Unit: -2

Building Planning- Classification of buildings, Provisions of National Building Codes and Rules, Building bye-laws, open area, Setbacks, FAR terminology, Design and drawing of Building, Design concepts and philosophies, Preparing sketch plans and working drawings of various types of buildings like residential building, institutional buildings and commercial buildings, site plans, presentation techniques, pictorial drawings, perspective and rendering, model making, introduction to computer aided design and drafting, Applying of principle of architectural composition (i.e. unity, contrast, etc.), Principles of planning, orientation in detailed drawings.

Classification of buildings

Types of building as per National Building Code of India

According to National building code of India (SP: 7 – 1983), buildings are classified based on occupancy as per following

Group A: Residential Buildings

These shall include any building in which sleeping accommodation is provided for normal residential purposes, with or without cooking or dining or both facilities, except any building classified under Group C.

Residential types of building are further sub divided as per following

1. A-1 Lodging or rooming houses
2. A-2 One-or two-family private dwellings
3. A-3 Dormitories
4. A-4 Apartment houses (flats)
5. A-5 Hotels

Group B: Educational Buildings

These shall include any building used for school, college or day-care purposes involving assembly for instruction, education or recreation and which is not covered by Group D.

Group C: Institutional Buildings

These shall include any building or part thereof, which is used for purposes, such as medical or other treatment or care of persons suffering from physical or mental illness, disease or infirmity; care of infants, convalescents or aged persons and for penal or correctional detention in which the liberty of the inmates is restricted. Institutional buildings ordinarily provide sleeping accommodation for the occupants.

Institutional types of building are further sub divided as per following

1. C-1 Hospitals and sanatoria
2. C-2 Custodial institutions
3. C-3 Penal and mental institutions

Group D: Assembly Buildings

These shall include any building or part of a building, where groups of people congregate or gather for amusement, recreation, social, religious, patriotic, civil, travel and similar purposes, for example, theaters, motion picture houses, assembly halls, auditoria, exhibition halls, museums, skating rinks, gymnasiums, restaurants, places of worship, dance halls, club rooms, passenger stations and terminals of air, surface and marine public transportation services, recreation piers and stadia, etc.

Assembly types of building are further sub divided as per following

1. D-1 Buildings having a theatrical stage and fixed seats for over 1000 persons
2. D-2 Buildings having a theatrical stage and fixed seats for less than 1000 persons
3. D-3 Buildings without a stage having accommodation for 300 or more persons but no permanent seating arrangement
4. D-4 Buildings without a stage having accommodation for less than 300 persons
5. D-5 All other structures designed for assembly of people not covered by subdivisions D-1 -to D-4

Group E: Business Buildings

These shall include any building or part of a building which is used for transaction of business (other than that covered by Group F and parts of buildings covered by 3.1.1); for keeping of accounts and records and similar purposes, professional establishments, service facilities, etc. City halls, town halls, court houses and libraries shall be classified in this group so far as the principal function of these is transaction of public business and keeping of books and records

Business types of building are further sub divided as per following

1. E-1 Offices, banks, professional establishments, like offices of architects, engineers, doctors, lawyers, etc.
2. E-2 Laboratories, research establishments and test houses.
3. E-3 Computer installations.

Group F: Mercantile Buildings

These shall include any building or part of a building, which is used as shops, stores, market, for display and sale of merchandise, either hole sale or retail.

Mercantile types of building are further sub divided as per following

1. F-1 Shops, stores, markets with area up to 500 m'.
2. F-2 Underground shopping centers, departmental stores with area more than 500 m2 Storage and service facilities incidental to the
   sale of merchandise and located in the same building shall be included under this group.

Group G : Industrial Buildings

These shall include any building or part of a building or structure, in which products or materials of all kinds and properties are fabricated, assembled, manufactured or processed, for example, assembly plants, laboratories, dry cleaning plants, power plants, pumping stations, smoke houses, laundries, gas plants, refineries: dairies and saw-mills.

Industrial types of building are further sub divided as per following

1. G-1 Buildings used for low hazard industries
2. G-2 Buildings used for moderate hazard industries
3. G-3 Buildings used for high hazard industries.

Group H: Storage Building

These shall include any building or part of a building, used primarily for the storage or sheltering (including servicing, processing or repairs incidental to storage) of goods, wares or merchandise (except those that involve highly combustible or explosive products or materials), vehicles or animals, for example, warehouses,' cold storage, freight depots, transit sheds, storehouses, truck and marine terminals, garages, hangars (other than aircraft repair hangars), grain elevators, barns and stables.

Storage properties are characterized by the presence of relatively small number of persons in proportion to the area, Any new use which increases the number of occupants to a figure comparable with other classes of occupancy shall change the classification of the building to that of the new use, for example, hangars used for assembly purposes, warehouses used for office purposes, garage buildings used for manufacturing.

Group J: Hazardous Buildings

These shall include any building or part of a building which is used for the storage, handling, manufacture or processing of highly combustible or explosive materials or products which are liable to burn with extreme rapidity and/or which may produce poisonous fumes or explosions; for storage, handling, manufacturing or processing which involve highly corrosive, toxic or noxious alkalis, acids or other liquids or chemicals producing flame, fumes and explosive, poisonous, irritant or corrosive gases; and for the storage, handling or processing. Of any material producing explosive mixtures of dust which result in the division of matter into tiny particles subject to spontaneous ignition.

Provisions of National Building Codes and Rules

This part sets out the standard space requirements of various parts of a building and those of light and ventilation. Some of these items depend on the number of persons who would normally occupy the building, for which the occupant load should be worked out from table hereunder:

Occupant Load

Sl. No.	Type of Occupancy	Occupant Load per 100 sq m. of Plinth or Covered Area
1	Residential	8.0
2	Educational	25.0
3	Institutional	6.60
4	Assembly (a) with fixed or loose seats and dance floor (b) without seating facilities including dining rooms	 166.6 66.6
5	Mercantile (a) street floor and sales basement (b) upper sale floor	 33.3 16.6
6	Business and industrial	10.0
7	Storage	3.3
8	Hazardous	10.0

SPACE REQUIREMENT FOR DIFFERENT PARTS OF BUILDING

Main Building

The plinth or any part of a building or outhouse shall be so located with respect to average road level from site so that adequate drainage of the site is assured but at a not height less than 45 cm.

