

VIA University College

Centre of Applied Research and Development in Building, Energy & Environment

Contact details

VIA University College (Horsens, Denmark)

www.via.dk

Søren Erbs Poulsen: soeb@via.dk

Maria Alberdi-Pagola: mapa@civil.aau.dk

General description of the activities

The Centre of Applied Research works with laboratory and field testing, modelling and monitoring of shallow geothermal installations. Foundation pile heat exchangers are being studied in an ongoing PhD project.

Overview of facilities

Laboratory testing facilities

- Thermal needle probe equipment (Hukseflux)
- Transient plane source equipment (Hot Disk)

Field testing facilities

- TRT equipment (heating)
UBeG, Germany
9kW heating
- 6 borehole heat exchangers (4 x 100 m + 2 x 30 m) at VIA Energy Park
- 1 building piled on 200 energy piles where the GSHP system is monitored (Rosborg Gymnasium, DK)

Computational capacities

- COMSOL Multiphysics
- FEFLOW

Key projects

- Evaluation of the potential for geological heat storage in Denmark, EUDP, https://energiforskning.dk/en/projects/detail?program=7&teknologi=65&field_bevillingsaar_value=&start=&slut=&field_status_value=All&keyword=&page=3.
- Demonstration of a full-scale concept for combined fascine and ground source heat pump, EUDP, https://energiforskning.dk/en/projects/detail?program=7&teknologi=65&field_bevillingsaar_value=&start=&slut=&field_status_value=All&keyword=&page=12.
- Boreholes in Brædstrup, EUDP & ForskEl, <http://www.energinet.dk/SiteCollectionDocuments/Danske%20dokumenter/Forskning%20-%20PSO-projekter/10496%20-%20Slutrapport%20Boreholes%20in%20Br%C3%A6dstrup.pdf>.
- HeatUp, EUDP, <https://insero.com/en/current-projects/heatup/>.
- Geoenergi project, EUDP, Tools for ground source heating and cooling based on closed loop boreholes, <http://geoenergi.org/index.shtml>.

Key references

- Poulsen, S. E. and Alberdi-Pagola, M., 2015. Interpretation of ongoing thermal response tests of vertical (BHE) borehole heat exchangers with predictive uncertainty based stopping criterion, Energy, 88, pp. 157-167, <http://dx.doi.org/10.1016/j.energy.2015.03.133>.
- Alberdi-Pagola, M. and Poulsen, S. E., 2015. Thermal response testing and performance of quadratic cross section energy piles (Vejle, Denmark), In ICE Publishing. Proceedings of the XVI ECSMGE Geotechnical Engineering FOR Infrastructure and Development. Paper presented at the XVI ECSMGE 2015, Edinburgh, United Kingdom, pp. 2469-2474.
- Alberdi-Pagola, M., Madsen, S., Jensen, L.J. & Poulsen, S.E., 2017. Numerical investigation on the thermo-mechanical behavior of a quadratic cross section pile heat exchanger. In proceedings of the IGSHPA Technical/Research Conference and Expo Denver, USA, March 14-16, 2017.
- Alberdi-Pagola, M., Poulsen, S.E., Jensen, L.J. & Madsen, S., 2016. Thermal response testing of precast pile heat exchangers: fieldwork report. Aalborg: Department of Civil Engineering, Aalborg University, 2016. pp. 42. (DCE Technical Reports; Nr. 205).
- Alberdi-Pagola, M., Poulsen, S.E. & Jensen, L.J., 2016. A performance case study of energy pile foundation at Rosborg Gymnasium (Denmark). In proceedings of the 12th REHVA World Congress Clima2016, May 2016, Aalborg, Denmark. Vol. 3, p. 10. Aalborg University, Department of Civil Engineering, http://vbn.aau.dk/files/233716932/paper_472.pdf.

Additional information, remarks

- 30 TRTs conducted in Denmark

Ongoing PhD theses, research

- Industrial PhD project by PhD student Maria Alberdi-Pagola.
Company: Centrum Pæle A/S (www.centrumpaele.dk), collaboration project with Aalborg University, VIA University College & INSERO Horsens.
Feb 2015 – Feb 2018.
“Experimental and numerical characterization of the thermo-mechanical behaviour of quadratic cross section energy piles”

Potential supervisors for thesis, PhD thesis, ...

- Søren Erbs Poulsen (Hydrogeology / Heat transport in porous media / UTES / TRT / Forward and inverse modelling)