Calculation of loads on bearing system of vehicles

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Currently, for design and operational development of cars design methods are widely used, for example, the finite element method (FEM). However, the finite element method is just a tool in the hands of the researcher. The resulting experience of the author showed that the problem were not only in the choice of the finite element model of the supporting structure, but also in the creation of mathematical models of the truck. They can be used to calculate the real loads acting on individual parts of the vehicle in different modes of operation, and then as resulting load calculations for strength and durability on the same nodes.

Based on the analysis of the operating conditions of dump trucks highlights of the main settlement cases are described. Hitting laden car on the road humps and unloading the car are among them. The mathematical models, methods and program for calculating loads acting on the bearing system dump truck in these cases are covered. The program implements Newton iteration method combined with the method of step-change parameters. The reactions to the frame of the guide vanes suspension when driving over uneven and the platform for unloading are considered. The ways to reduce these loads are suggested. In particular , it is shown that when a vehicle collision on the uneven application dependent rear suspension can significantly reduce the torque acting on the frame , as compared to an independent rear suspension.

The results of calculations of loads used to analyze the stress state of the frame dump truck are given. Recommendations on the use of various finite element models of the frame are offered. The comparative results of numerical and field experiments are presented. The proposed method makes it possible to obtain reliable results and enables even at an early design stage to carry out multiple calculations carrier vehicle system for the optimal design solution.

Keywords: *cars dump trucks, bearing system, mathematical models, loadings, the finite-element analysis, numerical experiment.*

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