

Chapter I

General information on building type structures

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I.1. Definitions

A building is a real estate construction, carried out by several parties, intended to serve as: a shelter, a place of activities, or storage.

A building is a structure composed of building bodies covering habitable spaces when it is of a significant size.

The term "building" refers to anything that is constructed: an architectural or industrial complex, one or more adjoining or non-adjoining buildings having the same purpose, a construction built for the development of land, a monument, etc.

The art of designing and drawing buildings both for their overall form and for their interior spaces is called Architecture . The science of design and studies that gives the technical solutions for architectural drawings and makes the project real on the ground is called **Civil Engineering**, while that of arranging the constructions on the scale of the city to connect them in agglomeration to the networks of roads, water, sewers, etc. is **Urban Planning** .

Building in the economic sense is also the professional sector of activity for the construction of buildings and their fittings; an economic sector often called Building and Public Works or BPW.

The construction of buildings is the responsibility of professional specialties defined in trades, called trades, which together form the construction sector. It is traditionally divided into **structural work** providing the building, in the literal sense the part built in structure which resists and the **second work** part which dresses it.

I.2. The constituent elements of a building

I.2.1. Structural work lot

The structural work lot represents the structural parts in a building, these are the parts and elements that constitute the majority of the work in a building, this lot consumes the large part of the budget allocated to a building project. The structural work lot may contain the following elements:

I.2.1.1. Earthworks (cutting, backfilling, excavations)

They represent all the earthworks, earthworks and backfills necessary for the development of the platform of the blocks and exterior development. All while respecting the plans, profiles, sections and details.

The excavation bottom dimensions must be taken under the same conditions and will be calculated taking into account the installation of 10 cm thick clean concrete, or large concrete as the case may be. The debris from these earthworks must be evacuated to the public landfill, unless justified by the competent services of the study laboratory.

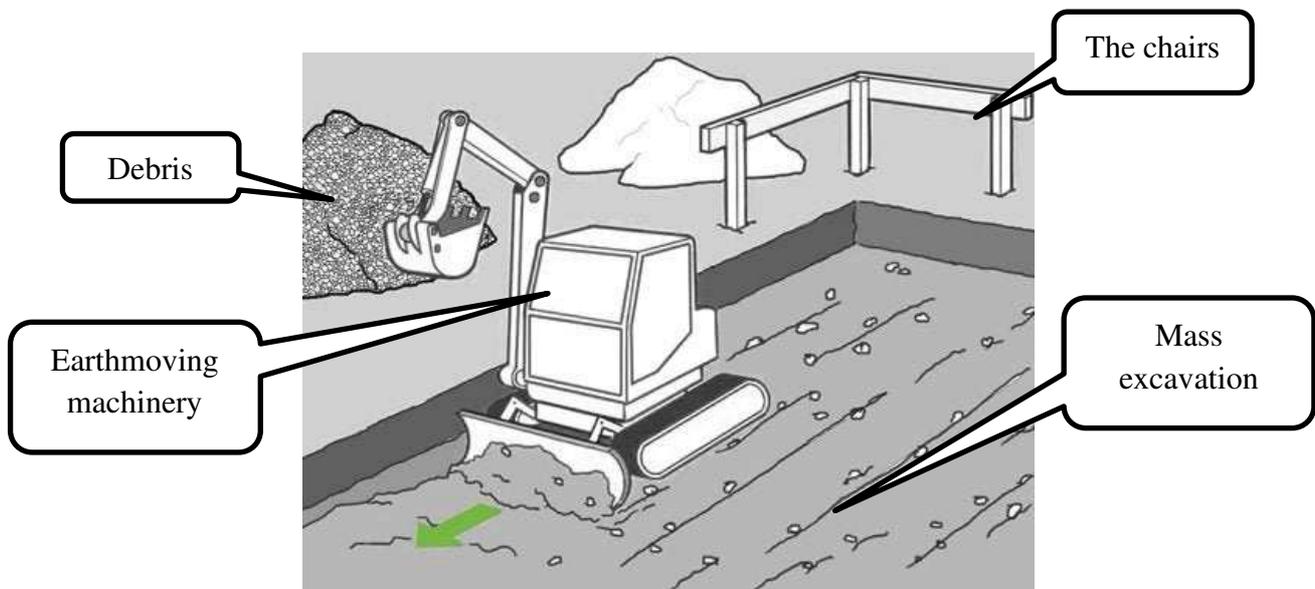


Figure I.1 – Earthworks for a building project (www.leroymerlin.fr)

