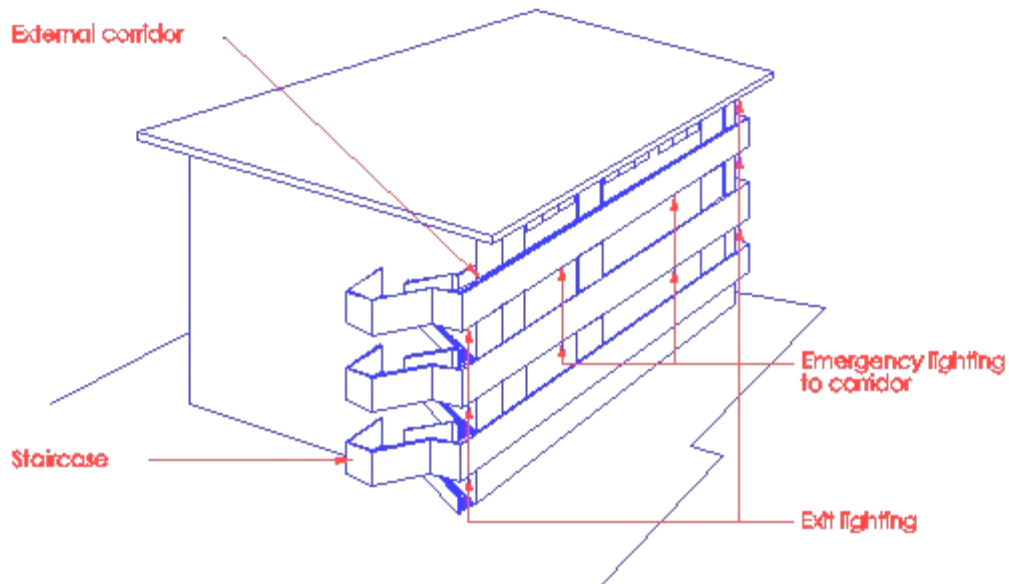


Diagram 8.1.1(a)

- (i) When fire occurs in a building, the degree of visibility in corridors, staircases and passageways plays a vital part in facilitating evacuation of occupants.
- (ii) Street lightings should not be relied upon to provide the emergency lighting as they could malfunction or there could be district power failure during an emergency or they could be shaded by trees/building structures. All buildings shall be self-sufficient in the provision of artificial lightings without any dependence on other or external sources.
- (b) The minimum illuminance to be provided for all exits and the spacing for luminaires shall be in accordance with the requirements in SS CP 19 Code of Practice for the Installation and Maintenance of Emergency Evacuation Lighting and Power Supply Systems in Buildings.

- (c) The delay between the failure of the electrical supply to normal lighting and the energization of the exit lighting shall not exceed 1 second.

(No illustration)

SS.CP 19 requires that horizontal illuminance in the centre line of any escape route shall not be less than 0.5 lux, measured at the floor, for minimum duration of 1 hour.

The positioning of lighting shall be so arranged that the failure of any single lighting unit, such as the burning out of a bulb, will not leave any area in darkness.

For critical areas, such as exit staircases, internal and external exit passageways, there shall be no interruption of illumination exceeding 1 second during the changeover from one energy source to another. This would ensure that occupants could see their way down the exit staircases without fear of tripping. For ease of reference, the value of 1 foot candle is equivalent to 10 lux, measured at the floor.

8.1.2 Emergency Lighting for Corridors and Lobbies

- (a) Emergency lighting shall be provided in all corridors and lobbies of all buildings except purpose group I.
- (b) The minimum level of illuminance, the spacing of luminaires and the maximum delay for emergency lighting required in this Clause shall be the same as that for the exit lighting.

(No illustration)

The requirements for provision of emergency lighting for corridors and lobbies in respect of:

- *min. level of luminance;*
- *spacing of luminaires; and*
- *delay (1 second) for the emergency lighting are similar to clause 8.1.1.*

Corridors and lobbies, including routes of escape, smoke stop lobbies, common lobbies are required to have min. 0.5 lux, measured at the floor, for minimum duration of 1 hour, notwithstanding that occupants may be presumed to be familiar with exit facilities by reason of regular usage of such facilities.

The emergency lighting system shall be so arranged to provide the required illumination by means of standby generator set upon failure of public utility supply. The changeover from one energy source to another shall not incur a delay of more than 15 seconds. This is consider a reasonable short time for the generator to start. However, where batteries are used for emergency power, they must be the type that will automatically be kept charged and

be able to perform for a minimum duration of 1 hour.

8.1.3 Emergency lighting for occupied areas

(a) Emergency lighting shall be provided in the occupied areas following the guideline below:

(i) along paths leading to corridors, lobbies and exit in all occupied areas where the direct distance from the entry point of the corridor, lobby or exit to the furthest point in the area concerned exceed 13m; or

(ii) over the whole of such area if there are no explicit paths leading to corridors, lobbies and exits.

