CEDR

Conférence Européenne
des Directeurs des Routes

Conference of European
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Examples of soil handling in infrastructure projects

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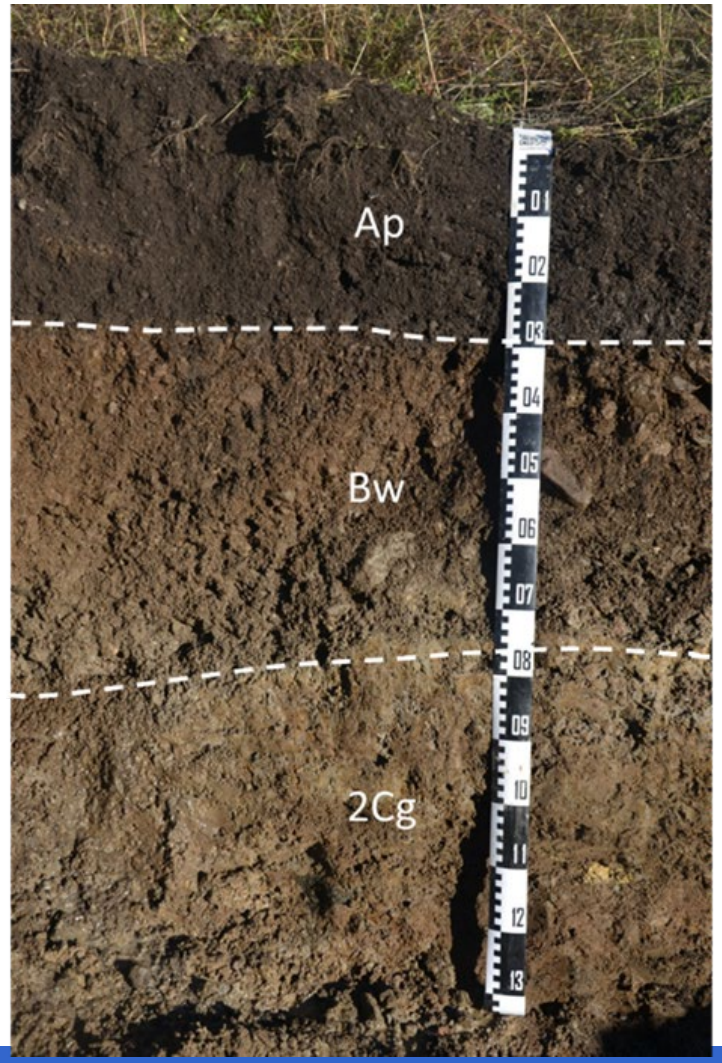
Introduction – reuse of soil

- Soil scientists ABC
- Soil investigations - cooperation with archeologists
- Concept for soil relocation-compensation areas
- Storage of soil and soil loosening
- Processing surplus soil and rock materials into new products

