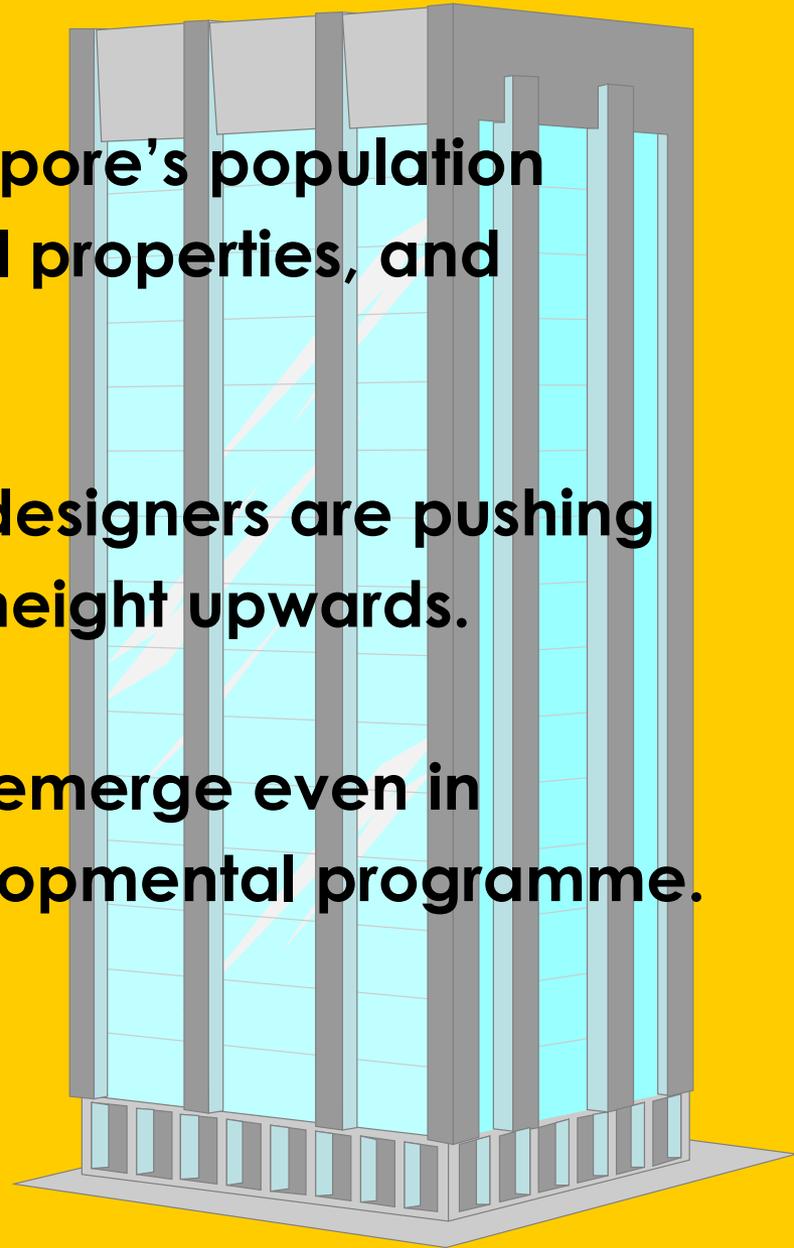


A stylized, colorful illustration of a city skyline. The buildings are represented by various geometric shapes in shades of blue, green, and purple. A prominent tower with a lattice structure is on the left. The background is a light green gradient. The text is overlaid in the center in a bold, red, italicized font.

***FIRE SAFETY
REQUIREMENTS
FOR
SUPER HIGH-RISE
RESIDENTIAL BUILDINGS***

Introduction

- Continuous growth of Singapore's population
- High demand for residential properties, and
- Limited land space
- Urban planners and designers are pushing the limits in building height upwards.
- Such a trend has begun to emerge even in our public residential developmental programme.



Introduction

- Given rise to greater fire safety concerns with skyscraping residential buildings
- As they pose greater difficulties in mitigating efforts required of emergency responders as well as evacuation of the occupants.



