

2018

EVACUATION PLANNING GUIDELINES



EVACUATION PLANNING GUIDELINES FOR PUBLIC and INDUSTRIAL PREMISES

The aim of this Evacuation Planning Guidelines is to detail the various measures and operational actions that need to be undertaken by the company in the event of any fire or other emergencies such as Hazmat that occur within the installation, in order to minimize injury to personnel and damage to property.

1. The Emergency Response Plan (ERP)

An Emergency Response Plan is a plan which contains information on types of fire safety measures that are provided for in designated premises & includes floor layout plans and evacuation procedures. The owner of the designated premises or his designated official (i.e. FSM) will be responsible to assist the owner in the preparation and implementation of the ERP. The ERP shall be prepared in accordance with the guidelines provided.

The ERP consists of the layout drawings of the building (it must be the SCDF approved plans/drawings), list of names forming the Fire Safety Committee, duties and responsibilities of designated responders during the emergency, emergency actions during and after operating hours and other relevant information.

2. The Fire Safety Committee

The complexity of an Emergency Response Plan is dependent upon the following factors:

- a. The size of premises;
- b. The premises height;
- c. The number of occupants;
- d. Premises type;
- e. P&FM and Hazardous materials storage; and
- f. Special risk associated with the premises.

In the case of commercial high rise buildings, it is necessary that the occupants operate not as individuals but collectively as a team for the implementation of the Emergency Response Plan, and to form a Fire Safety Committee.

The responsibility for forming and maintaining such a committee lies with the owner or his designated official. All key appointment holders of the Fire Safety Committee should preferably hold managerial or supervisory positions so that duties could be discharged effectively.

A Fire Safety Committee should be represented by all stakeholders (including tenants) of the premises. The committee should also include the following appointment holders:

- Fire Safety Manager / Coordinators / Assistant Coordinators
- Fire Warden / Assistant Fire wardens
- Chief Security Officer / Security officer

- Fire Command Centre operator
- Company Emergency Response Team (CERT)

3. Fire evacuation - 3 basic models:

There are 3 models of evacuation depending on the premises height. In deriving these evacuation models, four fundamental principles are adhered to:

- Occupants believed to be in the greatest potential danger are to evacuate first
- Should the scale of the emergency increase, evacuations can be expanded to include additional floors, or if need be, the entire building
- The provision of a EVCS, will allow buildings to adopt a 2-stage alarm
- The provision/adequacy of compartments, fire and smoke protection systems in addition to EVCS with feature for zone evacuation, allow premises to adopt a phased-evacuation strategy

a. Low-rise buildings (height less than or equal to 24m) without Emergency Voice Communications System (EVCS)

It can be summarized as “single stage alarm” and “total evacuation”. In such buildings, occupants will be expected to effect immediate evacuation of the building on hearing the fire alarm.

b. Low-rise buildings with EVCS capabilities but with atrium spaces.

The evacuation concept to be adopted is the “2 stage alarm” and total evacuation”. The sounding of the fire alarm (lasting not less than 1 minute) should be treated as an alert signal and occupants should standby for evacuation. Upon confirmation of a fire situation, the second continuous alarm is sounded and immediate evacuation should be effected.

c. Low-rise buildings with EVCS, with compartmented floors and High-rise buildings (height of more than 24m)

In high-rise buildings, a significant change in the principle of evacuation is observed. Experience and studies have shown that in high rise buildings simultaneous evacuation of all floors would result in undue delay. Hence, in such buildings, the concept of evacuation to be adopted is "two-stage alarm" and "phased evacuation".

The fire alarm when first activated would ring on all floors. This would serve as an "alert signal". A second alarm will confirm the emergency situation and the “phased evacuation” will be initiated.

The first phase will feature the evacuation of occupants situated on the "emergency floor", 2 floors above it and 2 floors below it. Those occupants would commence evacuation on being instructed through the announcement selectively made to these floors. Remaining floors are also advised to stand by for further instructions.

Once the fire wardens on the evacuating floors have reported "all clear" to the Fire Command Centre through their respective floor intercom system, the second phase of evacuation then commences. This would include all the floors above the "emergency floor".

