Training Program on National Building Code Compliant Computer Aided Design of Building for Engineers/Designers of Kathmandu Valley

Architectural Design Requirement as per NBC 206:1995

And

Fire Safety Requirement as per NBC 107

Kathmandu

Architectural Design Requirements as per NBC: 206

1. Staircase.
2. Exit.
   - *2.1. General Exit Requirements.*
   - *2.2. Exit Doors.*
3. Lighting and Ventilation.
4. Lift.
5. Requirements for the physically Disabled.
6. Glazing in Hazardous Locations.
7. Parapet Heights.

1.Staircase

- Minimum clear width of Staircase.

- Apartments – **1000mm**
  - With in each multilevel unit **– 800 mm**

- Auditoriums/Cinemas – Below 500 capacity – **1500mm**

  – Above 500 capacity – **2000mm**

- Hospitals – **2000mm**
- Cold storages & Warehouse – **1200mm**
- Building more than 4 stories – **1250mm** (Industrial or Commercial)
- Educational – **2000mm**
- Residential– **800mm**
- Public assembly – **2500mm** - occupants more than 2500

1.Staircase

- Minimum Tread Width **shall be 250mm**
- Maximum Riser Height **will be 175mm.**
- Height of Handrail **Should not be less 900mm.**
- No. of Riser per Flight **=15.**
- Minimum Head Room Under Staircase shall not be less than **2000mm.**

2.Exits

- Means of way out

- Doors, passages, lobbies, ramps, staircase etc

- Exit without any obstruction.
- Exit with proper lighting & exit sign.
- Maximum travel distance to exit **– 30m**.
- Size of exit door -minimum **1000X2000mm.**

  for Toilet door – minimum – 750X2000 mm
- Opening side of exit door – out ward (in case of Public Building open able without key and open outward).

Calculation of Exit Capacity

Number of Occupants per 500mm width

Building Type	Stairways* (occupants)	Doorways / Passages (occupants)
Apartments	*25*	*75*
Auditoriums	*60*	*90*
Hospitals	*25*	*75*
Cold Storage and Warehouses	*50*	*75*
Buildings more than 4 stories high (industrial and commercial)	*50*	*75*
Recommended for other types of buildings:		
Educational / Institutional	*25*	*75*
Other Residential	*25*	*75*
Cinemas	*60*	*90*

* For stairways, minimum width will be governed by Section 1.0

Example: Calculation of total doorway width at main exit level for a Cinema hall with 900 occupants:

900 occupants / 90 occupants per 500 mm width = 10 x 500 mm = 5000 mm total width.

This can be broken up with two main exit doors – Each 2500 mm wide.

3.Lighting and Ventilation

- Admission of light through external wall opening.
- Size of opening for light with respect to the size of habitable room -10 % of floor area
- Room shall be considered naturally lighted ≤ 7500mm from the opening
- Artificial lighting and mechanical ventilation should be provided.
- Size of ventilation shaft for water closet & bathrooms should be ≥ 1 Sq.m. for other 20% of the floor area.

4.Lifts

- Provision of Lift for all buildings more than 15 m. height.
- No. of Lifts per Bank is not more than 4 .
- Fire resistance enclosure wall for shaft of Lift - up to two hours.
- Separate electrical supply for lift.
- Lift well should be ventilated to outside air through opening not less than 3.5% of shaft area OR provision of enclose ducts or pipes.

5.Requirements for the physically Disabled

- One Primary entrance to a building for physically disabled.
- Gradient of ramp for wheelchair – 1:12
- Level platforms shall be provided at max 1800mm flight.
- Width of accessible ramp- 1000mm min..
- Clear width opening for wheel chair – min.775mm.

6.Glazing in Hazardous locations

- Specific Hazaradours locations:
  - Glazing in unframed ingress & egress doors
  - Glazing in shower, bathtub doors & enclosures
  - Glazing in balustrade railings
- Provision of special glass for hazardous locations.

7.Parapet walls

- Minimum height should be 1.0 m

RECOMMENDATION ON FIRE SAFETY - NBC 107

- **Every building should have an access** as defined by Architectural Design Requirements (NBC 206) and should be wide enough to enable the fireman to easily approach to the building site.
- **The entry door** shall be as defined by Architectural Design Requirements (NBC 206) and should be sufficiently wide and tall so that easy access in available to the fire man.
- **All buildings should have sufficient ways** as defined by Architectural Design Requirements (NBC 206) so as to allow the rapid evacuation of all occupants in the event of fire, if any. In addition to the main entrance, the side and/or rear entrance shall be incorporated in the design.

Exit Requirements

STAIRES:

- The number of stairs in any building, especially when it exceeds 500 square metres in plinth area, shall be a minimum of two, one internal and the other an external fire escape. Additional stairs shall be provided in proportion to any increase in the plinth area.
- In the case of residential buildings, the minimum width of the stairs shall be 90 (80) cm. For other buildings, the minimum width shall be 1.5 m. The distance from any point in a passageway to a staircase in a building shall not exceed 20 metres.
- The maximum travel distance on the floor to exits shall not exceed 30 m for all types of buildings.