Fire Safety Requirements for Super highrise Residential stand-alone Buildings

- **exit staircases – 2 no.**
- **wet riser**
- **fire lift**
- **fire fighting lobby**
- **compartmentation of units**
- **hosereel at common area**
- **no fire protection system (stand-alone residential buildings)**
- **site planning and external fire fighting provisions**
- **to bring fire engine near to building**
- **internal fire fighting operations**

A stylized, white line-art illustration of a city skyline with various skyscrapers of different heights and architectural styles, set against a solid yellow background. The buildings are arranged in a cluster, with some taller than others, creating a sense of depth and urban density.

***ADDITIONAL FIRE SAFETY
REQUIREMENTS
FOR
SUPER HIGH-RISE
RESIDENTIAL BUILDINGS***

Definition

Super High-Rise Building – Building having more than 40 storeys/levels

Refuge Floor - A floor designated for holding occupants in a super high-rise residential buildings.

Holding Area - A designated circulation area/space on the refuge floor for temporary assembly of occupants during fire emergency.



Refuge Floor

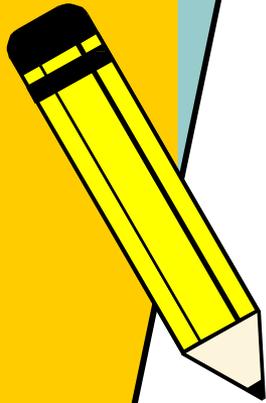
Provision

Residential buildings exceed 40 storeys high shall be provided with at least one Refuge Floor at an interval not more than 20 storeys.

WHY?

The purpose of which is to allow the occupants to enter this safe area and “wait out” the fire, especially for the elderly, sick, immobile, children, etc.

Requirements of Refuge floor



The floor of Refuge Floor shall be of masonry construction having fire resistance rating not less than 2 hour.



At least 50% of the total floor area of the Refuge Floor shall be designated as Refuge (Holding) Area.

There shall be no commercial activities at the Refuge (Holding) Area, except planting and equipment for physical exercises.



Size of the Refuge (Holding) Area shall be adequate to receive at least half of the total occupant load from all storeys above and below the Refuge Floor, based on 0.3m² per person.

(Occupant Load = 360 persons)

