Hotel Design

The main objective of any business organization is to earn profit. This depends not only on the working of an organization but also on its presentation; more so in the hotel and hospitality sector. The prime motive or objective of any hotel property is to attract more and more clients and guests and make their visits a memorable experience. Architecture and designing of a property play a great role in this,

Architecture is the art or science of designing and constructing buildings. It should be technically sound as well as aesthetically appealing. Any building design is invariably influenced by the technologies applied. The process of planning, designing and construction of a hotel is known as its integration.

According to noted hotel architect Morris Lapidus, hotel guests fall into two categories- Business travelers and other travelers. Business travelers require a comfortable bed, easily accessible food, drawers' space, good lighting for reading and quick service. Other category appreciates all these necessities, but wants the atmosphere of their room and hotel to reflect the culture of the city or country they are visiting. All these travelers expect something different in a hotel than what they find in their homes.

Design Considerations

A project is--- * an investment which can be analyzed and appraised independently.
* a series of activities.
* to bring into existence a business organization on a viable economic opportunity within an established cost and time framework.

Basic characteristics

Involves a current capital investment
Ensures a yield of benefits in the future
Has specific life span
Calls for a teamwork, the members of which are drawn from various disciplines of management.

Ex. A company may take up a project for the construction of a motel in a tourist resort. Company may desire to invest Rs. 50 lakhs expecting a return of Rs. 8 lakhs after-tax per annum for next 15 yrs from restaurant sales and room rentals. The completion of this project requires co-ordination of engineering, marketing and financial experts.

There are a number of sources from which an entrepreneur can gain knowledge about project ideas like:-

i) Performance study of existing units with particular reference to profitability of units and capacity utilization allow an entrepreneur to identify risk-free opportunities. For example, if a majority of hotels in a town enjoy an 80% occupancy rate, it indicates that there is still a need for lodging facilities.

ii) Encouragement from financial institutions indicates that these sectors are highly viable and hold promise since financial institutions back projects after thorough analysis.

iii) Study of economic trends and consumption patterns of individuals help to generate new project ideas. For example, increasing affluence of the middle class, growing expenditure on tourism, travel, leisure indicates a vast potential for travel agencies.

iv) An enquiry into the prevailing social and cultural trends of a society may provide valuable insights. For example, the search for Indian identity has caused a boom in the sales of ethnic fashion designers in the country.

v) An enquiry into the business practices in foreign countries may provide valuable clues. For example, adventure sports as part of tourism has been essentially borrowed from western countries.

vi) An investigation into locally available resources and raw materials and skills may indicate the availability of business opportunities. For example, Puppets are made in Jaipur, Rajasthan, which enjoys a worldwide market, and opportunities still exist for marketing them within the country.

vii) A study of developments in technology may also provide new product ideas. Often, new technologies allow a better utilization of locally available raw material as witnessed in the coir industry.

viii) A constant search for the unfulfilled needs of the market allows identification of a series of business opportunities. The development of any product/service which satisfies a human need not catered earlier ensures a steady market. This phenomenon is observed in the quick success of fast food joints, pre-school nurseries and labour saving kitchen devices.

ix) Quite often the plans of the Government provide new business opportunities in a country like India, where Government plays a significant role as a regulator as well as promoter in framing the policies. For instance, the hosting of the 2010 Commonwealth Games in Delhi has triggered the construction of many Star category as well as Budget class hotels, restaurants and fast food joints in that region.

x) Various incentives given to small scale industries, units set up in backward regions; tax exemptions for specific products etc. create new business opportunities. For example, the scheme of export incentives, financing the project at low rate of interest through Tourism Financial Corporation of India (TFCI), tax free holidays, single window clearance for hotel projects introduced by the Government has led to a boom in the development of new hotel projects throughout the country.

The above mentioned steps should be carefully considered keeping in mind the specific goals and objectives related to design considerations. Basic function of a design is to facilitate the flow of work with satisfaction keeping in mind the needs and wants of the end user- user friendliness and operational efficiency.

