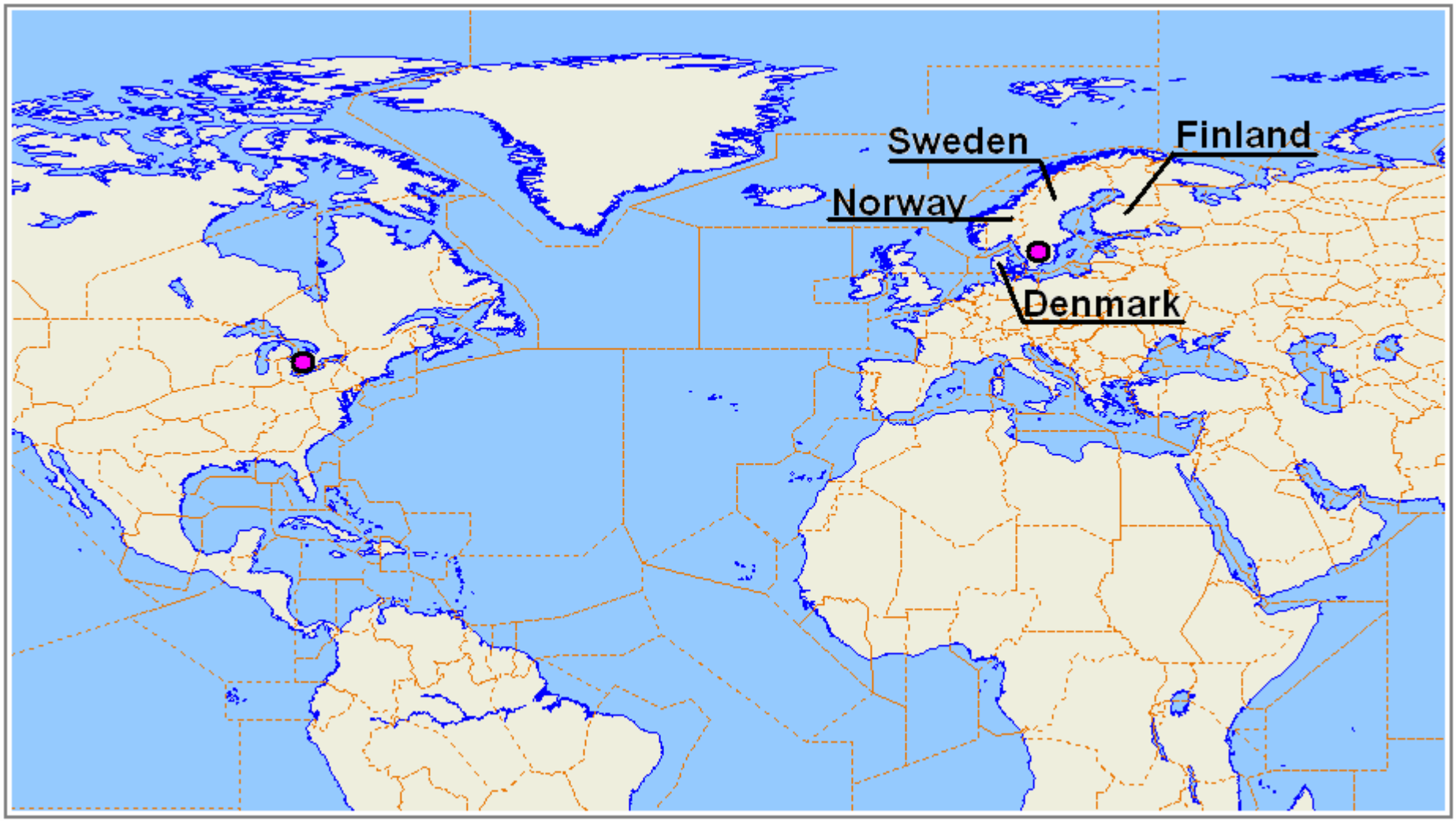
Drilled MicroPile Walls

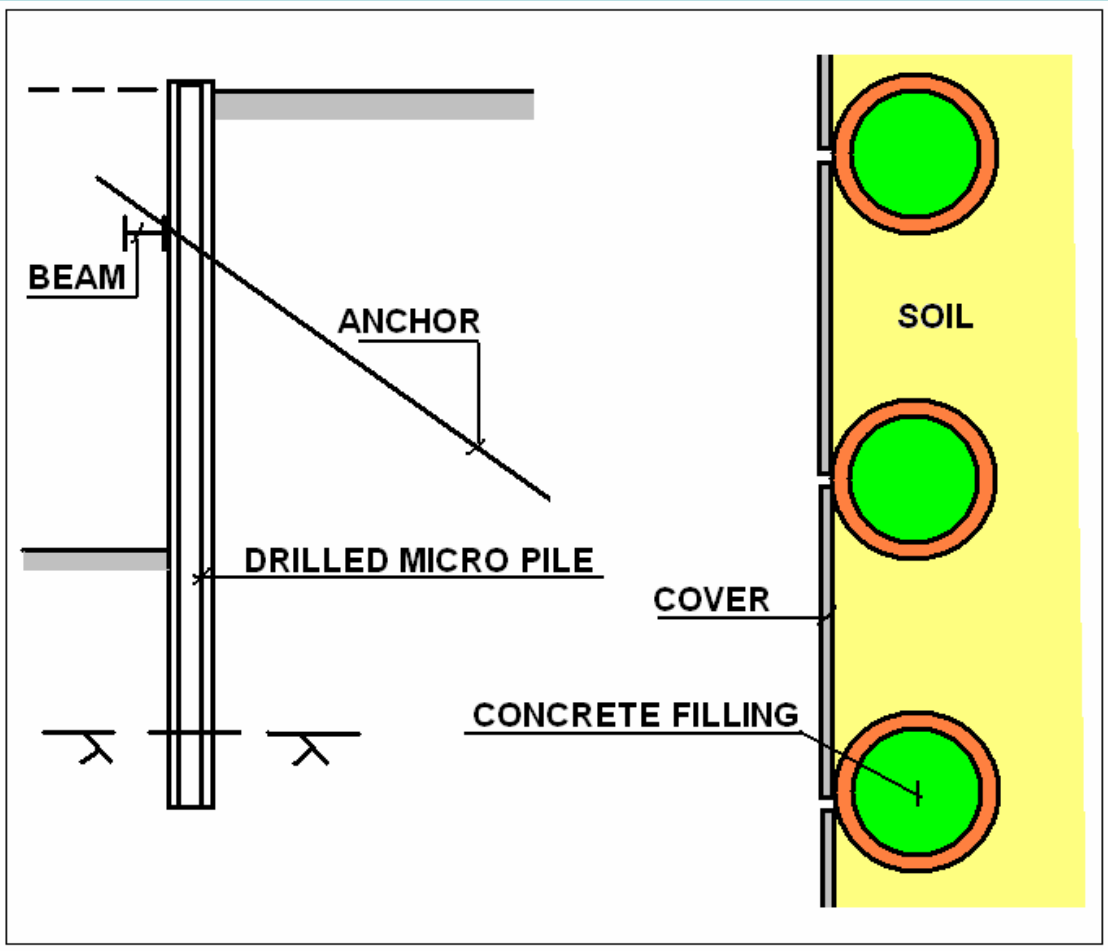
- Use of Drilled MicroPile Walls in Scandinavia