FIRE ESCAPE:

- Every building more than five storeys high shall have a separate fire escape having a minimum width of 75 cm.
- The fire escape shall have a minimum tread width of 20 cm and each riser shall be not more than 19 cm high.
- The number of risers per flight shall not be more than 15. Such a fire escape shall carry users towards an open space.

Exit Doors

- Exit doors shall open to a passageway or to a corridor.
- They should open outwards, but without restricting the movement of people passing outside the door.
- The maximum distance of such an exit doorway from any point in a passage shall be 30 m.
- The exit doorway shall neither be smaller than 90 cm in width, nor 180 cm in height.
- Exit doorway of Auditoriums, Cinemas and Public Assembly Buildings shall be open-able without a key from the side which they serve
- All exit doors to staircases and public passages shall open outwards. However, the doors shall not obstruct the passages and staircase landings when open.

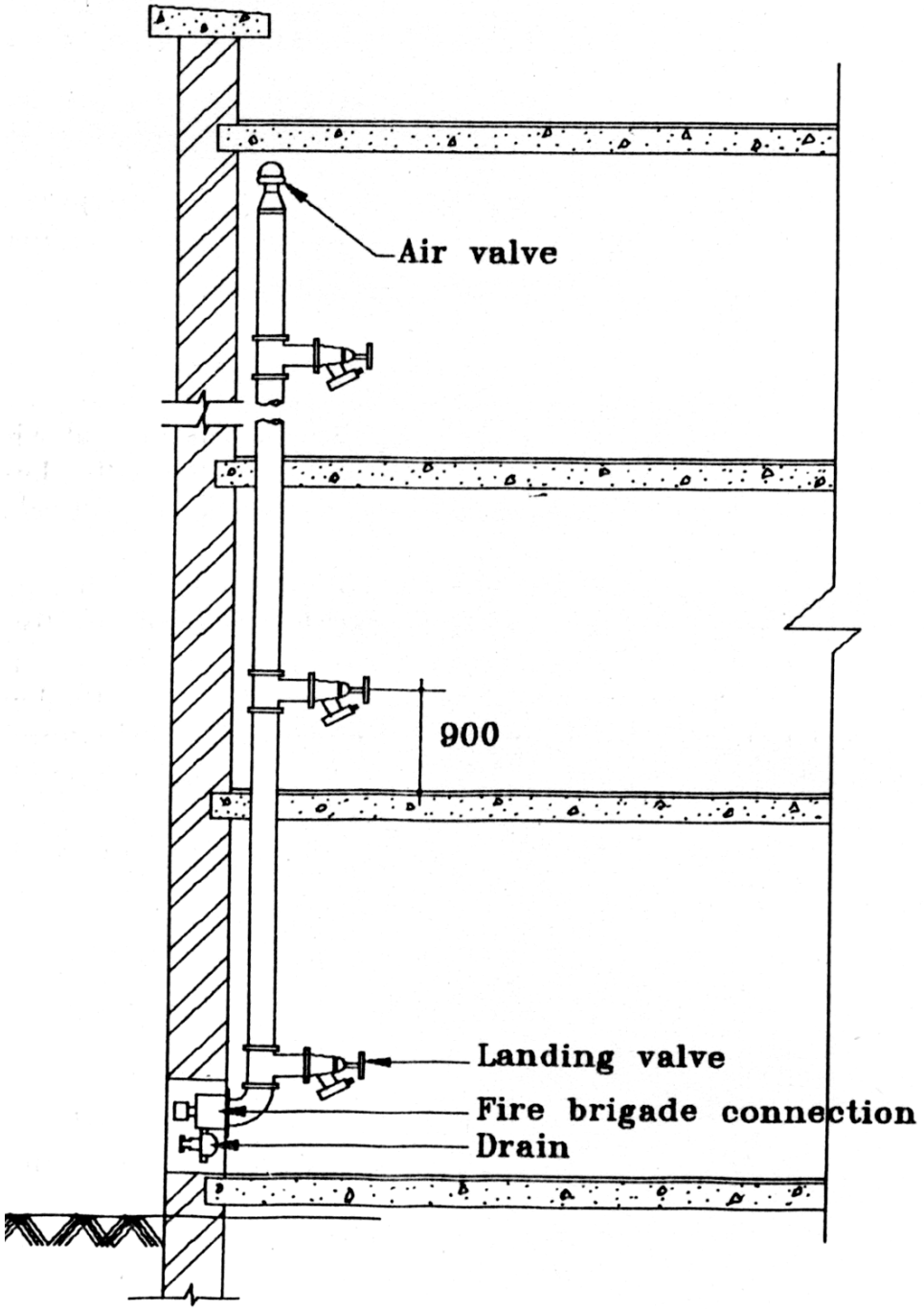
Lifts

- Shafts for lifts will have to be enclosed by walls having fire resistance of two hours
- Lift wells that extend for more than two floors shall be ventilated to outside air through opening of not less than 3.5 % of the area of the shaft.
- Lift wells shall not be vented directly through the machine room and provision of enclosed ventilation ducts or pipes should be provided through the machine room in such cases.

