3. Constructions Systems of Multi-Storey Buildings

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Basic Classification of Construction Systems of Multi-Storey Buildings

- According to the **type of vertical load-bearing structures**
  - Wall construction system
  - Column construction system (skeleton construction system)
  - Combined construction system
  - Core structures
  - Superconstruction
- **The construction system of multi-storey buildings** is characterized by the predominance of vertical load-bearing structures, transferring all loads to the foundation soil.

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Wall Construction System

- **Longitudinal construction systém**
  - The load-bearing walls are arranged parallel to the longitudinal axis to form longitudinal tracts. The ceiling structure is normally laid in a direction perpendicular to the longitudinal axis of the building.
- **Transverse construction systém**
  - The load-bearing walls are perpendicular to the longitudinal axis of the building and form transverse tracts. The ceiling construction is realized in the longitudinal direction.
- **Two-way construction systém**
  - In the case of a two-way (bi-directional) construction system, the supporting walls are arranged in the longitudinal and transverse directions.

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Column Construction System – Skeleton System

- Principle of the column system consists in separating the load-bearing function and the function of cladding.
- According to the method of transferring the load, the column system is divided - **Frame skeleton system** x **Flat slab with column capital skeleton system x Flat slab skeleton system.**
- The basic element of the frame skeleton is a frame made up of two columns and a beam:
  - **Longitudinal frames** - the beams are parallel to the longitudinal axis.
  - **Transverse frames -** the beams are perpendicular to the longitudinal axis.
  - **Two-way frames** - The beams are positioned in the transverse and longitudinal directions.

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Combined Construction Systems

- **Combined construction** systems can be implemented in a number of variations:
  - Combination of longitudinal wall system with inner column system
  - Combination of transverse wall system with inner column system
  - Combination of transverse and longitudinal walls with inner column system
  - Combination of two-way (bidirectional) column system with inner core
- The combination of load-bearing walls and columns creates diverse spatial formations with high stiffness and minimum weight

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Core Construcion System

- **The core construction system** transfers the load to the building foundation with a central stiff core. The construction of individual floors of core systems can be carried:
  - Primary lower horizontal supporting structure cantilevered overhang from the parterre core which carries the secondary uprights upper floors.
  - Primary upper support structure disposed in the core head, on which the ceilings of the lower floors are suspended.
  - Ceilings individually executed from the core into which all loads are transmitted directly.

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Superconstruction

- **Superconstruction** are two-stage building constructions that arise by concentrating loads into a limited number of massive elements of the main (primary) supporting structure into which a secondary (secondary) structure is inserted.
- The primary load-bearing structure is typically formed of a super-frame by which each floor having a height corresponding to the height of several storeys inserted.

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