

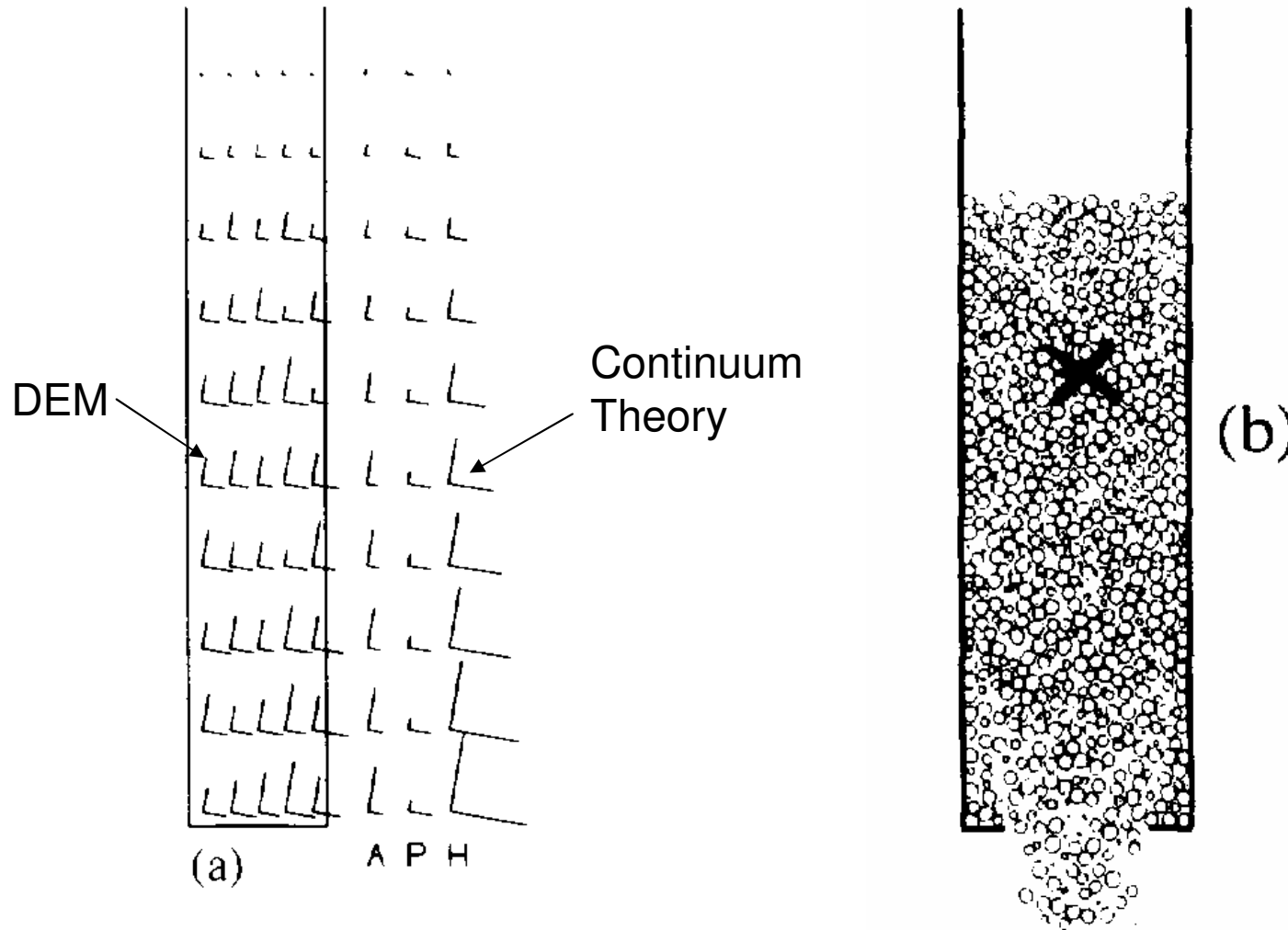
**Thoughts on the experimental
validation of
Discrete Element Models**

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CeParTec, Germany



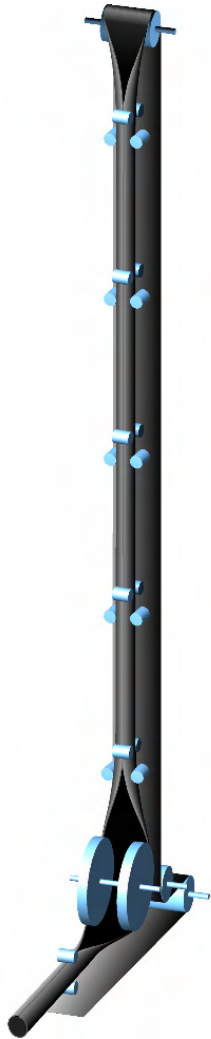
PARTEC '95

Botzen Meeting '95: „Nature is our model.“



Langston, P.A.; Tüzün, U.; Heyes, D. Powder Tech. 85 (1995)