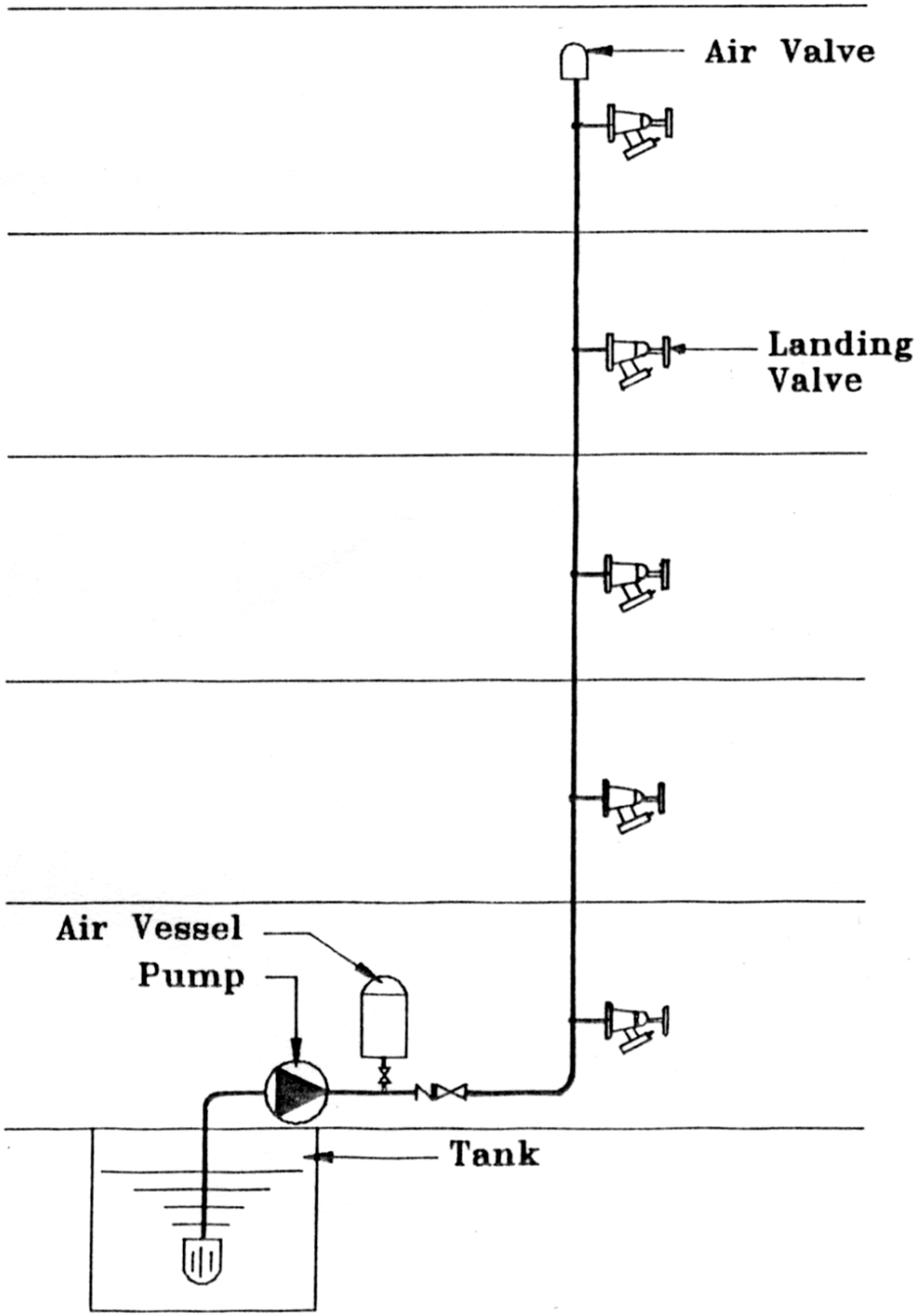
Fire Fighting Provision

- Apartment higher than 15 m need wet riser
- Wet riser replacement capacity 1000 lit/minute
- Tank for wet riser 50000 lts.
- Storage available from swimming pools, ornamental pools are considered as supplementary and are not acceptable as replacement for fire storage tank.
- It should be insured that no part of the floor is more than 6 meters from the hose nozzle when the hose reel in fully extended.
- Standby pumps : Where power supply in not dependable, standby pumps with diesel engine are provided to conduct fire fighting operations.

Dry Riser System



Wet Riser System



Lightning Arresters/Conductors

- A lightning arrester shall be located in the highest part of every building and it shall be connected by a conductor to an earth rod buried in the earth.
- The lightning arrester shall be so located that as much as possible of the building lies inside the surface of an imaginary cone having a vertex angle of 45 degrees and its apex at the top of the arrester.

Thank you