



Cargo bikes – Improvement of child safety

Background

A trend towards ecological and economic transportation can be observed in Austria. Cargo bikes allow the transportation of goods but also facilitate the carriage of children in the carriage box. Different manufacturers already provide safety features as adaptable seat for babies and young children as well as seat belts for older ones. Despite those safety measures, children can still suffer injuries in case of an accident.

To analyse possible injury mechanism, finite element (FE) simulations should be set up and evaluated. In a first step, a model of a common cargo bike needs to be generated and validated. By

conducting simulations with Human Body Models (HBM) the injury risks of children in the carriage box can be assessed. Further, counter measures to prevent the children from injuries should be elaborated and evaluated by conducting further FE-simulations.



Your goal in this thesis is to develop a FE model of a cargo bike, evaluate current safety measures and develop new safety measures to prevent children in the carriage box from possible injuries. Therefore, in a first step, the specifications of a cargo bike should be determined from literature and a FE-model generated. In the second step, an HBM of a child will be seated in the cargo bike and accident scenarios simulated. The goal is to identify safety measures with a positive effect on the injury mechanism.

Tasks

- **Get familiar** with FE modelling, HBM simulations and injury assessment.
- **Development** of a FE-model of a cargo bike.
- **Perform** FE-simulations with HBM and assess injury risks in different accident scenarios
- **Development of** safety measures to prevent children from injuries.

Topic as thesis for

Master Thesis for Mechanical Engineering or Production Science and Management

Organizational

- Start: anytime
- Language: German or English
- Scholarship **only for Master Thesis**: min. € 2.500, - for successful completion of the thesis
- Contact: Desiree Kofler (desiree.kofler@tugraz.at)