Vertical Pipe Conveyor



Einwurf

0

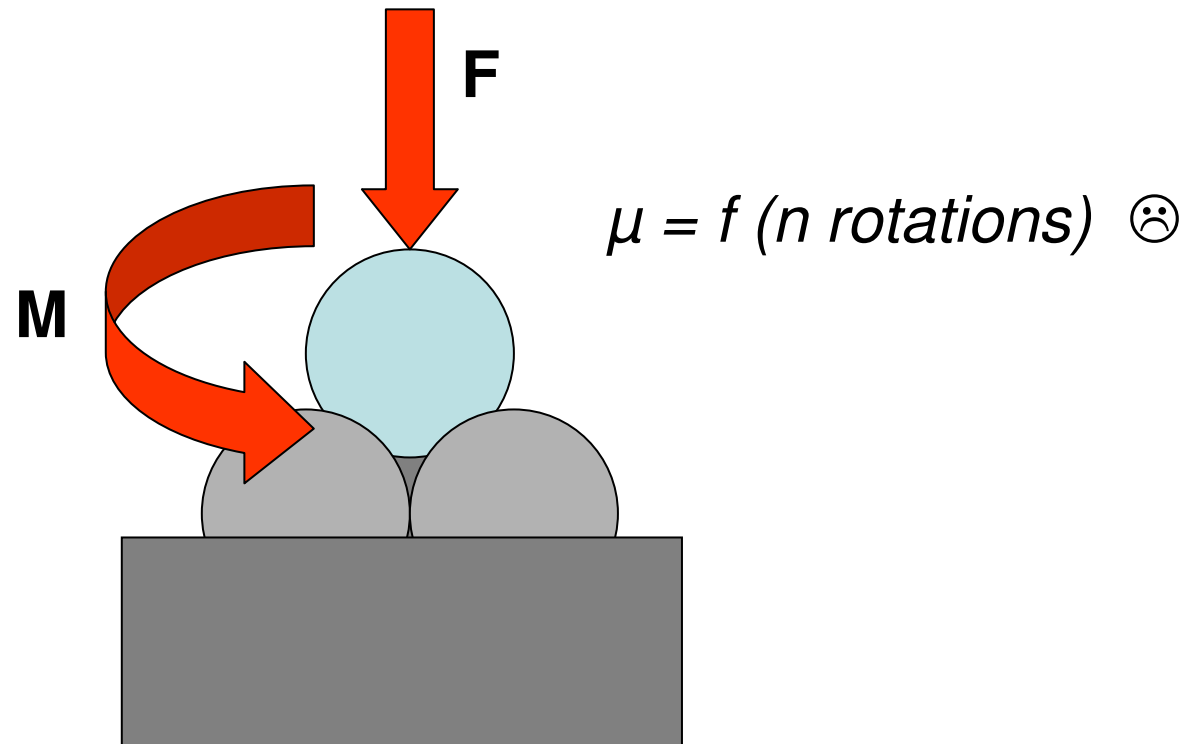
500

1000

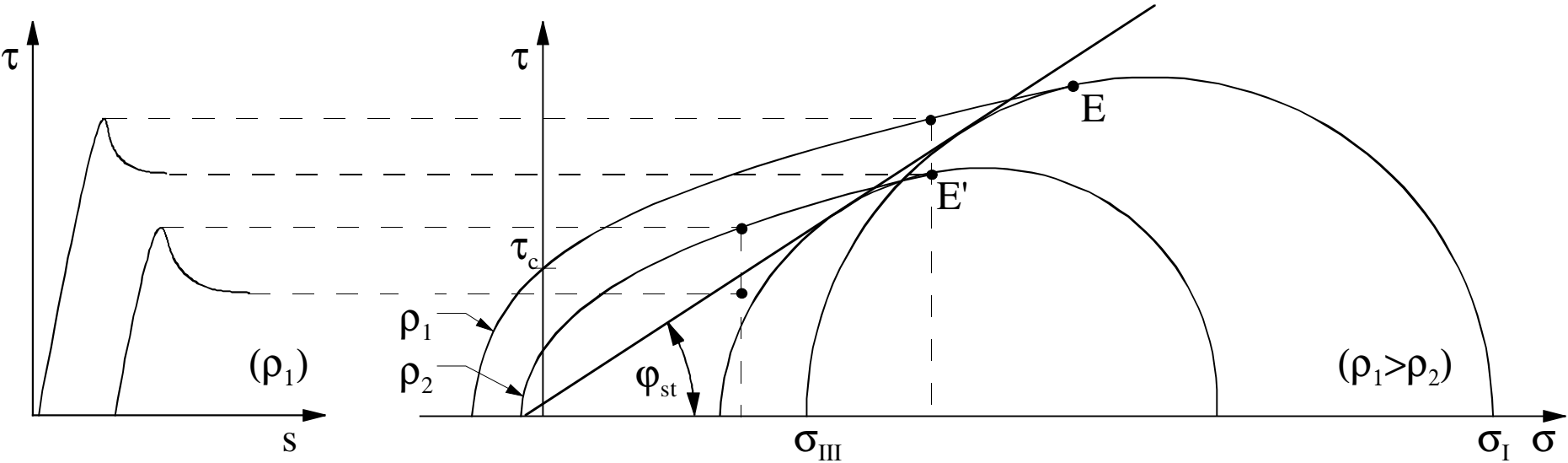
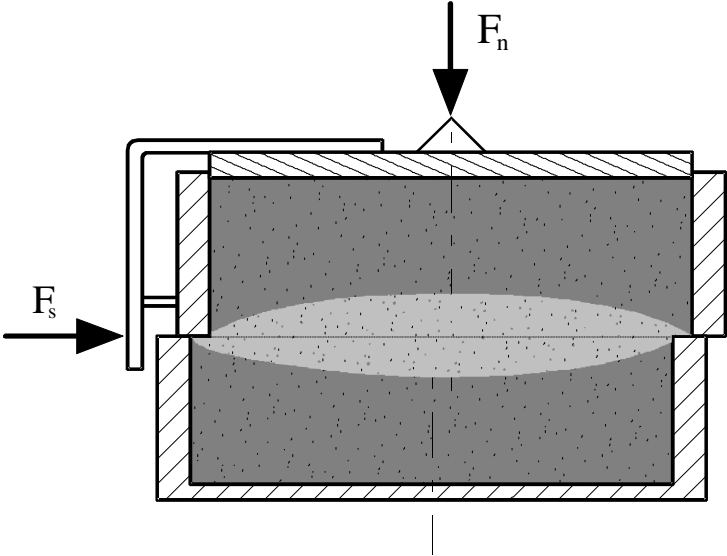
1500

