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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Faculty of Engineering
Institutt for konstruksjonsteknikk

PhD in coupled vehicle-bridge dynamic modelling (IV-192/18)

Position within in coupled vehicle-bridge dynamic modelling under severe environmental conditions for long-span bridges with emphasis on feedback interactions and traffic safety

Description.

The Norwegian Public Roads Administration (NPRA) is running a project "Ferry free coastal route E39". The research program and the project are presented in this video <https://vimeo.com/257970739>. Some of the straits are up to 5 kilometres wide and 1.5 kilometres deep and calls for significant extension of present bridge technology. The installations have to resist extreme environmental loads and accidental actions. For this PhD position, we will work in close collaboration with KTH in Sweden.

When considering long-span bridges it is important to address traffic safety issues in terms of preventing and mitigating actions in order to avoid serious incidences. For this reason, it is vital to be able to model, simulate and predict the behaviour of vehicles crossing moving bridges due to severe environmental conditions such as high winds. This includes the possibilities to estimate reduced speed and/or to introduce full or partial wind barriers to avoid bridge closure. Furthermore, for long-span bridges the tower size will become large and the varying wind barrier effects may become substantial.

This research project will consider elements from theoretical, numerical and experimental methods. The experimental investigations may be related to wind tunnel experiments as well as full-scale experiments. In full-scale experiments, both the vehicle and the bridge are instrumented and monitored simultaneously. The numerical simulation will mainly focus on the dynamic behaviour of the coupled driver-vehicle-bridge systems subjected to windy environmental conditions. The main objective is to predict traffic safety where accident probabilities may be used to propose preventive and mitigating actions.

In modelling the manoeuvrability and stability of the vehicle, driver and vehicle models with different levels of model fidelity will be used and the environmental conditions as well as bridge motion feedback will be considered. This may include road surface, friction, speed and direction of vehicle and wind as well as the dynamics and aerodynamics of the vehicle and the aeroelastic properties of the bridge. KTH in Stockholm has worked extensively on dynamic modelling of vehicles. In this project, we will continue to develop our collaboration with KTH to ensure that the models are state of the art for vehicle, bridge and the coupling of the two

Qualifications

Suitable background (master's degree) would be within vehicle, bridge and wind engineering, structural dynamics, stochastic dynamic analysis. The PhD applicant is expected to carry out experimental research and to develop advanced numerical models within the scope of the project. The successful applicants are motivated and ambitious students with excellent grades. Proficiency to carry out goal-oriented work and good cooperation abilities will be emphasized. Excellent communication skills in scientific writing and oral presentation are needed.

Conditions

PhD Candidates are remunerated in code 1017, and are normally remunerated at gross NOK 436 900 before tax. There will be a 2 % deduction to the Norwegian Public Service Pension Fund from gross wage.

Engagement as a PhD Candidate is done in accordance with "Regulation concerning terms and conditions of employment for the posts of post-doctoral research fellow, research fellow, research assistant and resident", given by the Ministry of Education and Research of 19.07.2010. The goal of the positions is to obtain a PhD degree. Applicants will engage in an organized PhD training program, and appointment requires approval of the applicants plan for a PhD study within three months from the date of commencement.

The position is of 3 years duration.

For further information about the position, please contact Professor *Anders Rönquist*, *Department of Structural Engineering, NTNU, Trondheim*. E-mail: anders.ronnquist@ntnu.no

See <https://www.ntnu.edu/iv/doctoral-programme> for more information.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants. The positions adhere to the Norwegian Government's policy of balanced ethnicity, age and gender. Women are encouraged to apply.

The application

The application must contain information of educational background and work experience. Certified copies of transcripts and reference letters

should be enclosed. Applications with CV, grade transcripts and other enclosures should be submitted via this webpage at www.jobbnorge.no.
Mark the application with IV-192/18

Start-up date tentatively fall 2018.

Application deadline is 23 July 2018

According to the new Freedom of Information Act, information concerning the applicant may be made public even if the applicant has requested not to be included in the list of applicants.

Jobbnorge-ID: 153803, Søknadsfrist: Søknadsfristen er gått ut