Håkan Bredenberg

Scandinavia … ?



Drilled MicroPile Walls …



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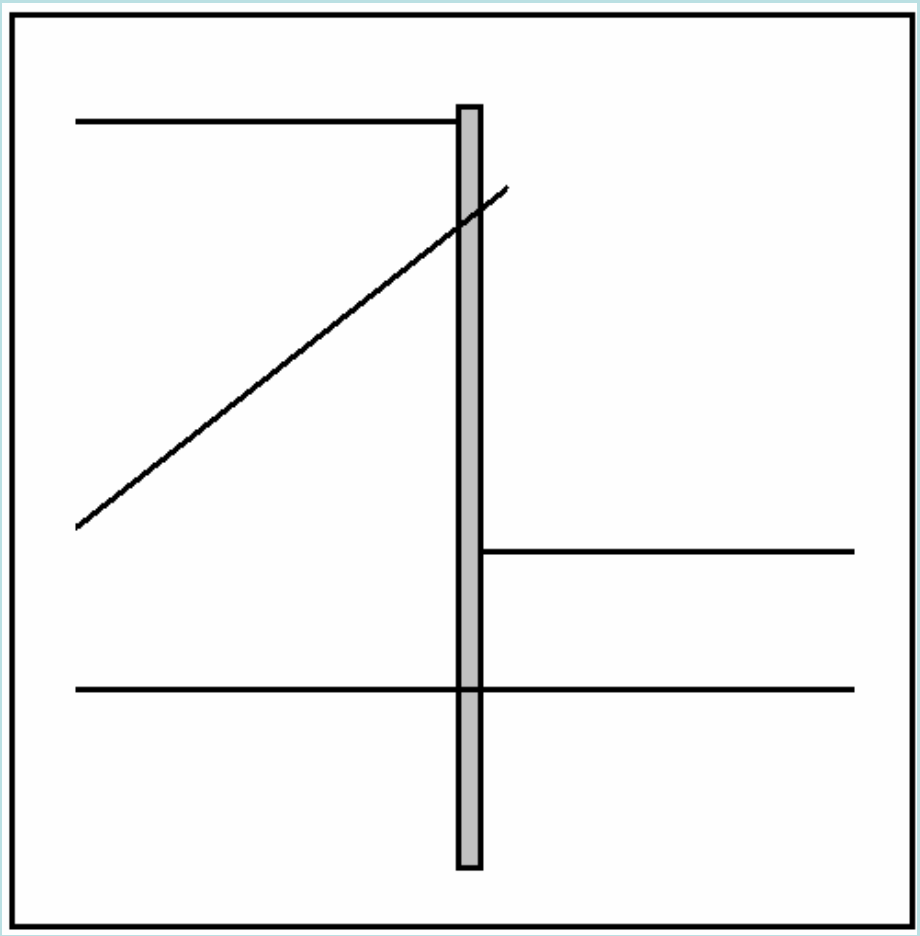
- drilled MicroPile wall elements
- supports
- cover
- costs
- equipment
- design