In the third and final phase, the floors below "the emergency floor" will be evacuated. (Note: With the exception of the first phase which would only involve 5 floors, evacuation of the rest of the phases should, as a rule of thumb, not involve more than 20 floors at any one time). Circumstances will dictate whether the building should be completely evacuated through the various phases in a real emergency.

In order to facilitate phased evacuation being conducted in high-rise buildings, it is a requirement for an approved 2-way voice communication system to be provided in addition to the fire alarm system.

4. Recommendation for selecting assembly areas under the Emergency Response Plan for evacuation

a. Selection of the Assembly Area (AA)

The building owner will, with the help of his Fire Safety Committee, identify at least 2 or 3 locations outside the said building premises to serve as the assembly area (AA) for his building. The Fire Safety Committee will assess and decide the best location as the AA and another as the alternative.

b. Selection Criteria for the Assembly Area (AA)

The following criteria are recommended for the selection of the AA:

- i. The area shall be familiar and readily accessible to the building evacuees.
- ii. It shall be able to accommodate the full occupant load (or evacuees) of the said building.
- iii. It shall be far enough to avoid falling debris, collapsing structures and/or spread of the fire/incident.
- iv. A distance at least equal to the height of the building, and no less than 20m away is recommended for locating the AA, or alternately, it can be in a protected area shielded from the burning building by a fire barrier or fire wall, or it may be in an adjacent building if it offers sufficient protection and is able to accommodate the evacuees.)
- v. The AA shall not interfere with the firefighting/response operations and/or its responding forces.

Safety of the Occupants shall be taken into consideration when drafting ERP. If the AA is located across any road, there shall be designated traffic wardens appointed to perform traffic control to ensure the safety of the occupants crossing the road to the AA.

5. General pointers for conducting evacuation drill: -

a. Distribution of the Emergency Response Plan

Copies of the ERP should be distributed to all members of the Fire Safety Committee and CERT to familiarize them with the emergency procedures.

b. Posting of emergency instructions

Notices on emergency instructions should be posted at conspicuous location throughout the building such as lift lobbies, staff notice boards, reception areas of offices etc.

c. Arm bands

All appointment holders should be supplied with armbands for easy identification - white for the FSM and his/her assistant, and red for all others. The armbands should bear the initials of the appointments such as FSM, FW / AFW and etc.

d. Loudspeakers

It is advisable to procure battery operated portable loud speakers to assist in crowd control during evacuation.

e. Regular meetings

FSMs should regularly meet fire wardens and other members of the fire safety organization and discuss on the safety policies/practices and on the actions to take in case of emergency. Shortcomings observed during the fire drills should also be addressed and documented in the Emergency Response Plan.

f. Training

Training should be held at periodic intervals and there should be a plan to cover all building tenants/occupants in educating/brief/training them on basic fire prevention, safety hazards, emergency procedures and fire extinguishing methods.

g. Organising drills (Frequency)

Two evacuation drills shall be conducted each year and involve all building occupants. Those with the medical conditions and pregnant women may be exempted from participating in drills. Special arrangements should also be made for disabled persons to be brought down to the ground floor safely.

h. Procedures

All personnel, with the exception of those authorized by the building owner/FSM shall participate in evacuation drills.

Special consideration is necessary for personnel handling cash/valuables, high security or confidential documents, conduct of laboratory experiments or operating sensitive computer equipment.

In conducting fire drills involving large numbers of people it may be necessary to seek assistance from the police in crowd control and directing of traffic in the area. 6

Decams Company shall be informed just before the activation of fire alarm for fire drill and when the drill ended. A debrief should be held to share learning pointers and correct any wrongdoings. Procedure of evacuation shall be updated as and when

necessary. Speed is not the main objective in evacuation drill. Familiarization of evacuation procedure and maintaining process order are important points to consider.

It is important to have an institutionalized system of keeping records of handicap, disabled, pregnant woman in the building. This record would come in handy during drills and emergencies. In such cases, an Evacuation Team of two persons can be included to use a fire lift to evacuate these people if there are only one or two such persons. If there are more such persons then more teams will need to be identified to bring them down using staircases. If evacuation of such persons is done using the fire lift, it be done expeditiously in order not to impede the operations of the Fire Fighting Team or SCDF. Evacuation Teams must remain contactable at all times

Management of Evacuation of Persons with Disabilities (PWDs)

It is mentioned under the Fire Safety Requirements (FSR) 7:2011 that evacuation procedures for PWDs be tested at least once a year and the building management shall ensure that the staff, designated to help PWDs in the event of emergency, are fully trained to execute the planned evacuation procedure.