Designing and constructing a hotel is an uphill task. The overall ambience may generate a feeling of sophistication to make a guest feel special, but it should no way be imposing or intimidating. Basic building design should take care of –

- Pocket of the promoter
- Profile of the targeted clientele
- Expected return on investment (ROI)

Following points need to be considered while designing a hotel:-

- Good location
- Attractive appearance / Architectural features and plans
- Efficient Plan
- Suitable material
- Good workmanship
- Sound financing
- Structural regulations laid by town and country planning department
- Competent management

Good location and site: Selection of location and site is a very vital issue in the development of a hotel project. The selection of suitable sites for hotels is a complex job. It is a matter of choosing from among a number of possible sites the one that has highest number of positive features or the fewest defects- as no site is likely to have all the desired merits. To look into for selection of a site following considerations are to be kept in mind:-

Financial aspects of the site:- Pertains to the cost of land, construction cost, cost related to developing the building systems, cost of furniture fixture, equipment, R & D costs, maintenance costs etc.

General aspects:- Which could have a direct bearing on the business and so selection of sites. Such aspects are:-

- Accessibility of transport, especially from airports and railway stations.
- Existence of present and planned future social centres.
- Special attraction in locations, such as proximity to parks or open space.
- Proximity to business houses and amusement centers.
- Residential or non-residential areas.
- Level of sound during night.
- Access for service deliveries.
- Suitability of ground floor street frontage for shops
- Class of surrounding property, whether free from industrial buildings.

- Good sub-soil to eliminate excessive foundation costs.
- Possibility of providing garage and/or parking arrangement.

Each of the above factors must be weighed before the final decision is made after a thorough analysis as to whether the site is suitable for a hotel and if so, for what type.

Attractive appearance/Architectural features

A building of a hotel must be as impressive as its interiors. Its distinctive features begin from the designing itself. Our various civilizations over the ages and their influence can be seen in some modern structures even today. In fact, the principal guiding factor for any hotelier is ensuring maximum occupancy at minimum maintenance cost.

Architectural styles of various civilizations:-

1. Hindu Architecture- Modern Indian style
2. Greek Architecture
3. Roman Architecture
4. Christian Architecture
5. Romanesque Architecture
6. Islamic Architecture
7. Renaissance Architecture
8. Gothic Architecture
9. Art Nouveau
10. Modern Architecture
11. Innovative Architecture
12. International Architecture

1)Indian architecture found its earliest expression in brick buildings that were contemporary to buildings that were constructed of wood. Over the centuries wooden structures disappeared, but they were succeeded and imitated in stone buildings, which have survived. This kind usually includes hemispherical mounds, domes with more concern for sculptural mass than for enclosed volume. Hotels like Amarvilas, Agra, Udayvilas, Rajvilas etc. are some examples of typical Hindu architecture.
Hindu style is closely related to the Jain style. It is divided into three general categories- northern, central and southern. In these three types, the style is marked by great ornamentality and the use of pyramidal roofs. Spire like domes terminate in delicate finials. Other features include the elaborate, grand-scale gates and the ceremonial halls.
Modern Indian style- These include the vaulted structure, topped by a huge, concrete roof umbrella and the use of concrete grille and bright pastel colours.

2) Greeks put their walls inside to protect the *cella* and their columns on the outside, where they could articulate exterior space. Perhaps for the first time, the overriding concern is for the building seen as a beautiful object externally, while at the same time containing precious

and sacred inner space. Greek architects have been commended for not crushing the viewer with over monumentality.

3) Romans widely used domes and vaults in their architectural style. Cylindrical and spherical spaces are the elements of design. The domes that the Romans introduced proved to be more stable. The second important invention of the Romans was vaults formed by the intersection of two identical barrel vaults over a square plan.

4) In early Christian architecture, buildings were of two types- the longitudinal hall or basilica, and the centralized building, frequently a baptistery or a mausoleum. The buildings mostly consisted of sloping roofs supported by wooden framework and a series of pillars. It was generally made out of bricks.

5) The structures were often crude and of relatively modest proportions. The buildings were often composed of elements or decorated with parts, called spoils, looted from Roman structures. One of the characteristics of this is the circular and polygonal domed structure. An outstanding achievement of these architects was the development of stone vaulted buildings. A major reason for the development of masonry vaulting was the need to replace the highly flammable wooden roofs of the pre-Romanesque structures.

