

3D CFD simulation of powder flows



Research Center
Pharmaceutical
Engineering



eXtended Particle System
DEM software

Scope of work:

The DEM (Discrete Element Method) code XPS, developed in-house by the Research Center for Pharmaceutical Engineering (RCPE), is successfully used to simulate powder flows, but is inherently computationally intensive. As a computationally efficient alternative, a CFD multiphase model implemented in ANSYS Fluent was successfully adapted to densely packed powder flows and validated in a previous study in collaboration with the IWT for pile collapse experiments.

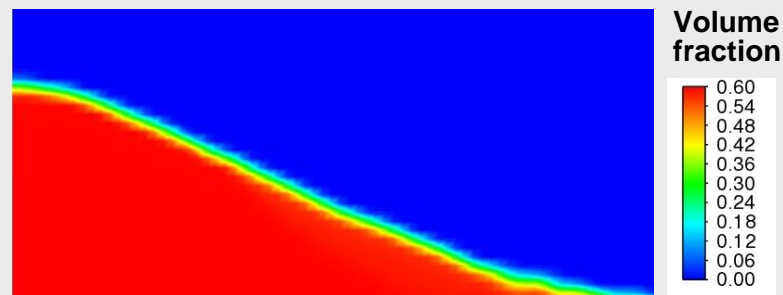
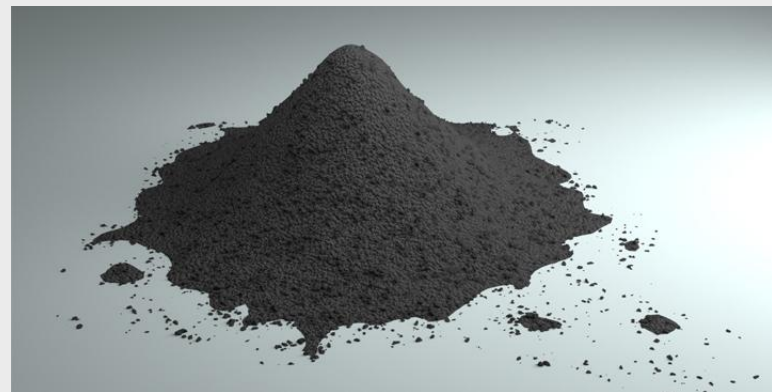
The goal of the current master's thesis/internship is to test the developed model for a selected real-world 3D application and to compare it with an XPS-DEM simulation.

Work content:

- Adjustment of the parameters of the CFD model to the specific powder material by comparing them with experimental data.
- Validation of the model parameters for a simplified 2D test case.
- Design of a 3D CFD model for a full-scale application.
- Simulation using the 3D CFD model and comparison with a XPS simulation.

Skills:

- Basic programming knowledge.
- Basic knowledge of numerical modelling.



Powder pile (top) and simulation of the angle of repose of a powder pile with Fluent CFD model (bottom)

Framework conditions:

Start: as soon as possible
Duration: ca. 6 months
Place: @ IWT, Graz
Payment: available
Thesis in English

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