I.2.1.2. Reinforced concrete elements (for reinforced concrete buildings):

This type of element must imperatively comply with the execution plans; the formwork plans, reinforcement, details and the calculation note (Civil Engineering File), and also with the instructions given on site by the engineer responsible for monitoring and by the inspection bodies, we can cite:

- **Foundations:** they can be isolated, continuous or general foundations, in reinforced concrete, these elements can be small stringers to prevent the foundations from slipping.
- **The frames:** they represent the beams and posts, which must be made with good quality.
- **The Floors:** they can be; hollow-body ribbed floors, solid reinforced concrete slabs, mixed floors, etc., above the terrace slab a slope shape will be laid which will receive a waterproofing complex (according to the engineer's details).
- **Stairs:** these are structural elements that allow you to move on foot from one floor of a building to another (stairs can be made with another material, such as metal, wood, glass, etc.).
- **The sails:** these are reinforced concrete walls designed to support horizontal and/or vertical forces.

And all other elements made of reinforced concrete; foundation beams, floating slabs, drainage manholes, acroteria, etc.

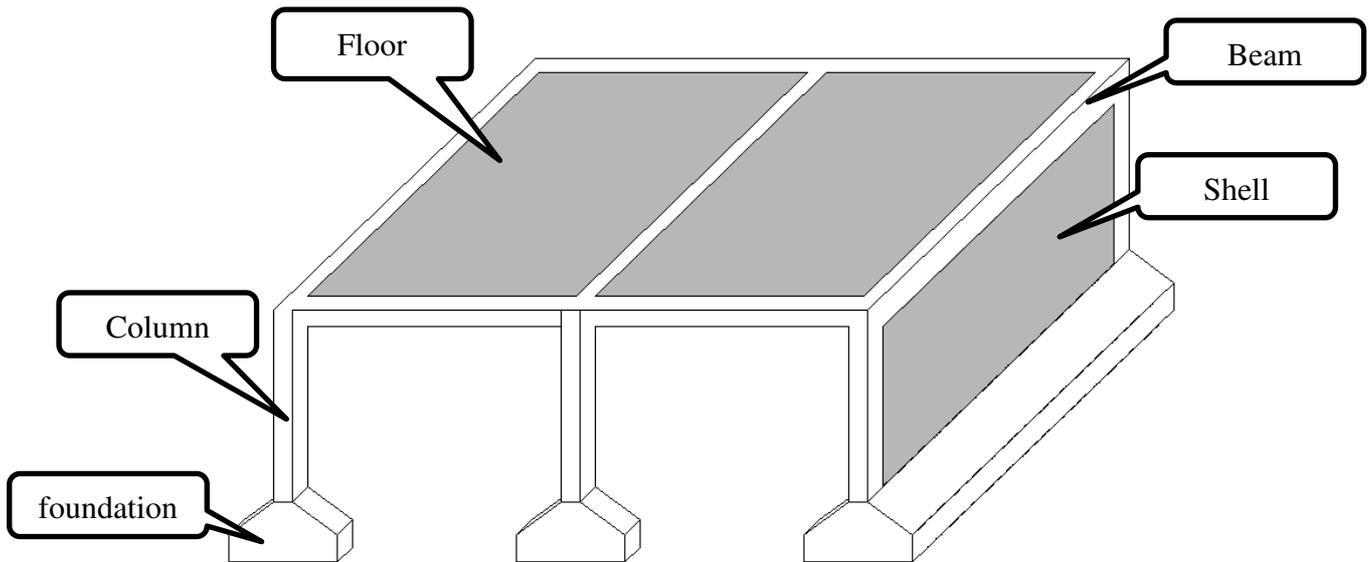


Figure I.2 – Examples of reinforced concrete parts

I.2.1.3. Structural elements (metal or wood):

- **Trusses:** they are triangular-shaped elements, arranged perpendicular to the supporting walls, whose function is to support the weight load of the roof. They are made of wood or metal.
- **Posts, crosspieces and beams:** they represent the frame's portico, the crosspieces are horizontal pieces and the posts are vertical pieces, they are made with rolled profiles (IPE, IPN, HEA, HEB...etc.), or PRS beams (Reconstituted and Welded Beams), or planks in the case of a wooden structure.
- **Breakdowns:** these are elements, made of wood (boards) or metal (IPN), allowing the connection of the trusses between them, the purlins constitute horizontal parts, and support the battens and the rafters, there are three types of purlins: the ridge purlin, located at the top of the frame, sometimes called ridge, the belly or intermediate purlin, positioned in the middle of the roof section, and the wall purlin, placed on the walls at the end of each of the slopes.
- **Rafters:** The rafter is used to distribute the load of the roof on the purlins. Installed in the direction of the slope (in wood or metal).
- **Floors :** these are horizontal or vertical pieces that allow the floors to be covered and the loads to be distributed to the trusses and crosspieces; they can be made of metal or wood.

