Department of architecture
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Building construction

انشاء معماري

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FOR

Architecture students

Level 1

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INTRODUCTION

- Why do we need buildings?
- constraints قيود on building construction
- Cycle Process of building construction
- Elements create building loading
- Forces delivered to earth for building to be structurally sound
- Basic building component
- Identify construction materials

Why do we need buildings?
لماذا نحتاج المباني ؟

- We need shelter from sun, wind, rain, and snow.
- We need dry, level platforms for our activities.
- we need to multiply available ground space.
- On these platforms, and within our shelter, we need air that is warmer or cooler, more or less humid, than outdoors.
- We need less light by day, and more light by night, than is offered by the natural world.
- We need services that provide energy, communications and water and disposal of wastes.
- So we gather materials and assemble them into the constructions we call buildings to satisfy these needs.

Constraints on building construction

القيود علي انشاء المباني

- Health codes : الانظمة الصحية
- Occupational health and safety انظمة الامن والسلامة المهنية
- Fire codes انظمة الحريق
- Plumbing codes انظمة الامداد بالمياه|
- Electrical codes الانظمة الكهربائية
- Building Contractors' and Labor Unions' Regulations قواعد اتحاد المقاولين والعمال

Cycle process of building construction

The main stages are •

- :1: Planning
- 2: Design
- 3: Tendering
- 4: Construction Process
- 5: Handover
- 6: Evaluation

Elements create building loading

- -Various loads are taken into account while designing the foundation of a structure loads coming on a structure are:
- **-Two broad categories:**

  - Dead loads
  - Live loads

- **-Specific terms for dead loads and live loads:**

  -Concentrated load
  - Distributed load
  - Design load
  - Un designed load

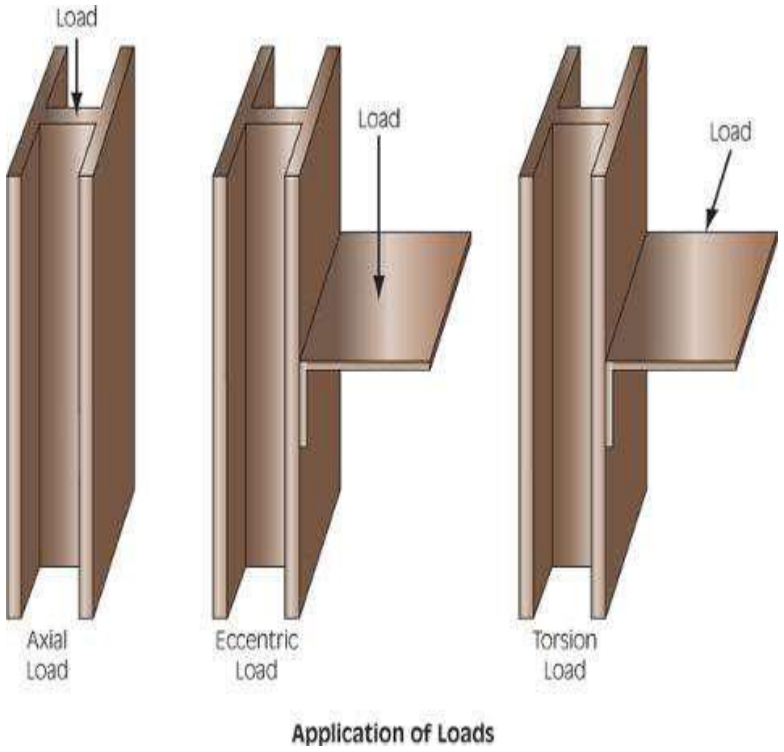
Imposition of Loads
الاوضاع المفترضة للأحمال

- Loads must be transmitted to structural elements

انتقال الاحمال

Terms associated with imposition:

- Axial load حمل محوري
- Eccentric load حمل غير مركزي
- Torsion load حمل الالتواء



