

Modelling elastomer buffers with DyMoRail

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In this paper a model for elastomer buffers for longitudinal railway vehicle dynamics is presented. This model is part of the more extended DyMoRail library which allows to simulate longitudinal dynamics of entire railway trains. With this library an efficient simulation of complete train compositions in various combinations is possible. The elastomer buffer can be used in combination with other buffer models and couplers in different test scenarios. We present details of our rubber spring model based on the one-dimensional, non-linear rubber spring model proposed by M. Berg [1][2][3]. To illustrate the behavior of the friction force modelled in the latter, it is compared to a diode model for Coulomb friction similar to the one in the Modelica Standard Library. Simulations for 40 J-buffer known as "Miner40" used for freight waggons during shunting at speeds up to 12 km/h are shown. Also shown are simulations of an entire S-Bahn combination with sixteen cars and fifteen elastomer buffers.

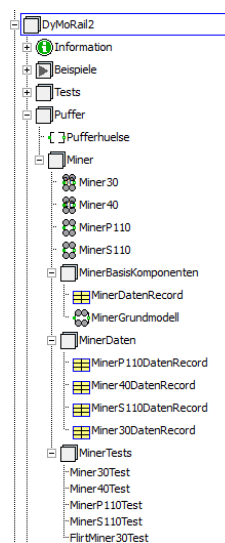


Figure 1: Structure of the buffer sublibrary "Puffer".

References

- [1] Berg, M. A model for rubber springs in the dynamic analysis of rail vehicles, Proc Instn Mech Engrs, Vol 211 Part F (1997), pp. 95-108.
- [2] Berg, M. A Non-Linear Rubber Spring Model for Vehicle Dynamics Analysis, Vehicle System Dynamics Supplement, Swets and Zeitlinger Publishers, 28 (1998), pp. 723-728.
- [3] Berg, M. A Non-Linear Rubber Spring Model for Rail Vehicle Dynamics Analysis, Vehicle System Dynamics, Swets and Zeitlinger Publishers, 30 (1998), pp 197 - 212.