

Calculation and validation of material tests with specimens made out of filled elastomers

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1 Abstract

In deep-drawing dies for steel sheet parts of car bodies huge masses are moved. To prevent vibrations, which occur by sudden acceleration or breaking of those masses, elastomeric tubular dampers are used. The dampers are made out of carbon filled elastomers. A good knowledge about the material behavior of metals is available. But for the numerical investigation of complete deep-drawing dies the elastomeric dampers must be taken into account, too. To characterize the material behavior of the elastomers tensile tests and pressure tests were carried out. The received material data from the tests were read into LS-DYNA. Simulation models of the tensile test and the pressure test were created for LS-DYNA according to the real dimensions and boundary conditions. For validation purposes, calculations of loading cycles were done to enable a comparison between test data and simulation results. For the calculations the implemented material model *MAT_SIMPLIFIED_RUBBER_WITH_DAMAGE was used. The comparison shows a good fitting between the test data and the calculation results with respect to the mechanical material behavior by using this material model.