Introduction to Architecture

AR0120 Theory of Architecture

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- Definition of Architecture
- Elements of architecture
- Space defining elements
- Opening in space defining elements
- Spatial relationship
- Spatial organization
- Primary forms
- Transformation of forms
Definition of Architecture

1. Originated from the Greek word Architekton
2. Archi – great tekton – builder
3. Architecture is the art and science of building
4. It is the conscious creation of utilitarian spaces with the deliberate use of material
5. Architecture should be technically efficient and aesthetically pleasing.
Elements of Architecture

PRIMARY ELEMENTS OF ARCHITECTURE

Point
- Zero dimension. Indicates position in space.

Line
1 d – point extended becomes a line. With properties of length, direction & position.

Plane
2 d - line extended becomes a plane with properties of length, width, shape, surface, orientation, position.
Elements of Architecture

Volume – 3 d

- a plane extended becomes a volume with properties and length, width, depth, form, space, surface, orientation, position.
Elements of Architecture

Plane –

1. Shape is the primary identifying characteristics of a plane.
2. Supplementary properties are Surface, color, pattern, texture, affecting visual weight and stability.
3. Plane serves to define the limits or boundaries of a volume.
Elements of Architecture

Volume –

Points or vertices

Lines or edges – 2 planes meet

Planes or surfaces

Form is the primary identifying characteristics of a volume. Established by shapes & interrelationship of planes. A volume can be solid space displaced by mass or void contained by planes.
Elements of form defining space

In architecture we manipulate three generic types of planes:

- Overhead plane
  - Ceiling plane or roof plane
- Wall plane
  - Vital for enclosure of architecture space. Active in our field of vision
- Base plane
  - With ground plane the building can merge, rest firmly or be elevated above it.

Munich Olympic stadium

Modern interior

Precast construction house
Elements of form defining space

Horizontal plane

- Base plane
- Elevated plane
- Depressed plane
- Overhead plane
  - Roof plane
  - Ceiling plane
Elements of form defining space

- Vertical Linear elements – define the edges of volume of space
- Single vertical plane - articulates the space which it fronts
- L-shaped plane – generates a volume of space from its center outward as a diagonal.
Elements of form defining space

- Parallel plane – define the volume of space in between that is oriented axially towards open end.

- U shaped plane – defines the volume that is primarily oriented towards the open ends.

- Planes closure – vertical plane on all sides establish boundaries of an introverted and influence the field of space around enclosure.
Elements of form defining space

Horizontal plane

Base plane

- Seems to be figured out when there is a perceptible change in color, texture.
- With edge definition
- With surface articulation – eg carpet, lawn, paving etc.
Elements of form defining space

Horizontal plane

Elevated Base plane

• Elevating creates a specific domain
• If surface characteristics continues up across the elevated plane, then the elevated one will appear part of surrounding plane.
• If edge conditions is articulated by a change in form, color, texture, then the field will become a distinct plateau, that is separated from surroundings.
Elements of form defining space

Horizontal plane

Elevated Base plane – spatial & visual continuity

Edge is well defined. Spatial continuity maintained. Physical access accommodated.

Spatial continuity interrupted. Visual continuity maintained. Required stairs for physical access.

Visual and spatial continuity is interrupted. Elevated plane isolated from ground level.
Elements of form defining space

Horizontal plane

Elevated plane

• It can be result of form site conditions or constructed to elevate a building from surroundings to enhance its image in landscape.
• Used to differentiate the scared buildings or it defines any important typology.
• Elevated plane can define a transitional space between exterior and interior.
• A section floor plane can be elevated to establish a zone of space within the large space.
Elements of form defining space

Horizontal plane

Elevated plane

Acropolis, Athens

Villa Savoye, Paris

CEPT, Canteen Area.
Elements of form defining space

Horizontal plane

Depressed Base plane – spatial & visual continuity

Vertical surface of depression establishes boundaries

By contrasting form, geometry or orientation

Remains an integral part

The space is distinct

Separates
Elements of form defining space

Horizontal plane

Depressed plane

Steps down – introvert nature

Steps up – extrovert nature

Depressed areas in topography of site – stage for outdoor arenas and amphitheater. Depression benefits sightlines, sense of having, acoustical quality.
Elements of form defining space

OVERHEAD PLANE

- It is similar to the trees. It gives sense of enclosure.
- Overhead plane define a field of space between itself and ground plane.
- Edges of the overhead plane define the boundaries of this field.
- Vertical linear elements, edges of overhead plane, elevated base plan and depressed base plane aid in visually establishing the limits of the defined space and reinforce the volume.
Elements of form defining space

OVERHEAD PLANE

- Offers protection. Determines overall form
- It is determined by the materials & structural form.
- The roof plane can visually express how the pattern of structural members resolve forces and transfer loads.
- The roof planes can be the major space defining element of the building and visually organizes a series of forms and spaces beneath the canopy.

