6. Subsoil and Earthworks

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Foundation and Subsoil

- The **foundations** are load-bearing components of objects that provide the load carrying structure into the subsoil. According to the way the load is transferred, are distinguished **shallow foundations** and **deep foundations**.

- **Subsoil** is a functional part of the building. **The footing bottom** is an area where the foundations meet the subsoil. **Soil** is unpaved or slightly hardened rock.

- SUBSOIL: rock, mud, clays, topsoil, marl, fusible mud, loess

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Foundation and Subsoil

- There are 3 classes according to soil exploitation:
  - **Class I** is defined by mining by conventional excavation mechanisms (bulldozers, excavators) or by hand.
  - **Class II** is defined by mining with special mechanisms - rippers, rock spoon, hammers
  - **Class III** is defined by mining by blasting works

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Deep of Foundation

- **Depth of foundation.** The depth of foundation is determined with respect to stability and settlement construction, climatic conditions (freezing, drying out of the soil) and geological and hydrogeological soil profile.
- Depending on the soil, we choose the depth of foundation:
  - 500 mm for rock and weak rocks soil and under the interior walls
  - 800 mm from landscaped terrain (loose soil outside the mountain range)
  - 1000 mm from landscaped terrain (cohesive soils outside mountain areas)
  - 1200 mm in cohesive soils with ground water depth less than 2 m deep
- Depth of foundation in mountain conditions always depends on local climatic conditions

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Earthworks and Excavations

- **Earthworks** in civil engineering are divided into preparatory earthworks, major earthworks and finishing earthworks. It also includes **rake off the topsoil, the embankments, the backfills.**
- **Excavations** are carried out by excavating below ground level. The **pit** is an excavation whose length and width is greater than 2 meters. The **furrow** has a predominant length dimension and a maximum width of 2 meters. The **shaft** has a predominant depth dimension and a maximum floor area of 36 square meters.
- The **footing bottom** must not be broken during excavations. It must also be protected from climatic effects.

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Ensuring Structural Stabiliy of Excavations

- Vertical walls can be excavated in cohesive soils with a depth of no more than 1.5 meters. In other cases, excavation walls must be provided with one of the following options:
- **Sloping walls of excavations**
  - Shoring of excavation walls
  - Piles shoring
  - Driven shoring:
  - Triggered shoring:
- **Shoring with attached sheeting**
- **Underground walls**
- **Pile walls**
- **Sheet pile walls**

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