

Discrete simulation of railway ballast shear test: spherical and polyhedral grain shapes

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Abstract. Dynamical behaviour of railway ballast is important in design and maintenance of railroads. Various modelling approaches are available. The least phenomenological but also the most computational demanding approach is direct representation of every ballast grain and its interaction with other grains in the model. The computational complexity is partially reduced by assuming non-deformable bodies with simplified shapes. Two different shapes of the bodies are considered: spherical and polyhedral. Spherical shapes are advantageous because of their great computational simplicity; however, missing shape information must be compensated by adding phenomenological rolling resistance. These two model variants are used to simulate different shear test. Results of the models are compared to each other and also to the experimental data from the literature.