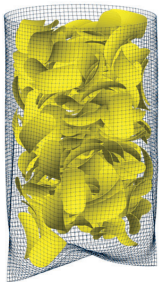


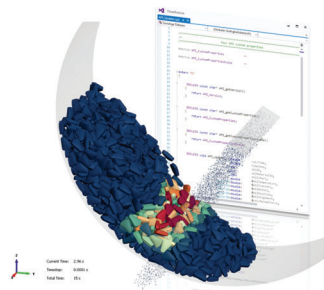
# MULTI-PHYSICS DEM SIMULATION

## CAPABILITIES & FEATURES OF THE SIMULATION SOFTWARE THREEPARTICLE/CAE AS A POWERFUL PLATFORM FOR VIRTUAL PROTOTYPING WITH COMPLEX BULK MATERIALS

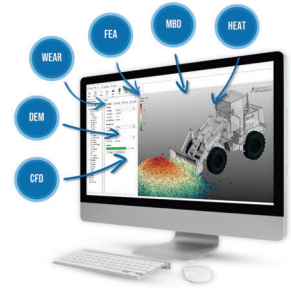
In recent years, numerical simulations for bulk materials have become more and more popular. For this purpose, the DEM is commonly applied; from basic analyses, such as chute design studies, to highly complex applications, such as with specific particle breakage. Consequently, the scope of application for DEM simulation has expanded, ranging from basic applications (as typical in material handling or mining) to totally new challenges, for example, modelling specifically-shaped and fracturable particles, such as for breakable rock fragments. And more generally, this regards the depiction of complex bulk material characteristics of all kinds, such as required for different types of bulk goods, such as crops, foods, or consumer products, to name a few.



Furthermore, the requirements for DEM software have changed significantly towards multi-physics simulation – to result in a parallel combination of multiple numerical methods – but at best without the need for an external coupling. This



means enabling the simulation of bulk materials – as in complex form: with fibrous, sticky, and pasty behaviour, complex-shaped particle geometries, specific fracture behaviour under certain load conditions, advanced user-defined capabilities, such as adopted contact models – with additional numerical techniques, such as dynamic system components, fluids, part deformations, wear, and many more.



### The Software: ThreeParticle/CAE by BECKER 3D

Meeting these requirements, Three-Particle/CAE results as an excellent software solution, which is therefore used as the basis to allow modern and complex DEM simulation – for general industrial applications, as well as for fundamental academic research. Some selected advantages provided by Three-Particle/CAE are: DEM with multi-physics solver; Complex particles; Complex interaction models; Automation & Keyword scripting; Multibody dynamics (MBD); Smoothed Particle Hydrodynamics (SPH); Finite Element Analysis (FEA); C++ API for all kinds of individual extension; Coupling possibilities, such as to Simulink; Optional ParaView Post-Processing.



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