VSI

E-bikes – Are they more dangerous than a conventional bikes?

Background

E-bikes become more and more popular on Austria's streets. People can cover long traveling distances or commute faster and with less effort than with commercial bikes.

Due to the electric drive, the bike is heavier and a faster traveling speed is possible. These are two parameter, which can influence the injury outcome in a case of an accident.

In Order to evaluate the influence of e-bikes in bike-to-car accidents, finite element (FE) simulations should be conducted. In a first step, a

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model of a common e-bike needs to be generated and validated. Further, simulations of different accident scenarios with a Human Body Model (HBM) seated on an e-bike and a commercial bike will be conducted. The comparison of the analysed injury risks allow the identification of the influence of the higher mass and traveling speed of an e-bike.

Your goal in this thesis is to develop a FE model of an e-bike and identify the difference of the injury outcome in accidents with e-bikes and commercial bikes. Therefore, in a first step, the specifications of an e-bike should be determined from literature and a FE-model generated. In the second step, an HBM will be seated on the e-bike and accident scenarios simulated. The goal is to identify the injury outcome in bike-to-car accidents for different bike types.

Tasks

- **Get familiar** with FE modelling, HBM simulations and injury assessment.
- **Development** of a FE-model of an e-bike.
- **Perform** FE-simulations with HBM and assess injury risks in different accident scenarios.
- **Identification** of differences in the injury outcome with e-bikes and commercial bikes.

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
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