(i) Room having a direct distance $> 13\text{m}$ and designed with defined escape path shall be provided with emergency lighting.

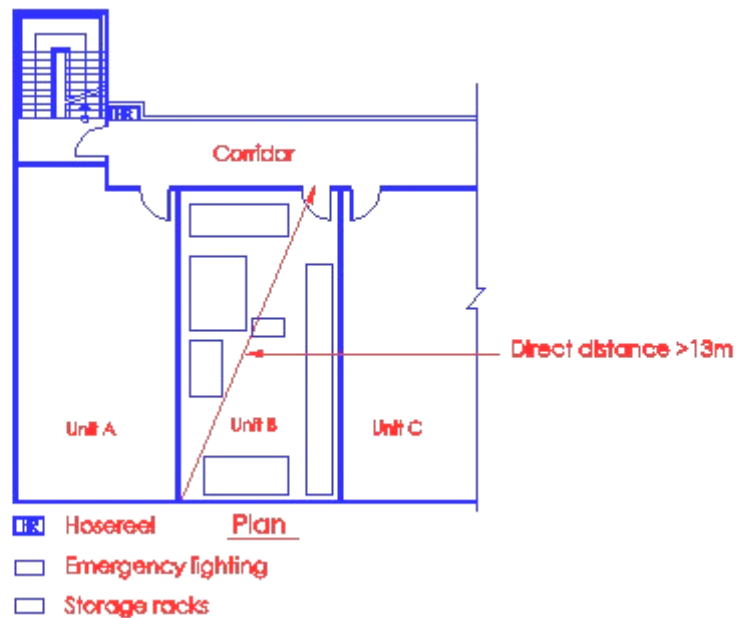


Diagram 8.1.3(a)(i)

(ii) Room having a direct distance $> 13\text{m}$ and not provided with defined escape path or where escape path is not defined, emergency lighting shall be provided to cover the whole floor space. The level of illuminance shall comply with CP 19.

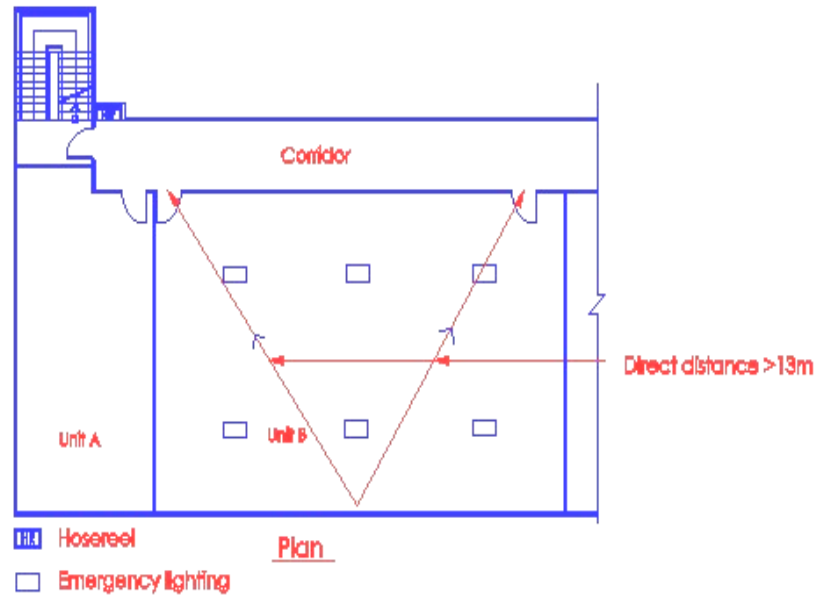


Diagram 8.1.3(a)(ii)

(b) Notwithstanding the requirements in (a) above, emergency lighting shall be provided in the following locations:

- (i) Lift cars as stipulated in this Code;
- (ii) Fire command centres;
- (iii) Generator rooms;
- (iv) Basement car parks;
- (v) Fire pump rooms;
- (vi) Areas of refuge within the same building.

8.1.3 (c) The minimum level of illuminance shall comply with the requirements in SS CP 19.

(d) The delay between the failure of the electrical supply to normal lighting and the energization of the emergency lighting for occupied areas shall not exceed 15 seconds.

(No illustration)

Emergency lighting is required to be provided to lift car, generator rooms & fire pump rooms to enable maintenance personnel to evacuate safely in times of power failure. The emergency lighting would help fire fighters if there is a need to gain access into any of these rooms or spaces.

8.1.4 Emergency lighting for fire fighting facilities

- (a) Fire alarm panels, fire alarm call points and fire fighting equipment shall be adequately illuminated at all times so that they can be readily located.
- (b) The minimum level of illuminance shall comply with the requirements in SS CP 19.
- (c) The delay between the failure of the electrical supply to normal lighting and the energization of the emergency lighting for fire fighting facilities shall not exceed 15 seconds.