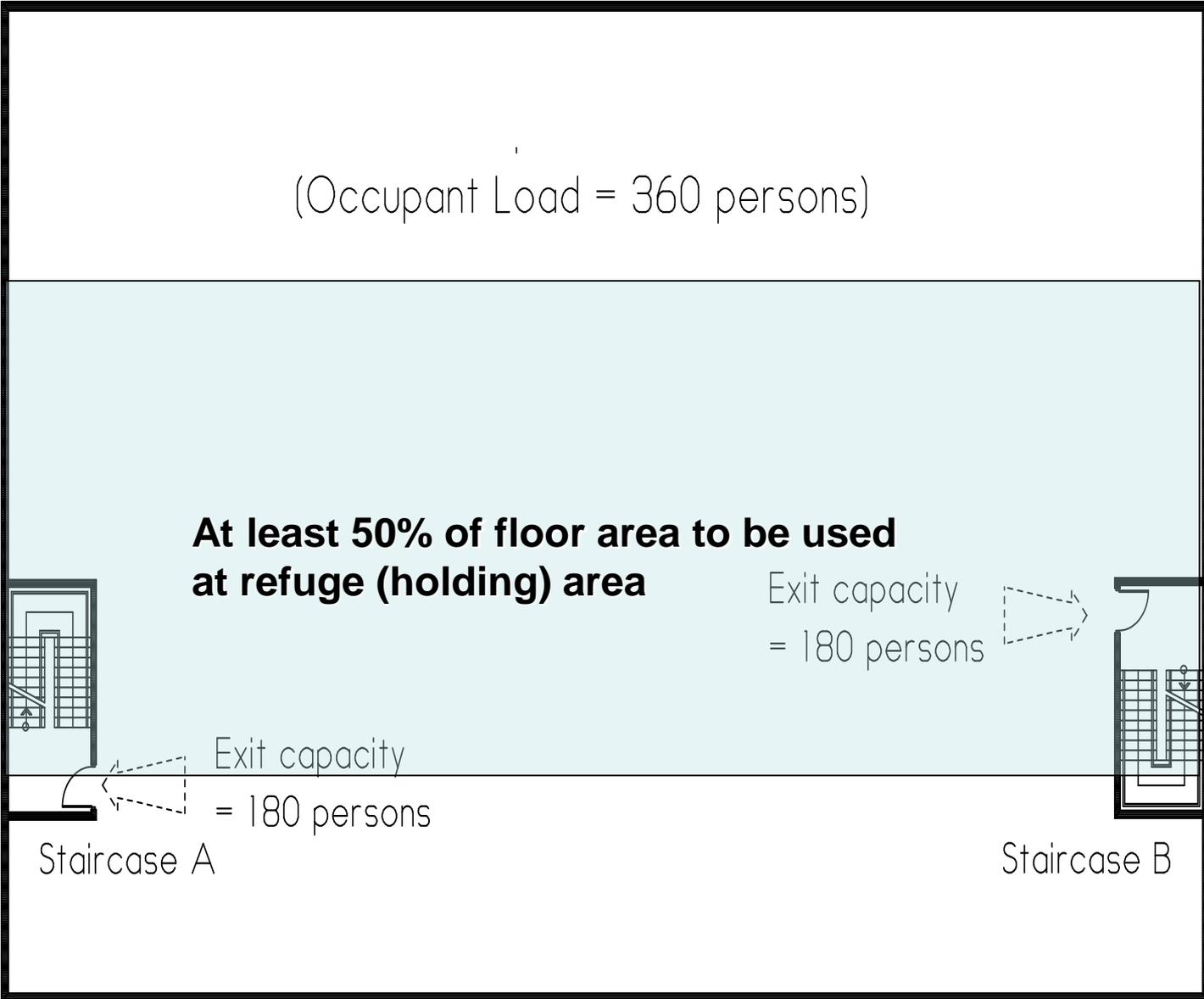
**At least 50% of floor area to be used
at refuge (holding) area**

Exit capacity
= 180 persons

Exit capacity
= 180 persons

Staircase A

Staircase B



Other areas of the Refuge may be used for recreation facilities and/or to house M & E services provided they are compartmentalised in accordance with Table 3.3A.