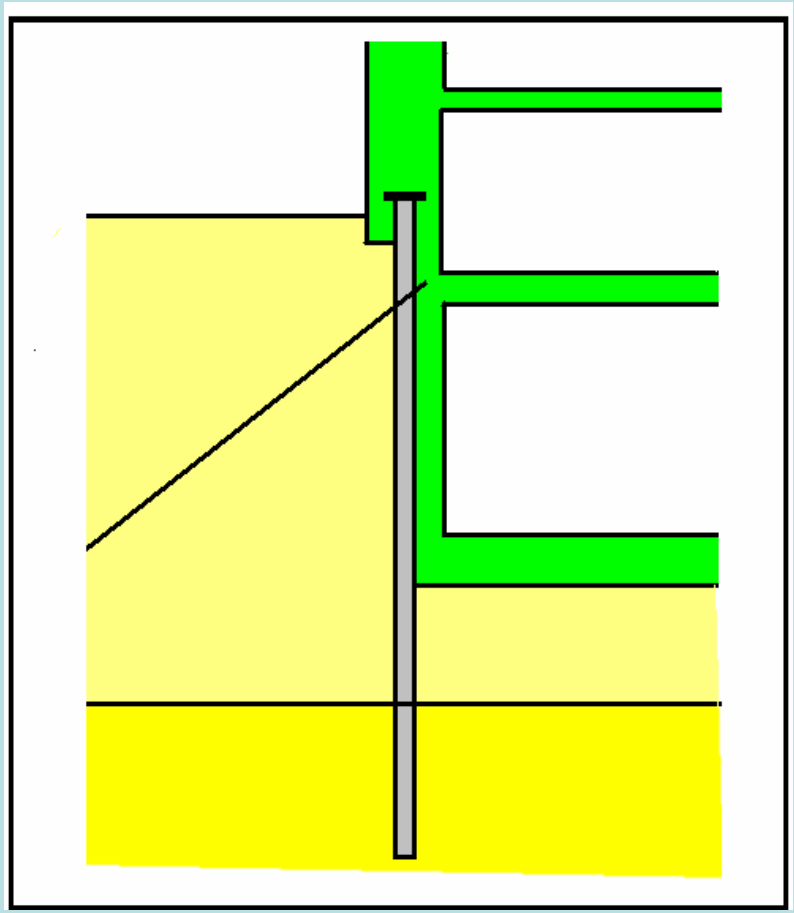
Applications

- excavation temporary cut off walls
- same, also serving as permanent support
- bridge support /foundation

