THE CRASH3 ALGORITHM AS A METHOD OF INVESTIGATING A TRAFFIC ACCIDENT

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The CRASH3 algorithm as a research method is probabilistic, so it should be used with some caution in practice. Thus, when measuring a car deformed in a traffic accident, one must always remember that the average amount of deformation in general is the ratio of the value of the displaced (lost) volume to the area on which there is deformation. At the front, for example, the most rigid parts of the car that absorb more (up to 80%) energy during deformation are the side members, the front bumper amplifier, the perimeter of the radiator frame, etc. And if in fact the main deformation is localized, for example, in the upper part of the wing or on the edge of the hood, then it is more correct to carry out calculations with stiffness coefficients differentiated for the location of the largest deformation both with an excess, that is, for the location and around it, and with a deficiency. Then the obtained interval of energy consumption for deformation will appear to be correct. The CRASH3 algorithm does not perform well for small local deformations. Therefore, for small deformations, it is more effective to use finite element calculations. As a result of the conducted research, it can be confidently stated that the method of calculating the deformation of the front part of the car allows you to calculate the real speed of the vehicle in the event of a road accident at the moment of collision with a frontal impact. Also, to automate the process, it is possible to use the PC-Crash software product, with available NHTSA databases that completely match the calculations performed. When studying the energy consumption for the deformation of the car, a low actual error was obtained, which is less than 0.1%, which confirms its efficiency in the case of calculating real traffic accidents. Conducted studies of a staged road accident with a frontal impact showed that in a real road accident, after determining the masses of the cars and their relative position at the time of the collision, it is technically possible to determine the speed of the cars at the time of the impact based on the energy consumption for the deformation of their structure. When using data from the PC-Crash program. When differentiating the stiffness of the front part, if the real car was damaged only, for example, in the middle part, then the solution for the averaged stiffness will give a smaller, compared to the actual, calculated result of the change in its speed upon impact. And if the real car was damaged beyond the bumper amplifier and spars, then the averaged stiffness will result in a deliberately overestimated result.

In general, the application of the CRASH3 algorithm for Ukraine is an undoubted progress, as it expands the arsenal of expert methods of road accident research and allows solving questions that were previously impossible to answer.