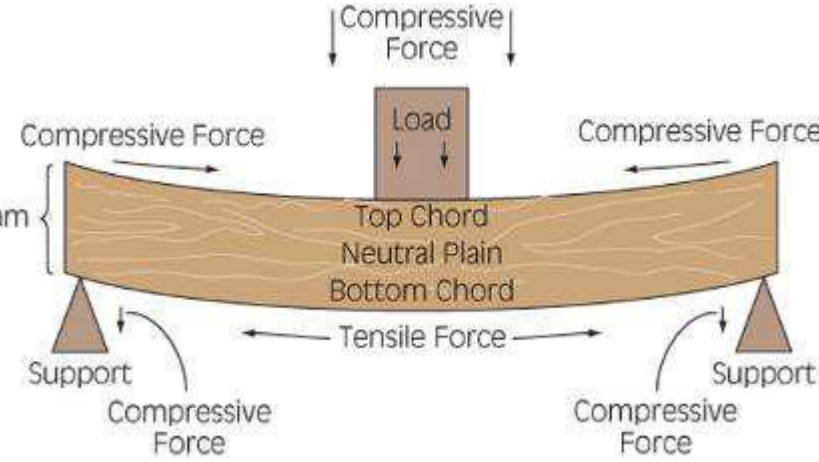
Application of Loads

Structural Elements

- Buildings are an assembly of structural elements designed to transfer loads to the earth Can be defined simply as:
- Beams
- Columns
- Walls
- Connections

Beams الكمرات

- Transfers loads perpendicular to its length
- Types of beams:
- – Simple beam البسيطة
- – Continuous beam المستمرة
- – Cantilever beam الكابولي
- – Lintel العتب
- – Girder كمرات بالمنشات الكبيرة
- – Joist العوارض
- – Truss جمالون



الاعمدة Columns

- Any structural component that transmits a compressive force
- parallel through its center
- Typically support beams and other columns
- Generally vertical supports of building
- Can be vertical, horizontal, or diagonal

الحوائط Walls

- Really long, but slender
- Two categories:

----- Load-bearing walls

*Carries weight of beams, other walls, floors, roofs, other structural elements

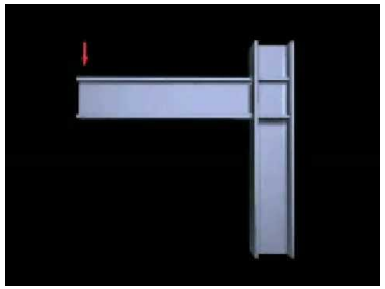
* Also carries weight of the wall itself

------Non-load-bearing walls

Need only support its own weight

Connections

- Weak link as it relates to structural failure during fires وتكون جزء ضعيف في المنشأ يعرضه للانهيار عند حدوث الحرائق
- Often small, low-mass material that lacks capacity to absorb heat
- Three categories:
- – Pinned
- – Rigid
- – Gravity



Basic building components

SUPER STURCTURE

Plinth	عوارض
Walls and columns	حوائط واعمده
Floors	ارضيات
Beams	كمرات
Roofs and slabs	اسقف وبلاطات
Lintels and Archers	عقود واعتاب
Doors and Window	نوافذ وابواب
Chajjas	مظلات بارزة
Parapet	الدراوي
Steps and Stairs	الدرج والسلالم
Cupboard and Shelves	الأرفف والخزن الحائطية

Substructure

Foundation	الاساسات

Identify construction materials

- Many factors determine which material is used to form structural elements:
- – Cost
- – Application
- – Engineering capabilities خصائصها الهندسية
- – Adaptability تكيفها مع الاستخدام المطلوب
- Each material reacts to fire in a different way

Wood

- من اكثر المواد شيوعا في الاستخدام لها تاريخ طويل
- رخيص نسبيا
- مورد متجدد فهو مادة بيئية بالدرجة الاولي
- الاخشاب الجيدة القوية تحتفظ بوظائفه الحاملة اثناء الحرائق
- يجب ان تكون خالية من العقد والالتواء لتصلح كمادة انشاء
- توجد انواع مختلفة بكثافة متنوعة وتستخدم في اغراض متعددة

Steel

- هو خليط من خام الحديد والكربون
- ممتاز في تحمل احمال الشد وقد يتحمل الضغط والقص
- تقل مقاومته مع ارتفاع درجة الحراري
- يسمح ارتفاعات عالية وطوال كبيرة للعناصر الانشائية والبحور
- يستخدم بكثرة

- – Girders
- – Lintels
- – Cantilevered beams
- – Columns

Concrete

- Mixture of portland cement, sand, gravel, and water
- Excellent compressive strength
- All concrete contains some moisture
- Under heat, moisture expands and causes concrete to crack and spall
- Concrete can stay hot long after the fire is out

Masonry

- Common term that refers to brick, concrete block, and stone
- Used to form load-bearing walls
- Veneer wall supports its own weight
- Mortar holds units together and have little or no tensile or shear strength
- Excellent fire-resistive qualities

Cement

- Mixture of calcium silicates and aluminum cilicates and aluminum ferrite
- It is give good compressive strength
- It have good setting time
  زمن الشك
- We use as binding material

Thanks see you next week