Interior Courtyards, Covered Parking Spaces and Garages

These shall be raised at least 15 cm. Above the surrounding ground level and shall satisfactorily drained.

Habitable Rooms Size and Width

The minimum size and width shall be as below given in Table

Minimum Size and Width of Different Components of Residential Premises

Sl. No.	Component of Building	Min. requirement for plots upto 50 sq m.		Min. requirement for plots above 50 sq m.	
1	Habitable Room	Area Width Height	7.50 sq m. 2.10 m. 2.75 m.	Area Width Height	9.50 sq m. 2.40 m. 2.75 m.
2	Kitchen	Area Width Height	3.30 sq m. 1.50 m. 2.75 m.	Area Width Height	4.50 sq m. 1.50 m. 2.75 m.
3	Pantry	Area Width Height	Not applicable Not applicable Not applicable	Area Width Height	3.00 sq m. 1.40 m. 2.75 m.
4	Bathroom	Area Width Height	1.20 sq m. 1.00 m. 2.20 m.	Area Width Height	1.80 sq m. 1.20 m. 2.20 m.
5	W.C.	Area Width Height	1.00 sq m. 0.90 m. 2.20 m.	Area Height Height	1.10 sq m. 0.90 m. 2.20 m.
6	Combined Bath & W.C. (Toilet)	Area Width Height	1.80 sq m. 1.00 m. 2.20 m.	Area Width Height	2.80 sq m. 1.20 m. 2.20 m.
7	Store	Area Width Height	No restriction No restriction 2.20 m.	Area Width Height	No restriction No restriction 2.2 m.
8	Projections	Permitted within the setbacks upto 0.75 m. width		Permitted within the setbacks	
9	Canopy	See clause 4.9.6		See clause 4.9.6	

Sl. No.	Component of Building	Min. requirement for plots upto 50 sq m.		Min. requirement for plots above 50 sq m.	
10	Garage	--		Area Width Length Height	14.85 sq m. 2.75 m. 5.40 m. 2.40 m.
11	Passage	--		Width	1.00 m.
12	Doorways Habitable rooms For kitchen bath, W.C. etc.	Width Height Width Height	0.80 m. 2.00 m. 0.75 m. 2.00 m.	Width Height Width Height	0.90 m 2.20 m. 0.75 m. 2.00 m

14	Staircase	Width 0.75 m. No internal restriction for	Width 0.90 m.

Building bye-laws

A **by-law** (or **bye-law**) is a rule or law established by an organization or community to regulate itself, as allowed or provided for by some higher authority. The higher authority, generally a legislature or some other government body, establishes the degree of control that the by-laws may exercise. By-laws may be established by entities such as a business corporation, a neighborhood association, or depending on the jurisdiction, a municipality.

Municipal by-laws are public regulatory laws which apply in a certain area. The main difference between a by-law and a law passed by a national/federal or regional/state body is that a bylaw is made by a non-sovereign body, which derives its authority from another governing body, and can only be made on a limited range of matters. A local council or municipal government gets its power to pass laws through a law of the national or regional government which specifies what things the town or city may regulate through bylaws. It is therefore a form of delegated legislation.

Within its jurisdiction and specific to those areas mandated by the higher body, a municipal by-law is no different than any other law of the land, and can be enforced with penalties, challenged in court and must comply with other laws of the land, such as the country's constitution. Municipal bylaws are often enforcable through the public justice system, and offenders can be charged with a criminal offence for breach of a bylaw. Common bylaws include vehicle parking and stopping regulations, animal control, building and construction, licensing, noise, zoning and business regulation, and management of public recreation areas.

Open area Related words

Alley

A narrow street or passage between or behind buildings

Alleyway

An alley

Arcade

A covered passage at the side of a building

Back

An outside area behind a house or other building

Backyard

An area behind a house covered with a hard brick or stone surface

Backyard

The area behind a house, often used to construct a smallsimple building for people to live in

Blind alley

A narrow path between or behind buildings, that is closed at one end

Boma

An area surrounded by a fence and sometimes covered with a dry grass roof, used for outdoor meals and parties

Campus
An area of land containing all the main buildings of a large company or organization

Car park
An area or a building where people can leave their cars for a short time

Cloister
A covered path around an open area in the center of a large building such as a cathedral or monastery

Close
The area around a cathedral including the buildings belonging to it

Court
A courtyard

Courtyard
A square area that is surrounded by buildings or walls

Deck
A wooden floor that is built onto the outside of the back of a house. The usual British word is decking.

Decking
A wooden floor that is built outside a house or in a garden

Driveway
A drive in front of someone's house

Estate
A very large area of land that belongs to one person, usually with a very big house on it

Forecourt
An open area in front of a large building or petrol station

Front
The area outside the part of a building that faces forwards

Frontage
The area in front of something such as a building or street

Garden
An area of land next to a house that belongs to the house, usually with grass and plants growing in it. The American word is yard

Garden
A section of an area of land next to or near a house that is used for growing flowers or vegetables

Land
An area that someone owns, often including the buildings on it. You can also refer to someone's lands, and this has the same meaning

Manor
An area of land containing a manor

Park
An enclosed area of grass and trees surrounding a large country house

Patio
A flat area covered with stone, brick etc. at the back of a house, where people can sit outside

Peristyle
In architecture, a line of columns that surrounds an outdoor space such as a garden inside a building, or the space surrounded by these columns

Porch
A veranda

Precincts
The area around an important building, especially a college or cathedral

Quadrangle
A square area in a school or university surrounded on all sides by buildings

Situation
The kind of area that surrounds a place, used especially by people who sell houses or property. A more usual word is location

Square
An open area of land in the shape of a square, usually with buildings around it. 'Square' is often used in the names of roads and can be written Sq.