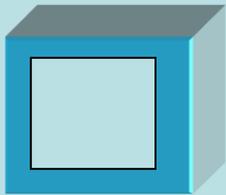
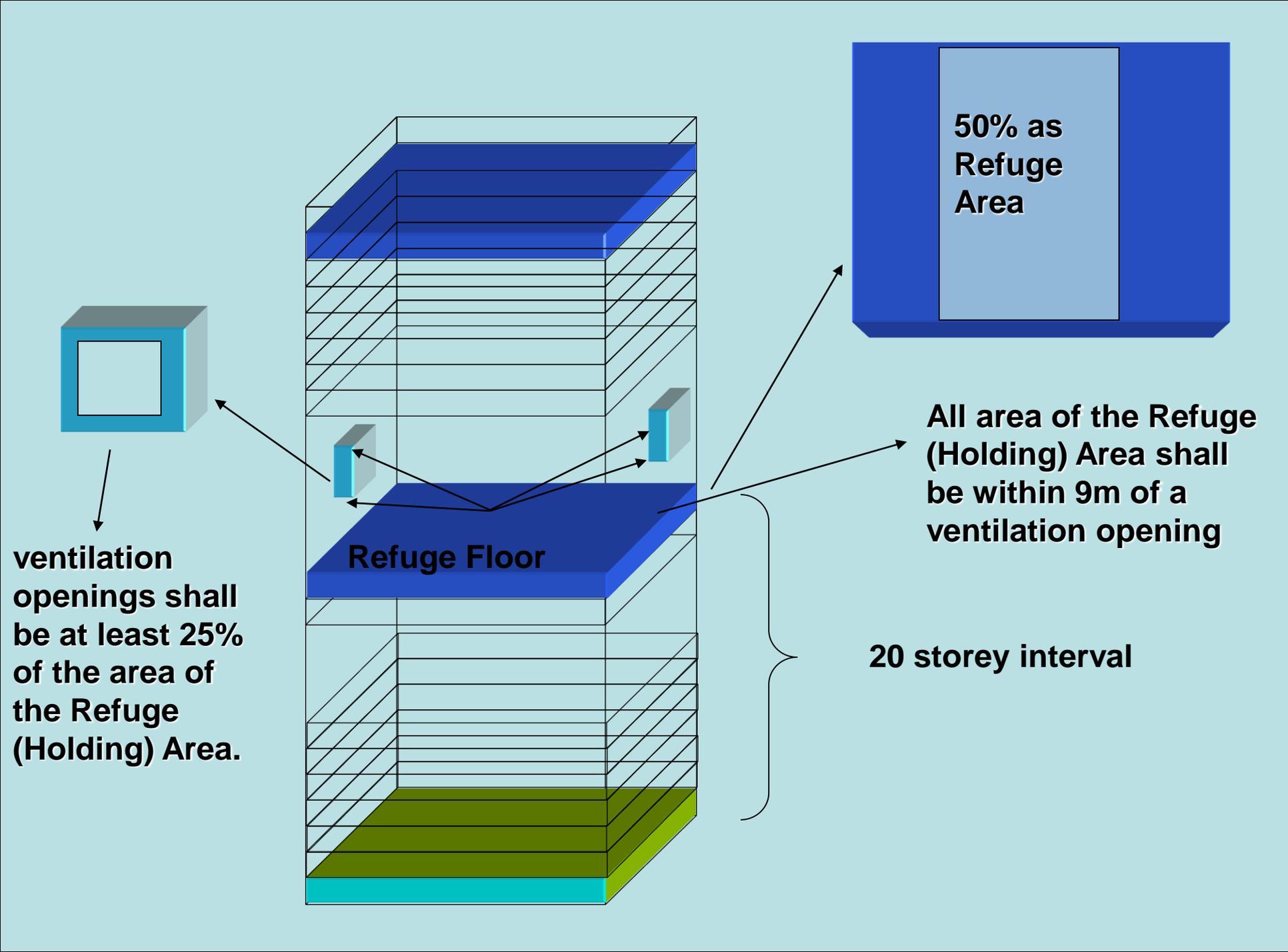
No residential units allow on refuge floor.

The designated refuge area shall be naturally ventilated with permanent openings on at least 2 sides of external walls. Height of opening shall not be less than 1200mm high

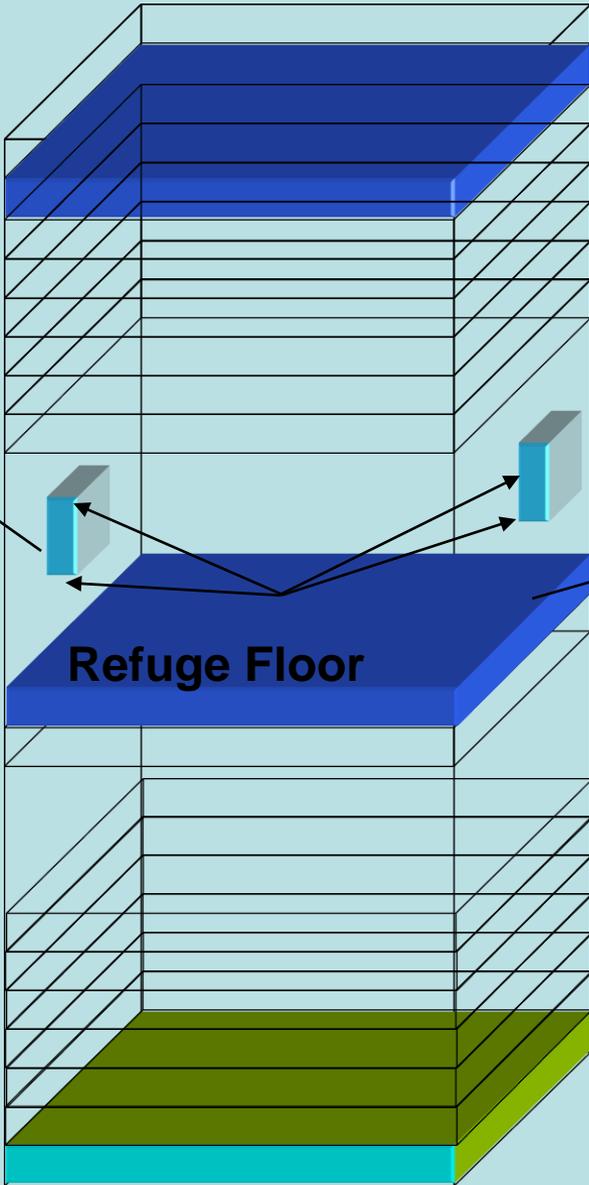
Total area of ventilation openings shall be at least 25% of the area of the Refuge Area.