Emergency lighting to breaching inlets/alarm call point

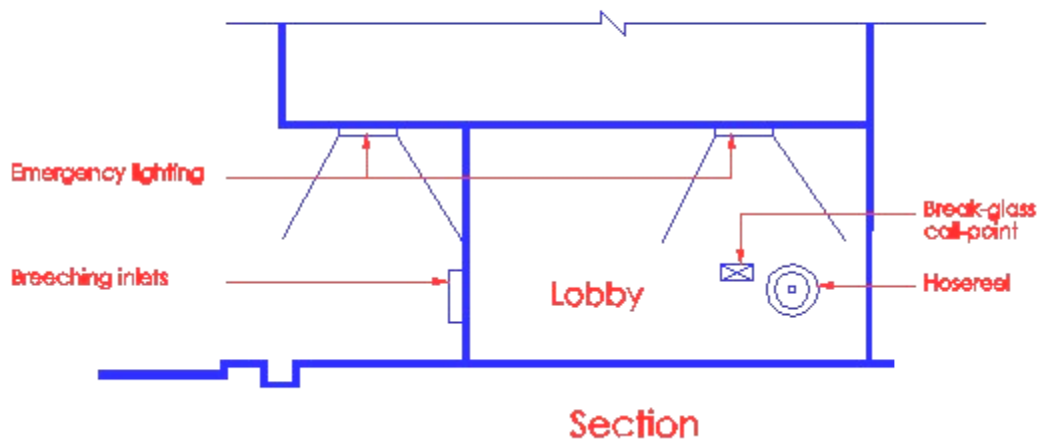


Diagram 8.1.4

The emergency lighting system shall be so arranged as to provide the required illumination automatically at places where fire fighting facilities are provided e.g. breaching inlets, fire alarm panels, fire alarm call points, sprinkler control valve etc.

This is to facilitate the occupants and fire fighters to locate the fire fighting facilities. The emergency illumination shall not incur a delay of more than 15 seconds during the changeover from normal supply to secondary source via generator supply.

8.1.5 Secondary Source of Power Supply

- (a) The delay for energization of the exit and emergency lighting systems between normal supply and the secondary source shall be as stipulated in the relevant clauses.
- (b) Duration of the secondary source of power supply shall comply with the requirements in SS CP 19.
- (c) Location, arrangement and control, installation of electrical wiring of the secondary source of supply, be it in the form of battery, standby generator, inverter or other accepted equipment, shall comply with the requirements in SS CP 19.

(No illustration)

- (i) *Where maintenance of illumination depends upon changing from normal power supply to secondary source via generator sets, there should be minimal delay during the switchover, which should not exceed 15 seconds;*
- (ii) *The emergency lighting system shall be capable of maintaining a supply of at least 1 hour, long enough for evacuation of occupants and to serve the initial stage of fire fighting;*
- (iii) *Generally, the time for changeover should not exceed 15 seconds for emergency lighting to be provided at occupied areas and at places where immediate visibility is not essential. As for critical areas such as exit points and along defined exit routes the min. level of lighting must be available at all times so that occupants when making their escape would not panic.*

8.1.6 Luminaries

All exit and emergency luminaires required by this Code shall be of approved type as specified in SS CP 19.

(No illustration)

Besides complying with SS CP 19, all exit and emergency luminaires should be of the approved under the PSB Product Listing Scheme and bear PSB label or mark

See Cl.8.1.7 (f)

8.1.7 Exit and Directional Signs

- (a) The entrance to every exit on every floor shall be clearly indicated by an exit sign placed over the exit door. Such signs shall be placed so as to be clearly visible at all times.

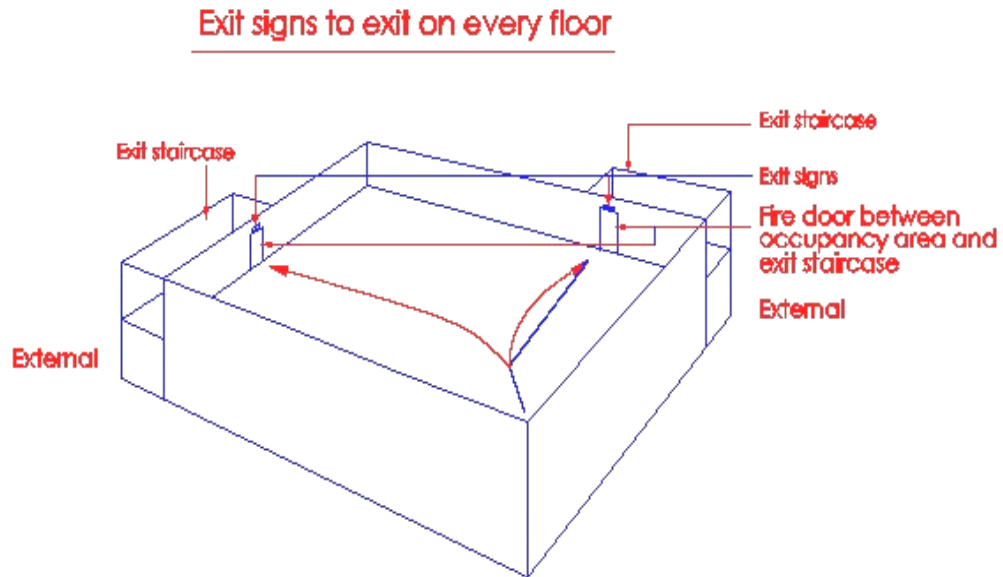


Diagram 8.1.7(a)

Decorations, furnishings or equipment, which impair visibility of an exit sign shall not be allowed; nor shall there be any brightly illuminated sign (for other than exit purposes), display or object in or near the line of vision to the required exit sign.