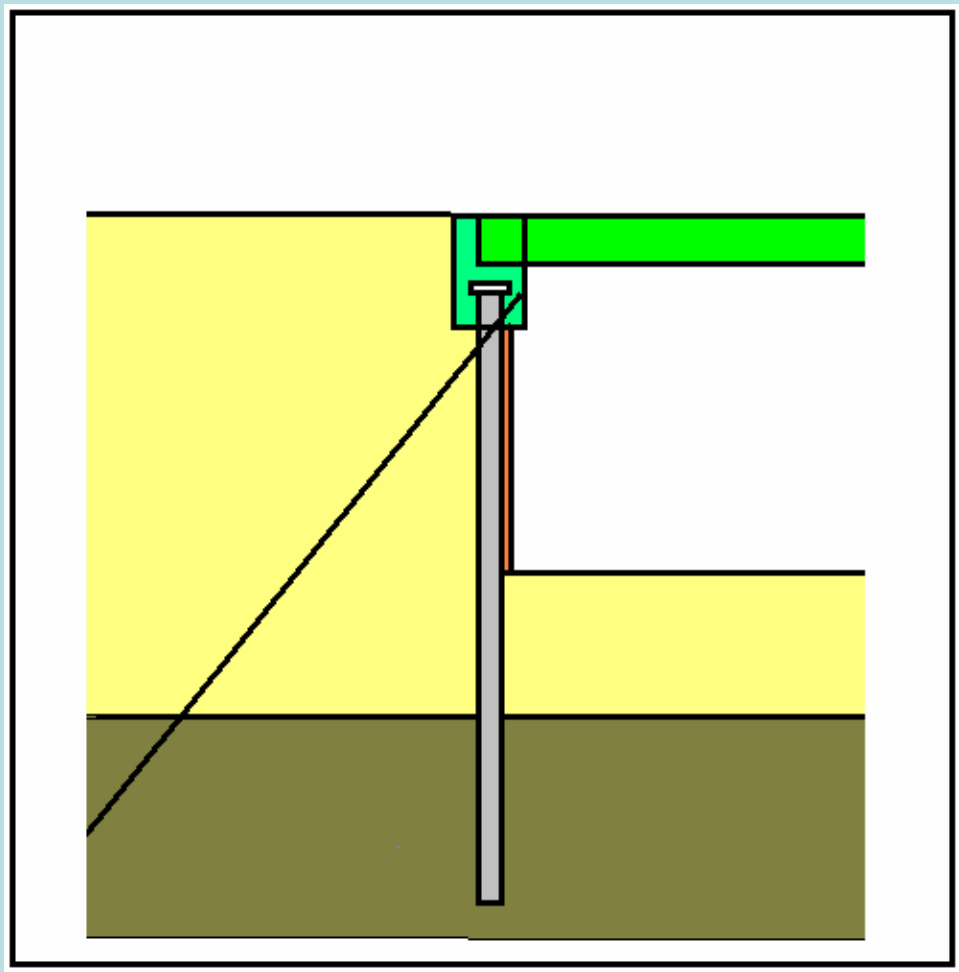
Excavation cut off wall



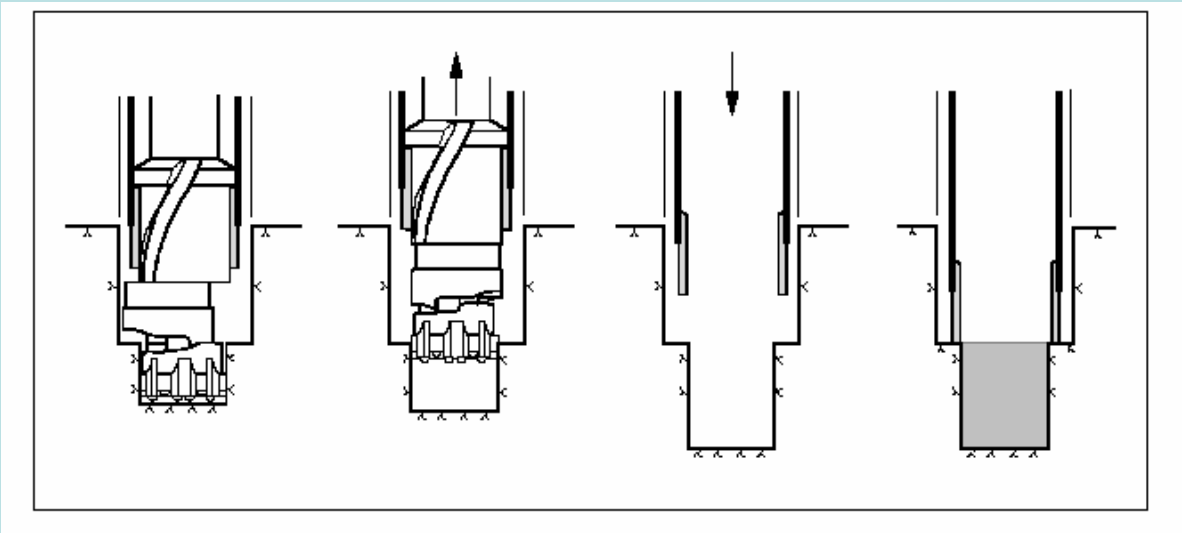
Temporary wall & permanent support

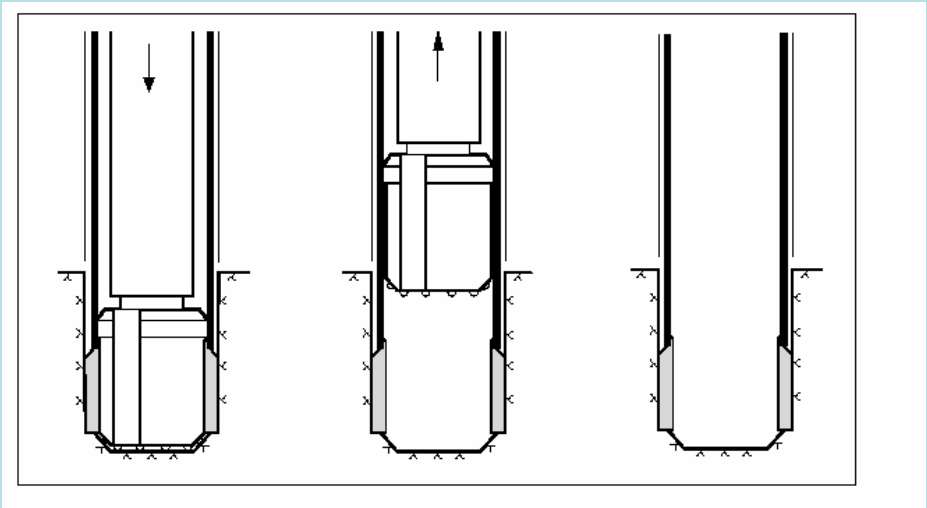


Temporary wall & permanent bridge support



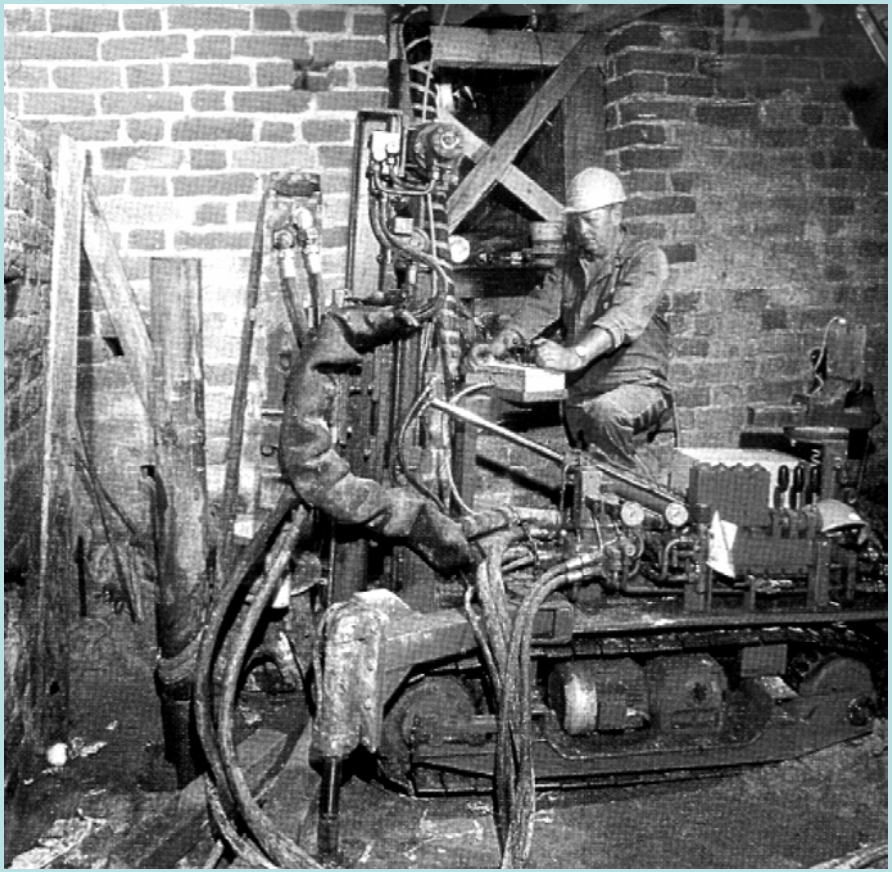
Drilled MicroPile Walls, usual Drilling metods





Drilled MicroPile Walls – the Klemm 806

Drilled MicroPile Walls - equipment



” The Basement Mouse”

