ACTIVE FIRE & EMERGENCY EVACUATION

INTRODUCTION

A fire broke out on the second floor of Block E in campus due to a laboratory accident. Active Fire Protection mechanism was taken in place to prevent the spread of flame while evacuation occurred.

01a BUILDING PREVENTION

In the case of an emergency, the spread of flame should be prevented, as well as providing a safe evacuation for the occupants. Hence, building prevention measures according to UBBL are taken.

By-Law 136. Provision of compartment walls and compartment floors.
By-Law 137. Compartmentation by height.
By-Law 141. Separating walls.
By-Law 147. Construction of separating walls.

By-Law 161. Fire-stopping.
By-Law 162. Fire doors in compartment walls and separating walls.
By-Law 163. Fire doors.

By-Law 152. Openings in lift shafts.
By-Law 139. Separation of fire risk areas.

01b GUIDE TO 10TH SCHEDULE

STEP 1 Occupancy Hazard

Firstly, identify the category of Occupancy Hazard that your site belongs to.

Occupancy Hazard	Extinguishing System Note 2	Detection and Fire Alarm System Note 3
III. INSTITUTIONAL		
1. Educational Occupancies		
(i) Rooms or halls used for instructional purpose only		
(a) Open corridor design	-	-
(A) 2 storeys and below	A	1
(B) 2 to 5 storeys	A	1 & 2
(C) 6 storeys and above		
(b) Other designs		
(A) Two or more storeys	A	1 & 2

STEP 2 Extinguishing System

In this case, institutional generally requires type A and B as its extinguishing system.

NOTE 2:

The figures in the third column of this Schedule refer to the types of fire alarm and fire defection system as follows:

A- Hose Reel System
B- Sprinkler System
C- Gaseous Extinguishing System
D- Pressurized Fire Hydrant

STEP 3 Detection & Fire Alarm Systems

Every type of detection & fire alarm are required to be installed based on sqm and height of the building.

NOTE 3:

The figures in the third column of this Schedule refer to the types of fire alarm and fire defection system as follows:

1. Automatic Fire Detectors System
2. Manual Electric Fire Alarm System
3. Signal Indicator Alarm System
4. Manual Alarm System
5. Fire Command Center

STEP 4 Note 1 & 4 - 8

Special requirements to look into regarding fire appliance access, fire extinguisher & smoke detector.

NOTE 4:
For the purpose of this Schedule measurement of heights shall be taken from the level of the highest point of fire appliance access to the highest habitable floor level.
NOTE 5:
Portable fire extinguishers are to be provided for private dwellings
NOTE 6:
Smoke detector of the self contained type is to be provided at the top of the staircase
NOTE 7:
Portable fire extinguishers are to be provided for private dwellings
NOTE 8:
Trolley type 25kg fire extinguishers to be provided

02 FIRE DETECTION

Smoke was detected in the laboratory that activates the Alarm System to give warning, controlled by the power system within the building. Sooner, the fire alarm will notify everyone in the building to evacuate to an open area or an assembly point.

Auto Fire Detection & Alarm System

By-Law 225.

Every building shall be provided with means of detecting, warning, and extinguishing fire according to the Tenth Schedule.