- (b) Directional signs

In long corridors, in open floor areas, and in all situations where the location of the exits may not be readily visible, directional signs shall be provided to serve as guides from all portions of the corridors or floors.

Fig (i)

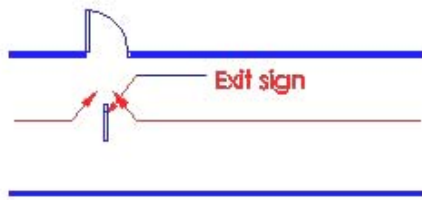


Fig (ii)

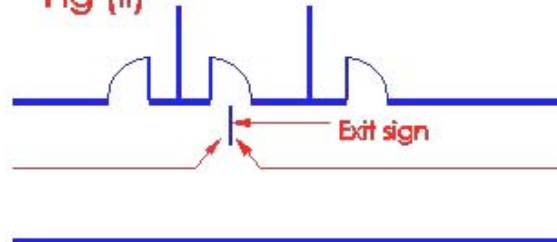


Fig (iii)

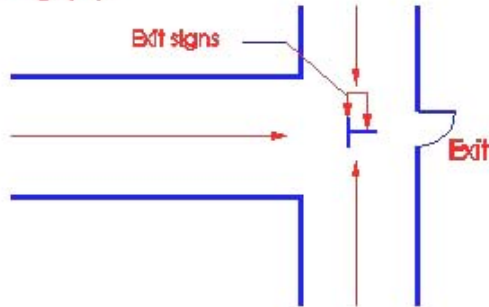


Fig (iv)

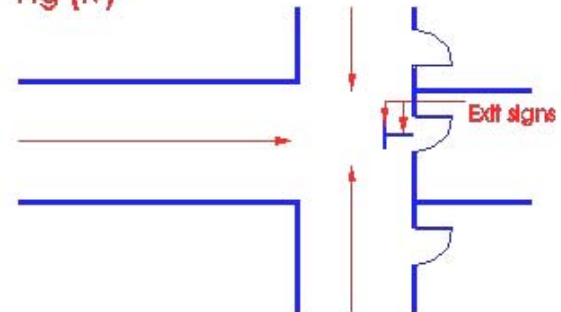


Fig (v)

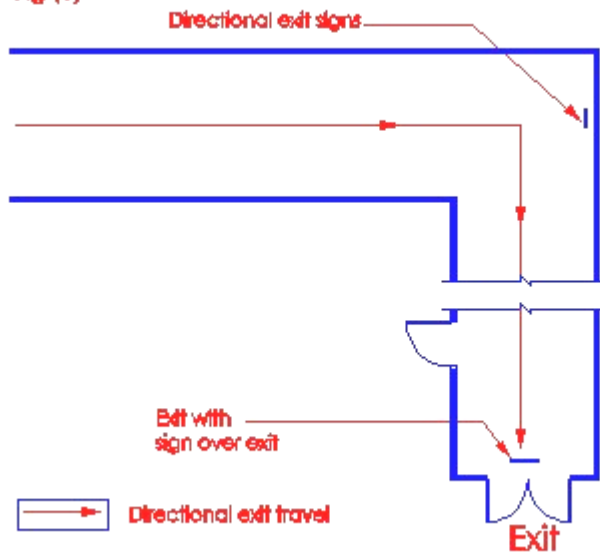


Diagram 8.1.7(b) - 1

The above shown a few variations of the placing of direction signs. Access to exits shall be marked by readily visible signs in all cases where the exit or way to reach it is not immediately visible to the occupants. Sign placement shall be such that no point along the exit route is more than 30m from the nearest visible sign.

