



About the Beacon training course

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Workshop on Mechanical properties of bentonite barriers

Lithuanian Energy Institute

Kaunas 19-20 June 2017

Beacon training course

□ The Description of Work:

- The topics of the course will be:
 1. The issues around the mechanical evolution of bentonite in nuclear waste management
 2. The fundamental science behind the mechanical properties of bentonite
 3. Current conceptual and mathematical approaches
 4. Hands-on training with a computer code
 - The main focus will be on 2), 3) and 4) above.
 - The course will be directed toward the waste management community as well as students in areas of soil science, mechanical engineering, etc.
 - The course will be arranged in collaboration of at least three of the academic institutions that are involved in the project.
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Beacon training course

❑ Five academic institutions:

➤ Charles University, Prague



➤ EPFL, Lausanne



➤ Imperial College, London



➤ Universitat P. de Catalunya



➤ Université de Liège

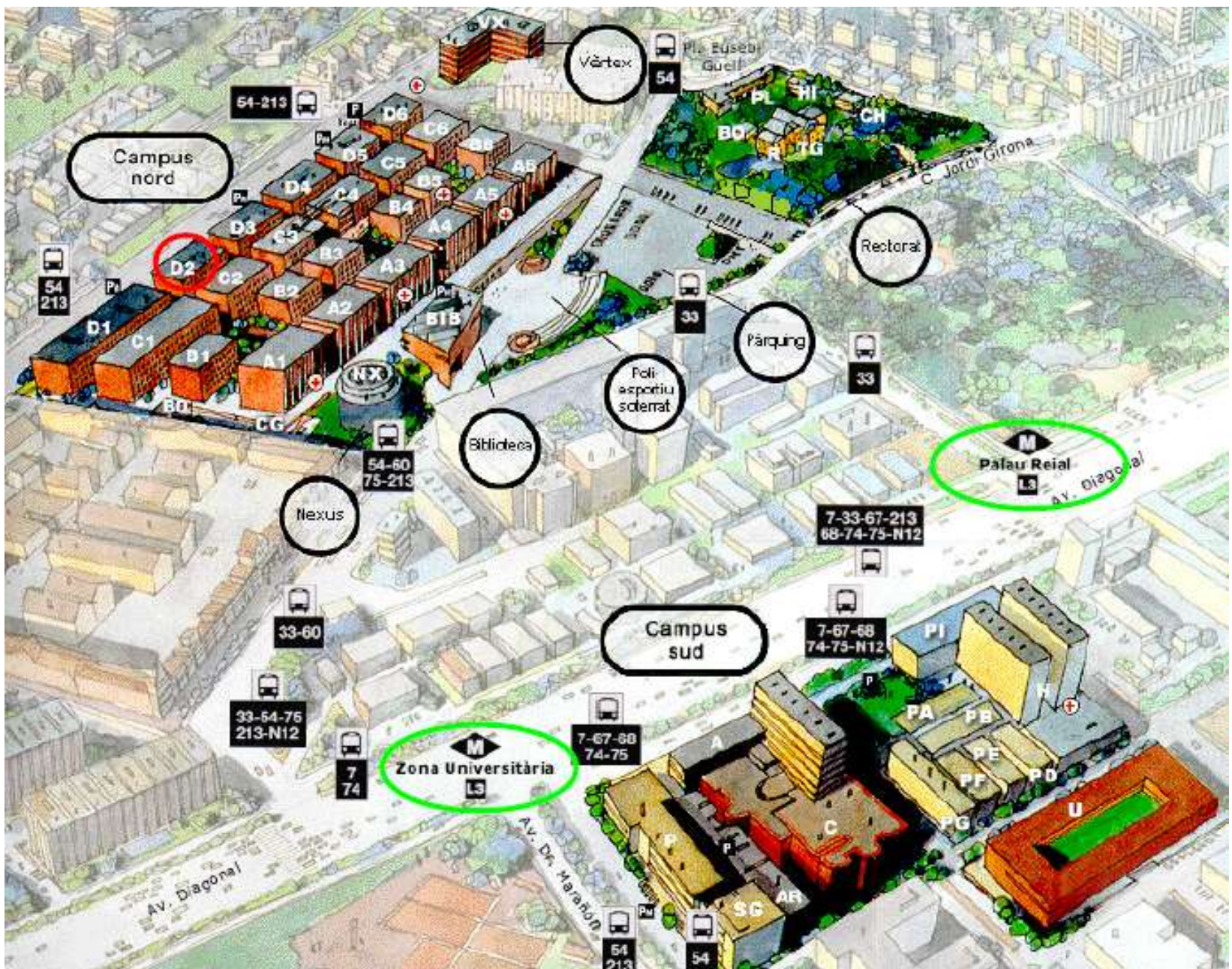


Beacon training course

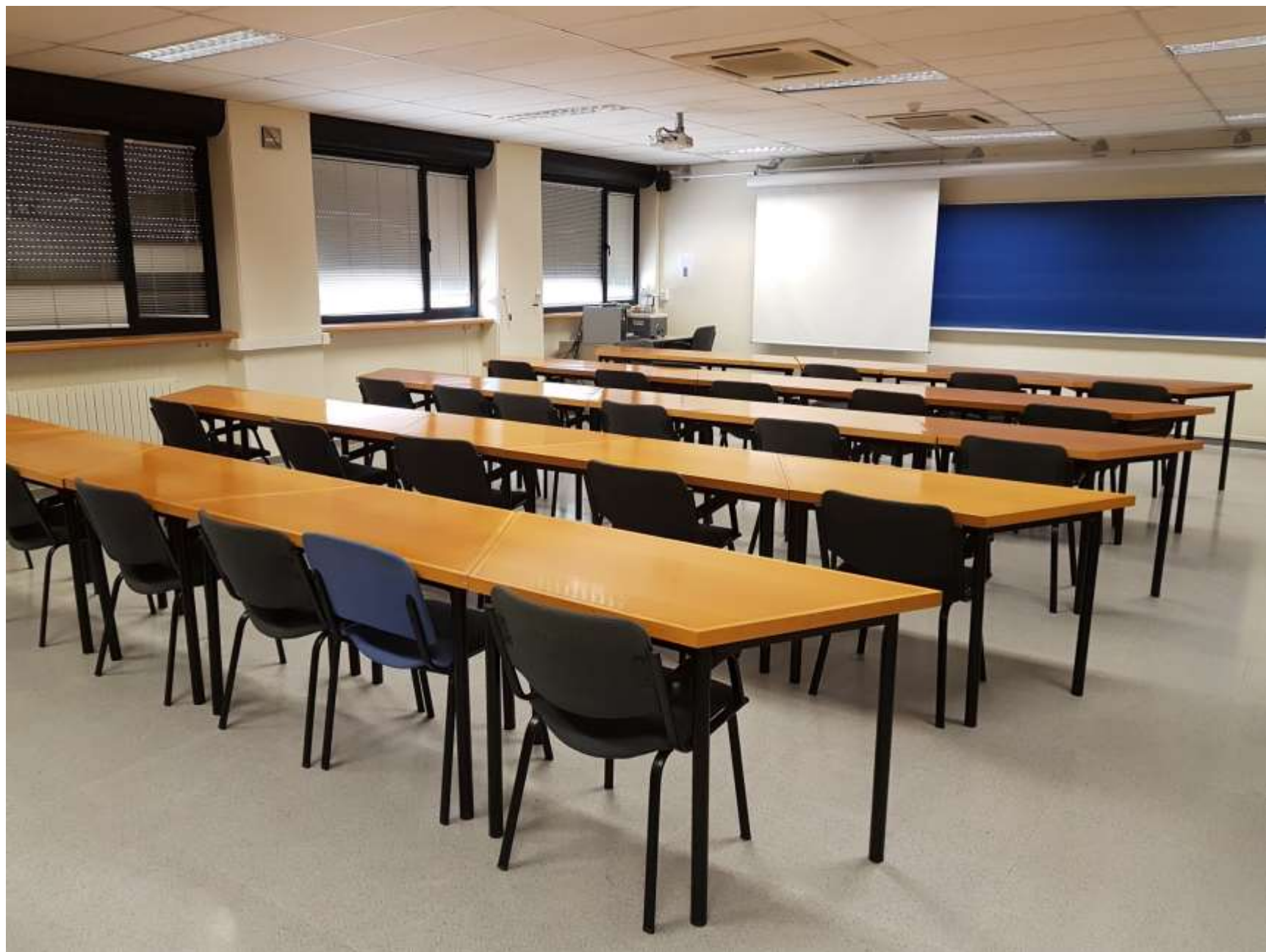
- ❑ Structure of the course (they are topics not individual lectures!):
 - 1st day (starting at lunch time)
 - Introductory lecture on issues around the mechanical evolution of bentonite in nuclear waste management
 - Mechanical behaviour of bentonite (including fundamental science)
 - Experimental techniques (laboratory visit)
 - 2nd day (morning)
 - Constitutive modelling for unsaturated soils
 - Constitutive modelling for highly expansive soils
 - 2nd day (afternoon)
 - Numerical modelling (FE) for saturated and unsaturated soils
 - Formulation and Numerical modeling for THM problems
 - 3rd day (all day)
 - Hands-on training with a computer code (CODE_BRIGHT?)