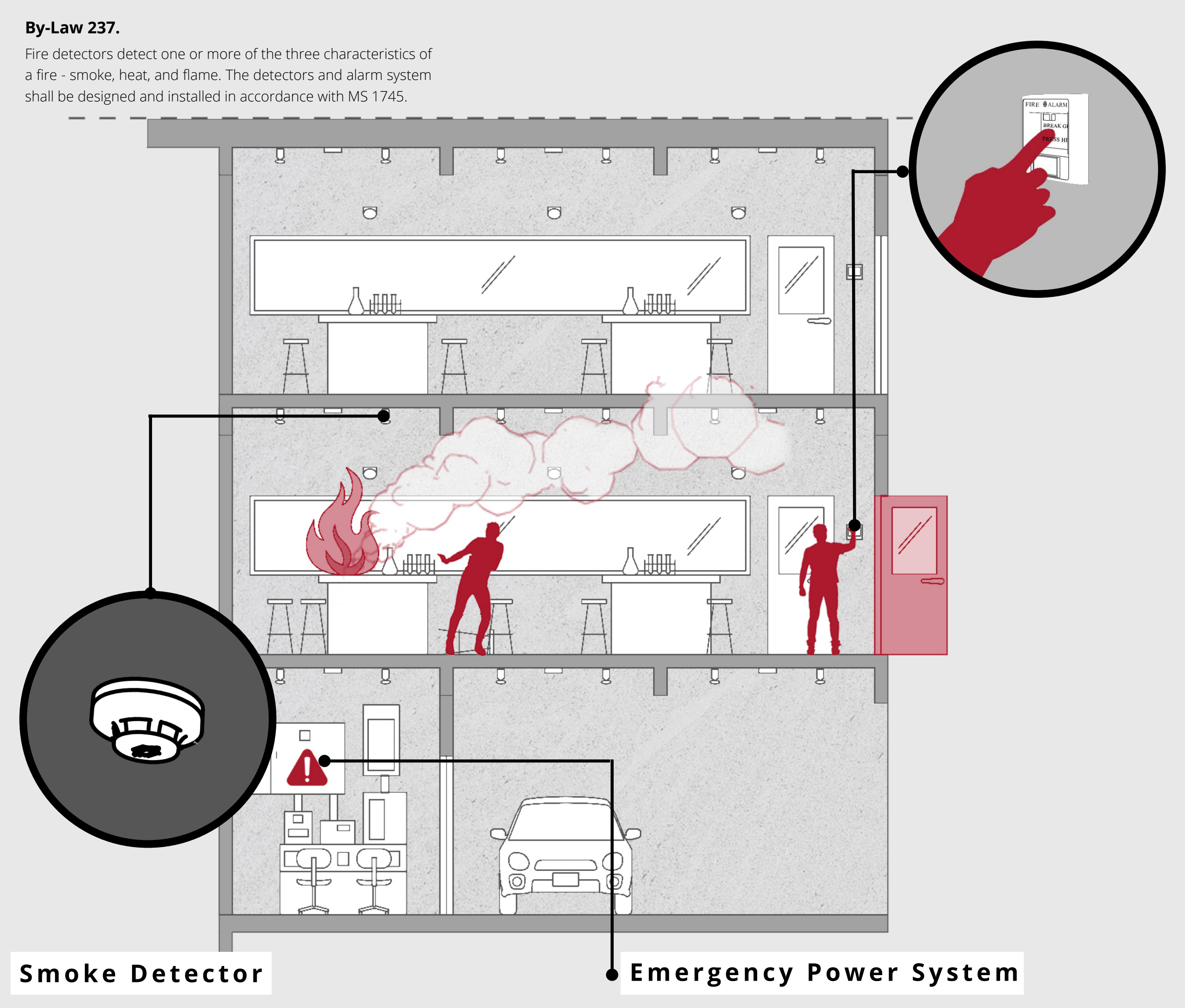
By-Law 237.

Fire detectors detect one or more of the three characteristics of a fire - smoke, heat, and flame. The detectors and alarm system shall be designed and installed in accordance with MS 1745.

Fire Alarm

By-Law 241.

Visual fire alarms should be present in locations which have loud noise or occupied by deaf people.



Smoke Detector

GFP 13.5.2 (ii)

Heat: fixed temperature; rate-of-rise temperature; linear/line
Smoke: ionization; optical; aspirating; beam
Flame: ultra violet flame; infra-red flame

Manual Call Points (MCP)

GFP 13.4

Every fire detection system must include call points, so that help can be called immediately in a fire emergency. It is known as the manual call points (MCP)

Emergency Power System

By-Law 253.

Emergency power systems shall provide power for smoke detection, illumination, and fire alarms.
All wiring for emergency systems shall be insulated with fire resistant materials, and laid along areas of the least fire risk.

Power Supply

GFP 13.6

The main fire alarm system power supplies should not affect the reliability of fire alarm responding to a fire.

03 EVACUATION

The exit routes were to enable the exit rate of 60 persons per minute through doors and 45 persons per minute down stairs. The smoke lobby is capable of blocking off the smoke which smoothly allows students to access the fire staircase.

Smoke Lobby

By-Law 196 (4 &5).

Smoke lobbies protect escape routes and allow occupants to exit unimpeded by smoke.
Smoke lobbies should be ventilated naturally with windows, artificially with shafts, or mechanically pressurized.

Exit Route

By-Law 169.
Buildings should have at least 2 exit routes on opposite sides of the building, and should be constant in width throughout.

Exit Door

By-Law 173 (1 & 2).
All exit doors should be openable from the inside without needing a key and close automatically upon release.
Magnetic door holders should also release doors upon power failure or activation of a fire alarm

Smoke Control System

By-Law 251

Methods of controlling the flow of smoke:
i) contain smoke with walls and doors,
ii) diluting smoke with clean air,
iii) use exhaust ventilation to funnel in clean air
iv) extract smoke
v) depressurize air in certain areas to draw smoke in a certain direction

Protected Shafts

By-Law 150, 156, 157.