Setbacks
In land use, a **setback** is the distance which a building or other structure is set back from a street or road, a river or other stream, a shore or flood plain, or any other place which is deemed to need protection.

FAR terminology

Floor area ratio (**FAR**) is the ratio of a building's total floor area (zoning floor area) to the size of the piece of land upon which it is built. The terms can also refer to limits imposed on such a ratio.

As a formula: Floor area ratio = (total amount of usable floor area that a building has, zoning floor area) / (area of the plot)

Design and drawing of Building
The information shown on a locating drawing will be overall sizes, levels and references to assembly drawings. They are intended to show the location of the works, not detail (a common mistake). The location drawings, which can be plans, elevation or sections, are numbered consecutively with the prefix L.
Typically, location drawings will include:

- Block plans.
- Site plans.
- Floor plans.
- Foundations plans.
- Roof plans.
- Section through the entire building.
- Elevations.

Site plans

Site plans usually show the extent of the site but no surrounding detail. Recommended scales are:

- 1 : 500
- 1 : 200

The function of the site plan is to show:

- The location of the building or buildings in relation to their surroundings.
- The topography of the site, with both existing and finished levels.
- Buildings to be demolished or removed.
- The extent of earthworks, included, cutting and filling, and the provision of bank and retaining walls.
- Roads, footpaths, hard standings and paved areas.
- Planting.
- The layout of external service runs, including drainage, water, gas, electricity, telephone, etc.
- The layout of external lighting.
- Fencing, walls and gates.
- The location of miscellaneous external components – bollards, litter bins, etc.

Floor plans

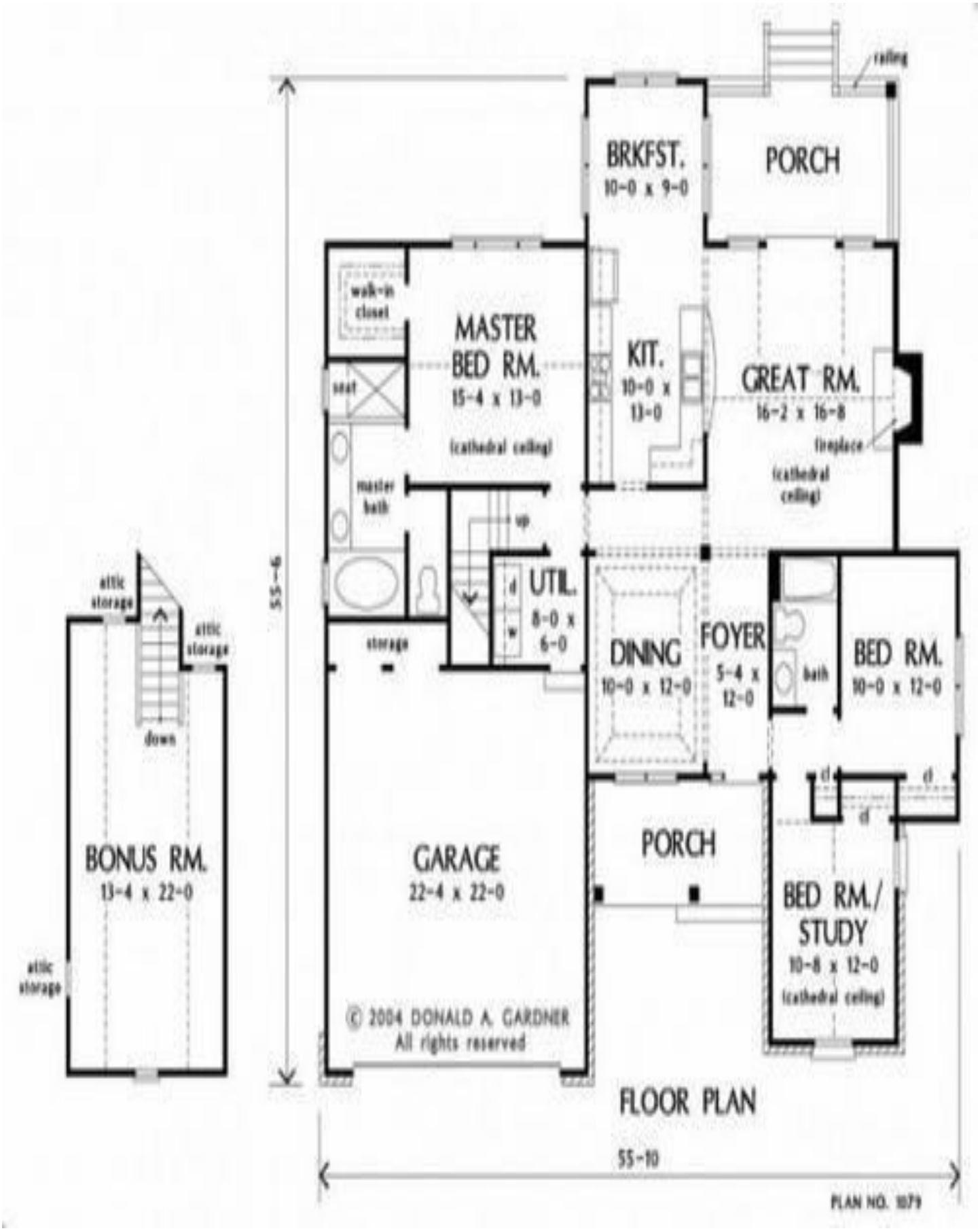
Floor plans usually show the layout of rooms, key dimensions and levels, and may also use conventions and symbols to show materials and locations of fittings and appliances. Recommended scales are:

- 1 : 200
- 1 : 100
- 1 : 50

Design concepts and philosophies

Philosophy of design is the study of assumptions, foundations, and implications of design. The field is defined by an interest in a set of problems, or an interest in central or foundational concerns in design. In addition to these central problems for design as a whole, many philosophers of design consider these problems as they apply to particular disciplines (e.g. philosophy of art). Although most practitioners are philosophers, several prominent designers and artists have contributed to the field. For an introduction to the philosophy of design see the article by Per Galle at the Royal Danish Academy.

