

# 〔 Building Construction 〕

2011-2012

## **General introduction about building**

### **1-1 Building construction steps**

#### **a. Specify the project target:**

Each project has a specific target and use such as schools, offices, commercial buildings, residential buildings, roads, bridges, dams ...etc.

At the beginning of any project must locate the building site and utilities such as water supply, electrical power and sewage drain lines...etc.

Any project must have a budget, which play an important role in design and construction.

#### **b. Project requirements:**

After specify the idea, target and uses of any project, project documents must be prepared which include different activities such as necessary information about costs, construction time, construction materials to prepare the preliminary design and specifications.

#### **c. Engineering design:**

It means all architectural, civil, electrical, mechanical...etc. drawings which include: site plan, buildings plans and details.

The drawings must be satisfy the specifications and codes and depend upon soil investigation report to ( Limit type of soil and soil bearing capacity to choose the appropriate foundation type ), forms of contract, the bill of quantities for each item and schedule which include all the work categories and the execution time.

#### **d. Execution of project:**

The construction and execution of any building demand a contract form such as direct execution...etc. and many steps must be achieved after the construction documents were complete.

The first step in the construction process is the application for the a building permit, then is all plans and details are submitted to the building department where they are reviewed for compliance with local zoning ordinances and building codes, when the review is complete, a permit for construction is issued.

Preparation of the building site for construction include, cleaning the site and extending utilities such as water, electrical power and sewage drain to the building.

## **1-2 Types of buildings:**

Buildings may be classified according to:

### **a. Execution method:**

#### **I. Site execution:**

Most of the construction items executed in site location.

These types of execution needs more workers and prepare all construction materials in site location.

The designer especially the architectural engineer has a wide range in selecting the building style and finishing materials. Disadvantage of this type are lost of raw materials and more execution time.

Site execution used in residential buildings and houses.

#### **II. Precast or prefabricated buildings:**

Precast panels are fabricated in special factories outside the site location, then transferred to the site and composed or installed together according to specified engineering details.

Precast panels include slabs, beams, columns, walls...etc. These panels may be concrete, steel or composite.

This type of execution characterized by high or good quality control, less number of workers and minimize the project execution period. The precast buildings are lighter than the traditional buildings.

### **b. Construction design:**

Buildings are designed according to the types below:

#### **I. Frame building:**

It is consist of bearing frame which include beams, columns that transfer the loads of slabs, floors, walls to the foundations.

The frames are reinforced concrete, steel and composite frames ( Concrete & steel ).

Steel frame characterized by:

- High compressive & tensile strength, that means the required cross sectional area of steel sections is smaller than the required cross sectional area of

other materials, so reduce applied loads on the foundation and offered more areas and spaces.

- Steel frames need fire protection & continuous maintenance against weathering conditions.
- All steel section used in building construction are imported and increase the construction costs.
- Local manufacturing materials may be used instead of imported materials to gain an economic construction.
- Steel frames installed in a short time compared with other materials.

Reinforced concrete frame characterized by:

- All raw materials excepting reinforcing steel bars are locally manufacturing.
- These frames may be cost in site or precast in special factories.
- Concrete frames give the construction designer more ideas about the style of construction.
- These frames characterized by high durability and fire strength.
- Disadvantages of these frames are heavy weight; need long time to construct it and quality control to the manufacturing and execution process.
- These frames are permanent construction.
- Frame building walls executed after complete the frame construction and can remove it without affect upon building.

II. Bearing wall buildings:

Applied loads are transferred to foundation by bearing walls which can't remove after construction.

This type of execution used in houses with low height.

The bearing walls are constructed before casting the slabs.

III. Frame & bearing walls buildings:

Steel & reinforced concrete columns & beams in one part of the building and the other part consist of bearing walls.

This type of construction used for economical, architectural and construction requirements.

### **1-3 Building construction development:**

It needs the following requirements:

- a. Good design
- b. Suitable construction materials
- c. Good execution
- d. Materials quality control and used modern methods of execution

Reference:

1. انشاء المباني – آرتين ليفون – زهير ساكو
2. Aspect of civil engineering contract procedure, by Marks, R.J., etal.