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МОДЕЛИРОВАНИЕ АВАРИЙНОГО СОУДАРЕНИЯ С ПРЕГРАДОЙ ПАССАЖИРСКОГО ПОЕЗДА, ОБОРУДОВАННОГО СИСТЕМОЙ ПАССИВНОЙ БЕЗОПАСНОСТИ

SIMULATION OF EMERGENCY COLLISION OF PASSENGER TRAIN EQUIPPED WITH PASSIVE SAFETY SYSTEM WITH OBSTACLE

Rail incidents take place throughout the world. Constant improvement of precautions does not alleviate problems of safe traffic. Because of this, the development and creation of railway new-generation vehicles with efficient systems of passive safety are notable problems in management of the high-speed traffic of passenger cars. Mathematical modelling dynamic loads of the passenger car equipped with energy-absorbing devices at ultra-normal collisions allows the estimation of designs at the stage of the design and the conduction of numerical experiments without high capital expenses. An emergency collision on a railway with 1520 mm gauge is simulated by the computer. It is shown that it is essential to equip a locomotive and cars with energy-absorbing devices for safety of the locomotive crew and passengers and a lowering the level of vehicles accelerations and longitudinal compressing forces in intercar coupling at an emergency collision between the train and an obstacle. To simulate numerically test collision scenarios for the passenger train and an obstacle, cars of which are equipped with movable gapless couplers, a mathematical model for dynamics of the train at an ultra-normal collision is improved by describing a force characteristic of the intercar coupling, taking into account an initial tightening absorbing devices, a function of the gapless coupler and the vehicle design as well as devices of the passenger safety system. An improved mathematical model can be used for a numerical simulation of test scenarios of a collision between a new-generation passenger train and an obstacle in order to develop out the passive safety system.

Keywords: ultra-normal collisions, passive safety, passenger train, couplers.

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