Preparing sketch plans and working drawings of various types of buildings like residential building


railing
BRKFST.
10-0 x 9-0
PORCH
walk-in closet
MASTER BED RM.
15-4 x 13-0
(cathedral ceiling)
seat
master bath
KIT.
10-0 x 13-0
GREAT RM.
16-2 x 16-8
fireplace
(cathedral ceiling)
up
UTIL.
8-0 x 6-0
storage
55-4
attic storage
attic storage
down
attic storage
BONUS RM.
13-4 x 22-0
DINING
10-0 x 12-0
FOYER
5-4 x 12-0
bath
BED RM.
10-0 x 12-0
GARAGE
22-4 x 22-0
PORCH
BED RM./ STUDY
10-8 x 12-0
(cathedral ceiling)
© 2004 DONALD A. GARDNER
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FLOOR PLAN
55-10
PLAN NO. 1079

Presentation techniques

We have condensed all of the presentation techniques down to the most effective.

1. Use visual aids

Using pictures in your presentations instead of words can double the chances of meeting your objectives.

2. Keep it short and sweet

There is an old adage that said – "No one ever complained of a presentation being too short." Nothing kills a presentation more than going on too long.

There are some college professors who will penalize a short presentation (most lecturers see no problem in droning on) , but for most people a shorter presentation is better. Keep your presentation to under 22 minutes if you can.

3. Use the rule of three

A simple technique is that people tend to only remember three things. Work out what the three messages that you want your audience to take away and structure your presentation around them. Use a maximum of three points on a slide.

4. Rehearse

Practice makes for perfect performance. Many experts say that rehearsal is the biggest single thing that you can do to improve your performance. Perform your presentation out loud at least four times. One of these should be in front of a real scary audience. Family, friends or colleagues. Even the dog is better than nothing.

5. Tell stories

All presentations are a type of theatre. Tell stories and anecdotes to help illustrate points. It all helps to make your presentation more effective and memorable.

6. Lose the bullet points – don't put your speaker notes up on the screen

Bullet points are the kiss of death for most presentations. Most people use bullet points as a form of speaker notes. To make your presentation more effective put your speaker notes in your notes and not up on the screen.

7. Video yourself

Set up a video camera and video yourself presenting. You will see all sorts of mistakes that you are making, from how you are standing, if you are jangling keys, to how well your presentation is structured.

8. Know what slide is coming next

You should always know when presenting which slide is coming up next. It sounds very powerful when you say "On the next slide [Click] you will see…", rather than than a period of confusion when the next slide appears.

9. Have a back-up plan

Murphy's Law normally applies during a presentation. Technology not working, power cuts, projector blowing a bulb, spilling coffee on your front, not enough power leads, no loudspeakers, presentation displays strangely on the laptop – all of these are things that have happened in presentations that I have given.

Have a back-up plan. Take with you the following items – a printed out set of slides – (you can hold these up to the audience if you need to), a CD or data stick of your presentation, a laptop with your slides on it. Just in case it goes wrong.

Guess what? When you have back-ups – you seldom need to use them.

10. Check out the presentation room

Arrive early and check out the presentation room. If you can make sure that you see your slides loaded onto the PC and working on the screen. Work out where you will need to stand.

Do you agree or disagree with any of these effective presentation techniques? Have you have any experiences like this? Add it in to the comments box below.

Pictorial drawings

A view of an object (actual or imagined) as it would be seen by an observer who looks at the object either in a chosendirection or from a selected point of view. Pictorial sketches often are more readily made and more cle arly understood thanare front, top, and side views of an object. Pictorial drawings, either sketched freehand or made with drawing instruments,are frequently used by engineers and architects to convey ideas to their assist ants and clients. *See* Engineering drawing

In making a pictorial drawing, the viewing direction that shows the object and its details to the best advantage is chosen. Theresultant drawing is orthographic if the viewing rays are considered as parallel, or perspective if the rays are considered asmeeting at the eye of the observer. Perspective drawings provide the most realistic, and usually the most pleasing, likenesswhen compared with other types of pictorial views.

Perspective & Rendering

Perspective: -The art of representing three-dimensional objects on a two-dimensional surface so as to give the right impression of their height, width, depth, and position in relation to each other.

Rendering: -

Software rendering is the process of generating an image from a model by means of computer software. In the context of computer graphics rendering, software rendering refers to a rendering process that is not dependent upon graphics hardware ASICs, such as a graphics card. The rendering takes place entirely in the CPU.

Model Making

1. Use the Right Tools

Having the right tools for building your model may not be everything when it comes to model making, but it sure will separate a good model from a great one. You don't want to waste time trying to find a

less-than-suitable substitute for a missing tool. However, listing all the essential tools calls for a post in itself; take a look at this one to get started.

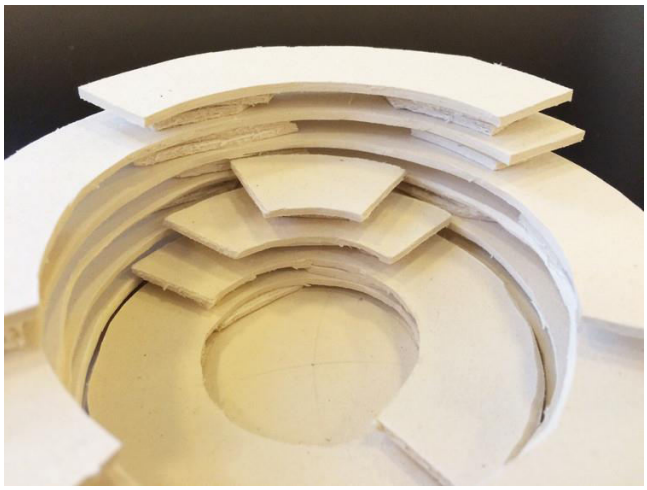

Figure-50:- Model Making

2. Use High Quality Cutting Tools

When building a model you will always need to cut up some material or another in order to suit your needs, making this specific tool somewhat more important than many of the others (with the exception of glue perhaps – more on that later). Getting that clean edge adds another level of neatness; it may not be fully appreciated, but trust us, its absence is always noted. Get your hands on a good utility knife with a set of exchangeable blades; a blunt knife is often more dangerous than a sharp one. A good pair of sharp scissors comes in handy too, especially when you don't want to spend hours making delicate cuts using a knife for a simple sketch model.

