

unit-1

Building Byelaws and Regulations

Introduction - terminology - objectives of building byelaws - floor area ratio - floor space index - principles under laying building bye laws - classification of buildings - open space requirements - built up area limitations - height of buildings - wall thickness - lightening and ventilation requirements.

unit-2

Residential Buildings

Minimum standards for various parts of buildings - requirements of different rooms and their grouping - characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions.

unit-3

Public Buildings

Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial

buildings, hotel and motels, buildings for recreation, Landscaping requirements.

unit-4

Sign Conventions And Bonds

Bricks, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.

English bond and flemish bond - odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

unit-5

Doors, Windows, Ventilators And Roofs

Panelled doors, panelled and glazed door, glazed windows, panelled windows, swing ventilators, coupled roof, collar roofs.

King Post truss, Queen Post truss

sloped and flat roof and buildings:

drawing plans, Elerations and Cross

Sections of given sloped and flat roof

Buildings.

unit-6

Planning And Drawing of Buildings

Draw the Plan, Elevation and sections of a Residential and public Buildings from the given line diagram.



unit-1

Building Byelaws and Regulations

The rules & regulations prepared by the local authorities for covering the requirements of building ensure safety of the public through proper open space, min size of rooms & height & area limitations are known as building byelaws.

The main provisions designed for national Building code (NBC) by town planning ,authorities, urban development & municipal authorities to protect the persons living in the house, neighbours & public passing by the side of the buildings against structural failures, fire accidents and insanitary conditions are called as 'Building Bye-laws'.

IS:12564

Objectives of Building Byelaws:

- Building byelaws gave guidelines to the architects and engineers thus helps in preplanning of authorities.
- These laws allows order growth/systematic growth & prevent hazardous development.

→ Provisions of these laws usually effort safety against fire, noise, health, hazard, structural failures.

Following important points should be rember in connection with Building Bye-laws:

→ The building bye-laws causes under hardship to the public should either be remove or simplified.

tie → There should not be frequent changes in the basic requirements of these laws.

re → There should be adequate staff for effective implementation of these laws

→ The professional institutions, engineers & staff should be consulted at the time of framing (or) changing these laws.

→ The building bye-laws should be given wide publicity to make public awareness of them.

Terminology:-

Building:

Any structure for whatever purpose & whatever materials constructed & energy

part of the structure used for human habitation (or) any other purpose is known as "Building".

Permit:-

A permission (or) authorization writing by the authority to carryout work regulated by the code is known as 'Permit'.

Set-Back line:-

It is a line usually parallel to the flat boundaries and laid down in each case by the authority beyond which nothing can be constructed towards size boundaries.

Sanctioned plan:-

It is a set of diagrams, plan and specification submitted under the code and approved & sanctioned by the authorities.

Room height:-

The vertical distance measured from the finished floor surface to the finished ceiling surface is known as room height.

Covered area:-

The area covered by the building immediately above the plinth level that is known as covered area. In this area does not include

the space covered by compound walls, gate, uncovered stair case etc.

plinth area:-

It is the built up covered area measured at the floor level of the basement or any flooring.

detached buildings

- It is a building whose walls and roofs are independent of any other building.
- It has open space on all sides as specified
- It may include abilities such as garden, swimming pool etc
- It is the highest class of residential buildings type.

Semi detached building:

A building detached on 3 sides with specified open space is known as semi detached building.

Pl.

ely

Floor Area Ratio:-

It is the quotient obtained by dividing the total covered area (plint area) on all the floors by the area of plot.

$$FAR = \frac{\text{Total covered area of all floors}}{\text{plot area.}}$$

Area limitations:

The limitations of area & height of the building of different types of construction and occupancy is achieved by satisfying FAR.

The following Aspects are taken into Account

1. occupancy
2. Type of construction
3. width of street
4. traffic load
5. locality where the building is proposed.
6. parking facility
7. local fire facility
8. water supply & drainage facility
9. land availability.

Maximum permissible floor Area Ratio!

The maximum permissible FAR for individual buildings as per govt of AP are given below.

Roadwidth	FAR	max. height of Building
<12m	1.25	11m
12-18m	1.50	13m
>18m	1.75	15m

Floor Space Index:

It is the legal term same as floor area ratio.