Protected shafts insulate escape routes or ventilation ducts from external fires, and should have an FRP of at least an hour. Protected shafts should have no more than one opening in them.

EVACUATION

Students should follow the guidance of emergency lights and signage that leads to the final exit or an open area that

Voice Communicating System

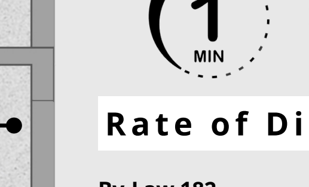
By-Law 239.

Two separate electrically supervised voice communications systems,
1. fire brigade communications system
2. public address system between the central control station and different areas.

Emergency Lights

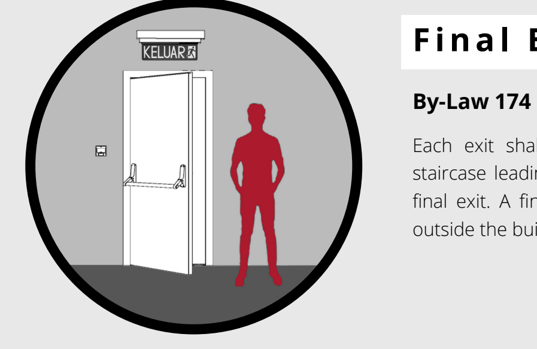
By-Law 253A.

Emergency lighting shall be installed to provide sufficient illumination for escape purposes. Such lighting shall be of the self-contained type to MS 619 and provide illumination for up to an hour.



Rate of Discharge

By-Law 182.
Occupants have to be able to exit a building at a rate of 60 persons per minute through doors on level passageways and 45 persons per minute down stairs.



Final Exit

By-Law 174 (2).

Each exit shall give direct access to a final exit, a protected staircase leading to a final exit, or an external route leading to a final exit. A final exit should then directly lead to an open area outside the building.

Places of Assembly

By-Law 174 (2).

Exits in places of assembly should not be more than 60m from any point in the building.

By-Law 188.

Exits to a street or large open space, along with the staircases, corridors, and passages shall be separated or protected to avoid any danger to the occupants at the place of assembly.

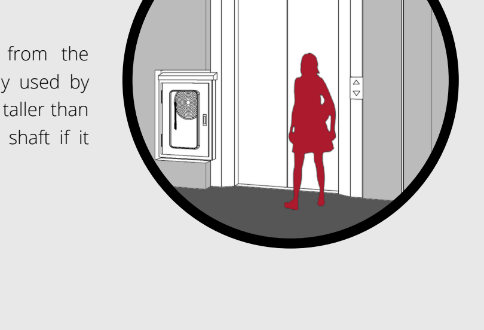
04 FIREFIGHTING

After the smoke was detected, the sprinkler system was activated while the firefighters enter the building via the 6m wide fire appliance access entries and fire lift to access upper levels.

Fire Lift

By-Law 197 (A).

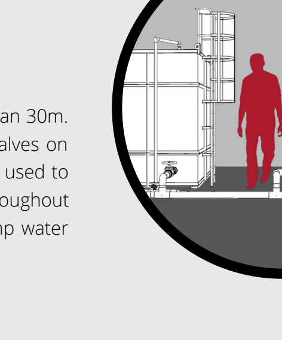
Fire lifts, placed no further than 61m from the furthest point in the room, are exclusively used by firemen during a fire, provided in buildings taller than 18m and be protected within a separate shaft if it opens into a separate lobby.



Wet Riser System

By-Law 231.

Wet risers are only used for buildings taller than 30m. Both dry risers and wet risers have landing valves on each floor to attach a hose. A jockey pump is used to supply water and regulate water pressure throughout the system, ensuring sufficient power to pump water to upper levels.



Hose Reel System

By-Law 226A.