Figure-51:- Use High Quality Cutting Tools

3. Carefully Choose Your Materials

Although your model may not always be an exact miniature of a full-scale building, the materials you select to represent it are important. Firstly, you want your model to narrate something about your project; having carefully chosen materials, as opposed to a model entirely made of card, will help to immerse others in that narrative far more effectively. Secondly, you want to make sure that the materials you use are easy enough for you to work with; a model should supplement your project, not hijack all of your time.

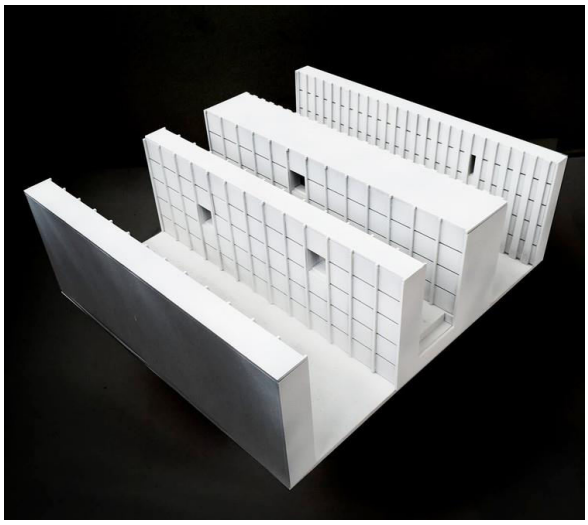

Figure-52:- Carefully Choose Your Materials

4. Use a Laser Cutter if Necessary

It's not uncommon to already have a CAD model on your computer, but it is uncommon, in such a situation, to have the motivation to recreate the entire thing by hand. In this case, laser cutting may be a favorable alternative. The trick with laser cutting is to set up your virtual model correctly, in order to make it possible to cut and piece together. It's likely that you'll be more restricted regarding your geometry, and tip 3 comes into play here too: unless you want to start a fire, the thickness of the material you use may be limited, and if you're planning to use wood then you should have a plan to remove or cover up those freshly-burned edges. If you're trying to get something very organic produced from a 3D model, 3D printingis probably the way to go.

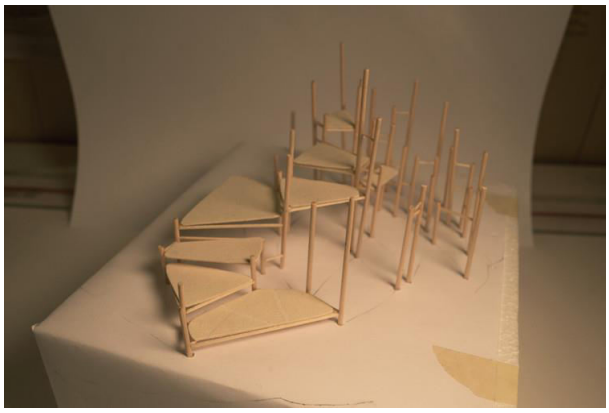

Figure-53:- Carefully Choose Your Materials

5. Use Sketch Models

Thinking spatially is a tricky thing, even for architects. Sketch models, especially flexible ones that aren't permanently glued together, can be excellent tools in themselves when trying to figure out how to compose the finished model or overall architectural design. These models have the appeal of not needing to look so polished, nor do they take too much time to make.

Figure-54:- Use Sketch Models

6. Think about Your Lighting

Ensuring that your working environment is properly lit is essential in preventing your eyes from straining themselves, as well as enabling you to see the details in your model and avoid mistakes. Models can also result in beautiful photographs, but only if you have proper lighting set up.

Figure-55:- Think about Your Lighting

7. Make Sure You Have Enough Space

Making enough space for yourself before beginning on a model is something your future self will thank you for. Model making can get messy and confusing very quickly if one doesn't have a big enough or organized space. Setting up a trashcan, for example, for left over scraps, or having a cutting area separated from an assembly area, can make the experience much more pleasant and prevent you from losing your gumption.

8. Select the Right Adhesives

As mentioned earlier, alongside cutting tools, getting your adhesives right is one of the most essential parts of model making. Nothing, nothing is worse than showing up with a model that is ready to fall apart at the slightest touch—except, perhaps, showing up with a model covered in drips and strings of glue. Hereis an extensive list summarizing the best types of glue and tape for different types of models and materials. Bookmark it and use it wisely.

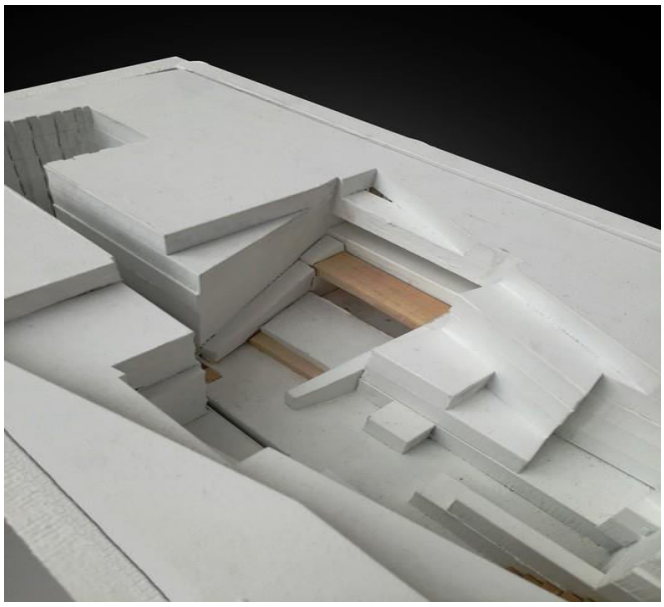

Figure-32:- Select the Right Adhesives

9. Wash Your Hands

One source suggests washing your hands every 30 minutes, and while this may be a tad excessive for some, washing your hands more often than usual is probably a good thing, especially when working with a white material. The oil and dirt that begins to accumulate on your fingers may not be obvious to you until you see it on your completed model. By that point, it'll be too late.