- It is the ratio of total permission for built up area and plot area.
- for residential buildings FSI is measured as 0.5 to 4
- for commerical building F.S.I is measured as 0.5 to 1.5

Minimum Plot sizes and Building frontage:

Building frontage is the margin to be left beyond the extreme edge of the road to the front of the building line i.e it is the width of clearance of land to be left within the private plot to

facilitate.

- (i) Binding of roads in future
- (ii) more site distance at junctions avoid blind corners.
- (iii) minimizing sound pollution for inmates of the house
- (iv) To create a space b/w public and private property.

This clearance depends upon

- (i) status of the area.
- (ii) Nature of the road joining the building.

Status of the area:-

- within the municipality (or) panchayathi limits
- less than \nearrow 20,000 population it is a rural area.
- more than 20,000 population it is a urban area.

Nature of the road adjoining the building:

1. within a city

- main roads: that is roads open to any type of traffic including heavy trucks.

- Roads open to mixed traffic that is slow moving vehicles & also speed moving motor vehicles.

- feeder roads: Roads joining of two residential areas.

2. outside the city:

The roads may be classified as

(i) National & Express highways
60 kmph 80 kmph

- (ii) state highways
(iii) major district roads
(iv) minor district roads
(v) village roads.

- set back line (OSI) front building line is the line upto which we can extend our construction.

TYPE of residential Building	plot size in m ²	frontage in m
detached Building	above 250 m ² (5x5)	above 12m
semidetached building	125-250 m ² (3.5x3.5)	8-12 m
Row buildings	50-125 m ² (2.5x2.5) in size m	4.5 - 8 m

open spaces:-

These open spaces inside and around a building are essential for the lightening & ventilation requirement of the rooms.

This are 2 type

- (i) outer open spaces
- (ii) Inner open spaces

(i) outer open spaces:

They are additional margins to be left within the plot to isolate the building from the road & neighbouring buildings to provide more privacy, ventilation, natural lighting & to localise the impact of fire accidents, gas cylinders, explosions etc

(ii) Inner open spaces:

- They are open spaces within a building
- They are needed in heavily congested areas to provide lightening to the interior rooms.
- These all outer & inner spaces to be provided entirely within the owners premises.

External open space:-

It may be in the front, rear, sides of the buildings

(i) front open space: (Height of Building - 7m)

width of the street from buliding frontage line <u>in (cm)</u>	minimum front open space in (m)
upto 7.5m	1.5m
7.5 - 18 m	3m
18 m >	4.5m 6.0m

Rare open space!

Every residential building shall have average width of 3m rare open space

- In case of corner plots <300m² in area the rare open space should be minimum of 2.4m

Side open Space:

for every detached building shall have a minimum of 3m side open space at both sides whereas semidetached building shall have a min of 3m side open space on only one side.

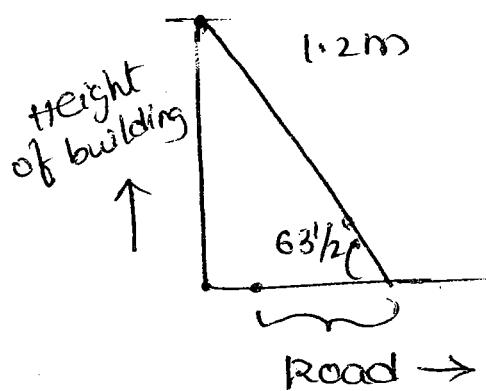
- for road types of buildings no side open space is required.

sides & their open spaces.

Height of the Buildings

- The height and NO of stores for a building are related to FAR under provisions of open space.
- Where the building height is not lowered by (related)
the FAR. the maximum height should be limited to width of the street as follows.
 - * the max height of building shall not exceed 0.5 times the width of road abutting (विचार) the front open space.
 - * if a building abuttes two or more streets width different widths. the following building face upon the street that has the greater width

63½° Rule:-



The height of the building should be such that the angle made from the extreme edge of the road on the opposite side to the top of building should not be greater than $63\frac{1}{2}^\circ$ angle.

under this rule we cannot include the height of upto 1.2m i.e water tanks, Chimineys , parapet walls etc,

Principles of Building Bye-laws:-

During planning and construction of any Building certain restrictions are laid down by municipal bodies, urban development authorities and other government departments as town planning truss related to clear open spaces to be left around the building, permissible height of Building, permissible height of Building, permissible construction areas etc. Hence the proposed plans of building are to be prepared according to the bye laws which are checked and approved by the above authorities.