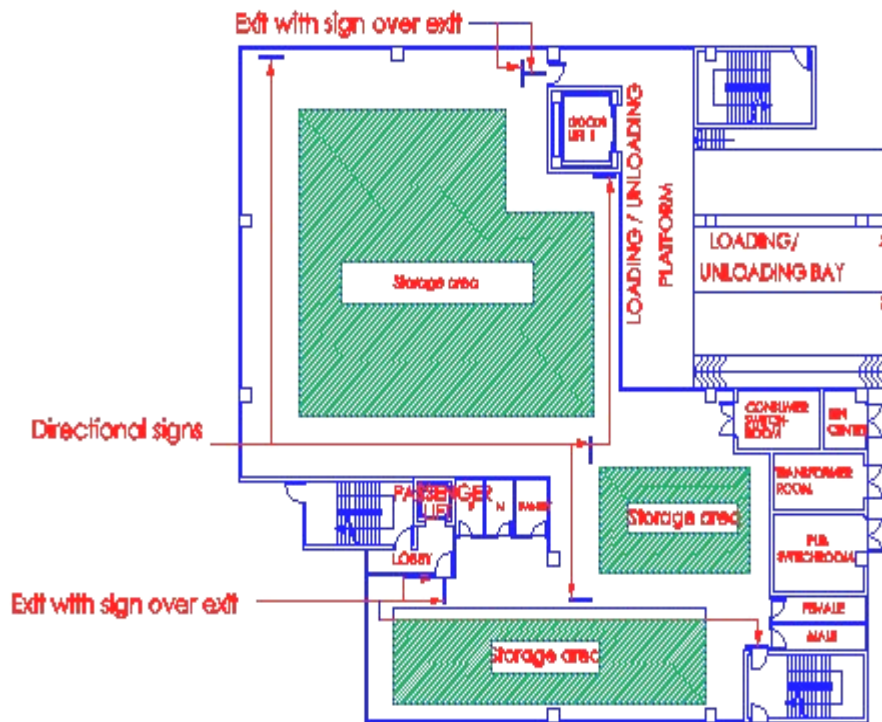


Diagram 8.1.7(b) – 2

In factory/warehouse premises such as plant, high storage rack area, which may be blocking the vision to exits and directional exit signs, either the signs are shifted or additional signs be provided to help occupants to evacuate in times of emergency.

8.1.7 (d) Signages

Where the Relevant Authority has allowed under subclause 2.3.5(d) upper storey staircase to be continuous with that serving the basement, appropriate signages, including pictorials shall be placed at strategic location inside the staircase to direct occupants out of the building in times of emergency.

Applicable only if staircase serves 4 storeys (including basement) or less and entry into the staircase from the basement is through a 1 hour rated fire door

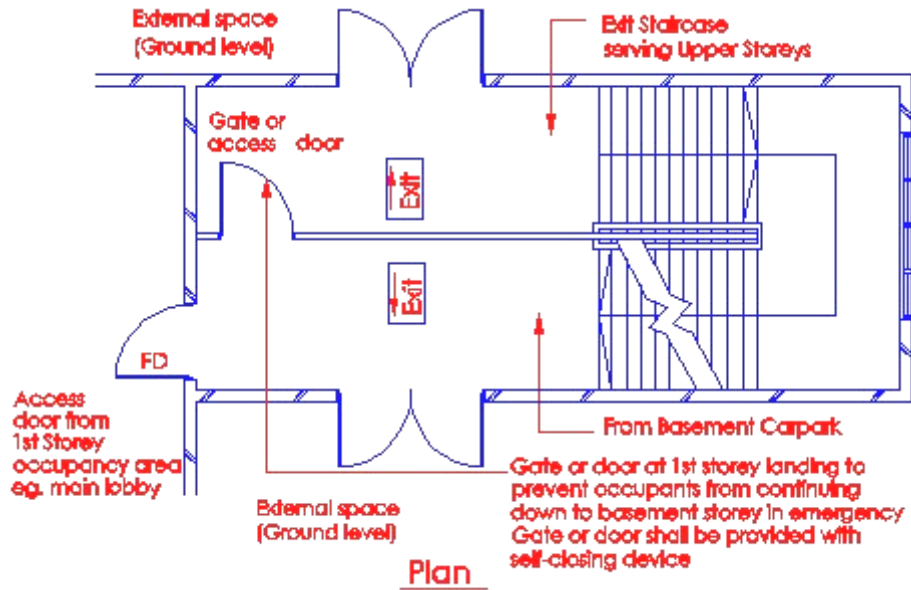


Diagram 8.1.7(d) - 1

This can be done by placing a physical barrier to prevent occupants from continuing below the level of exit discharge into the basement. This helps to warn occupants in the staircase enclosure that they are on the level of exit discharge.

- (i) Clause 2.3.5(d) allows upper storey staircase to be continuous with that serving the basement, which is naturally ventilated.
- (ii) To prevent occupants exiting continuously from upper storeys into the basement floor during an emergency, a physical barrier in the form of a door or a gate (as shown above) could be provided across the staircase landing at ground level to separate the discharge route of upper storeys from the basement staircase.
- (iii) In addition, appropriate signages should be provided inside the staircase enclosure to direct occupants out of the building at ground level.