20

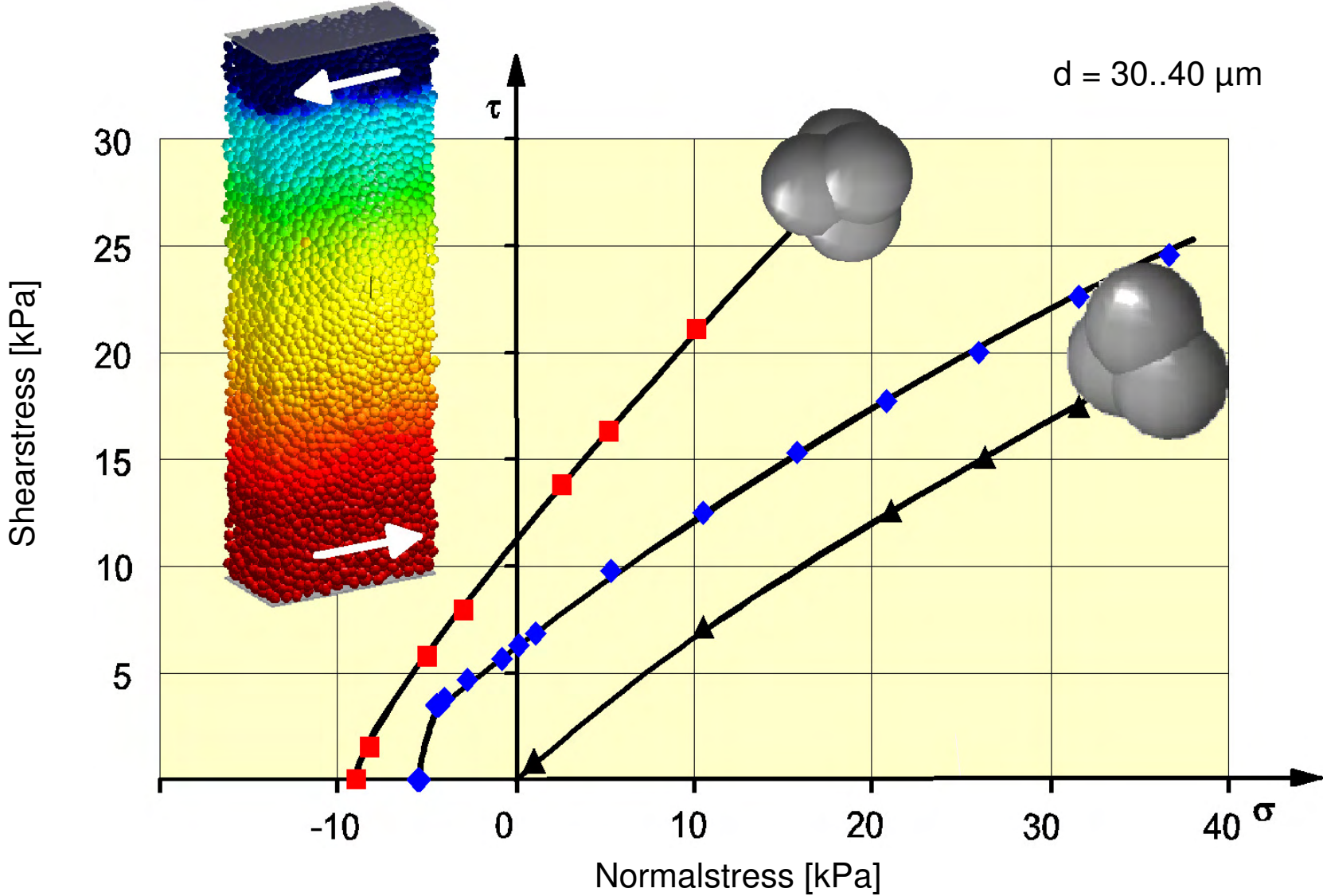
Measuring Particle Properties



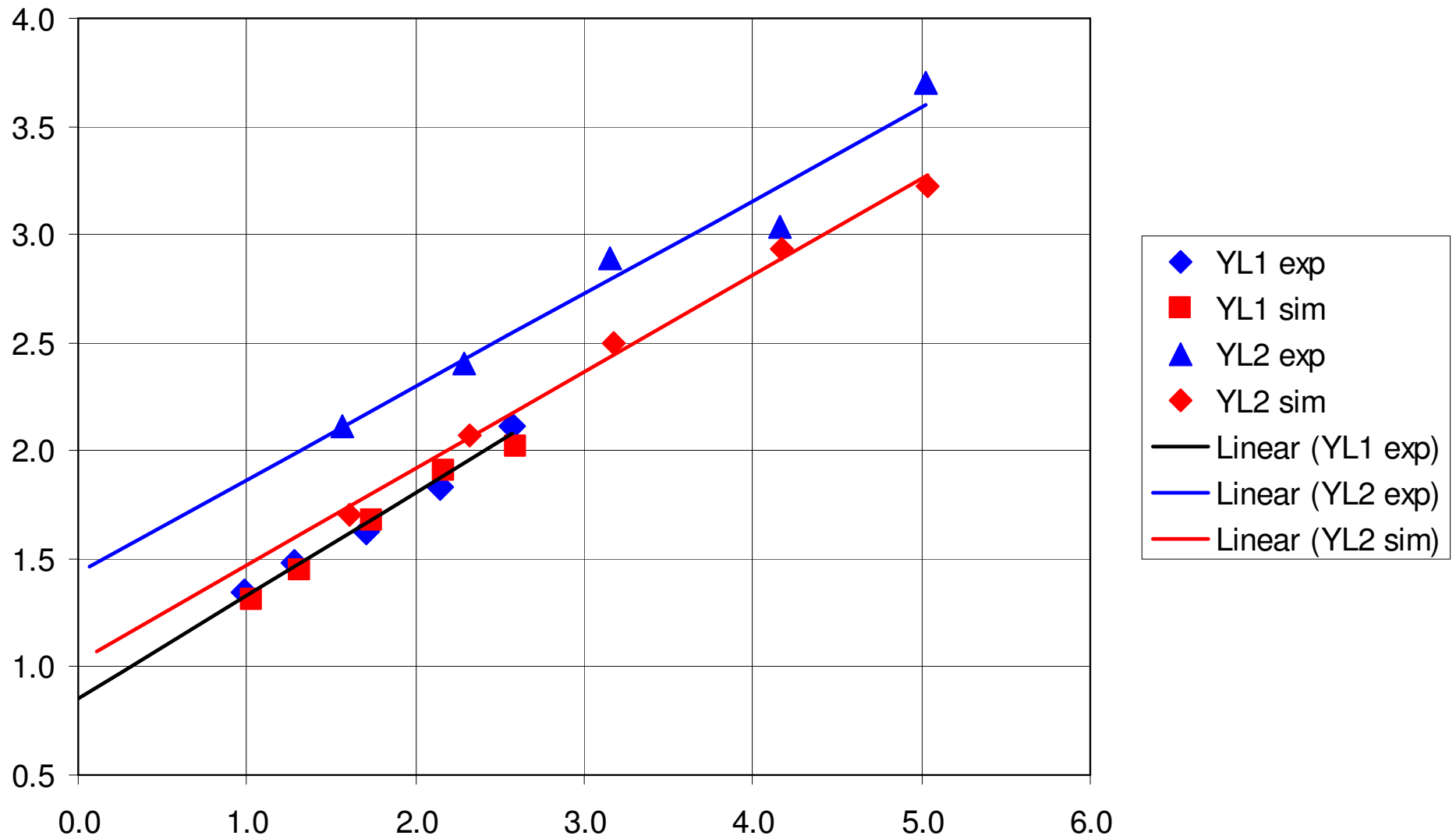
Jenike-Shear-Test



Simulation of Shear Tests



Yield loci of a cohesive sphere assembly



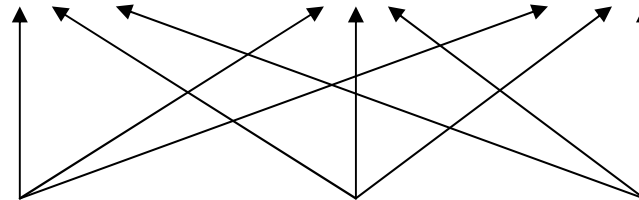
Selected relations of micro-properties and macro-properties

