Geothermal energy in foundation components
the Marina Tower in Vienna

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GSHP

Water

Open loop
- Drilled wells
  - Aquifers
  - Rivers
  - Lakes

Closed loop
- Probes
- Slabs
- Foundation elements
- Slurry walls
- Excavation support
- Concrete elements
- Cold networks
ENERCRET closed loop geothermal absorbers

Driven Pile

Bored pile

Hollow pile

Ductile piles

Geothermal probes

Slurry wall

Slab absorbers
Marina Tower - Vienna

500 luxury flats on the Danube
Marina Tower - fundamentals

• Very small footprint building (70m x 50m) – 500 luxury flats – 40+ levels

• District heating and cooling available

• Owner commits to maximize geothermal system despite unfavourable conditions

• Contractor commits to dynamic building simulation
Marina Tower – geothermal investigations

• Closed loop absorbers: slurry foundation, slurry walls and base slab

• Open loop: aquifer

• Commercial findings:
  slurry foundations and base slab used as absorbers
Marina Tower - Vienna

Construction
Marina Tower - construction

- Water table +10 meters over base slab
- 220cm base slab – 5 sub manifolds – hundreds of watertight pipe penetrations
- Constricted working conditions
- Collected water from manifolds had to run under base slab
- Hand in hand construction with other contractors
- Strong PRO geothermal mindset from all stakeholders
Marina Tower – the result

• Geothermal system covers 55% of the heating load and 67% of the cooling load

• District heating and dry air coolers cover peaks

• Domestic hot water covered by district heating

• Pay back time for additional investment in GSHP system: 7 years

• Building reaches highest level of BREEAM certificate
Marina Tower – lessons learned

• A dynamic building simulation is key to find the commercial sweet spot for GSHP

• Even under unfavourable conditions a solution including GSHP can be found

• BREEAM and other certificates help to make GSHP installations feasible

• GSHP is about an integrated solution rather than just pipes in the ground

• Don’t take NO as an answer when selling GSHP systems
Other interesting projects

Mattenhof I&II – 1600 driven piles

Frankfurt FOUR– massive slurry walls & piles

Astra Zeneca – 200 probes á 200 meter
Thank you - Vielen Dank

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