Research Grants for PhD students from the China Scholarship Council

Information Form (please read the guidelines carefully on the website www-csc.utt.fr)

Supervisor's name : NOWAMOOZ Given names : Hossein

Status (prof., assistant prof., …) : Professor

Laboratory : LGCGM (Laboratoire de Génie Civil et Génie Mécanique)	Website address : https://lgcgm.fr/
Institution : INSA de Rennes	Website address : https://www.insa-rennes.fr/index.html

Scientific competence :
Numerical modeling; Cemented materials; Chemo-thermo-hydro-mechanical coupling; Applied engineering.

Two major publications in the field proposed for the PhD :
X. Zhang, H Nowamooz (2021), Effect of rising damp in unstabilized rammed earth (URE) walls, Construction and Building Materials, 307, 124989.
X. Zhang, H Nowamooz (2021), Thermo-hydro-mechanical (THM) behavior of Unstabilized Rammed Earth (URE) wall submitted to environmental and mechanical loadings, Materials and structures, , 2021, 54(5), 198

Website address of the personal page : https://scholar.google.fr/citations?user=oek346kAAAAJ&hl=en
Supervisor's email : Hossein.Nowamooz@insa-rennes.fr

Description of the research work proposed for a PhD ***Topic # (see list) :*** IV.7/VI.3

Title : Study of the chemo-thermo-hydro-mechanical (CTHM) coupling of cement-treated materials

Subject :
Cement-treated materials are a mixture of soil / granular material / recycled aggregate, cement, and water. They have been widely used in construction of stabilized rammed earth materials. Once the cement-treated material is mixed, the hydration process begins immediately, and the material undergoes a transition from the mixing state to skeleton formation until it finally hardens. During the hydration process, the thermo-hydro-mechanical behavior cement-treated material is changing all the time, presenting the transformation from soil-like granular material to cemented material.

Therefore, a novel thermo-hydro-mechanical analysis approach for the characterization of cement-treated materials will be elaborated in this study. To achieve this step, the thermo-hydro-mechanical properties with hydration process will be provided experimentally and analytically investigated. Finally, the structures constructed with this material will be numerically simulated in a finite element code. This study will provide the necessary elements to better design these structures considering its thermo-hydro-mechanical and its influence on the structural service life.

Keywords :
Numerical modeling; Chemo-thermo-hydro- mechanical coupling; Applied engineering.

Expected collaborations :
EXETER University (UK)

Background required from the applicant :
Civil engineering; Numerical modeling; Chemo-thermo-hydro-mechanical coupling; Cemented materials.

Existence of a PDF file detailing the proposal ("yes" or "no") : yes
(see guidelines on the website www-csc.utt.fr)