Staircase serving more than 4 storey inclusive of basement

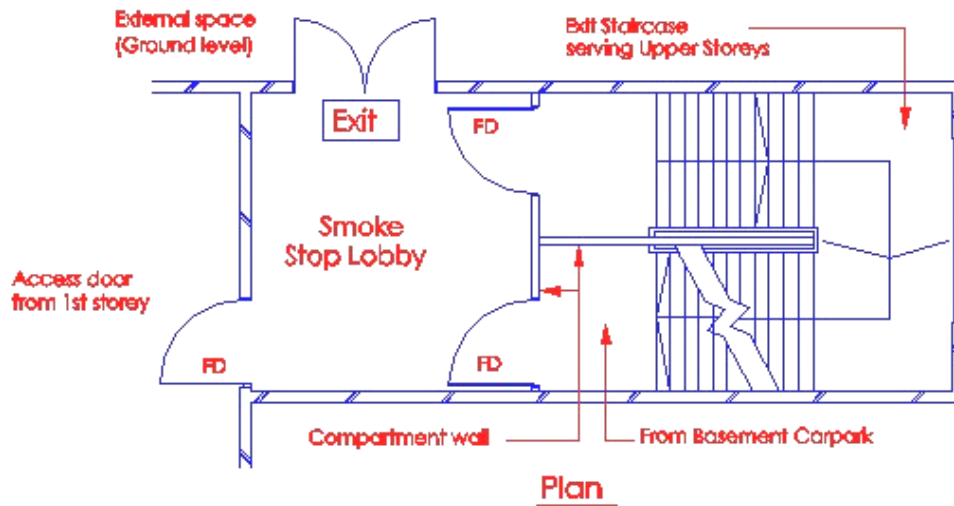


Diagram 8.1.7(d) - 2

- (e) The legends, dimensions, design and installation of the exit signs and directional signs shall comply with SS CP 19.

(No illustration)

All exit and emergency luminaries should be of the approved type under the PSB Product Listing Scheme and bear PSB label or mark.

Self-illuminating signs

- 8.1.7 (f) Self-illuminating exit and directional signs with letters in green and powered by radioactive material are allowed for use in buildings, provided the signs comply with BS 5499 Part 2, SS 364 and SS CP 19 under sub-clause 8.1.7(e).

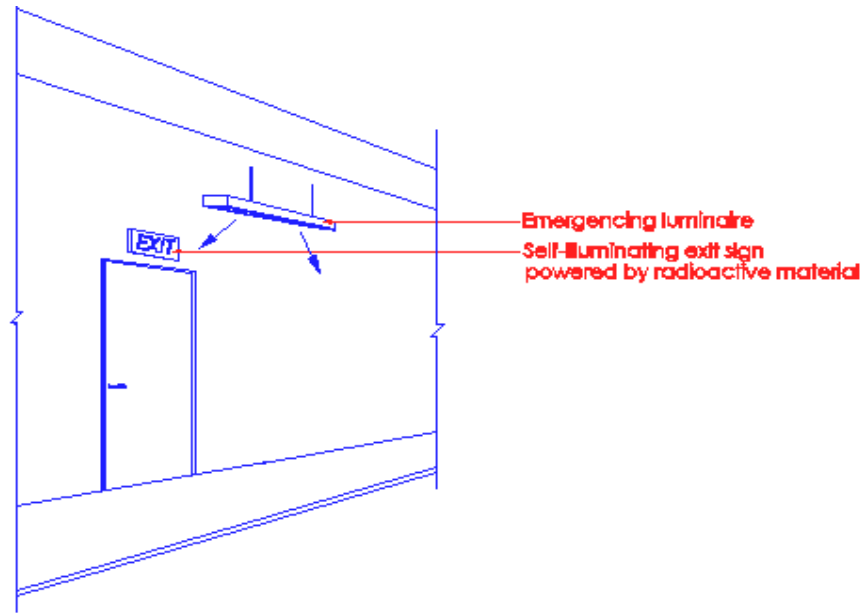


Diagram 8.1.7(f)

(No illustration)

Self-illuminating exit signs powered by radioactive material do not have the required minimum 50 lux illuminance on the face of the signs. To meet the requirement of CP 19, the signs can be externally lit by a nearby emergency luminaire. The light from the emergency luminaire shall be able to provide the required minimum 50 lux illuminance on the face of the sign. Building owners must observe the safety requirements on the disposal of signs when the life span expired.

SCDF (FSSD)'s circular dated 24 Sept 2003

RIs (arch) are only required to check on the provision/location of the emergency luminaries, including self-contained light fittings, in the buildings. For the emergency lighting that are powered by battery-pack or central battery system or uninterrupted power supply system (UPS) and linked to emergency generator set, the RIs (M&E) shall conduct test on the emergency lighting systems to ensure that they conform to CP 19:2002.

8.2 VOICE COMMUNICATION SYSTEM AND FIRE COMMAND CENTRE

8.2.1 System requirements

- (a) One way emergency communication system and a fire command centre shall be provided as follows:
 - (i) For all large industrial buildings under Purpose group VI (gross floor area greater than 5000 sq m).

Construction

- (ii) For all buildings belonging to purpose group VI of more than 24m in habitable height.

