Course Theme
Cement-based grouting in SGES
Delivery date
22nd January 2021
Summary
This course describes the cement-based grouting that is used as backfill of boreholes for heat exchange in shallow geothermal energy systems (SGES). The course starts with an overview of SGES and the corresponding objectives in the GEOCOND project. It will be then continued by outlining the role of grout and the required properties. Following that, the grout development process, the final recipes and the associated testing and properties will be presented. Afterwards, a laboratory-scale test, which was a small-scale replication of a geothermal heat exchange borehole in a sand box conducted using the developed grouts, will be demonstrated. Subsequently, different aspects and the significance of proper grout mixing in practice will be discussed. Eventually, two large-scale field tests conducted in two different facilities in Valencia (Spain) and Borås (Sweden) will be summarized. The course will be finally summed up by concluding remarks and answers to the questions raised by the participants.
Objectives (you can list here the objectives/goals for the course)
The main objectives of this course are to provide an overview on: • The significance of SGES, different types and components • The role of grout as backfilling material and the required properties • The grout development in the GEOCOND project • The final grout recipes and the properties obtained during the laboratory testing • The differences between the behaviour of the GEOCOND grout solutions and benchmark products in fully controlled condition using a lab-scale replication of a geothermal heat exchange borehole in a sand box. • The significance of proper grout mixing in practice • The application of the GEOCOND grout solutions in two large-scale field tests

Time	Description
9:00-9:05	Introduction
9:05-9:20	Overview of SGE; what is SGE, the objectives, different types (BS)
9:20-9:35	GEOCOND project: innovative products for enhancing the performance of SGES (JM)
9:35-10:00	Role of grouts and its importance in SGES - Grout properties required to enhance performance of SGEs (BS)
10:00-10:10	Pause
10:10-10:30	Grout preparation and testing– important parameters (AN)
10:30-11:00	Thermally enhanced grouts – GEOCOND solutions (OAC)
11:00-11:10	Pause
11:10-11:30	Lab-scale test (sand box) (GZ-AN)
11:30-11:40	Grouting in practice (EM)
11:40-12:10	Large-scale field tests (Borås/Valencia) (JM-AN)
12:10-12:30	Concluding remarks Answer to questions (BS-Asking the questions on behalf of the participants) (Answering by BS-AN-JM,…)

Presenters		
Initial	Full name	Org.
AN	Ali Nejad Ghafar	RISE
OAC	Ojas Arun Chaudhari	RISE
BS	Burkhard Sanner	UBEG
EM	Erich Mands	UBEG
JM	Jose Manuel Cuevas	UPV

Previous knowledge for participants (what type of subjects, topics and technical knowledge participants require to make the most of the course)

General knowledge about shallow geothermal energy systems.