Hose reels allow occupants to extinguish small/ medium fires. Although allowed to be installed in open areas, they are also installed in recesses to not obstruct the escape route.
(Info refer to MS 1489)

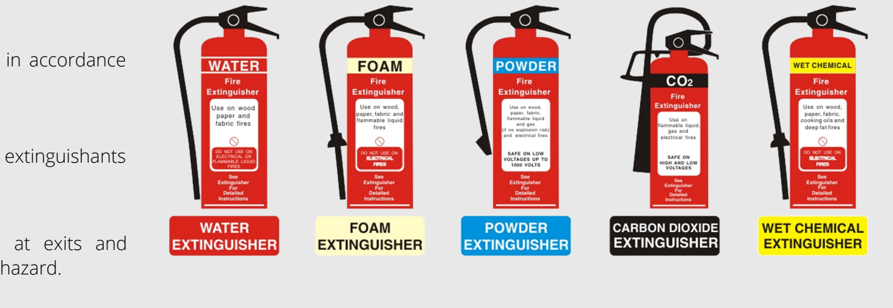
Fire Extinguisher

By-Law 229.

Table Design of Portable extinguisher in accordance with MS 1539.

Different types of fires require different extinguishants and colour coding.

Fire extinguishers should be placed at exits and corridors not 20m from a potential fire hazard.



Class	Type of fire
A	Embers: Paper, Wood
B	Liquids: Petrol, Kerosene
C	Gasses: LNG, LPG
D	Metals: Sodium, Potassium
E	Electrical Equipment
F	Fats & Oils

Extinguishant	Class	Colour Code
Water	A	Red
Foam	A, B	Cream
Dry Powder	A, B, C, D, E	Blue
Carbon Dioxide	B, E	Black
Wet Chemical	F	Yellow

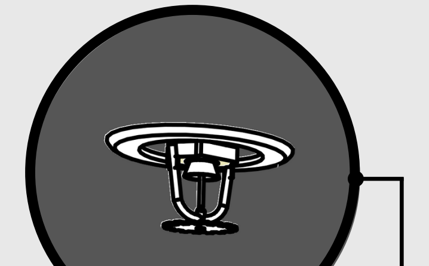
FIREFIGHTING

The firefighters connected the wet riser system from the fire brigade to put out the fire. Meanwhile, medium fires were extinguished using hose reels.

Sprinklers System

By-Law 228.

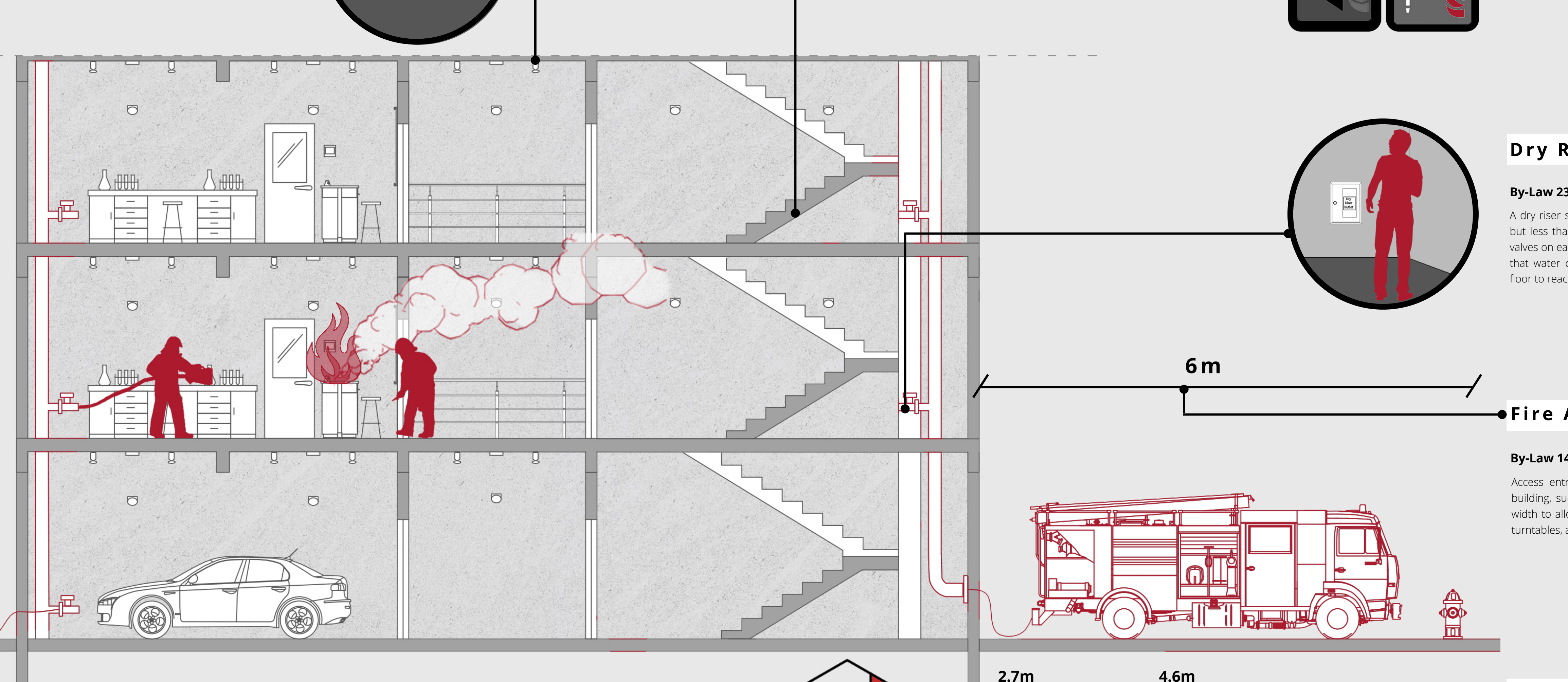
Sprinkler systems shall be designed and installed in accordance to MS1910: comprises of water supplies, automatic pumps (if any), control valve sets, all associated pipes, sprinklers and devices.