6) The basic structural elements are arches and domes. The motifs are geometrical designs, floral arabesques and Arabic calligraphy. The materials are glazed tiles, wood joinery and parquetry, marble, mosaic, sandstone, stucco carving, gemstones etc.

7) In early renaissance period the elements are combined in rather static compositions. The buildings mostly consist of files of columns, domes, all assembled in a restrained and elegant harmony in strong contrast to the spirited elaboration of forms in the medieval North.

8) The aesthetic qualities depend on a structural development. Early in the 12^{th} century, masons developed the ribbed vault, which consists of thin arches of stone, running diagonally, transversely and longitudinally. In this case, the new vault which was thinner, lighter and more versatile, allowed a number of architectural developments to take place.

9) It had simple shapes of the brick and stone exterior clearly indicating the division of space within the building, while the large expanses of glass provided a strong visual connection between the interior spaces and the outside world. The style basically aimed at rejection of earlier architectural styles with the view of introducing something new.

10) Modern architecture introduced use of concrete, steel and iron and construction of skyscraper facilitated by the introduction of the electric elevator and the abundance of steel. A transition was made from the masonry-bearing wall to the steel framed load bearing structure. The building's skeleton could be erected quickly.

11) Innovative architecture introduced construction of molding spaces with utmost sophistication, great care in the distribution of light, the use of materials- stone, wood and copper with familiar and sympathetic tactile qualities.

12) The style is geometric and asymmetrical and features such modern materials as concrete, steel and glass. Functional, logical floor plans and simple unornamented walls of glass and concrete are emphasized. This method is extremely efficient for large-scale construction in which the same module could be repeated.

Efficient Building Plan

Some of the popular types of modern hotel plans are:-

- Modular Construction
- Slip forming
- Arch design
- Cylinder like structure

Modular Construction- This is most recent and promising development in the construction of hotel buildings. The technique has cut down the construction time and costs by 40% as compared to traditional construction method. In this method, room units are constructed separately and hoisted into the place with the help of cranes. Buildings are relatively low cost, time saving, fire resistant and sound proof.

Slip forming- This was first used in 1930's in the buildings and erection of grain silos and other similar structures. Early slip forming techniques relied on hydraulic jacks and the pouring of concrete into a form work made of timber. Today slip forming is used to build everything from silo to complexes, chimneys, reservoirs, medium to high-rise buildings, office buildings, hotels, hospitals, bridge support piers, in-ground shafts to dams and power stations. It was used to raise the exterior walls and some of the interior walls and structures of a 15-storey hotel in Petersburg, Florida. It enabled the hotel to be 'topped out' (constructed till the top storey) in just eight days. In Norfolk, Virginia, this technique, which was used in the construction of a 14-storey motor-inn, enabled the builders to cut three months from the normal construction time for a property of that size.

Arch design- These designs have cent percent useable clear span space and do not have any beams, poles and trusses. They are easy to construct and most of the buildings are erected in just a few days. These buildings are well ventilated and have better air flow than other building types. These buildings are very cost effective and have very low cost in developing heating, ventilation and air conditioning system. The maintenance cost of these buildings is also very low and they are fire resistant. The idea of tri-arch design was introduced by Travelodge International. Main advantages of arch designing are:

- Each room has a view.
- The wedge shape of guest rooms permits each to have an unusually large bath and dressing area.
- The control core containing elevators, linen room, utilities and ice cube machines facilitates economies in construction and operations.

Cylinder like structure- This design of hotel building has a distinctive appearance as seen in the Radisson property in Berlin. It has also advantages like:

- Concentration of service and utility equipment at the centre core.
- Lower construction and operating costs.

- All guest rooms on the outer side with view.
- Ready-made for the popular roof top revolving restaurant or lounge.
- Minimum resistance to wind.
- Suitable for site where land costs are high and minimum area is available.
- Compatibility with circumferential ramps leading to parking.