Drilled (micro) Pile Walls – equipment, drilling rigs

Drilled MicroPile Walls – equipment for drilling

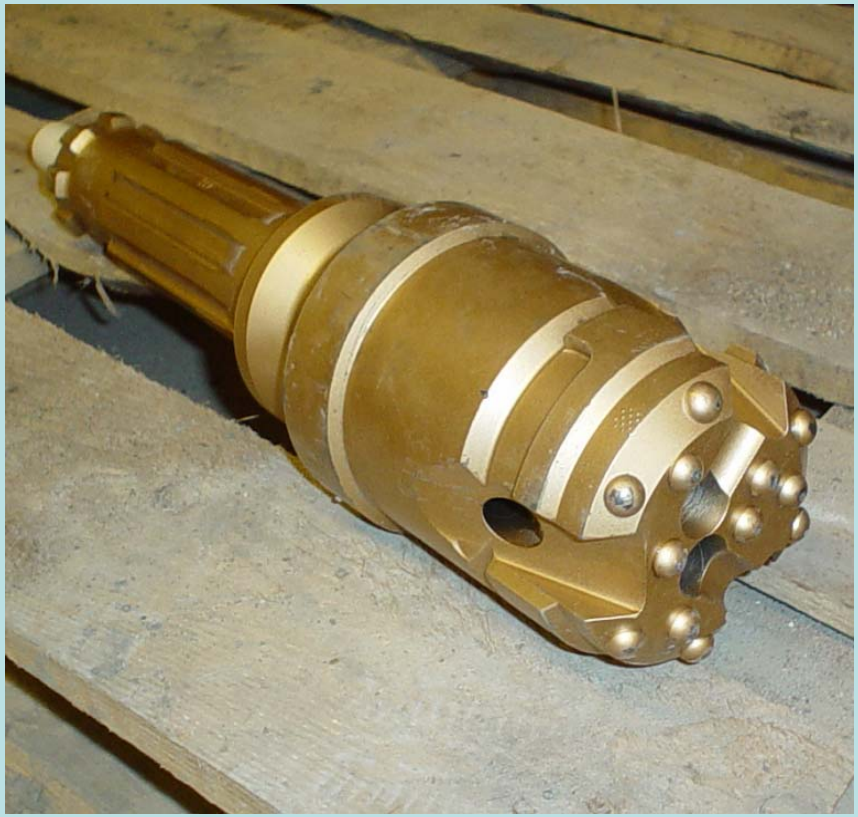
Pilot

Casing

Drill shoe (welded to casing)

Ring drill crown (left at bottom of casing)

Drilled MicroPile Walls – Equipment at tube front



Pilot (recovered)

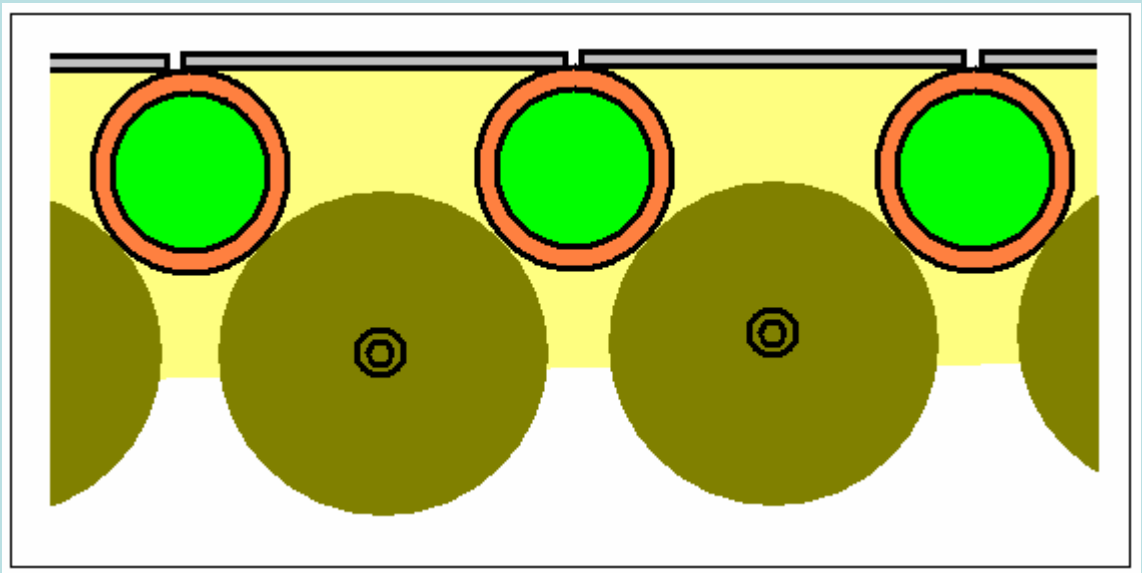
Ring crown – welded to tube, left at tip

Drilled pile walls – drill bit for 600 mm tubes

Excavation

- How to keep soil in place between space between tubes ?
- Which spacing between tubes ?
- If ground water level above excavation bottom ?
- Which material for cover ? Wood, steel, shotcrete ?

Jet grouting to prevent soil inflow



Drilled MicroPile Wall – extending into rock

Drilled MicroPile Wall during construction

Drilled MicroPile Wall in rock fill

Excavation before cover

5 mm steel sheet cover beeing spot welded to drilled soldier beams

5 mm steel cover plates beeing cut to size (from 2 x 1 m)

Drilled MicroPile Wall sealed with shotcrete

After excavation to final level …

some case pictures from 2007.

