



Rail Vehicles

Part of the Masters program in
Vehicle Engineering



Master's Thesis:

Modelling wheel wear caused by block brakes

Background

Most freight trains use block brakes, where the energy dissipation is generated with the friction between a brake block and the wheel thread. It is a simple method that avoids the use of more complex systems (i.e. disk brakes), but the friction generates wear which influences directly the evolution of the wheel profile. Moreover, novel braking materials which reduce noise generation seem to cause more wear. These braking systems are becoming mandatory following noise reduction policies, but their impact on wear has not been investigated deep enough.

The main objective of the project is to develop a model able to predict the wear evolution at the interface between wheel and block brake for different block materials. It will be carried out in collaboration with Green Cargo AB.

Tasks

The master's thesis will consist of the following tasks:

1. Literature review
 - a. Block brake systems and materials
 - b. Wear calculation methodologies
2. Block-wheel contact mechanics study
 - a. Pressure distribution and sliding for different configurations
 - b. Studies for different combinations of new and worn out profiles
3. Application to wheel wear calculation
 - a. Isolated wheel and block
 - b. Coupling with a full vehicle wear calculation model

These tasks might be updated while working on the project. Profile data from a real vehicle may also be gathered in order to validate the developed model.

Application

Recommended prerequisites: Contact mechanics knowledge, Finite Element Method software experience and/or Matlab/Octave programming experience.

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