Curtain Wall : In this system the exterior wall of each floor is hung on the iron or steel frame so that the wall supports only its own weight and not the floors above it. This method of construction reduces the overall weight of a building, which allows it to built higher and permits the extensive use of glass on the façade.

Rooms : As guest rooms or bed rooms constitute a major part of hotel construction, the key to economical design lies largely in layout of the guest room block. Some of the variants in the design layout of guest rooms are as follows:-

a) Double-loaded block- Considered the most economical layout, is capable of development into courtyard plan. It required two staircases.
b) Double-loaded T-shaped block- This capable of being developed into cross; also economical, but required three staircases.
c) Single-loaded block- This is capable of being developed into courtyard plan; not an economical solution but may be desirable.
d) Square block- Comprises a central core containing all vertical services such as maids rooms etc. It is compact and useful for small sites where tower development may be desirable.
e) Y Plan- It has more complicated structure than straight blocks and requires three staircases. The disadvantage is that the structural system may cause problems in public areas.
f) Tri-arch Plan- this is similar to 'Y' plan, but more space is taken up by circulation; concave curve results in a bedroom wider at bath room end providing opportunity for larger bathroom and dressing area.
g) Circular Plan- This requires careful handling; avoid outward and inward facing rooms; not capable of extension.
h) Circular with Central Core- This design is similar to square block one. This too requires careful handling to avoid awkward room.

Following table provides useful insight into the optimum number of guest rooms that can be accommodated on each floor depending on the design layout

Structure	No. of Double Rooms per Floor	Dimensions	Remarks
Single load	12-30	32’ x l	Long Corridor
Double load	16-24	60’ x l	Long Corridor
Offset Slab	24-40	80’ x l	Split Corridor
Rectangular	16-24	110’ x 110’	Space in Centre enhances room appearance
Circular	16-24	130’	Less rooms per floor
Atrium	24	90’ x l	Beautification capsule lift can be provided. Space in the Centre enhances the appearance.

Suitable Material

Availability of raw material and other inputs is essential for successful implementation of the project. The availability of inputs of the right quantity and the right quality on a regular and continuous basis is essential for continuity of operations. Wherever necessary, the enterprise must enter into supply contracts to ensure availability of essential inputs. The enterprise may also create their own source of supply. Various building materials commonly used in modern construction are:-

Bricks- A brick may be defined as

- a block of clay or other ceramic used for construction and decorative facing.

It resists dampness and heat, cost relatively little, can last longer than stone. Its colour varies according to the clay used and in proportions according to architectural tradition. Some bricks are made of special fireclays for use in fireplaces or ovens.
Bricks may be arranged in patterns called bonds according to the way long sides (stretchers) or short sides (headers) are placed. Can be laid in a variety of intricate patterns like checker, herringbone, basket wave or Flemish bond.

Concrete- It is the most widely used construction material in the world. It is the only major building material that can be delivered to the job site in a plastic state. The unique quality makes concrete desirable as a building material because it can be moulded to virtually any form or shape. Qualities of concrete as a building material are its strength, economy and durability.

Polymer Concrete- A composite material- formulation of thermo set resins and aggregate that simulates stone. In applications particularly in the usage of pedestrians, a heavy material may be desirable to provide both the look and feel of stone or concrete. Has several advantages over real stone- does not absorb moisture, dirt or graffiti. Stone-like polymer concrete surfaces can also be created on lightweight fiberglass panels.

Steel- Introduction of steel for construction purpose done by Americans. It acts not only as a frame but provides tensile strengths to the building. It does not rot and can be easily moulded.

Glass- Widely used construction materials now-a-days – supported by frames of wood or steel. Production of more durable glasses made use of them in buildings on all the sides.

Fiberglass- For specialty applications, decorative fiberglass architectural elements are becoming the first choice among building owners and architects due to;-

- installed cost is less than traditional materials.
- composites are easier to install and maintain.
- new finishes that simulate traditional material make Fiber-reinforced Plastic (FRP) (with technological advances) nearly indistinguishable from the real things.
- number of different finishes to mimic woods, stone, terracotta, concrete, steel or other materials.