All area of the Refuge (Holding) Area shall be within 9m of a ventilation opening.

Ventilation openings shall be located at least 1.5m horizontally and 3m vertically above adjoining unprotected openings.



50% as
Refuge
Area



Refuge Floor

All area of the Refuge
(Holding) Area shall
be within 9m of a
ventilation opening

20 storey interval

ventilation
openings shall
be at least 25%
of the area of
the Refuge
(Holding) Area.

(Occupant Load = 360 persons)

**At least 50% of floor area to be used
at refuge area**

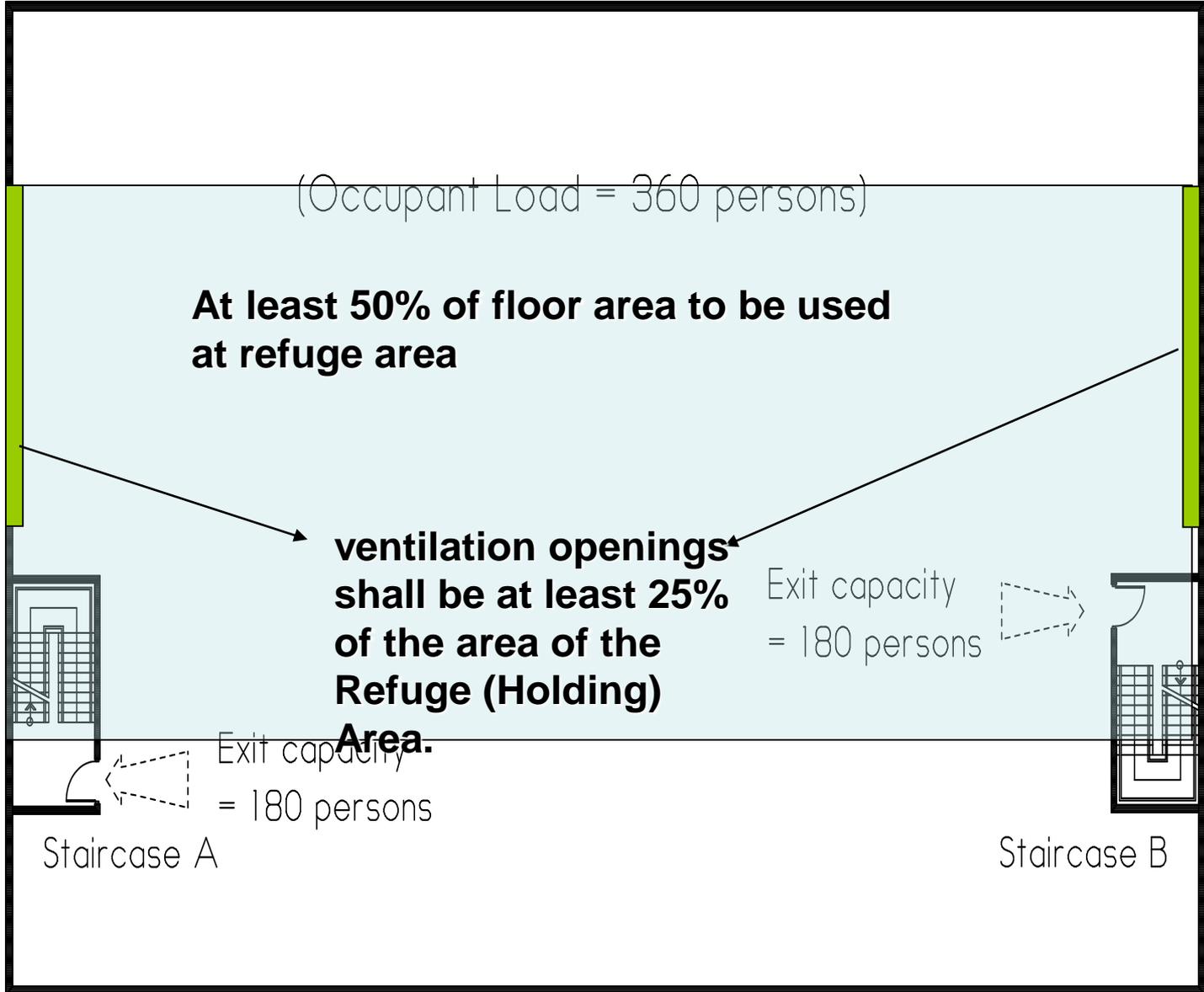
**ventilation openings
shall be at least 25%
of the area of the
Refuge (Holding)
Area.**