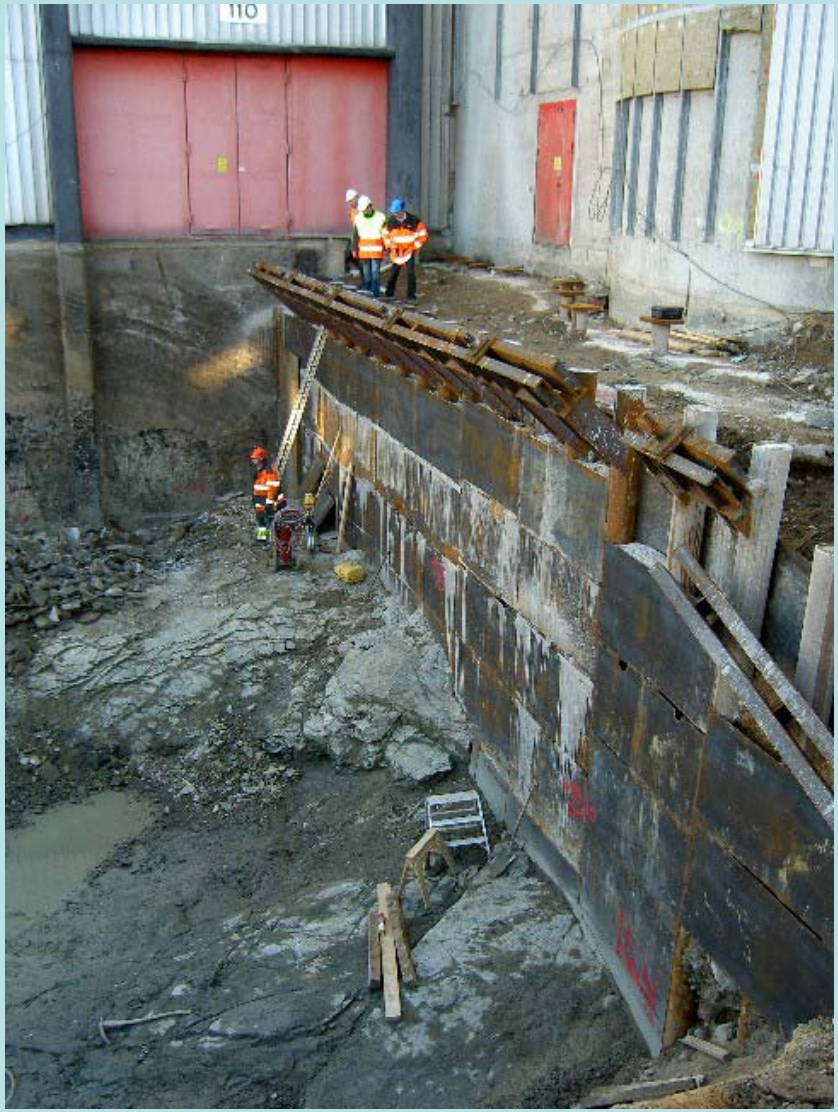
Drilled & driven Pile Wall, finalized (?), rock anchors

Drilled MicroPile Wall, Limmared

Liljeholmen, drilled MicroPile wall for new subway station

Drilled MicroPile Wall at Ringhals nuclear power plant

MicroPile Wall was drilled into rock



Drilled MicroPile Wall for new theatre building, Norrköping, Sweden

Drilled MicroPile Wall – shotcreted – note boulders.