Accountability

Accountability of the occupants in the building is of prime importance and FSMs must devise a plan to account for the occupants who has yet to be evacuated as those occupants may potentially be trapped in the building/premises.

Registers shall be kept updated as far as possible. However, for places like shopping centres where the occupants are transient and cannot be accounted for, information counters may be set up for people who wish to report on missing people.

For tertiary institutions, these are usually the semi-transient people where they will move from one classroom to another. Using documents such as class nominal roll (with contact numbers), attendance and classroom allocation plan, the FSMs will be able to affirm the evacuation status of the students.

i. Maintain year round visual checks of work areas

The duties and responsibilities of the fire wardens include a daily visual check of the floor area and to report any fire hazards to the coordinator or his assistant:

- i. Fire doors wedged or blocked open
- ii. Exit lights out
- iii. First aid or firefighting equipment inoperative or obstructed
- iv. Obvious fire hazards- accumulation of combustible - oily rags
- v. Defective or unsafe use of temporary electrical wiring

It is the responsibility of the FSM to see to it that all fire hazards are abated promptly.

j. Company Emergency Response Team (CERT)

The fire safety manager should assist the owner of a FSM premises to establish a CERT appointed from within the premises. The CERT should comprise minimum 6 persons (1 Site Main Controller, 1 Site Incident Controller and 4 Response Team

members) and be trained adequately to provide initial response to emergencies such as Fire and Hazmat incidents in their initial stages before the arrival of the SCDF. The CERT could be appointed from, but not limited to the employees, building maintenance and service staff, security staff, managing agents and tenants.

k. Building plans

Detailed plans of the building should be drawn up, the purpose of which is to:

- Give an understanding of the building's structure, nature of occupancies, hazards and protection systems available in the building
- Help formulate evacuation plans
- Provide information for the SCDF in an emergency

The building plans should include 3 types of plan:

i. Site plan

Site plan shows the location of the building, roads around the building, Assembly Area/s, alternate assembly and adjacent building etc.

ii. Elevation plan

Elevation plan shows the façade of a building, usually this is to show the height of the building, Fireman's Access Panel, etc

iii. Floor Plan

Floor Plan shows the layout of each floor. For the building's floor plan, the following details are expected:

- Escape and alternative escape routes, including exit staircase. Arrows or shaded areas shall be included to in the drawings.
- Location of fire extinguishers, hose reels, dry risers, fire alarm panels and manual call points.
- Fire resisting walls, floors, ceilings and doors, lifts (differentiating firemen's lifts) and staircases
- Indication of difference usage for each partition or compartment, e.g. office shop production area, toilet, store, corridor, passageway, Assembly Area, smoke stop lobby, firefighting lobby etc.
- Fire Engine Access way / road
- Fireman's access panel 8
- Processes and equipment introducing a particular hazard or requiring special protection against fire, water or smoke damage e.g. kitchens, transformer rooms, computer rooms and telephone exchanges
- The rooms protected by Gaseous Systems

The Mechanical Ventilation Plan:

- Ventilation and air conditioning systems and other ductwork
- Major electrical equipment and wiring installations, including those for telephones

The Fire Protection Plan:

- Firefighting equipment, sprinkler systems
- Fire detection equipment
- Manual fire alarm systems

The plan should be prepared in two ways:

- By individual storey - showing all building services together on each floor plan. If the floor is of the same layout for various floor, it is required to indicate the word "TYPICAL FROM X storey to X storey"
- By individual service-showing each building service separately on plans of the whole building
- Elevations to show Fire Access Panel
- Site plan/site layout to show fire engine access way and access road

All the drawings must be labelled. The labelling includes the bolded title above, i.e. Building plan, which storey to which storey. And on each drawing there must be an indication on the usage, e.g. shop, office etc.

They should be reviewed at three-monthly intervals or redrawn as and when necessary (for example when you just took over another FSM duty) or whenever there is any addition and alteration works being carried out.

A complete set of ERP shall be kept at the Fire Command Centre and appropriate copies of individual storeys shall be displayed by the main access points to each storey.