Exit capacity
= 180 persons

Exit capacity
= 180 persons

Staircase A

Staircase B

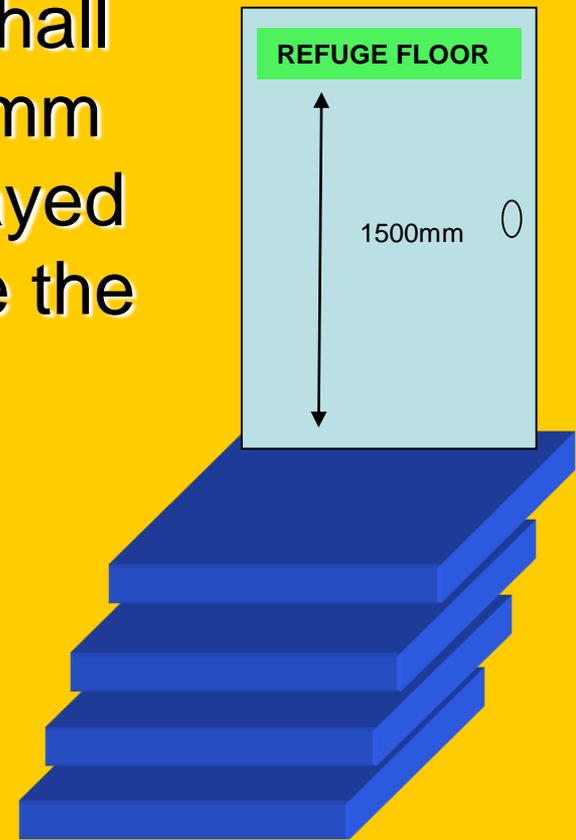


Sprinkler system shall be provided throughout the Refuge Floor, if there is any non-residential room located on the same floor.

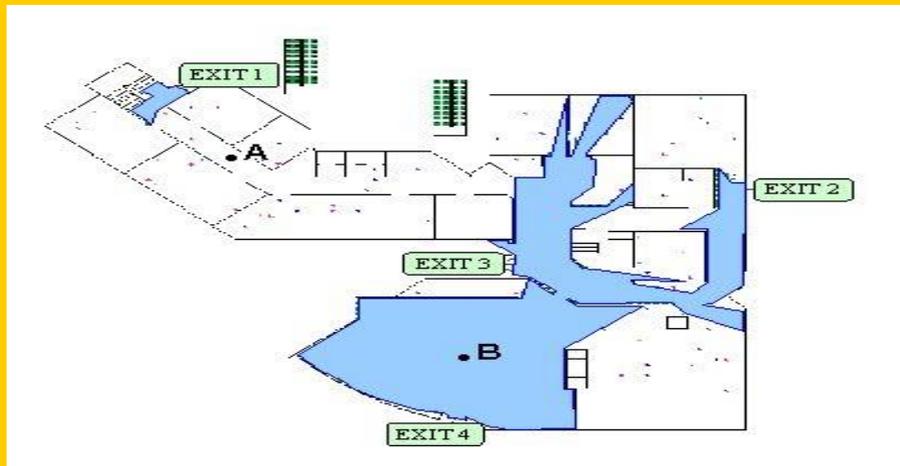
Two-way voice communication system shall be installed at the Refuge Floor and Fire Lift.

