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MODELING THE CAR BODY DEFORMATION PROCESS DURING THE CRASH TEST

In this paper the identification methodology of decoding the crash tests results in a frontal impact is offered. Such D-segment automobiles as Honda Accord (USA), Lexus IS (Japan), Volvo S60 (Sweden), Mercedes-Benz C-Class (Germany) have been tested.

Time-lapse video decoding using the technical characteristics of cars (length, weight and speed at the moment of hitting a tough obstacle) reproduces the process of body elements deformation, plane-parallel movement of the car body after the impact and kinetics of the driver-mannequin's head and a front left wheel displacement.

While researching the analysis of the hitting a tough obstacle process was carried out. The external defects of automobile and kinetics of human movement in the car were also analysed.

According to the results of decoding the destruction process kinetics the mathematical model of car body deformation was built and the peculiarities for the above mentioned car brands were obtained.

The methodology of the time-lapse reconstruction of the car body deformation process was developed in the research. The creation of this technique made it possible to investigate the peculiarities of the car construction safety, plane-parallel movement of the car body and kinematics of the driver-mannequin's head movement and the front left wheel.

All measurements were transferred into real rates to estimate the process of car body and its components deformation.

For quantitative kinetic studies of car body deformation the dimensionless number of car body deformation that is a scalar measure for comparison of deformation and dynamic features of different models of car body configurations in crash tests was introduced.

Data processing and the results of experimental measurements helped to build mathematical models of car deformation process and the driver-mannequin's head movement having observed that tremendous pressure on the man in the car accidents.

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