University of Phoenix, Arizona, Indoor stadium. Retractable roof. 

Tensile Roof
- Elements of form defining space

Roof PLANE

- Can be hidden from view by wall or merge.
- Can be single or many
- Can extend outward as overhang
- Can be elevated to allow breeze to pass through
- Overall form can be endeavored with a distinctly planar quality by opening with vertical or horizontal edges.

Dynamic Tower, UAE

Arena Zaqreb, Croatia
Elements of form defining space

ROOF PLANE

Elements of form defining space

Ceiling PLANE

- Can reflect the form of the structural system.
- Can be detached from roof plane, suspended, underside of an overhead. Can be lowered / raised to articulate spaces.
- Can be manipulated to define and articulate spaces.
- Can be manipulated to define and articulate zone of spaces.
- Form, color, texture and pattern of the ceiling plane can be manipulated to improve the quality of light / sound / directional quality.
- Form can be manipulated to control the quality of light, sound / within a space.
Elements of form defining space

Ceiling PLANE

Light wave ceiling plane

UAE, Airport.

Restaurant Rosso, ISrael
Elements of form defining space

Single vertical plane

- A vertical plane has frontal qualities. It has two surfaces or faces which it fronts on and establish two distinct spatial fields.
- They can differ in form, color or texture to articulate different spatial conditions.
- The height of the vertical plane relative to our body height and eye level is the critical factor that effects the ability of the plane to visually describe spaces.
**Single vertical plane**

This vertical wall divides the campus and forest area.

**JNCASR, BUILDING, DESIGNED BY CHARLES COREA, BANGALORE**

The wall establishes different spatial quality.
Single vertical plane

Provides little or no sense of enclosure. It defines the edges of spatial field.

Provides sense of enclosure. It allows visual continuity.

Separates one space from another.

Full sense of enclosure.
Linear elements

- Vertical linear elements such as columns, obelisks, and towers have been used throughout history to commemorate significant events or establish particular points in space or to organize spaces around it.
- Vertical linear elements can also define a transparent volume of spaces.
- Marks the corners and edges of spaces.
- Linear members that possess the necessary material strength can perform structural functions.
- They can express movement across space.
- Stand as column supports for entablature.
- Columns and beams together form a 3D framework for architectural space.
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Linear elements

A row of column supporting an entablature – a colonnade is often used to define the public face or façade of a building –

advantages

a. Being penetrated easily for entry.
b. Offers a degree of shelter from the elements
c. Forms a semi transparent screen the unifies individual building form behind it.
d. Columns can define the edges of an exterior space.
e. Articulate the edges of building mass in space.
f. Trellis or pergola can provide a moderate degree of definition and enclosure for outdoor spaces.
g. Allow light and breeze to penetrate.

Colonnade in ST.Peters Square

IIMB, CORRIDOR, B.V.Doshi
Openings in space defining elements

- Openings are required for visual and spatial continuity.
- Openings determine patterns of movement (door).
- Openings allow light to penetrate the space (window) & illuminate the surface of a room.
- They offer views from the room / interior to exterior.
- They establish visual relationship between rooms and adjacent spaces.
- They provide natural ventilation.
- Depending on size, number and location they can weaken the enclosure.
PRIMARY SOLIDS

- SPHERE
- CYLINDER
- CONE
- PYRAMID
- CUBE
PRIMARY SOLIDS

• SPHERE
CUBOID

CUBE
PYRAMID
SANCHI STUPA
CONE
Dome of St. Peter's Basilica

CYLINDER
MILLENIUM DOME
Sphere

• Sphere is body that consists of regular, continuous surface.
• It has no lines, edges or corners
• Neither horizontal or vertical emphasis
• It is a form which is closed within itself.
Visual effect

• Pure convex form externally
• Presents impenetrable, uninviting appearance.
• It displays visual quality of repulsion.
• Has no points of interest to focus
• Defined by vague outline of circle, whole mass appears as immense dot.
Emotional effect

- Lack of concentration
- Restlessness
- Diffuseness
- This diffuseness also characteristics the external space surrounding the sphere.

- Total effect on observer. Is lack of sense of orientation
Inside the sphere

- There is a dramatic change inside.
- The bounding surface is continually concave.
- It opens to the observer.
- Invites attention.
- Attraction is from all sides.
- This results in equilibrium of forces.
- Center of this equilibrium is center of sphere. The center is imaginary.
Emotional effect

• It arouses sensations of Concentration, repose and orientation.

HOUSE IN SWEDEN
Derivatives of sphere – Hemisphere

- Cut horizontally in half.
- Cut portion forms an edge, circular in plan.
- The dome and the edge portion give the visual character