Escape routes for Refuge (Holding) Area shall approach directly through smoke-stop/fire fighting lobby or external corridor.

A sign depicting “FIRE EMERGENCY HOLDING AREA” shall be displayed inside staircase and on wall immediately outside staircase. Lettering shall have height not less than 50mm high. The sign shall be displayed at a height of 1500mm above the landing/finished floor.



Emergency lighting shall be provided to cover all area of the Refuge (Holding) Area. Such lighting shall be connected to secondary power supply, ie generator, and able to provide a horizontal illuminance at floor level of not less than 5 lux. 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.



The image features a bright yellow background. On the left side, there is a vertical blue bar. A light blue rectangular area is pinned to the yellow background by three red pushpins. The pushpins are located at the top-left, top-center, and top-right corners of the light blue area. The text "Fire Lift" is centered within the light blue area.

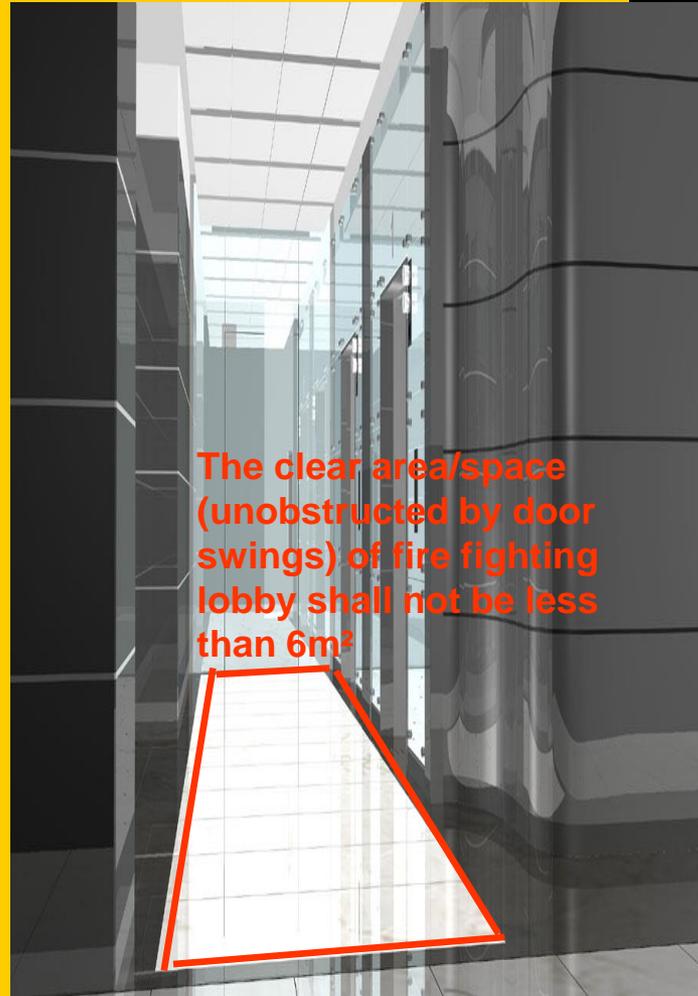
Fire Lift

Provision

At least 2 fire lifts shall be provided. The size of fire lift car in residential buildings exceed 40 storeys high shall be have nett area not less than 1.7m (depth) x 1.5m (width).

The clear area/space (unobstructed by door swings) of fire fighting lobby shall not be less than 6m².

Two-way communication system shall be provided at the fire fighting lift lobby serving the refuge floor.



WHY?

- To support fire fighting operations
 1. Enable the rapid deployment of larger number of fire fighting crews and equipment to higher floors
 2. The firemen's lift shall be sized to accommodate stretchers in view of the aging populace and the need to attend to the needs of the mobility impaired during a fire emergency.
 3. Help to reduce the number of round trips in fire fighting in traversing greater heights.

Thank You