8.2.1(b) Two way emergency communication system shall be provided between the Fire Command Centre, under sub-clauses 8.2.1(a), (i) and (ii) above, and the following area:

- (i) every fire fighting lobby, including 1st storey;
- (ii) all fire fighting related mechanical equipment rooms inclusive of sprinkler pump room, wet rising main pump room, hose reel pump room, switch rooms and generator rooms;
- (iii) all rooms housing smoke control equipment;
- (iv) all lift machine rooms;
- (v) fire lift;
- (vi) each area of refuge; and
- (vii) Air - handling control rooms.

8.2.2 Where a one way or two way emergency communication system is required by this code, it shall comply with the requirements stipulated in SS CP 25: Code of Practice for Emergency Voice Communication Systems in Buildings

(No illustration)

8.2.3 Fire Command Centre

- (a) A Fire Command Centre shall be provided in any building which requires any of the following installation:
 - (i) fire lift;
 - (ii) emergency voice communication system; and
 - (iii) engineered smoke control system.

(b) Size

A Fire Command Centre shall be of adequate size to house all the terminals and supervisory/control equipment, etc of the building's fire protection/detection systems and a free working space of at least 6 sq m.

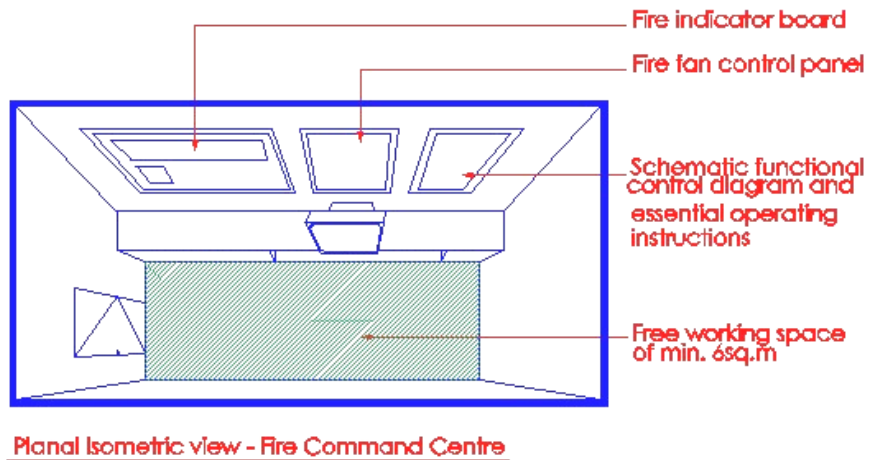


Diagram 8.2.3(b)

The actual size of a fire command centre should be provided at plan submission stage. The net minimum working space of 6 sq m shall exclude equipments and furniture.

(c) Location of fire command centre

A Fire Command Centre shall be located adjacent to the fire lift lobby at the designated storey of the building (ie the lobby of the building on the first storey or immediately adjacent thereto) or at any other location as may be designated by the Relevant Authority.

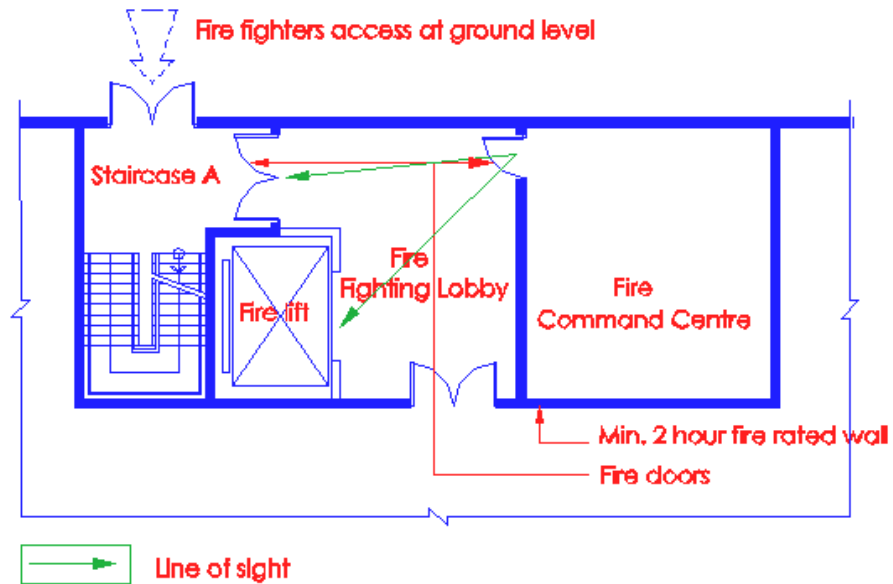


Diagram 8.2.3(c)

It is desirable that a "Line of sight" could be achieved from the door of fire command centre to the door of the fire lift & firemen staircase. This arrangement would assist greatly the communication linkage amongst the 3 areas & lead to good command of fire fighters moving in & out of the fire lift.

However, where direct linkage between fire command centre & fire lift/staircase could not be achieved, prior approval from SCDF (FSSD) should be obtained before building plan submission.