The preparation of plans may in itself highlight weaknesses in the safety/protection of the building e.g. the absence of fire-resisting doors, a breach in a fire - resisting wall or ceiling, missing or damaged firefighting equipment, unauthorized storage of hazardous materials such as flammable liquids, of the obstruction of an escape route by a partition. Such faults should be remedied immediately.

I. Fire prevention maintenance programme

With time, technical equipment will deteriorate, fire loads may increase, alteration works conducted, repairs and decorations put up that reduce structural fire protection or obstruct means of escape. Such activities generally reduce the standard of fire safety in the building. To maintain the level of fire safety, the Fire Safety Committee and FSM should draw up a fire prevention maintenance programme in conjunction with the building maintenance staff. The purpose of the programme is to ensure regular inspections, tests and maintenance of all safety systems throughout the building.

The fire safety manager should be responsible for ensuring, by inspections and spot-checks, that all works are carried out to a high standard. This is especially important when outside contractors are engaged.

m. Occupant training and awareness

Safety in high-rise buildings can only be achieved if all occupants know what is expected of them in the event of an emergency and how to avoid fire or other emergency in the first place. A detailed safety programme is of no value if the occupants are unaware

of its existence. Leaflets should be distributed to all occupants telling them of the activities of the Fire Safety Committee, evacuation procedures and advice on good housekeeping. Drills and discussions on safety should be carried out with small groups of people in rotation and notices exhibited in rooms and corridors. The aim is to establish a continuing responsible attitude to safety by all occupants.

These recommendations are intended primarily for the management of office premises. For other premises types, the general principles could still be applied, albeit with modifications.

Hotels present a significant risk, as guests are unlikely to be familiar with the layout of the building or means of escape. A high number of staff is required to supervise guests' evacuation during an emergency.

Safe and panic-free evacuation are a result of well-trained staff and extensive pre-planning by managements. Intoxicated patrons may be present at premises with pub/bar/karaoke and Fire Wardens of such establishment will need to pay extra attention and may require additional manpower to execute the evacuation procedures.

For a shopping complex, people may be moving around in the constantly and accounting for these transient people may be difficult during evacuation. An information area may be setup for anyone to report the known whereabouts of people who are trapped in the building.

Hospitals/clinics face the challenges of having occupants who may be sick and immobile. Detailed pre-planning and validation of plan through exercises are essential to achieve efficiency during actual mass evacuation. Such premises could explore the feasibility of evacuation concepts like area of refuge or horizontal evacuation.

The FSM should take every opportunity to update the records of new occupant in the building. When putting up the ERP, special attention shall be given to children, elderly or PWDs occupants.

The preparation and conduct of a fire evacuation drill is usually carried out in 3 stages:

Stage 1

- **Determine evacuation drill date, time and assembly area/s.**
- **Prepare the ERP in accordance to SCDF guidelines.**
- **Educate and distribute ERP and guide books to everyone.**
- **Nominate all the key personnel for the evacuation drill.**
- **Conduct briefings and meetings to all key personnel.**
- **Prepare and distribute the following items for the drill such as:**
 - Identification helmets/ caps
 - General instruction files
 - Arm bands
 - Floor registers
 - List of nominated personnel with contact numbers
 - Logistical needs
 - Signages
 - Evacuation drill status board
 - System testing

- **Prepare/ distribute all necessary notices and circulars.**
- **Conduct a table top exercise to ensure the committee understand their roles.**
- **Nominate fire safety committee to assess the fire evacuation drill.**

Stage 2

Before activation of alarm, ensure the following:

- **Revise with the key personnel makes sure they are familiar with their functions**
- **Reporting and support centres are set-up**
- **Monitoring stations and relevant authorities notified**
- **Announcement messages prepared**
- **Inform DECAM company of the fire drill**

When evacuation starts, monitor the following:

- **Floor evacuation status**
- **Assembly area evacuation status**
- **Fire situation status**
- **Support centres status**

For disaster situation:

- **Implement recovery plan**
- **Determine command and control centre**
- **Determine a press release centre**
- **Expansion of support centres to include enquiry post**

Stage 3

Immediately after the fire evacuation drill, conduct meetings with fire safety committees.