Good Workmanship

This entails the selection of appropriate technology, plant and machinery which ensures efficient and economical operations. Selection of proper technology as per specific requirements to be done. According to the size or capacity of the facilities to be created, proper plant and machinery to be chosen. The decision must be taken after a careful consideration of demand and fluctuations in the market demand.

Sound Financing

A proper costing of any project is essential for determining its viability and profitability. Any financial institution entertains an entrepreneur on the basis of the cost estimates of the project. For any cost over-run, the entrepreneur would find it difficult to arrange for the extra fund for completion of the project which usually leads to time over-run, fund flow etc. Hence, there is a need for proper determination of the cost of capital. Following are the essential elements of project cost:-

- Land and site development
- Building and civil works
- Plant and machinery
- Engineering fees for acquisition of technology

- Miscellaneous fixed assets which includes:-

  Furniture, Office equipment, Cars and trucks, Power equipment, Air conditioning systems, Fire fighting systems, Pollution control systems and other such systems.
- An exhaustive schedule of such fixed assets must be prepared and their prices ascertained for estimation of the cost.
- Preliminary and capital issue expenses.
- Provision for contingencies.
- Margin money for working capital.

A sample table has been shown below for arriving at the summary of Project Cost.

Item	Cost (in Rs)
Site	
Building	
Plant and machinery	
Furniture, furnishing and interior	
Food and beverage equipment	
Laundry and housekeeping equipment	
Specialized equipment	
Misc. accessories	
Linen and uniform	
Architectural fee (4%)	
Interior designing fee (10%)	
Facilities planning fee (10%)	
Project management and supervision (1.5%)	
Contingency (2.5%)	
Pre-opening expenses	
Cost of finance	
Total	

Structural Regulation laid by Statutory Authorities

Every town and city planning authority generally lays down the structural regulations and guidelines to be followed scrupulously in the event of any mishap such as a fire, or an emergency like bomb scare etc. It is obligatory for hotel managements to incorporate such structural regulations while designing their properties. For example, in case of a fire or a terror attack, safe evacuation of building occupants may present serious problems unless a plan for orderly and systematic evacuation is prepared in advance and all staff well trained through evacuation drills. General guidelines are:-

Alarms- Any person discovering fire, heat or smoke should immediately report such condition to the fire brigade unless he or she has personal knowledge that such report has been made. No person shall make, issue, post or maintain any regulation or order, written or

verbal that would require any person to take any unnecessary delaying action prior to reporting such condition to the fire brigade.

Drills- Fire drills must be conducted, in accordance with the fire safety plan, at least once every three months for existing buildings during the first two years after the effective date of these rules, or for new buildings during the first two years after the issuance of the certificate of occupancy. Thereafter, fire drills must be conducted at least once in six months.
All occupants of the building must participate in the fire drill. However, occupants of the building, other than building service employees, are not required to leave the floor or use the exits during the drill. A written record of such drill has to be kept on the premises for a three year period and produced readily for the brigade inspection.

Signs and Plans

Signs at lift landings-A sign shall be posted and maintained at a conspicuous place on every floor, or near the loft landing, indicating that in case of fire, occupants shall use the stairs unless instructed otherwise. The sign contain a diagram showing the location of the stairways, and it must be pasted at conspicuous places on every floor. It should have the caption, 'in case of fire, use stairs unless instructed otherwise'. The font size has to be at least 1.25 cm block letters in red against a white background. The lettering has to be properly spaced to provide good legibility. The sign shall be at least 25x30 cm. where the diagram is also incorporated in it, and 6.25x25 cm. where the diagram is omitted. In the latter case, the diagram sign shall be at least 20x30 cm. The sign should be located directly above a call-button, and squarely attached to the wall or partition. The top of the sign should not be more than 2 metres from the floor level.

Floor numbering signs- A sign indicating the floor level has to pasted and maintained within each stair enclosure on every floor. The numbering has to be distinct and conform to the stated specifications. The numerals have to be bold type and at least 7.5 cm high. The numerals and background shall be in contrasting colours. These signs should be prominently displayed on the stair-side of the door.