(d) Construction of fire command centre

The construction of enclosure, facilities and lighting of a Fire Command Centre shall comply with the SS CP25: Code of Practice for Emergency Voice Communication Systems in Buildings.

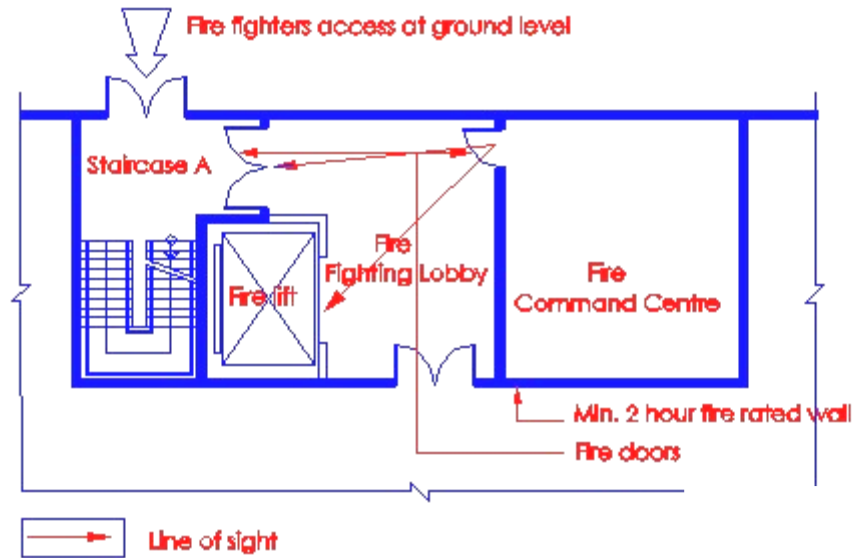


Diagram 8.2.3(c)

It is desirable that a "Line of sight" could be achieved from the door of fire command centre to the door of the fire lift & firemen staircase. This arrangement would assist greatly the communication linkage amongst the 3 areas & lead to good command of fire fighters moving in & out of the fire lift. However, where direct linkage between fire command centre & fire lift/staircase could not be achieved, prior approval from SCDF (FSSD) should be obtained before building plan submission.

- (e) Mechanical ventilation where required for the Fire Command Centre shall be provided with standby power supply and shall have ductworks independent of any other ductwork serving other parts of the building.

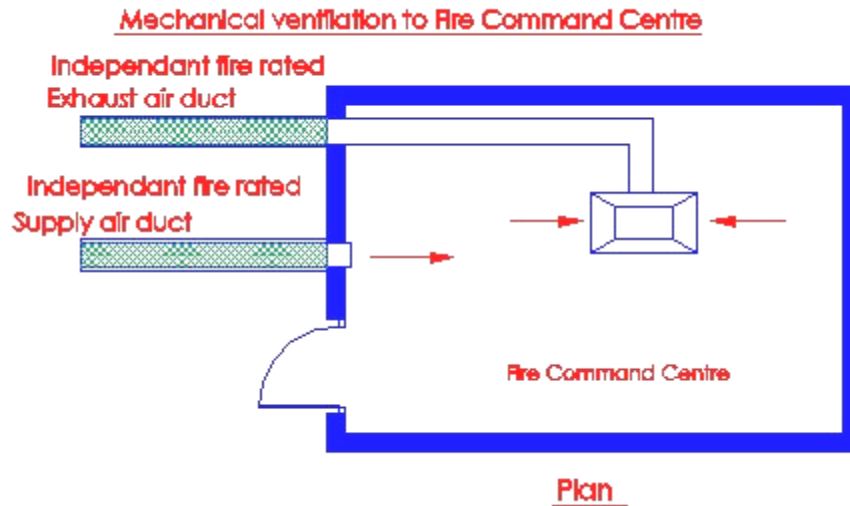


Diagram 8.2.3(e)

The critical usage of fire command centre during fire emergency requires that lighting/ventilation & other power supply should come from standby power source eg generator set. The supply & exhaust ductworks of the mechanical ventilation shall be independent of any other ductwork serving other parts of the building. This is to prevent heat or smoke from being conveyed into the fire command centre via the ducts.

Two-way communication system

8.2.4 All multi-level basements of buildings under purpose group VI and VIII are required to be provided with two-way emergency communication system between the Fire Command Centre and the following areas:

- (i) Every fire fighting lobby, including 1st storey. In building comprising 2, 3 or 4 basements, one of the smoke stop lobbies shall be designated as a fire fighting lobby;
- (ii) All fire fighting related mechanical equipment rooms, inclusive of sprinkler pump room, wet rising main pump room, hosereel pump, switch rooms, generator rooms, and lift machine room;
- (iii) All rooms housing smoke control equipment;
- (iv) Fire lift;

- (v) Each area of refuge; and
- (vi) Air-handling control rooms.

Exception :

- (i) Single-level basement, irrespective of its usage of building is not required to be provided with two-way emergency communication.