Soil Scientists ABC

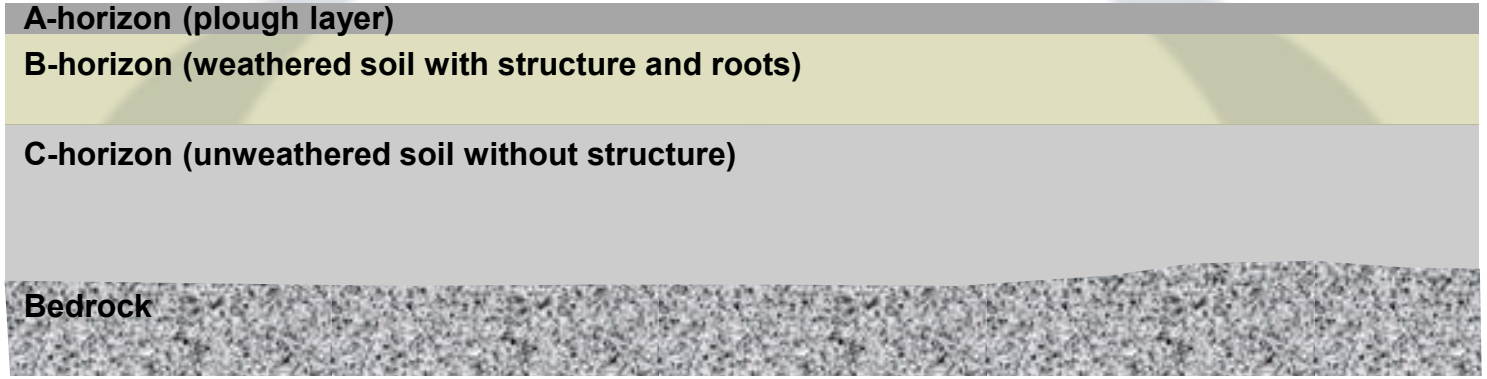


- Topsoil, Ap - plough layer
- Weathered subsoil, Bw
- Clayey subsoil with mottles, Cg-horizon

