THOMO

Development of a Finite Element Model of the Human Thorax and Upper Extremities

Project details	
Domain	Vehicle Technology: Passive Safety
Duration	from 01/01/2009 until 30/06/2012
Website	http://www.thomo.eu/index.php
Other sources	Project details

In 2004, in the European Union, there were 42193 road fatalities and 1213300 accidents involving injuries. The socio-economic cost of road crashes to the EU 15 is twice the EU s annual budget. The number of casualties is so important that it shall be reduced by all the available ways. Presently, the vehicle safety devices used as prevention tools shall be improved, since they were developed in an outdated context, for a mean person and a limited area of application. Numerical human body models could be used instead of anthropomorphic dummies to assess injury risks in different accident scenarios, to adapt accordingly vehicles and then regulations. The present project proposes to give to passive safety players a tool capable of assessing real safety. It aims to create and maintain biofidelic finite element models of the human thorax including upper extremities based on the research, development, and validation of the models for the 5th, 50th, and 95th percentile of each gender.

It is based on the following steps:

- development and maintenance of a biomechanical database of post-mortem human subject tests at the segment (thorax) and organ (heart, lungs, aorta) levels with the necessity to define the mechanical validation criteria of the model and to improve the knowledge of the mechanical behaviour of the organs and of the mechanical and geometrical properties of the rib cage;

- development of numerical models from the CAD data with the necessity to personalize these data, to define a model architecture allowing its validation at the mechanical and injury levels and to quantify the numerical and mechanical consequences at the fracture level;

- mechanical and injury validation of the thorax and of the upper extremities with tests coming from the literature or performed during the project.

This project fits into a worldwide project, called Global Human Body Model, which aims to create and maintain the world s most biofidelic human body models.

Coordinator
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Partners
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