

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 : Given names :

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

Laboratory : Website address :

Institution : Website address :

Scientific competence of the supervisor:

Mechanical behaviour of gravel emulsion mixtures / granular materials (modelling and testing) from soils to unbound granular materials for roads / Fatigue damage of asphalt concrete materials / Reinforced asphalt concrete materials (modelling and testing) / Rheological behaviour of bitumen mixes (modelling and testing) / Pavement modelling.

Two major publications in the field proposed for the PhD :

1. Zhi Chen, Cyrille Chazallon, Saïda Mouhoubi, Pierre Hornych, Vincent Gaudefroy, Experimental study on the short-term mechanical behavior evolution of gravel-emulsion mixtures for pavement base layers, Construction
2. C. Wang, C. Chazallon, P. Hornych, S. Mouhoubi, P. Jing. Effect of self-cementing properties on the resilient behaviour of recycled concrete aggregates used in base and subbase, Road

Website address of the personal page :

Supervisor's email :

Description of the research work proposed for a PhD

Topic # (see list) :

Title :

Subject :

Cold recycled mixtures (CRM) like gravel-emulsified mixtures used for base layer in road pavement have a similar mechanical behaviour as granular materials like unbound granular materials (UGM), reclaimed crushed concrete aggregates (RCA), reclaimed asphalt concrete aggregates (RAP) or mixes of these materials. CRM are more and more used in the road pavement structure and become a key point in pavement life cycle assessment (LCA). The mechanical behavior of these materials is generally out of standards and has to be studied with repeated load triaxial tests (RLTT) in which the elastic response is defined as the resilient behavior after a conditioning loading. The influence, either on the elastic behaviour or on the plastic behaviour of these granular materials, of the hydric state, the temperature, and curing time, has never been studied or taken into account in models for road pavements. Previous Ph.D. studies have been performed recently in our team with either UGM (Ph.D. of N. HO (2013), P. JING (2016)), RAP (Ph. D. of L. Gaillard (2019)), RCA (Ph.D. C. WANG (2023)) and CRM (PhD. of Z. CHEN (2027)).

In this context, we propose to study the influence of the hydric state, temperature, curing time, amount of active fillers and bitumen emulsion, mix design (amount of RAP) on the cyclic mechanical behaviour of a compacted mixes of bitumen stabilized materials with a repeated load triaxial cell. We will first study the chemo-physical properties of RAP,

Keywords :

soil mechanics, unbound granular materials, reclaimed asphalt concrete, cold recycled mixtures, bitumen stabilised materials (BSM), cement-bitumen treated materials (CBTM), resilient behaviour, analytical modelling, finite element

Expected collaborations :

Gustave-Eiffel University (France)

Beijing University of Technology (China)

Background required from the applicant :

We are looking for applicants interested in the experimental study of cold recycled mixtures like bitumen stabilised materials, cement-bitumen treated materials materials with or without reclaimed asphalt pavement for road pavement base layer. The rheological behaviour of these mixes will be modelled analytically or with the finite element method. A good knowledge in continuum mechanics, soils mechanic and/or pavement material is welcome. Experimental skills and previous experiences in one (or more) of the mentioned fields are welcome, but not mandatory.

Existence of a PDF file detailing the proposal ("yes" or "no") :

(see guidelines on the website www-csc.utt.fr)