**Macro-
Level**

bulk
damping

bulk
friction

compressibility



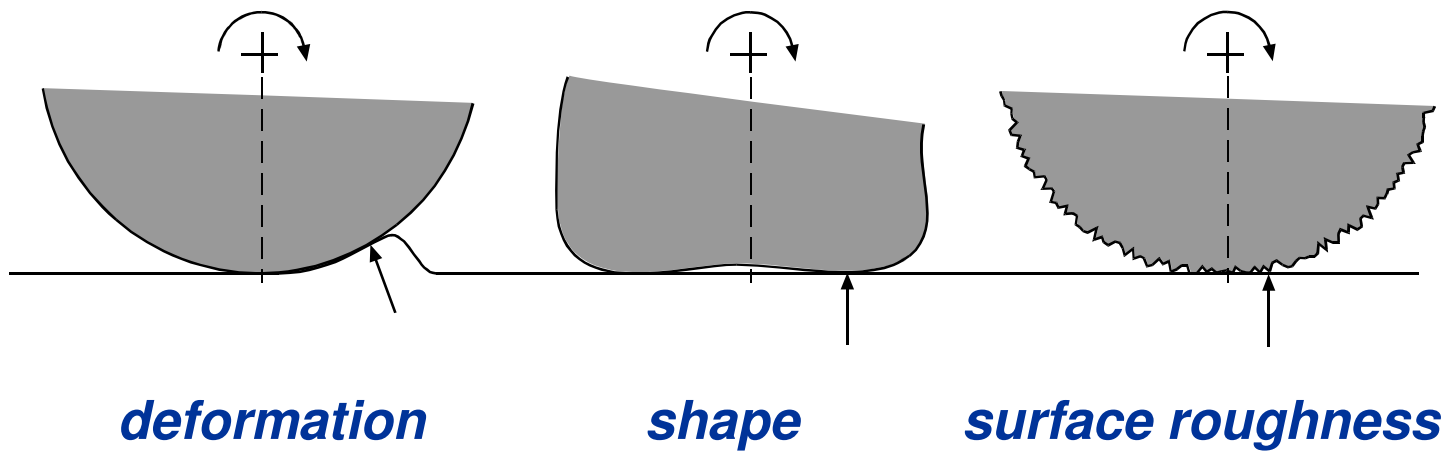
**Micro-
Level**

sliding
friction

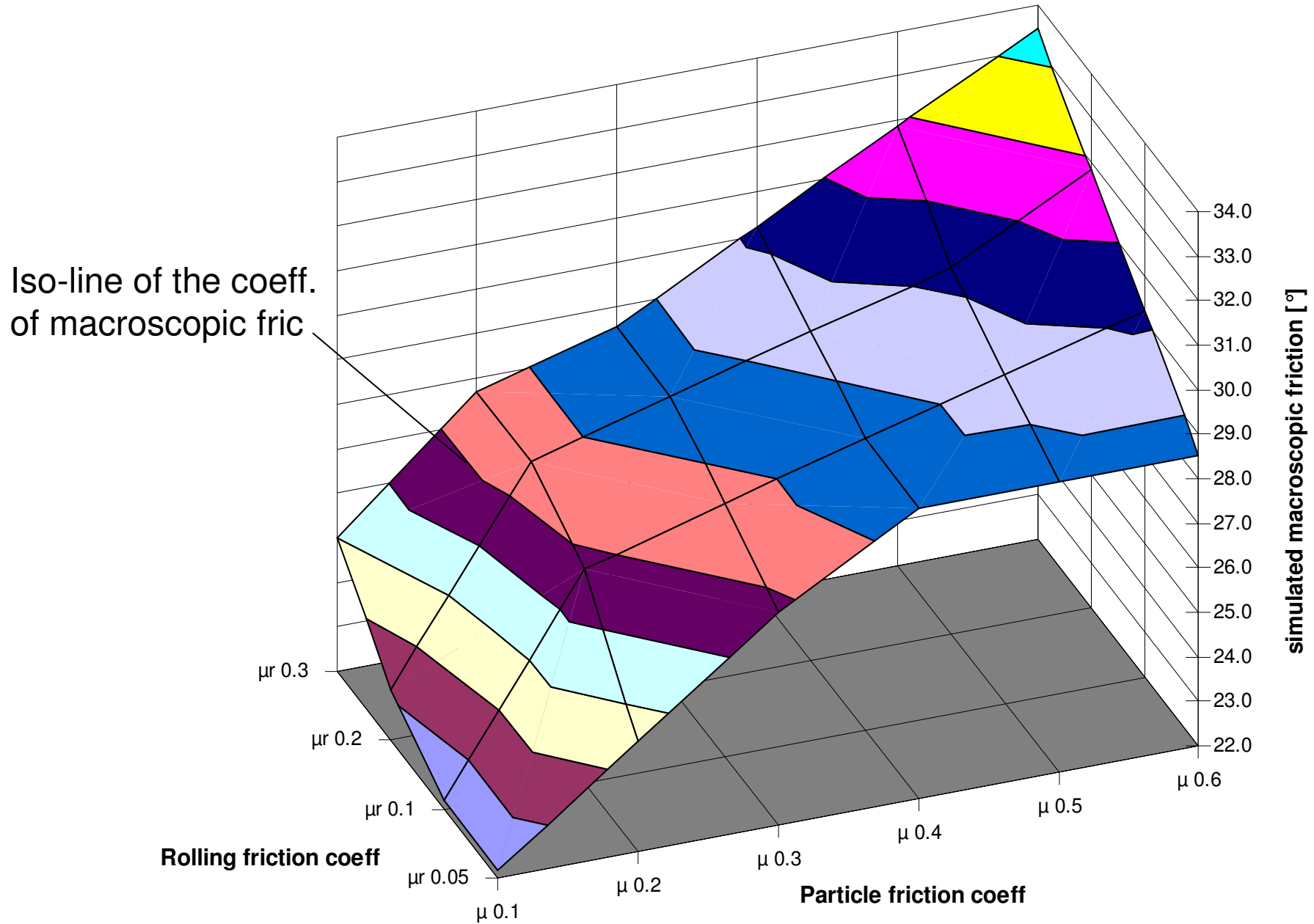
rolling
friction

particle
shape

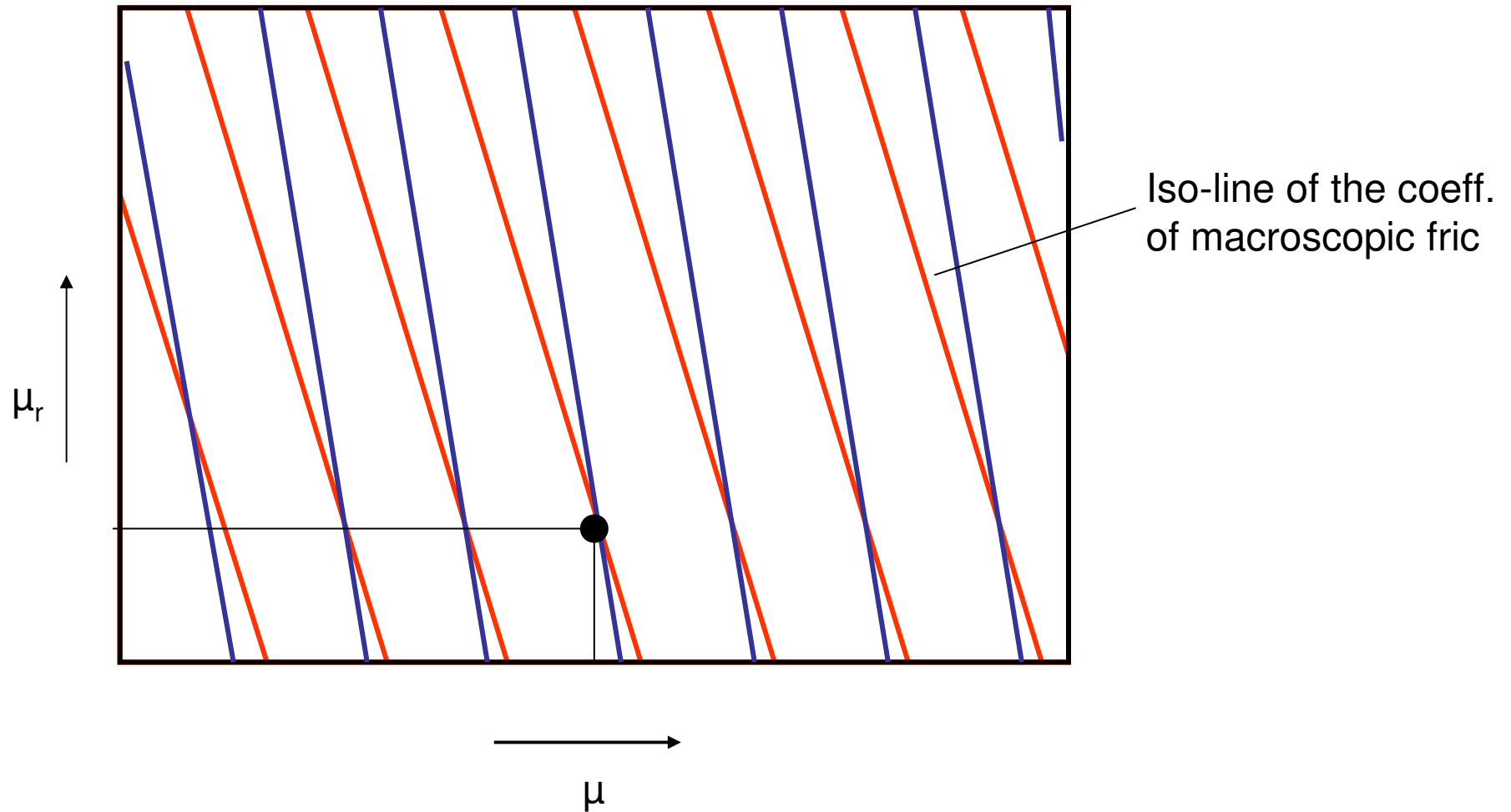
Causes for Rolling Resistance