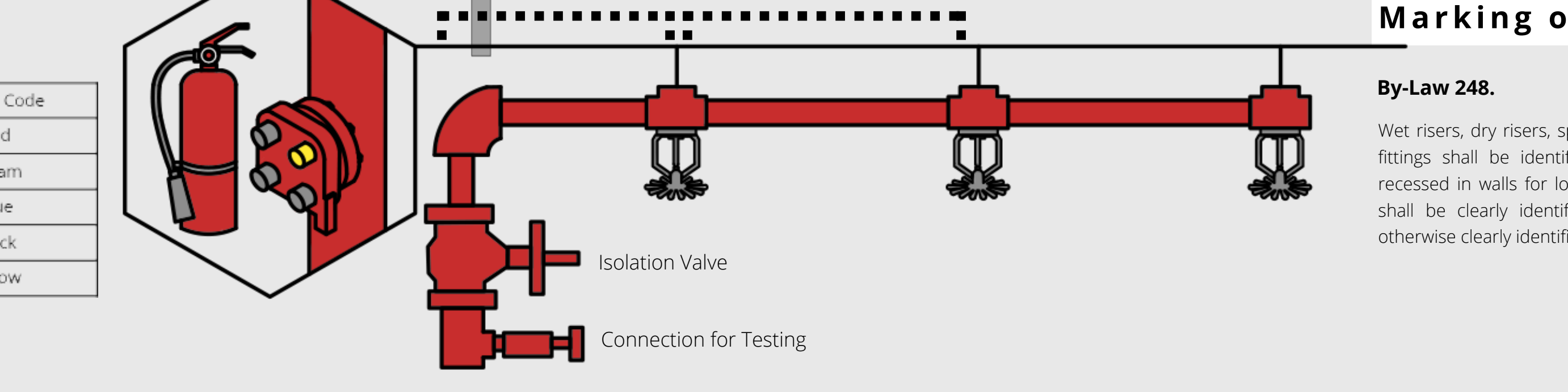


Fire Fighting Staircase

By-Law 197 (A).

Fire fighting staircases should be accessible from the outside of a building and reach each floor, and can be used as a means of egress for occupants.





FIREFIGHTING

Several classes of fire extinguishers were placed at exits and corridors not 20m from a potential fire hazard to extinguish different types of fire.

Fire Fighting in Tall Buildings

By-Law 229.

Buildings above 18m in height shall be constructed to allow easy access and fire fighting to each floor. Installations include smoke lobbies, fire fighting staircases, wet or dry rising systems, and fire lifts.

Dry Riser System

By-Law 230.

A dry riser system is provided in buildings that are more than 18m but less than 30m in height. It consists of a riser pipe with landing valves on each floor, which allows a hose to be connected to them so that water can be pumped into its breeching inlet on the ground floor to reach the upper floors through the riser pipe.

Fire Appliance Access

By-Law 140.

Access entries shall be provided along the external walls of the building, such as doors, windows, and skylights and at least 6m in width to allow the entry of fire engines, the deployment of ladders, turntables, and hydraulic platforms.

Marking on Risers

By-Law 248.

Wet risers, dry risers, sprinkler and other fire installation pipes and fittings shall be identified in red colour. All cabinets and areas recessed in walls for location of fire installations and extinguishers shall be clearly identified to the satisfaction of the D.G.F.R. or otherwise clearly identified.

Reference list:
1. SELANGOR UNIFORM BUILDING BY-LAWS 1986 (By-Law)
2. Guide to Fire Protection (GFP).