Beacon training course

- ❑ Maximum number of students: maximum 25 (better 20)
 - Priority given to members of partners' institutions
- ❑ When: Probably January 2018
 - Possibly combined with a meeting of WP3/WP5 (to be decided)
- ❑ Where: Universitat Politècnica de Catalunya, Barcelona



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CP BELBaR Partners



CP BELBaR

Training course:

**“Swelling clays: From
compacted bentonite to
clay colloids in the context
of nuclear waste disposal”**

Karlsruhe, Germany
October 14 - 16, 2015

**Bentonite Erosion: effects on the Long
term performance of the engineered
Barrier and Radionuclide transport**

BELBaR



KIT - Universität des Saartals, Saarland, Saarland
Internationale Forschungsanstalt für die Nukleartechnik

www.kit.edu

Introduction

The main aim of the BELBaR project is to increase the knowledge of the processes that controls clay colloid stability, generation and ability to transport radionuclides. The overall purpose of the project will be to suggest a treatment of the issues in long-term safety/performance assessment.

Nature and scope of the project

They include national radioactive waste management organizations (WMOs) from a number of countries, research institutes, universities and commercial organizations working in the radioactive waste disposal field. The Collaborative Project (CP) is based on the desire to improve the long-term safety assessments for repository concepts that combine a clay Engineered Barrier System (EBS) with a fractured rock. The formation and stability of colloids from the EBS may have a direct impact of assessed risk from the repository in two aspects:

- Generation of colloids may degrade the engineered barrier
- Colloid transport of radionuclides may reduce the efficiency of the natural barrier: An increased understanding of processes will have an effect on the outcome of future assessments.

Scope of the Training Course

The Training course aims at Master and PhD students as well as early-career Postdocs working in the broad field of clay mineralogy and/or nuclear waste disposal. The intention of the Training course is to provide the participants with a sound understanding of clays and clay colloids and their role in the context of nuclear waste disposal. The course comprises both overview and introductory lectures from experts in the field as well as hands-on training on state-of-the-art analytical techniques

used in the characterization of clays, clay colloids and the interaction of clay colloids with radionuclides.

The following analytical techniques will be applied:

- Environmental Scanning Electron Microscopy (ESEM)
- Laser-induced breakdown detection (LIBD)
- Photon correlation spectroscopy (PCS)
- Zeta-potential measurements
- Asymmetric Flow-Field Flow Fractionation (AsFFF)
- Atomic Force Microscopy (AFM)
- Time resolved laser spectroscopy (TRLFS)

General information

Programme

The course will take 2 full days (14.10. and 15.10.2015) split into a series of lectures in the morning and laboratory training in the afternoon. Within the lectures the participants will be presented with introductory and background information on the analytical techniques used in the laboratory part of the workshop. Afterwards the participants will have the opportunity to apply the analytical techniques on their own guided by well experienced experts.

In the evening of the first day, a poster session will take place where the participants are given the opportunity for presenting their research and networking. The second day will end with a joined dinner at a local micro-brewery. On Friday morning (16.10.2015) there will be the possibility to visit the synchrotron facility ANKA at the campus of the Karlsruhe Institute of Technology.

Registration

To register please send an Email to forian.huber@kit.edu using the subject "BELBaR course registration". The deadline for registration is the XX.XX.2015. Please note that there is a limitation in the number of participants (max. 20).

Fee

The participation fee of the workshop is covered by the CP BELBaR project. Please note that both travel and accommodation expenses are not covered. Hotel rooms will be available at the Hotel Anker (<http://www.hotel-anker-eggstein.de/>) at a rate of XX € per night.

Location

The workshop will be held at the Karlsruhe Institute of Technology (KIT), Campus North, Institute of Nuclear Waste Disposal (INE), which is located ~10km north of Karlsruhe near Eggstein-Leopoldshafen.



Acknowledgment



This project receives funding from the Euratom research and training programme 2014-2018 under grant agreement No 745942

