

Abstract

Title: Validation of the test dummy - differences in human mechanical response

Objectives: The main goal of this thesis was to verify the usability of the Dummy Hybrid III for crash tests in the transport industry (the front and side directions).

Methods: In the presented thesis, experimental methods were used to achieve the goal. The measurement of small impacts in laboratory conditions was carried out using the pendulum of the Department of Anatomy and Biomechanics of the UK FTVS.

The measurement was performed on humans as well as on the Dummy Hybrid III.

We monitored the reactions in the thoracic spine (thoracic vertebra Th5) and on the top of the head after impacts by a pendulum on certain areas on the human body/dummy. Impacts were delivered in four different intensities to the forehead, temporal bone, chest, shoulder and thigh.

The measured impact quantity was the impact velocity. The observed magnitude of the response on the human body and dummy was the magnitude of the resulting acceleration in the area of the Th5 thoracic vertebra and the top of the head.

Results: The results of this work have expanded the knowledge in the field of crash tests in the transport industry.

Thanks to the obtained results, there was verified the suitability of the laboratory model of the pendulum for further experimental measurements. So it can be used in the impact tests. The validity of the measuring chain was also verified after experimental testing of minor impacts to people in the front or side direction.

A match of the measured values between the Dummy Hybrid III dummy and the human was found.

Keywords: crash tests, experiment, dummy, Dummy Hybrid III, pendulum, human