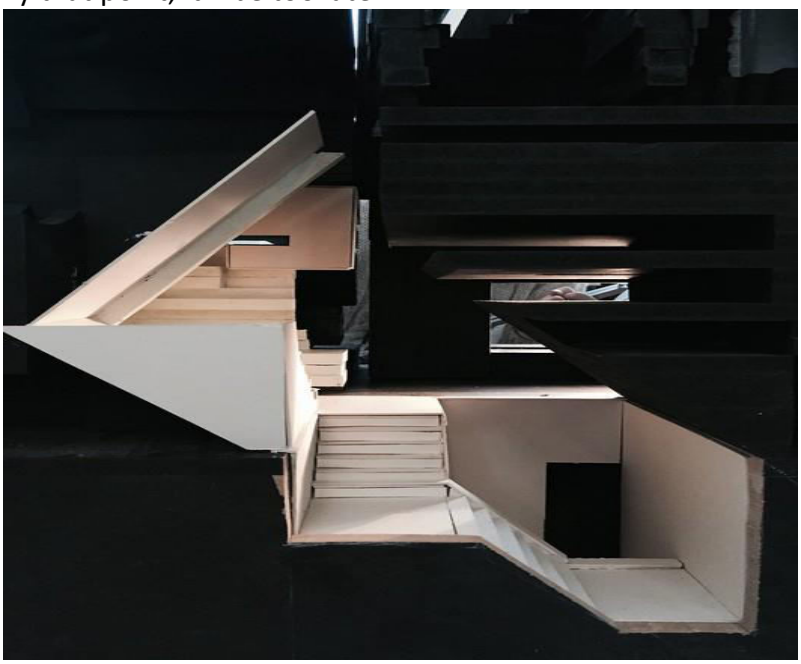

Figure-56:- Wash Your Hands

10. Anchor the Model

A model always represents a real building project, which always has a site or context; don't forget the context! Having a solid base is so much better than having a model floating in thin air. Models require something to anchor them down and give them that final touch, or as one source calls it, the equivalent of a "picture frame."

Figure-57:- Anchor the Model

11. Decide on a Scale

Scale can be a game changer. Not only will it determine the level of detail and space that can be seen, but also the amount of time you spend on your model—and contrary to popular belief, smaller isn't always faster. Spending hours cutting meticulous, small elements using your X-Acto knife is something you'll regret when you could just as well have chosen a larger scale and used scissors.

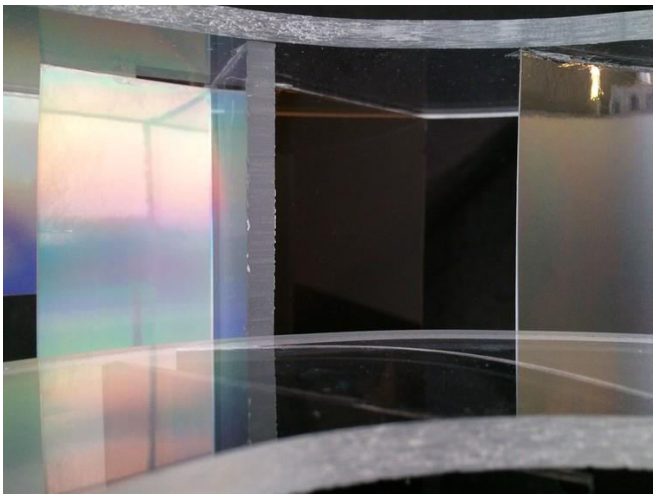

Figure-58:- Decide on a Scale

12. Be Selective in What You Show

There will never be enough time or money to include everything in a model, so make sure you know what your model is aiming to communicate. Is it illustrating the essence of your project or concept, or is it showing a technical section of a wall? This will help you to cut out materials and time, including only what's essential.

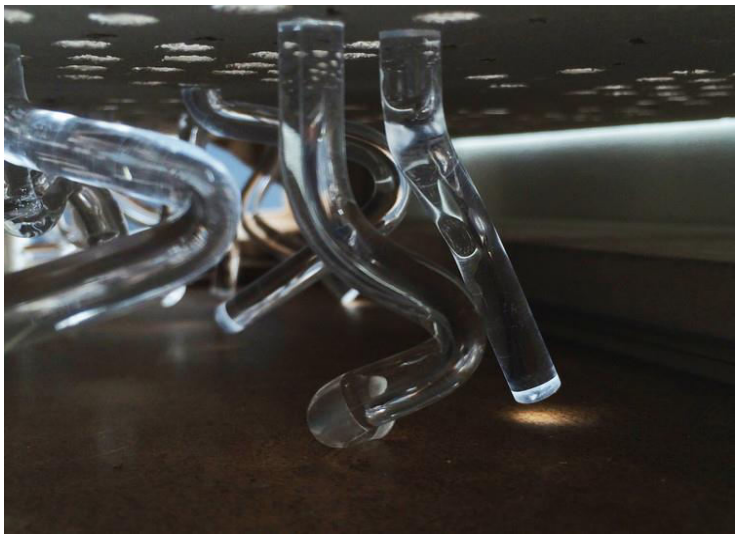

Figure-59:- Be Selective in What You Show

13. Show Something New

In certain cases, models are near-replicas of drawings, however in an ideal world they shouldn't be. A model should enhance a set of drawings, showing another level of depth that drawings may not be able to communicate. Develop your project a step further in your model, in order to get the most out of your time and resources.