Drilled MicroPile Wall – under & close to existing building

Drilled MicroPile Wall finalized

Drilled MicroPile Wall used as formwork

Drilled MicroPiles for temporary column support

Drilled MicroPile Wall support

- soil / rock anchors
- beam struts
- tie-backs
- … others

Drilled MicroPile Wall – supported by drilled soil anchors

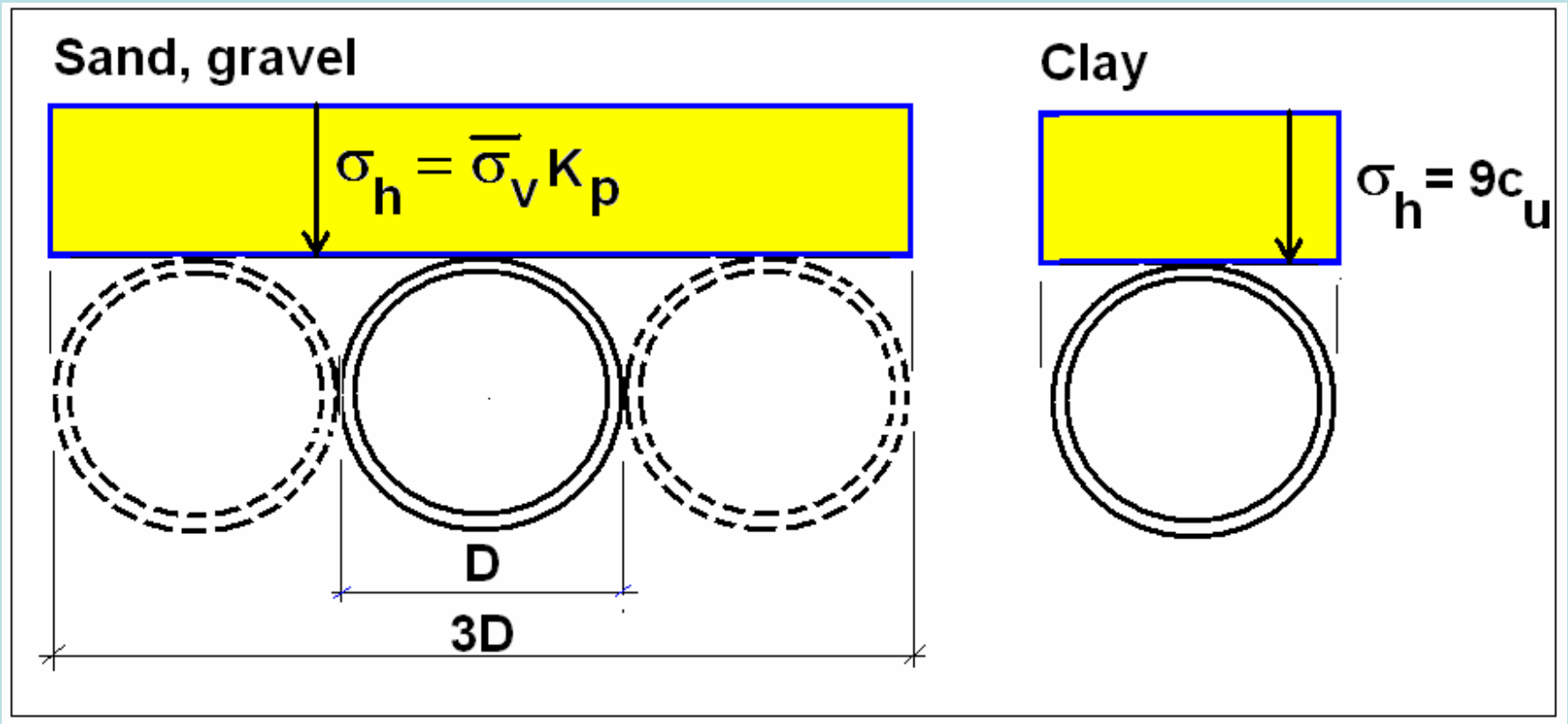
Corner supported by H-beams

Anchor rod fixed to slab

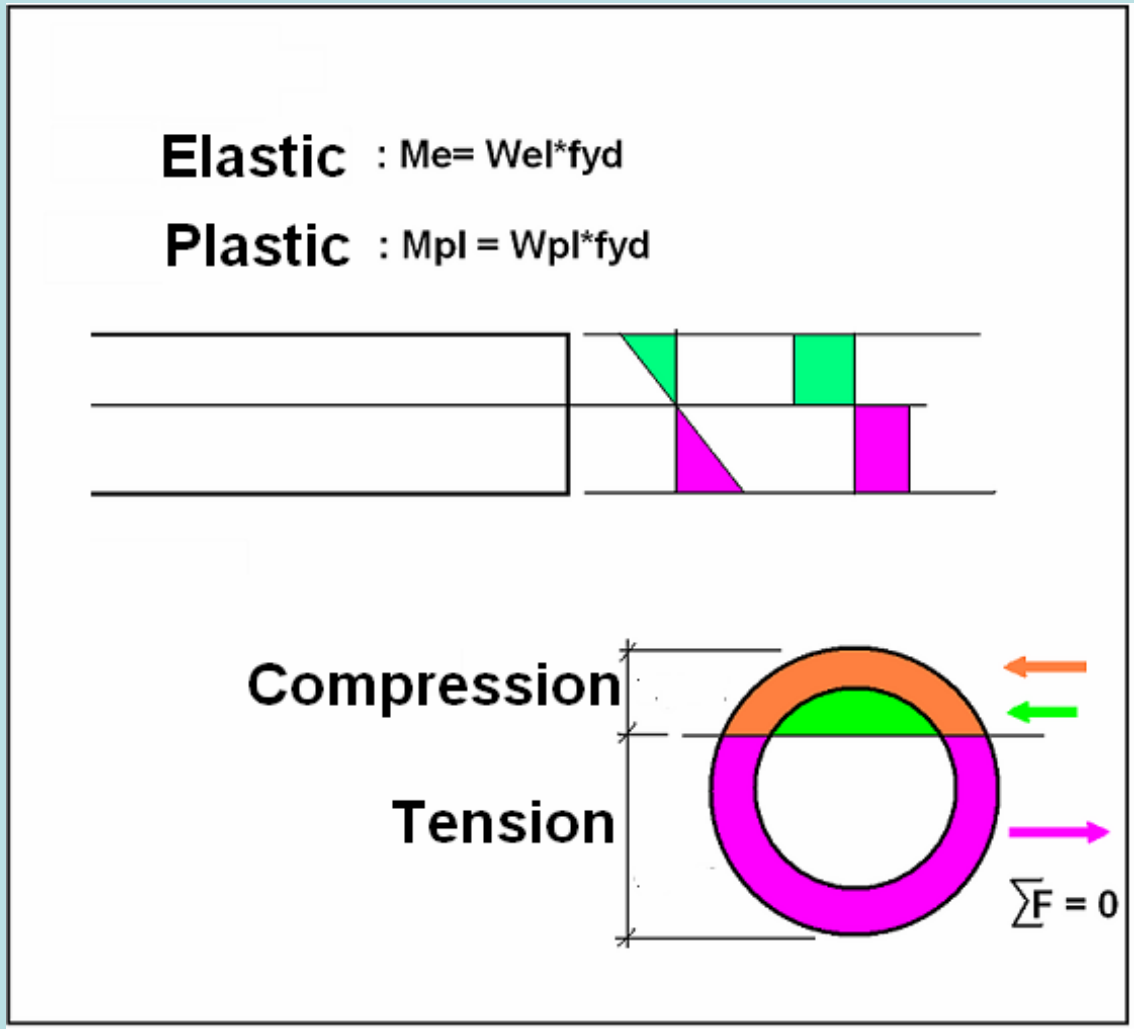
Design of drilled MicroPile walls

- Soil pressure active/passive
- Forces, bending moments
- Section analysis :
  - Axial capacity
  - Bending capacity
  - Buckling
  - Local buckling (thin wall structures)
- Deflection, soil movements