Staircase and elevator identification signs- Each stairway and each elevator have to be identified by an alphabetical letter. A sign to this effect should be posted and maintained at each elevator landing and on the side of the stairway door that leads to the exit. The lettering on the sign shall be at least 7.5 cm high, of bold type and in a contrasting colour from the background.

Staircase re-entry signs- A sign shall be posted and maintained on each floor within each stairway and on the occupancy side of the stairway where required, indicating whether re-entry is provided into the building and the floor where such re-entry is provided, in accordance with the requirements. The lettering and numerals of the signs should be at least 1.25 cm high of bold type. The lettering and background should be of contrasting colour and be displayed at approximately 1.5 m from the floor level. The fire command station should be provided with the floor plan of the building and other pertinent information related to the service equipment of the building.

Eco-friendly practices- In view of increasing environmental concern and governmental regulations in this regard, the technical feasibility study must also outline the systems for safe and non-polluting disposal of solid and liquid wastes. Use of non-conventional energy resources like renewable energy from sun, windmills etc. can also be considered, as these now carry extra points when seeking approval/classification for new or on-going projects.

Systematic Layout Planning (SLP)

Systematic refers to an organized, disciplined and rational approach to a problem or assigned task. Systematic planning process involves conceptualization, planning, analysis, designing and implementation, with interrelationships of people, materials, information, equipment and method in a flow with an objective of efficient layout. The figure below depicts the various activities of systematic planning in a sequential manner.

Note: The figure depicting the flow chart has been discussed in detail in the class.

Systematic Layout Planning is framework of four planning phases:- Analysis, Search, Evaluation and Selection. There are 20(twenty) steps in the systematic layout pattern(SLP) of facilities design procedure, which are:-

1. Procure data
2. Analyze data
3. Design production process
4. Design material flow pattern
5. Select/design material handling plan
6. Calculate requirement of equipment
7. Plan work areas
8. Select material handling equipment
9. Plan groups of related operations
10. Design activity relationships
11. Calculate space requirement
12. Plan service activities
13. Calculate total space requirements
14. Allocate activities to space
15. Consider building types
16. Construct model layout
17. Evaluate, adjust and check layout
18. Justify
19. Install layout
20. Nurture layout

Thumb Rules for Allocation of Space in a Hotel

Space allocation of various facilities is an important aspect of designing and planning a hotel project. In fact, it is a complex as well as tricky job. However, there are certain ground rules or principles that have evolved in the industry over the years.
A summary of some widely followed norms in space allocation in hotels in general, and for a three star hotel in particular have been given in the following Table 1 and Table 2 for reference.

Table 1 : Space allocation norms in hotels according to their size (number of rooms)

Table 2 :- Space allocation norms for a Three Star Hotel

Page nos. 14 to 19 covers Table 1 and Table 2 given as handouts in the class.

Noted hotel architect William B. Tabler coined some important criteria for designing and space allocation. His thumb rules in this regard are as follows:-

- Construction cost must not exceed Rs. 1,000 per Re. 1 of average room rate.
- The market and competition determine the room rate. If the ARR (Average Room Rate) is Rs 1,000 then Rs 10, 00,000 should be the maximum construction cost for the finished but unfurnished room, including public space and service areas.
- The total area of bedrooms and floors should be at least as much as total public space and service areas.
- The total allowance for all facilities should not exceed 6,000 sq. ft. (162 m^2 per guest room).
- Not over one employee per room. Payrolls must be kept to minimum. The requisite number of staff is determined by the basic design which involves the number of kitchens, methods of food handling, the routine of guest and built in maintenance stores.
- Land cost must not exceed 10 per cent of the cost of the building.
- Profit ratio: Profit mix of a hotel business may be summarized as follows:-
  Contribution of profit from the guest rooms is average 70 per cent and remaining revenue comes from other departments such as food and beverage, shopping arcade, business centres, health club etc. Generally a small profit is shown on food but often this does not include space rental value, cost of kitchen equipment, utility services, repairs and maintenance.
- Breakeven point at 65 per cent is a highly controversial figure. The design should permit operating costs to be reduced, proportionately if possible, when business declines by shutting down guest floors using only segments of the total kitchen facilities.