BSc Thesis proposal in Vehicle Dynamics:

**Driver Influence on Vehicle Track-Ability on Floating Bridges**

Version, modified 2018-10-25 13:57

**Background**

Norwegian Public Roads Administration (NPRA) is projecting a number of bridges along the Norwegian east coast. The roadway will sway, heave and roll due to water and wind loads. The vehicle will be affected by forces also directly from the wind. Different road grip conditions and different vehicle types will be further variations to model.

**Problem motivating the project**

It is not known on which conditions the bridge must be closed to secure traffic safety. One ingredient in the analysis of such conditions is how driver experiences and acts when driving on a roadway that is moving.

**Envisioned solution**

A driving simulator could enable trying out which road motion and wind loads that can be safely handled by a driver.
Objective (or Research Question)
Develop a driving simulator set-up in the CASTER simulator.

Deliverables
- Vehicle model (probably an update of CASTER’s existing vehicle model with moving road)
- One road motion pattern (the research project has time trajectories from NRPA’s bridge simulations)
- Demonstration in CASTER simulator
- Identify remaining problems and document in future work section in report
- (Stretched target: Do a “clinic” with several drivers. Collect questionnaires and log data for future analysis.)

Limitations
Limitations are not formulated yet. However, we know that limitations will have to be formulated, to make the problem manageable for a BSc thesis. Example of possible limitations:
- Graphics model can be very simplified, only viewing the lane
- Maybe enough to cover the road way motion (not the wind loads on the vehicle body)
- Maybe just one vehicle type
- Maybe just one bridge motion

Sketch of activities
- Literature studies, Information search
- Extending existing CASTER vehicle model
- Implementing bridge motion
- Integrate in simulator
- Demonstration in simulator

Pre-requisites on students:
BSc programmes: M, F, Z, D, IT, (V)
Dynamic systems/modelling, Interest in Vehicle engineering and Real time systems
Suitable number of students: 3-6

Administrative
- Responsible subject/research group at Chalmers: Vehicle Dynamics
  - Examiner: Bengt Jacobson
  - Supervisor: Dragan Sekulic, Ingemar Johansson
- Physical location: VEAS office and CASTER simulator