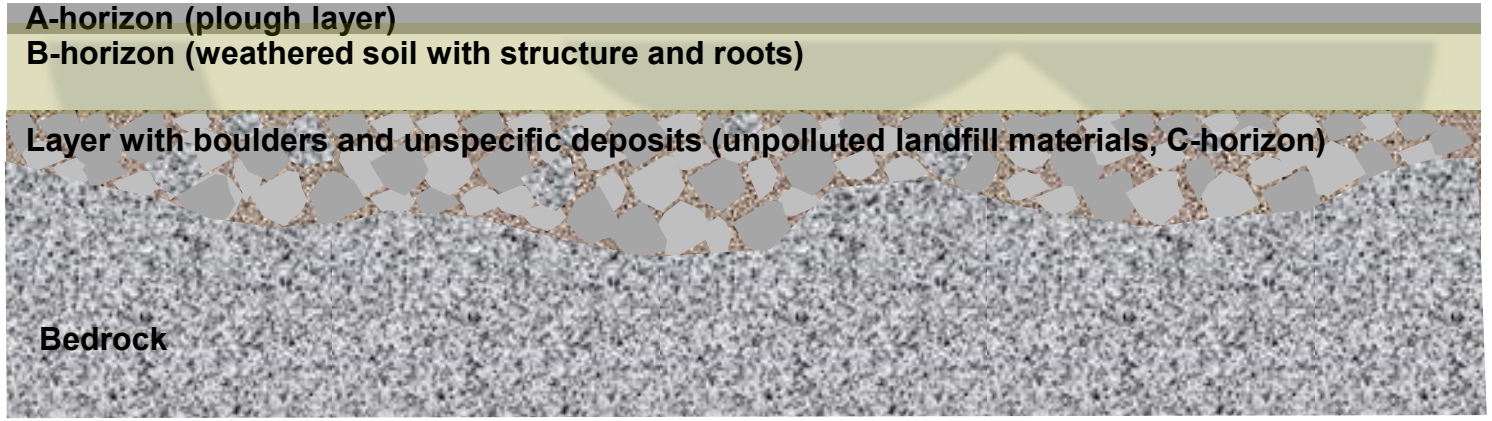
Archeological and soil investigations

Concept for soil relocation

Natural soil



Relocated soil

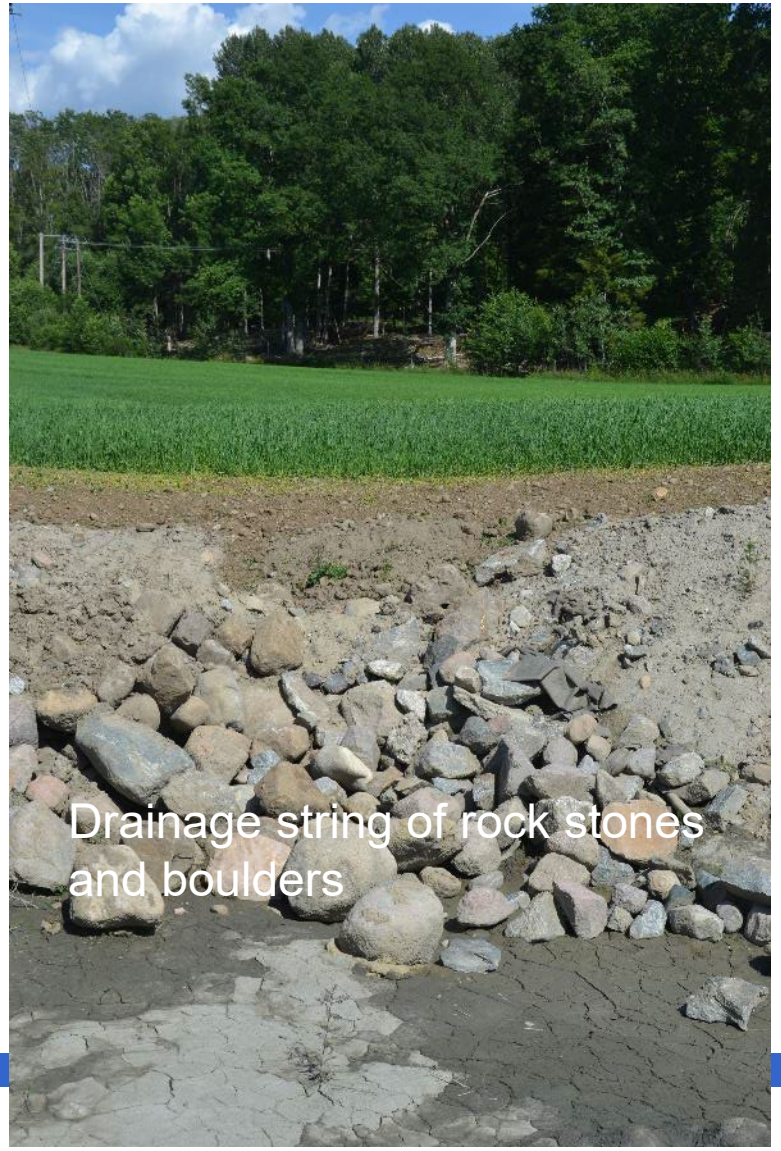


Site for soil relocation – compensation area of agriculture

Use of stones for access tracks and drainage


Access track for mass transport


Access track as drainage system


Drainage string of rock stones and boulders

Reconstruction of the soil

Spring barley first year at compensation area

Success criteria for soil reconstruction

- Soil material from A- and B-horizons should not be mixed but stripped separately and should be stored separately to conserve soil structure and the living conditions of the soil organisms.
- After restoration, only minimal agricultural intervention (e.g., without heavy machinery) should take place on the soil for a period of several years, because freshly restored soils are very susceptible to compaction.
- Soil need to settle and stabilize before permanent drainage systems are installed
- Management of soil materials should preferably occur when the materials are slightly moist.
- Measurements of soil moisture should be taken during the construction period.

Making agricultural field of skeletic soil materials

Mass storage area levelled by bulldozer

Sorting out stones and boulders

Sorting out stones

Placing stones in rows

After placement of new topsoil

Restored agricultural land with pioneer crops

Turning mass storage areas into agriculture

The process of restoring mass storage areas into intended agricultural production takes many years and is very expensive. The process includes:

- Loosening of soil and sorting out stones and boulders with an excavator
- Mechanical stone removal
- Placement of new topsoil
- One season of growing pioneer crop species (*Vicia villosa*, *Phacelia tanacetifolia*, *Trifolium incarnatum,* and *Lolium multiflorum*)

- Mass storage areas of skeletic soil materials are often revegetated as forest

Temporary soil storage on agricultural field

1 Storage of soil in piles

2 Storage area after displacement of soil, heavily compacted

3 Loosening of B-horizon with excavator and replacement of A-horizon strip by strip

4 Winter wheat in august 2021

Making manufactured soil and building materials of surplus soil


Incoming soil with stones and boulders


Making stonefree soil mixture


Mixing soil material and fines from crushed rock

Crushing of bedrock and till boulders

Conclusions

- General recommendations on soil management in road projects should always be adapted to local climate, terrain and soil
- Soil experts should follow the projects in all phases from plannning, construction and aftercare
- The competence in soil management of the employees of the construction companies is a key for proper soil management in road projects
- The protocols for archeological investigations have little attention to damage on soil and cooperation between soil scientists and archeologists would improve the outcome of both archeological and soil investigations in infrastructure projects