Figure-60:- Show Something New

14. Make a Time Plan

Before getting started on your model, write up a time plan to keep you on track for your deadline. This is to ensure that you show up with a model that can stand on its own and withstand the examination of others (in other words, a completed model) but also so that you don't end up sacrificing too much of your time that should be allocated to other work. Be realistic with your time plan; as stated earlier, nothing is worse than a model ready to fall apart.

Figure-61:- Make a Time Plan

Introduction to computer aided design and drafting

Computer Aided Drafting (CAD) means using the computer, instead of the classical tools (pencil, ink, rulers, and paper) to create drawings. There are several advantages to this, for example the drawing can be subdivided in smaller parts, that can be reused or be worked on by several architects, updating the drawing is much faster than with hand-made drawings (where you often needed to redraw the whole drawing), and several tools can help you to check your drawing for errors. Besides this, computer generally allows you to work in real-world units, and does the scaling automatically, so your drawing fits on the printer sheet.

CAD Applications are nowadays complex and very carefully conceived. Therefore most of them are highly expensive software. Among the most used worldwide, are Autocad, Archicad, Inventor, Microstation, Vectorworks or Allplan. Almost all engineering and architecture offices on the planet use one of them, so knowing at least some of them is very important in the professional world, and usually the most important requirement on architecture job offerings.

Those applications are generally used to design whole architecture or engineering projects, often from scratch, and to produce the printed drawings that will be used to discuss the project with involved people such as project partners, authorities and clients, and the execution documents that will be used by the building team to actually build the project. Nowadays, all of them can be used to make 2-dimensional drawings directly (similarly to drawing on a sheet of paper), or to build a 3-dimensional model of your project, from which the software will extract 2D drawings that will be printed on paper.

Unity: -

The **principle of Unity** deals with visual composition in design. Composition means the relationship between the visual elements. The brick work, timber and concrete which we use as building materials for protection from weather or for structural support from the visual composition of architectural composition. To get a good composition, the elements of unity should be chosen carefully.

Figure-62:- Unity

Unity therefore deals with the arrangement of building materials and building parts (floor, wall, roof, column, beam, etc.) to create a good composition.

7 key Elements of Unity

1. Texture
2. Color
3. Tone
4. Direction
5. Proportion
6. Solid and Void
7. Form and Shape

Consider materials such as stone, glass and steel. They are available in a variety of colors, tones, textures, shapes, proportions, etc. Various compositions of these material properties are possible-the challenge lies in arising at the most pleasing composition. The texture or color of a single brick or wood panel will differ in effect when it forms a part of the larger composition such as brick wall or a door frame set in a wall.

Texture

The word texture generally refers to the appearance and feel of a surface. However, it could also mean the physical composition or structure of something, especially with respect to its size, shape and arrangement of its parts.

Figure-63:- Texture

In this figure, a variety of textures can be seen in the roofs, walls and paving. Strongly identifiable shapes in roofs and battered walls are seen as repeated units, presenting a definite and distinguishable feel of the surface. Individual dwellings within a group, as well as decorations and carvings in buildings can create an effect of texture.

Color

Here color refers to hue. Color is one of the pronounced elements of aesthetics and its selection is very crucial to the overall effect it has on aesthetics. A variety of effects can be produced by varying luminance, fullness and its transparency.

Tone

Tone is related to the color theory and varies from the neutral scale of white to black through a range of greys. This plays an important role in drawings used to represent buildings.

Direction

Every building has elements which suggest direction. In most buildings, these are strong elements that suggest vertical and horizontal direction. The total shape of the building, or parts of the building or its structural components (beam, column, wall, ceiling etc.) its windows and other openings all suggest the direction.

Example: City Theatre, Helsinki, Finland

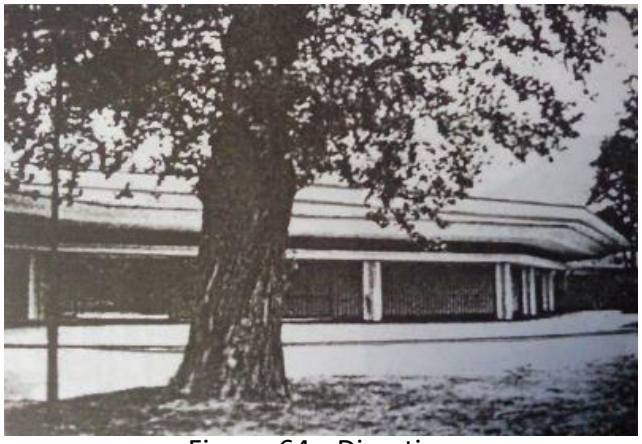

Figure-64:- Direction

This building shows a strong dominance of horizontality given by the roof line and overhang in contrast from the columns. The directional emphasis is reinforced by the use of a strongly ribbed cladding tile, which can be seen running horizontally on the eaves soffit and the beams linking the column heads and the solid parts of the wall behind them.

Here a dominantly vertical composition is shown where the verticality is reinforced by the faceting of the envelope. Contrast is given by the generally horizontal emphasis of the fenestration. The curving round of the plan affords more window space for the living accommodation of the southerly side relative to the service and circulation space on the north i.e., stairs, lifts, passage access to flats.

Proportion

In this context, proportion is the geometric relationship of the sides of volumes (e.g., rectangles). It is also the ratio and comparative size of individual parts of the composition.

Ducal Palace, Urbina, Paris illustrates the concept of unity through proportions.

We cannot measure these relationships accurately by eye, but we can compare them and try to judge the relationship of one to another on proportional basis. Buildings belonging to Classical and Gothic Architecture have better proportional relationships than most buildings today.

Solid and Void

The relationship between solid (walls, roofs, etc.) and void (windows and other openings) structural units is very important to form a good composition.