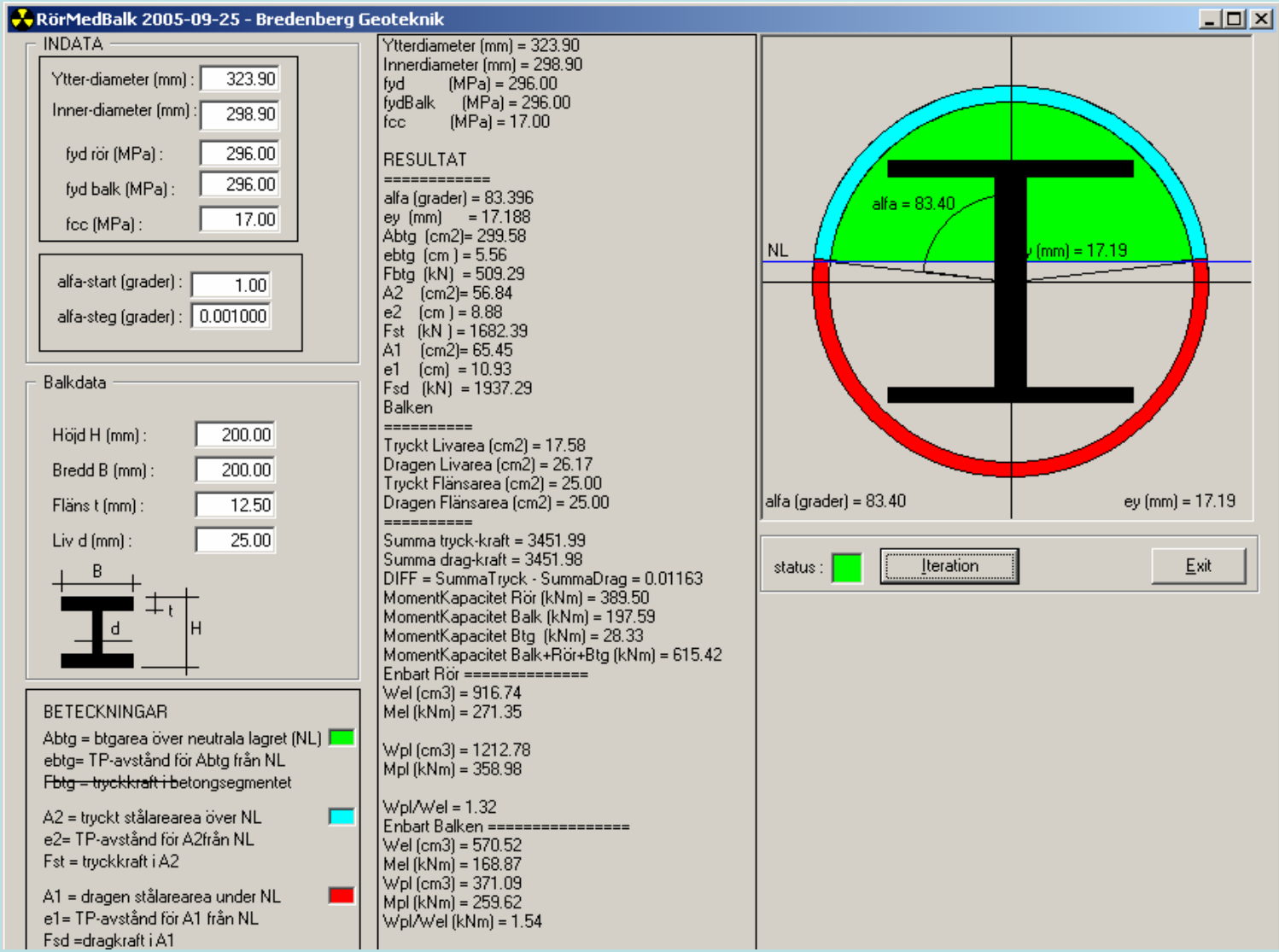
Soil – tube interaction



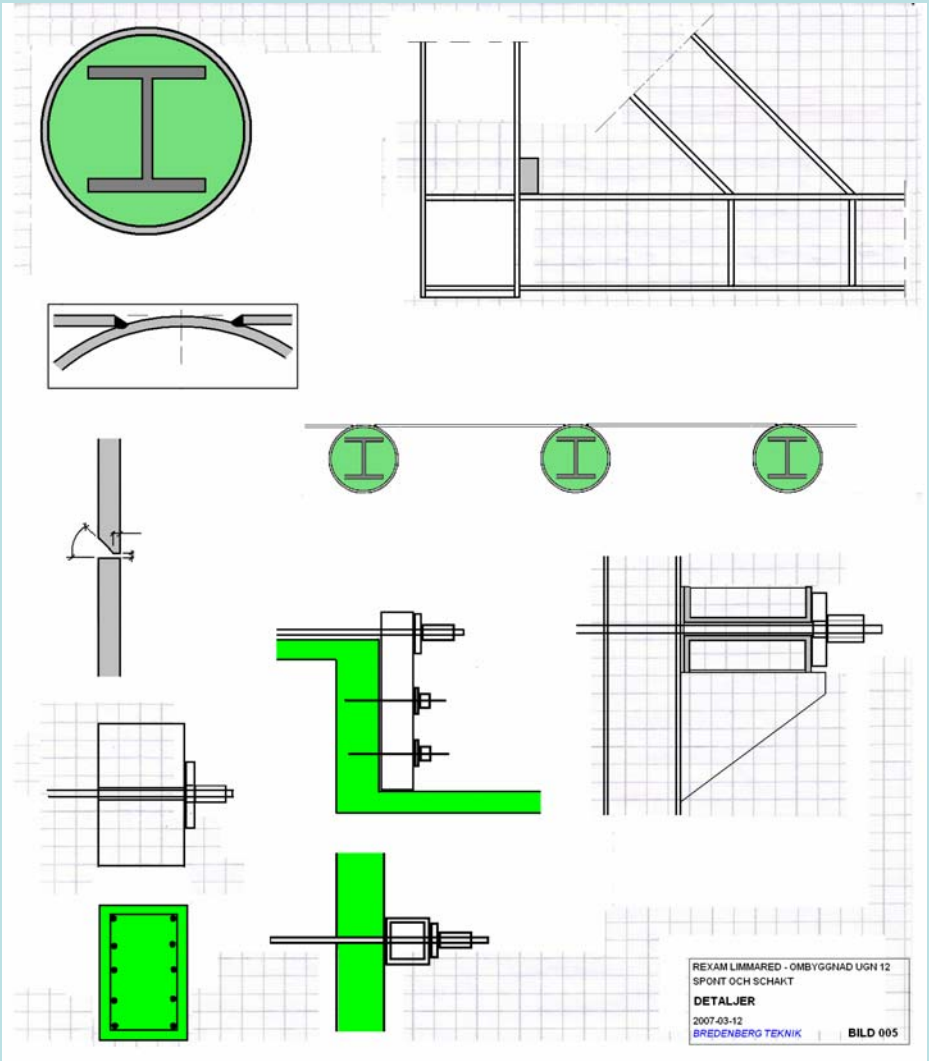
Bending moment capacity



Drilled MicroPile Wall – bending capacity



Design details



Conclusions

- **Consider to use Drilled MicroPile walls when:**
  - **Obstacles in soil prevents sheet piling**
  - **Small equipment required at site**
  - **Time schedule of critical importance**
  - **Temporary piles can be used for permanent use**
  - **If below ground water level, lowering is required**
  - **If soil flow use jet grouting/small excavation steps**
  - **Thats all for now …drill carefully out there !**