The principles which should be observed while framing the building bye laws for any locality can be summarized as follows.

- (i) classifying the rooms according to use and then specifying minimum standards of each room with respect to size, height, floor area, lightening and ventilations.

- (ii) specifying height of compound wall and location of compound wall gates.
- (iii) controlling height of the structure and laying maximum limit of height in certain zones
- (iv) controlling projection in marginal spaces.
- (v) specifying suitable arrangements with respect to drainage and water supply.
- (vi) specifying materials and workmanship as per standard specifications.
- (vii) specifying set back lines and marginal spaces
- (viii) specifying minimum size of plots and their dimensions and frontage.
- (ix) making compulsory appointment of higher authorities like architect, engineer etc for works of specified nature.

Classification of Building based on occupancy

Group A, Group B, Group C, Group D, Group E,
Group F, Group I.

Group A - Residential Buildings

Group B - Educational "

Group C - Institutional "

Group D - assembly "

Group E - Business "

Group F - Merchantile

Group G - Industrial

Group H - Storage

Group I - Hazardous

Group-A - Residential Buildings:-

The Buildings in which sleeping accommodation is provided for normal residential purpose with or without dining facilities is known as residential buildings.

Group-B - Educational Buildings:-

The Buildings in which the education is provided to students like schools and colleges are known as educational Buildings.

Group-C - Institutional Buildings:-

The Buildings which includes Hospitals, orphanages, Jails, mental hospitals and dormitories.

(i) physical and mental patients undergoing treatment is treated as hospital.

(ii) Emotional ^{people} feelings convicted for their crimes undergoing their term of punishment or reformation buildings are Jails.

(iii) oldage homes (or) orphanages where living and sleeping accommodation are provided where care and caetion of primary importants called orphanges (or) oldage homes.

Group-D - Assembly Buildings:-

These are relatively larger buildings accomodating more no. of people for a stay of relatively short time for social, cultural, religous (or) political meetings and recreation purposes as assembly halls, community halls, auditorium, museums, busstops, railway station, airport terminals.

Group-E - Business Buildings:-

They are the buildings meant for public transactions as offices, banks, consultancy offices, research and test laboratorys, libraries where records are kept for the activites. they shall be kept open during the a part of the day.

Group-F - Merchantable buildings:-

These buildings involve money transactions towards purchaser, shopping complexes, markets, showrooms, serviceing centers come under this category.

Group-G - Industrial Building:-

They are specially constructed structures

to manufacture products after processing, assembly and fabricating.

- power plants, pumping stations, cleaning plants come under this category.
- They invariably harbour men and machinery and also involve risk.
- more care is to be exercised to render the buildings and also ^{for} fire proof.

Group - II - Storage Buildings:-

These buildings constructed mainly for the storage and preservation of goods.

They include ware houses, cold storage godowns, garages etc.

cool and dry place with less ventilation and illumination is required for effective storage.

Group I - Hazardous Buildings:-

These buildings store manufacture (or) process hazardous products which are explosive, highly inflammable, poisonous, irritating, ^{corrosive}, readily ignitable, chemicals producing flame, fumes and smoke.

- These buildings need to be isolated from the rest of the buildings so that in case of any accidents (or) leakage, the damage occurred should bear minimum & confined to a limited

area. These are classifications according to nature of occupancy

Based On Fire Resistance:-

TYPE-I, TYPE-II, TYPE-III, TYPE-IV.

- NO building is absolutely fire resistant depending on materials of construction, planning, and design of the various plots of the building compact or loose, method of construction, ability of the building to withstand the effect of fire for a greater period of exposure buildings are classified into four groups

TYPE - I - construction:-

In which all structural members shall be four hour fire resistance.

TYPE - II - construction:-

In which all structural members shall be three hour fire resistance.

TYPE - III - construction:-

In which all structural members shall be two hour fire resistance.