Figure-65:- Solid and Void

Cemetery Chapel, Turku, Finland shows the relationship between solid and void structural units. In this structure, the dominance of solid material contributes to the sense of enduring unity.

Form and Shape

Form and shape can be clearly observed in the overall arrangement of a building or in parts of a building (windows, doors etc.) which have geometric shapes. Repetition or variation of a particular form can provide strong elements of composition. Parts of a building, for example, windows depicting form represent geometric shapes such as a square or a rectangle. Repetition of a window unit form a good element of composition. Shape helps to identify different forms, for example, the pitch of a roof will provide a certain form which is easy to identify and also easy to relate to other roofs which have a similar pitch. When a roof is of a distinctly different shape, it will look strongly dissimilar.

Principles of planning, orientation in detailed drawings.

The term planning of a building refers to mean the arrangement of all the units of a building on all the floors and at all the levels.

There are certain general principles which as a engineer should bear in mind while planning a building. The general principles are

- Aspect
- Prospect
- Privacy
- Grouping
- Roominess
- Flexibility
- Furniture requirements
- Circulation
- Elegance
- Economy
- Sanitation

Aspect

Aspect: different rooms of the buildings are placed and located accordingly to the functional utility in such a way that maximum advantage of natural elements like sun, wind, can be obtained. To obtain sufficient sunlight inside the room windows are placed in external walls

Kitchen aspect: Kitchen should have window in east, because morning sun kills the germs. So kitchen should have **eastern** aspect.

Bed room aspect: Bed room is a unit of residential building generally used in night time, for sleeping so evening sun rays, which are cool in nature should enter the bed room to create cheerful atmosphere. So bed room should have **western aspect, south-western or north-western aspect.**

Drawing room aspect: It is a room which is used by the occupants for maximum hours of the day. To achieve good sunlight it should be placed in south or **southeast** or **north-east**. Windows should be provided in external walls

Study room aspect: Windows in this room should be in **northern** side to obtain sufficient light throughout the day. So aspect of this room is north.

Verandah: there should be sufficient light in the above unit throughout the day so they should be placed with opening in **north-direction**.

Prospect

It is related with the views as seen of the outside from doors and windows in the external wall. For pleasant atmosphere view of a garden, hill and a river, etc. is a good prospect. Towards these objective doors and windows should be provided in the external wall of the building. Undesirable views like a small nallah, slum area, drainage disposal unit, garbage collection centers should be concealed by not providing windows in that direction

Prospect of living room should be toward the main road to keep control on the plot. Prospects of bed should be on the rear side of the building so that to avoid disturbance due to noise.

Privacy

This is very important factor to be considered while planning both residential as well as public building Privacy of one room from another in a building as well as privacy of the whole building with other building should be achieved.

The privacy of residential building as a whole can be achieved by planting trees, and by providing entrance. Even the compound wall of required height can be constructed to provide privacy of trespassers.

Privacy in different rooms can be achieved by providing doors in such a way that minimum view of room is seen when shutter is opened. Privacy is very important in bed rooms and wick. and the view of bed room should not be visible from any other room.

Grouping

It is the arrangement of various rooms with respect to their functions, In case of residential building to achieve maximum efficiency of the plan the grouping should be done as follows

Verandah should be the first unit after the entrance of the house Living room and dining room should be close next to verandah Kitchen and dining should be close to each other Sanitary arrangements should be close to bed rooms. Staircase should be approachable from each room Passages connecting various rooms should be well lighted and ventilated

Roominess

This principle of planning is directly related to dimensions of the room. A rectangular room is found more convenient as compared to a square room of the same size. Hence length to width ratio should be 1.2 to 1 or 1.5 to 1 if the ratio is greater it will give a tunnel effect to the room. Height of doors and windows, ceilings, floorings, color treatment also affect the roominess of the building unit. Light color give effect of more space whereas dark color makes the room look smaller. Height of ceiling should be low as more height gives a feeling of a cave.

Flexibility

Flexibility means a room which was planned for one function can be used for other, if so required. If rooms are big enough and are having a minimum width of 3m are more flexible and even the activities of various rooms can be exchanged.

Furniture requirement

One of the most important requirement of a building planner, is to know how much space is needed by each function in a particular building. The room sizes for a particular function can be completed on the

basis of permanent furniture's to be used in the room. Hence while planning a building furniture arrangement must be shown.

Circulation

Circulation is the access into or out of a room. It is the internal movement inside the building and the area earmarked for it.

Circulation area should be straight, short, bright, lighted.

Circulation should not affect the privacy of a room nor interfere with the utility space

Circulation in a building is of two types

Horizontal circulation and vertical circulation

Circulation within a floor is called horizontal circulation

And circulation between different floors is called vertical communication.

Lighting

It can be natural light as that obtained from the sun during the day or artificial light. Adequate illumination is essential in day to day activities to execute the safety and comfort and efficiency

Good visibility is a must for accident prevention, comfortable watching and reading to reduce fatigue, avert confusion, and efficient security.

Elegance

Elegance refers to the planning of elevation and layout of the plan to give an impressive appearance to the building. The proper width, height, location of doors and windows, materials employed in construction of exterior walls etc create elegance. The result of elegance is aesthetics of building

Economy

Building planning should be carried out in the financial limit of the client. An engineer should know in advance, the client intends to spend for the building and accordingly material of construction, finishing items, stage of construction should be suggested. By estimation proposed amount should be derived and as per that progress should be followed to avoid delay in work progress

Sanitation

- Provision for cleanliness, lighting and ventilation in sanitary units avoid growing of bacteria's, and spread of diseases and give hygienic condition. In bath and w.c. glazed tiles and dado should be provided on wall to maintain clean condition. The ventilator in bath, w.c. permit sunlight and air collation to maintain hygienic condition. The flooring material s should be easy to clean, skirting's should be provided in rooms. Bath tubs, w.c. , kitchen sink should be made of ceramic material to maintain clean easily.