Macroscopic friction of a sphere assembly

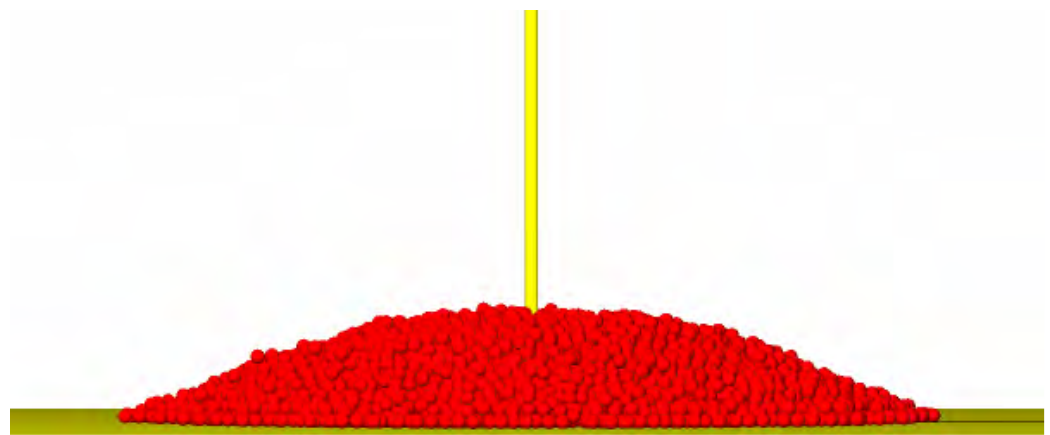
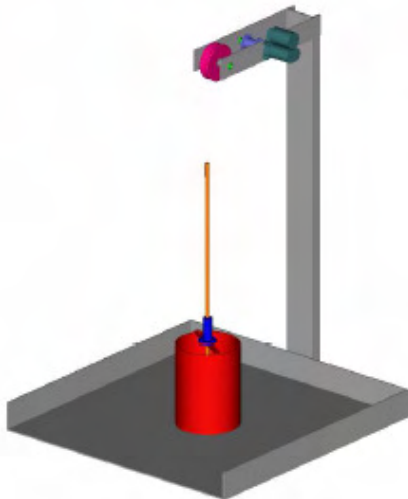
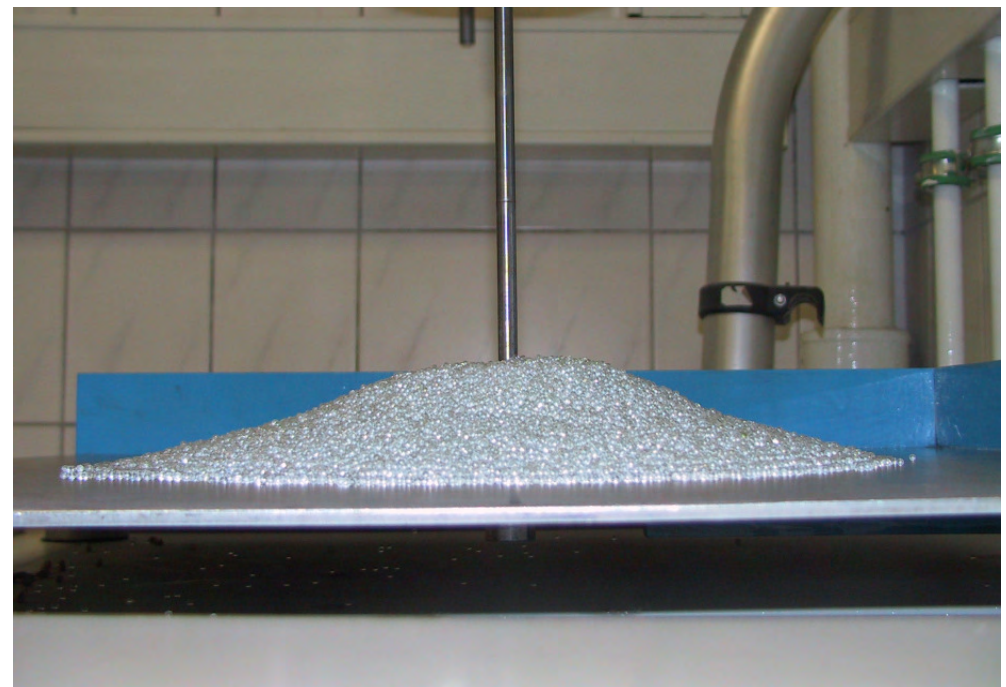


Macroscopic friction of a sphere assembly

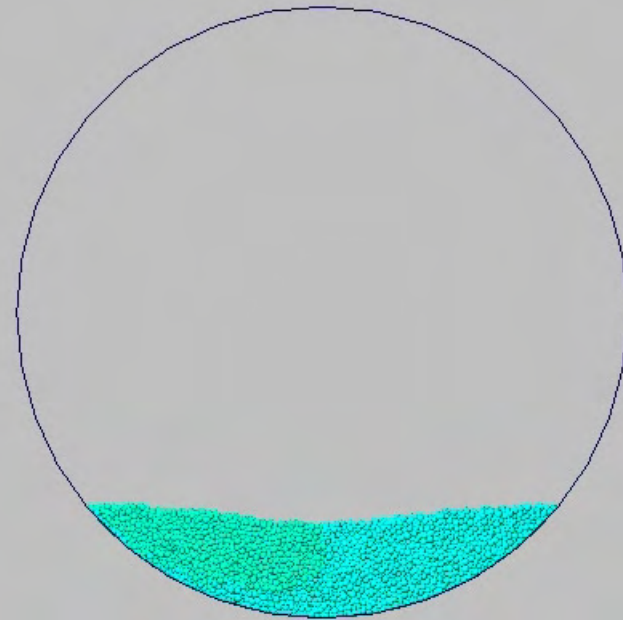
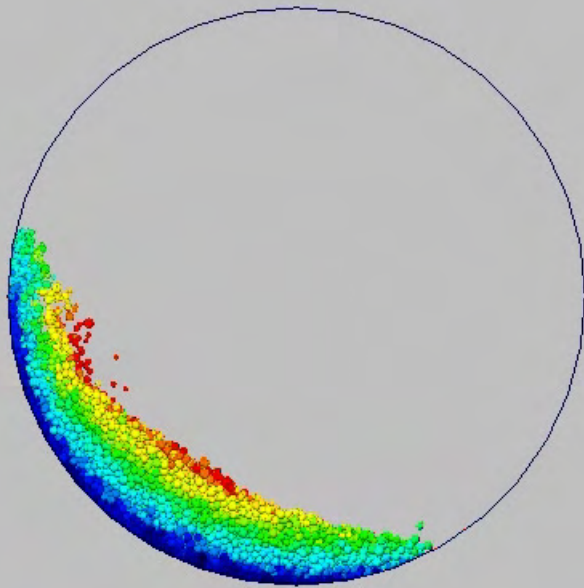


For different flow regimes the microscopic parameters (Coulomb fric, roll fric) have a different influence on the macroscopic behavior. Projecting the results of experiments with different flow regimes onto each other is expected to deliver a characteristic combination of the microscopic parameter.

