



Master Thesis: Pickup dynamics for electrified roads

VTI is looking for one (or possibly two) master thesis student for the vehicle system and driving simulation (FSK) and infrastructure maintenance (DOU) units. The FSK and DOU units conduct research in driving simulation, vehicle dynamics, tire characteristics and road maintenance and have several unique equipment including three driving simulators, a test rig to measure the tire-road friction and a car to measure road texture. The objective of the master thesis project is to investigate how vertical vehicle dynamics and road characteristics influence the electrical properties of a pickup mechanism in electrified roads. The project will be performed in cooperation with Chalmers University.

VTI, FSK and DOU

VTI, the Swedish National Road and Transport Research Institute, is an independent and internationally prominent research institute in the transport sector. Its principal task is to conduct research and development relating to infrastructure, traffic and transport and its operations include all modes of transport. VTI has a total of some 200 employees. The institute is a government agency under the Swedish Government.

FSK and DOU activities currently focus on investigating the possibilities of introducing electrified roads as a mean to solve energy and power distribution for vehicles.

Background

Society is facing a global climate challenge in reducing the human made influence. The transport sector contributes to the warming of the planet in a significant way. Electrification of the vehicle fleet is today considered as the most viable solution to mitigate the negative impact on the climate.

Electrification requires techniques to carry the energy needed to create the motion of the vehicles. While fuel cells could potentially be a viable solution to this problem in the future, the most likely option today are batteries. However, with the limitations of batteries such as shortage of metals, long charging times etc. it is likely that we will need a complementing solution.

One such battery complementing solution is through electrification of the road network. With electrified roads in part of the road network, vehicles will need smaller batteries and charging will be distributed as opposed to conventional charging.

There are different techniques to distribute the electrical energy to the vehicles, such as overhead lines and pantographs or wirelessly between magnetic plates beneath the road surface and receivers in the vehicle. A technique currently studied at VTI is through electric rails in the road surface and pickup mechanisms in the vehicles.

The aim of this project is to study and understand how the vertical dynamics of a traveling vehicle is influencing the electrical connection quality in the pickup. The outcome may result in requirements on road characteristics to match a good connectivity.

Qualification

You are a self-sufficient person that can make your own decisions and work independent. Successful candidate(s) should have a good knowledge in physical modeling and simulation and in vehicle dynamics as well as basic programming skills (Matlab and Simulink).

Application instruction & information

Send your application (incl.CV & transcript) to: fredrik.bruzelius@vti.se or Lina Nordin lina.nordin@vti.se