

Researcher position: Measure and analysis of dynamic soil parameters and characterization of the associated uncertainties.

Fixed-term contract (CDD) of 21 months

Deadline to candidate: 15/06/2019

Start of the contract: 01/09/2019

Direction/Service	Direction territoriale Méditerranée Agence de Sophia-Antipolis
Localization	<i>Service risque sismique, 500 routes des lucioles CS 80125, Valbonne, 06903 Sophia-Antipolis Cedex</i>

Description of the employer :

Cerema (Centre for Studies and Expertise on Risks, Mobility, Land Planning and the Environment) is a State agency of scientific and technical expertise, in support of the definition, implementation and evaluation of public policies, on both national and local levels. It is placed under the supervision of the French ministries in charge of sustainable development, town planning and transportation. The seismic risk team in the Sophia-Antipolis Agency is part of the territorial department of the Cerema Méditerranée. The team is composed of 8 agents among them 3 researchers, one engineer, 2 technicians and 2 Phd students. The main objective of the team is the seismic risk mitigation through the definition of the seismic solicitation and the understanding of the dynamic behavior of the structures. Multidisciplinary approaches are used, from earthquake and ambient vibrations recordings analyses to sophisticated numerical simulations of the wave propagation. These approaches are applied at different scales from punctual elements (building, bridges, nuclear power plant...), linear objects (itinerary) to city and regional scales.

Description of the project :

The scope of Sigma 2 project, lead by EDF, is to improve the methods to evaluate the seismic ground motion and consequently the seismic risk. One main part of this project is the evaluation and integration of the uncertainties in the process of the seismic risk estimation. In the work-package 4, that deal with the seismic site response analysis, EDF and the Cerema propose a post doc position on the characterization of the uncertainties of the dynamic non-linear soil parameters. This approach is mainly based on empirical data.

Description of the work :

The researcher will perform analysis of the uncertainties in the evaluation of the non-linear dynamic soil parameters. These uncertainties can be divided according to the following categories:

1. **Natural variability of the soil.** Quantification of the natural variability of the shear modulus decay and increase of damping curves from available in-situ measurements such as CPT measurements for example.
2. **Quality of the samples tested,** depending on the way the samples are derived and bring to the laboratory. These analyses could be realized by testing several soil samples with different degrees of reworking.
3. **Uncertainties linked to the methods used to perform the measurement** (stress path, frequency of solicitation), what is the reproducibility of the tests?
4. **Variability linked to the confining pressure.**
5. **Link between the measured data and the parameters that are used in numerical simulation to predict the dynamic behavior of the soil.**

The first part of the work will be dedicated to an extensive bibliographical research on the uncertainties in dynamic non-linear soil parameters. It will be followed by an experimental part to constitute a database of non-linear parameters. This database will contain data from France (EDF and Cerema), international data already available in previous research project such as PRENOLIN and the specific measurements performed for this task. The point 1 and 4 are dependent on the quality of the geotechnical database and would be feasible depending on the completeness and quality of the database.

Required candidate profile

We are looking for a researcher in geotechnical earthquake engineering. The candidate must have an expertise on dynamic soil behavior and laboratory measurement and a knowledge in seismic site response will be much appreciated.

Contact :

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