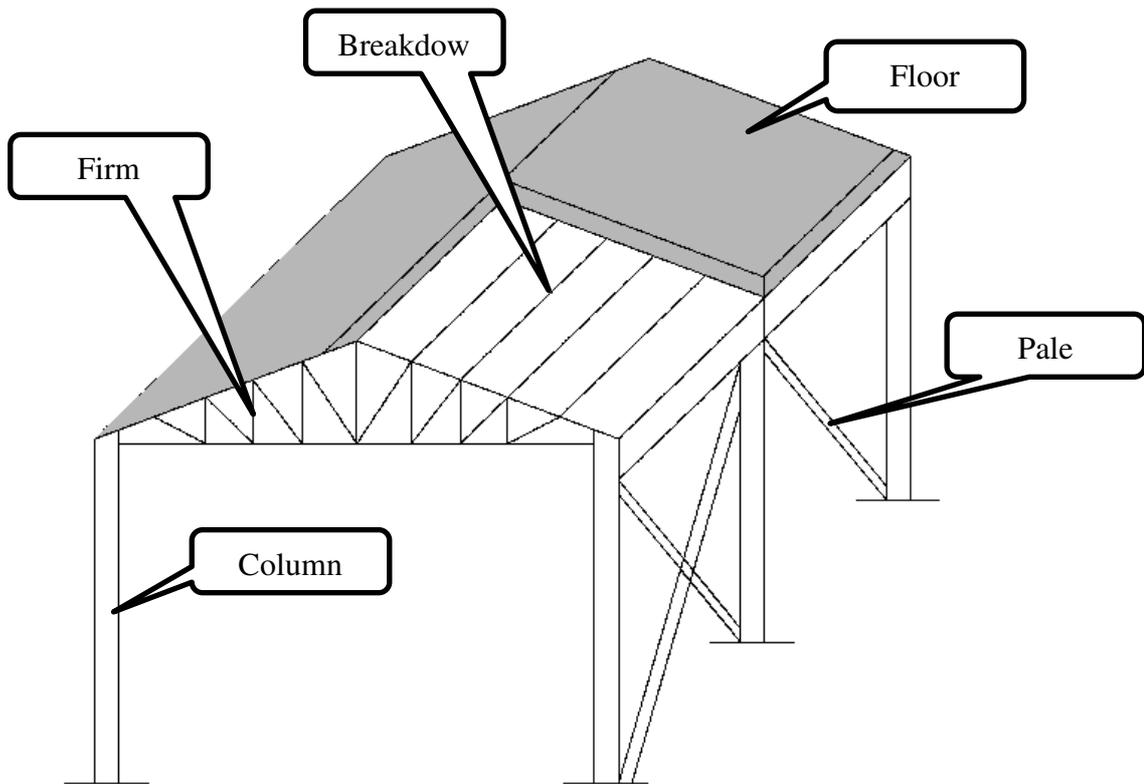


Figure I.3 – Examples of structural parts (wood or metal)

I.2.1.4. Masonry:

Masonry represents all types of walls used; exterior walls in double walls 30 cm thick with an air gap 5 cm thick, interior partitions, or walls with any other materials (metal panels, plaster tiles, etc.).

I.2.1.5. Coatings:

They represent protective elements for walls, porticos and floors, they can be made with bastard mortar (sand + cement + lime + water) for exterior walls, or in cement mortar (sand + cement + water), or in plaster for interior walls and under floors.