- **Conduct debrief/ meeting with key personnel**
- **Prepare comments to all fire wardens**
- **Send letter of thanks to all parties concerned**
- **Prepare a fire evacuation drill report to include the following topics:**
 - **Scenario of the fire drill**
 - **Management response**
 - **Evacuation procedures**
 - **Occupant participation, total number of occupants and the number of participation**
 - **Evacuation time**
 - **SCDF's comments (if any)**
 - **Fire Safety Committee's comments**
 - **Conclusion (compare previous drills)**
 - **Attachments such as Evacuation drill status records, record sheet, participating names**

Summary

In formulating an ERP for your building, ask yourself the following questions. Your answers indicate whether your staff and occupants of your building are ready now to react effectively to an emergency situation in your building.

Emergency Response Plan

1. Do you have an Emergency Response Plan?
2. Has it been reviewed and approved, as required?
3. Have your tenants and employees been given the full instruction on the details of the plan?
4. Can your building be evacuated to street level in the event of an emergency without interference/assistance from SCDF personnel?
5. Is there provision for the safe evacuation of every child, elderly or disabled or those with medical problems who may be in the building?
6. If a fire starts, will it be detected promptly?
7. Will the SCDF Operation Centre be notified quickly? How?
8. What will you do before the SCDF arrive?
9. Is there provision for immediate control of ventilating and air conditioning systems? How to start and stop manually?
10. How will you communicate with all the occupants of your building during an emergency?
11. Does your building have fire wardens in every floor? Have they been trained? How?
12. Are fire pumps, emergency generators etc. always ready for use if needed?
13. Are all measures that have been taken to prevent unauthorized entry interfering with evacuation of occupants or ingress of firemen?

Fire fighting

1. Are portable fire extinguishers and or hose reels provided in clearly visible and readily accessible places throughout the premises and properly maintained at regular intervals, and are all the staffs familiar with their use?
2. Is the fire station familiar with your building in all pertinent details?
3. Has space been designated for a Fire Command Centre in your building? Is it equipped?

Fire prevention

1. Are all parts of the premises kept clear of waste and rubbish, particularly any storerooms, boiler rooms, lift shafts, staircases and under the stairs?
2. Are substantial ashtrays provided in all areas where smoking is permitted, and are the staff warned to stub out cigarette ends in ashtrays and not to throw them into waste paper receptacles, through gratings or out of the windows?
3. Are there sufficient electrical points; are frayed leads replaced immediately and are all electrical installations maintained to comply with the PUB wiring rules?
4. When work ceases, is a check made to ensure that all electric, gas and all equipment not required to operate overnight is switched off so that any equipment in use overnight is left safe, that no cigarettes are left smouldering and that all fire resisting or smoke-stop doors are closed?

**SAMPLE FIRE INSTRUCTION NOTICE FOR STAFF FOR A BUILDING
ADOPTING PHASED EVACUATION**

INSTRUCTIONS TO ALL STAFF

On discovering fire:

- Raise the alarm by breaking the glass of the alarm call-point
- Call for assistance and attack the fire with the fire-extinguishing equipment provided
- Do not take undue personal risk
- Evacuate if unsafe or in doubt

On hearing the first stage alarm:

- Stand-by for evacuation.

On hearing the second alarm:

- Evacuate

The assembly point is at _____.

INSTRUCTIONS TO TELEPHONE SWITCHBOARD OPERATOR*

On being notified of an outbreak of fire:

- Call 995

Notify: (1) _____
(2) _____
(3) _____

- Ensure that appropriate voice messages are broadcast

* To be kept where the operator can refer to them instantly.

**CHILD CARE CENTRES ACT
(CHAPTER 37A, SECTION 19)
CHILD CARE CENTRES REGULATIONS**

38. Every operator of childcare centre shall ensure that —

- (a) there is an Emergency Response Plan;
- (b) the written procedure is displayed on a notice board on the premises;
- (c) fire evacuation drills are conducted at least once in 6 months;
- (d) a written record is maintained of all fire drills;
- (e) any apparatus or fire-fighting equipment recommended by the Commissioner of Singapore Civil Defence Force is installed, regularly inspected, maintained and ready for use;
- (f) the staff are conversant with the method of using such equipment; and
- (g) all exits from the child care centre building as well as all passageways and staircases are clear of obstruction at all times.