TYPE - IV - construction:-

In which all structural members shall be one hour fire resistance,

Classification of Buildings Based on Built in Environment and Naturality

1. Natural buildings.
2. Green buildings (or) Sustainable buildings
3. Intelligent buildings.

Natural Buildings:-

- It is the construction of building using local and low tech materials with a major emphasis on local ecology and also for social ecology.
- A natural Building involves a variety of design elements , location , ~~material~~ & materials , site and size appropriate , non-toxic materials , appropriate , high functioning system and regenerative in india

Green buildings (or) Sustainable buildings:-

It is a structure that is designed , built , renovated , operated (or) reused in an ecological and resource efficient manner .

A Green building is one which uses less water , optimise energy efficiency , conserves natural resources , generates less wastage and provides healthier spaces for occupancy as compared to a conventional buildings .

Intelligent buildings:-

It is one which provides a productive and cost effective environment through optimization of its four basic elements structure, systems, services and management and also the inter relationship between them.

Typical features of intelligent building :-

1. Restricted access to the building. One would need a password to enter the building
2. Energy saving devices and technique are used to save electricity bill upto 40%
3. Green land Scapes to conserve environment
4. Integrated home auto machine systems
5. measures to be adopted to reduce operation (or) maintenance cost.
6. Building management systems to manage heating, close circuit televisions alarm systems.

Lightening and Ventilation:-

except the store room all rooms of a residential house require illumination & free air circulation

Habitable rooms:-

windows, openings either directly to external air or into an open veranda are provided for admission of natural light and air into rooms.

door openings are not counted in the lightening and ventilation provisions of the building.

- If window is partly fixed only the area of shutter doors can be open shall be counted
- The minium area of openings for ligheting and ventilation point of view should not be less than
 - (i) $\frac{1}{10}$ th of the floor area for dry hot climate
 - (ii) $\frac{1}{6}$ th of the floor area for wet hot climate
 - (iii) $\frac{1}{8}$ th of the floor area for intermediately climate and
 - (iv) $\frac{1}{12}$ th of the floor are for cold climate
- The total area of doors and windows shall not be less than $\frac{1}{7}$ th of the floor area of room.

Bathrooms and water closets:-

- for these rooms it should be provided with natural ligheting and permanent ventilation by one of the (following) following.
 - sky lights may be provided which will provide complete light and ventilation ($\frac{1}{10}$ th)
 - windows having an area of not less 10% of the floor area and locate in an external wall facing a street (or) yard,

Kitchens-

1. every kitchen should be ventilated according to

the standards prescribed

Basement and cellar:-

It shall be lighted and ventilated by windows in external walls having a ventilation area of not less than ~~25%~~ ^{25/100} 2½% of floor area.

Store Room:-

These rooms shall have atleast half of ventilation required which is required for living rooms. If such ventilation is not possible atleast they shall be ventilated by means of chimneys.

Staircases:-

- Every staircase should be lighted and ventilated from an open air space of not less than 3m
- 4.5m of open space shall be provided incase of higher structures

Wall thickness:-

The strength of walls depends no. of factors such as quality of brick, mortar, method of bonding, length, unsupported height, eccentric loading, the position and amount of openings of wall and cross section of various external load to which the walls are subjected.

By considering all the above factor such that the stress in the wall do not exceed the safe permissible limits.

storeys | wall thickness (cm)

	1	2	3	4
1	20	-	-	-
2	20	20	-	-
3	20	20	-	-
4	20	20	20	20

- Masonry walls (or) columns capacity to bare load largely depends upon the slenderness ratio.
- for a wall the slenderness ratio shall be the effective height divided by the effective thickness (or) the effective length divided by effective thickness.
- for load bearing walls set in 1:6 cement mortar, (or) 1:2:9 cement lime mortar, slenderness ratio shall not exceed 18.
- for non-load bearing walls and curtain walls shall not exceed 30 and for free standing walls and parapet walls the slenderness ratio shall not exceed 24.
- The slenderness ratio for load bearing columns shall not exceed 12.

Classifications of Residential Buildings:-

1. Detached houses
2. semi-detached houses
3. Row houses or chawls
4. Block of flats or terrace houses
5. duplex type houses,