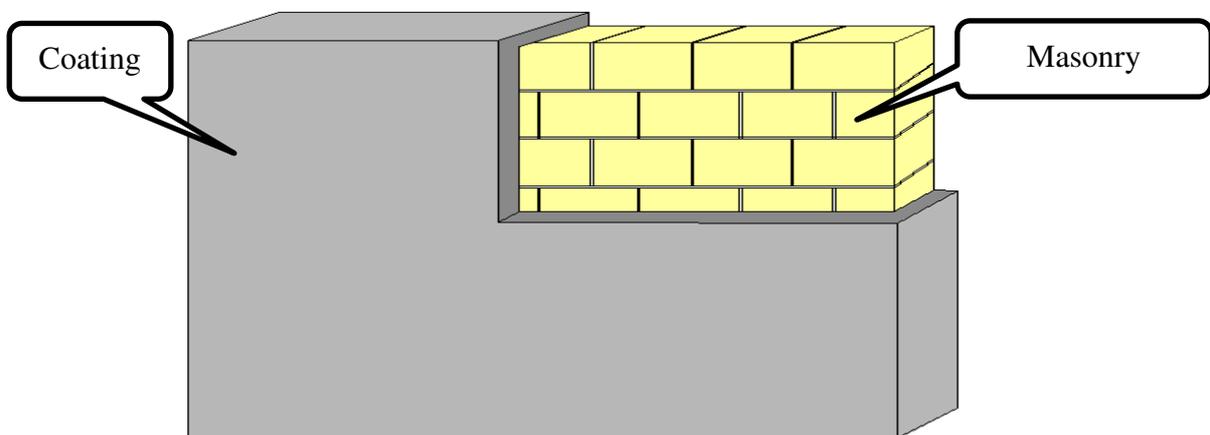


Figure I.4 – Example of a masonry wall with rendering

I.2.1. 6. Wall, floor and platform coverings:

The coverings of the platforms and floors can be made of granite tiles, marble, or ceramic products or any other material that can meet the requirements of the users. The wall covering can be made with earthenware tiles, marble, or any other material required by the builders.

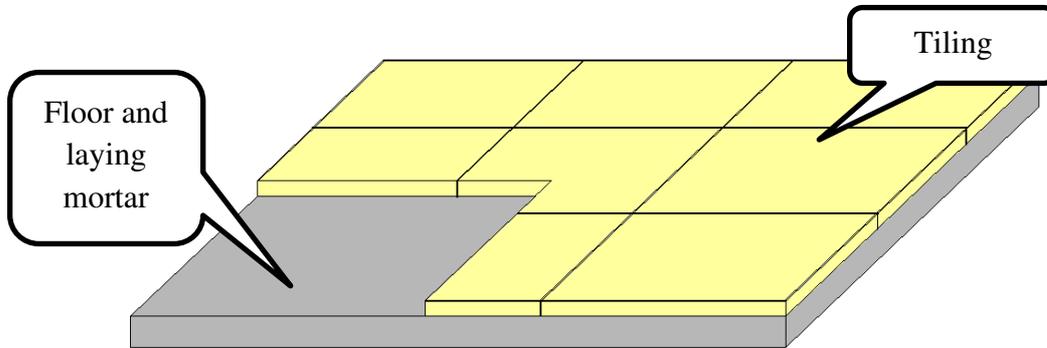


Figure I.5 – Example of floor covering with tiles

I.2.2. Second work lot

I.2.2.1. Waterproofing

Waterproofing is an element that is carried out on floors and terraces in order to protect the building against water infiltration.

I.2.2.2. Sanitary plumbing

Sanitary plumbing work consists of carrying out:

- Risers and water supply pipes and anti-fire ,
- The supply and installation of sanitary equipment,
- Wastewater drainage pipes,

I.2.2.3. Electricity

The electrical work involves the supply and installation of electrical equipment with wiring and protective sheaths as well as distribution boxes with cabling and earthing.

I.2.2.4. Carpentry

The carpentry can be made of wood, metal, aluminum, PVC (Poly- Vinyl - Chloride), it includes all interior and exterior carpentry;

- Exterior joinery for facades,
- Exterior doors and windows,
- Interior joinery,
- Glass frames fixed to interior partitions, etc.

I.2.2 .5. Painting and glazing

- **Painting:** All interior walls and ceilings will receive three coats of paint, and all woodwork must receive two coats of oil paint with an impregnation coat, and two coats of anti-rust paint and two coats of oil paint on the ironwork.
- **Glasswork :** It is recommended to use glass for glass doors and windows facing the exterior facade.

I.2.2.6. Heating

The heating system can be of the classic type (gas), or central heating with hot water produced from a boiler and distributed to radiators.

I.2.2.7. Roads and Miscellaneous Networks (VRD)

The VRD and development works include:

- Sanitation,
- Drinking water supply and fire network,
- Exterior lighting,
- Exterior development: Roads, outdoor space, etc.

Noticed

Other elements that go into the construction of a building can be found for very specific projects, what is exposed above represents the majority of cases of elements of a building type structure.