

Review on Ph.D. thesis

MOTORCYCLIST BIOMECHANICAL MODEL

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The thesis concerns 215 pages including annexes. The introduction defines the work and integrates it to the rest of the MYMOSA projects that the current work is part of. Even it is not explicitly defined, the goal of the work is to implement a virtual model of a PTW driver to assess injuries caused by impact in various scenarios.

The second chapter brings really huge overview of the both hardware and virtual human body models from the very beginning of the biomechanical approach to the transport safety. It also describes numerical codes to be used for particular scenarios modelling and the state-of-the-art models.

The third chapter follows it by describing anatomy, physiology and trauma related to PTW. The body segments are described in detail in the fourth chapter and related biomechanical data including modelling approach is stated. MBS model to each segment is also proposed and each segment is also discussed from the injury point of view.

The fifth chapter brings huge introduction to the MBS modelling including development of a simple 2D PTW driver model. The chapter is unnecessarily detailed and it shows basic mathematical formulae.

The sixth chapter develops the 3D human body model in the LMS software and validates it in a pedestrian crash by tuning contact parameters to obtain good correlation to the experimental data. The HUMOS FE head model is further linked to the MBS model and the comparison to the HYBRID data for several impact velocities is presented.

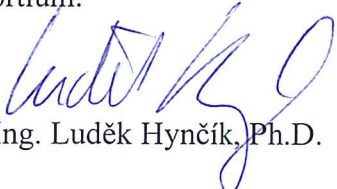
Final chapter provides the methodology for injury assessment using coupled MBS and FE simulations and typical PTW accidents are reconstructed. The use of helmets is also discussed.

The thesis as a whole is very comprehensive and some parts contains encyclopaedic amount of information that should not be a goal of a thesis. The graphical design of the work is quite good. The thesis is written in really bad English, some of the sentences are hardly understandable. In the part of multi-body system modelling, the work defines elementary mathematical and mechanical knowledge. Some of the figures have unreadable labels.

Anyway, the present thesis meets in my opinion the requirements placed on it. The investigated issue is currently very up-to-date and the developed active human model as well as the obtained knowledge and its application on the motorcyclists' passive safety can be widely applied.

My recommendations and requirements were discussed with the candidate Pedro Talaia during finalizing the thesis, my only question for defense is to describe the particular work developed by the candidate and its relation to the MYMOSA consortium.

In Plzeň, 31 October 2013



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