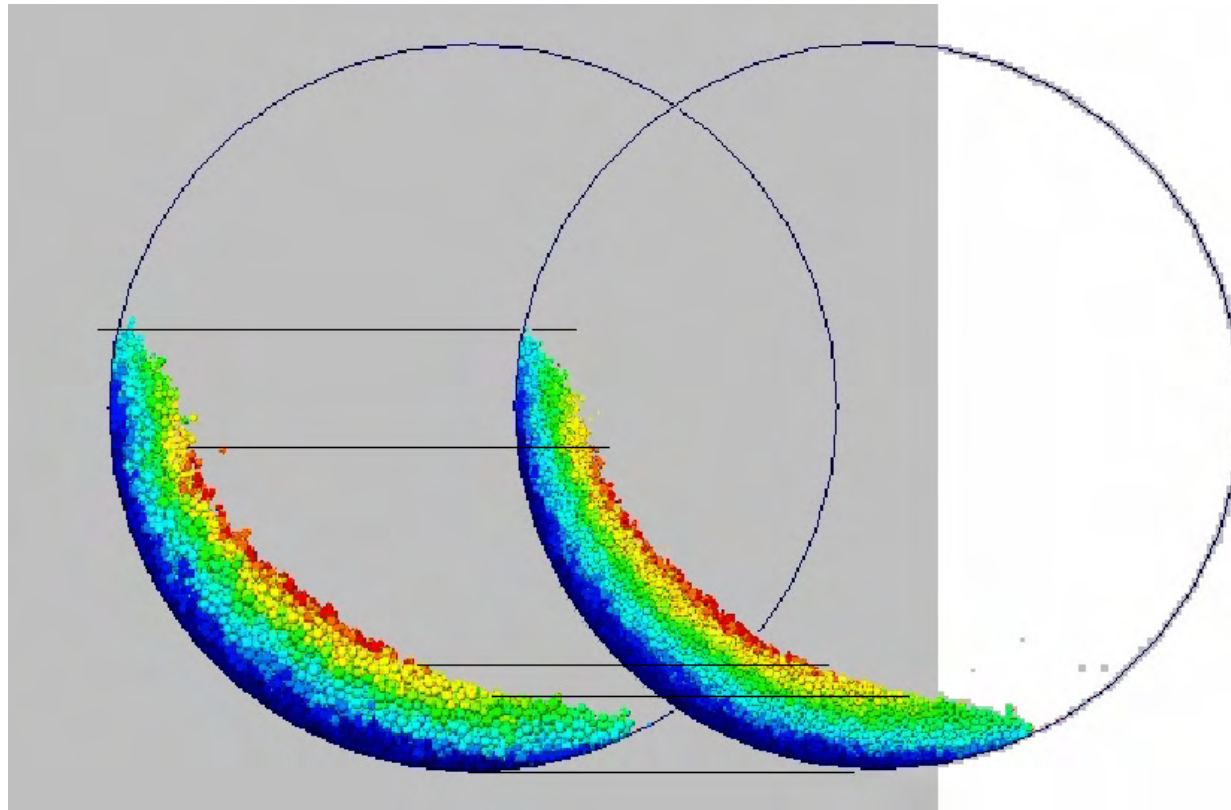
Calibration of friction



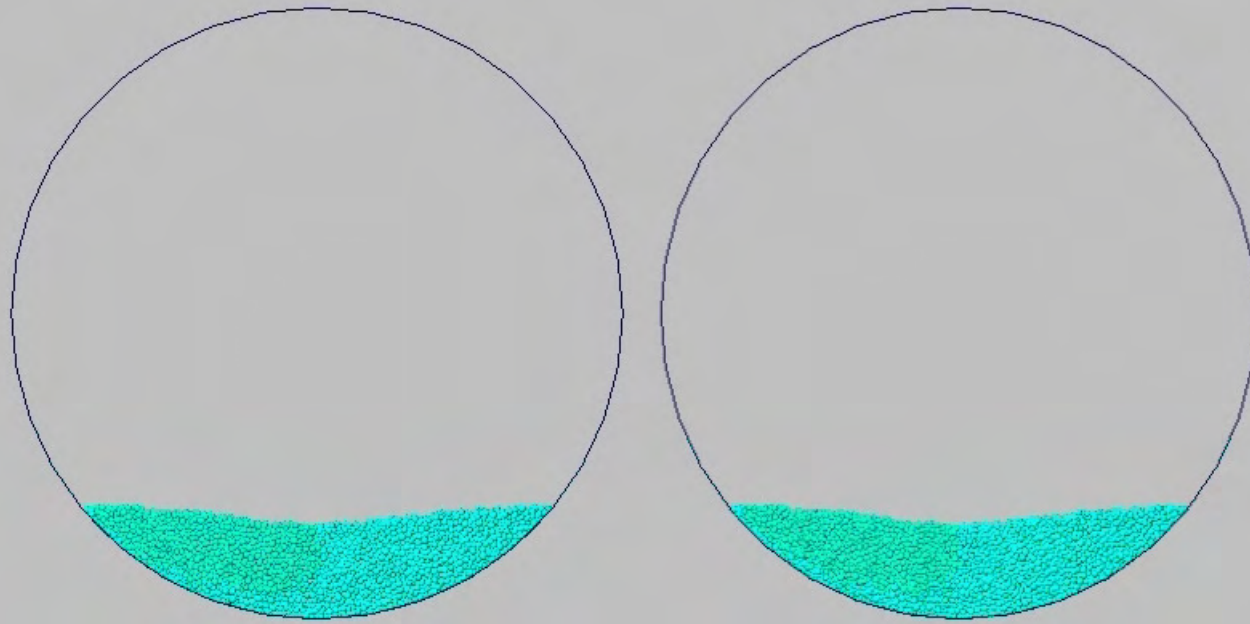
Rotating drum



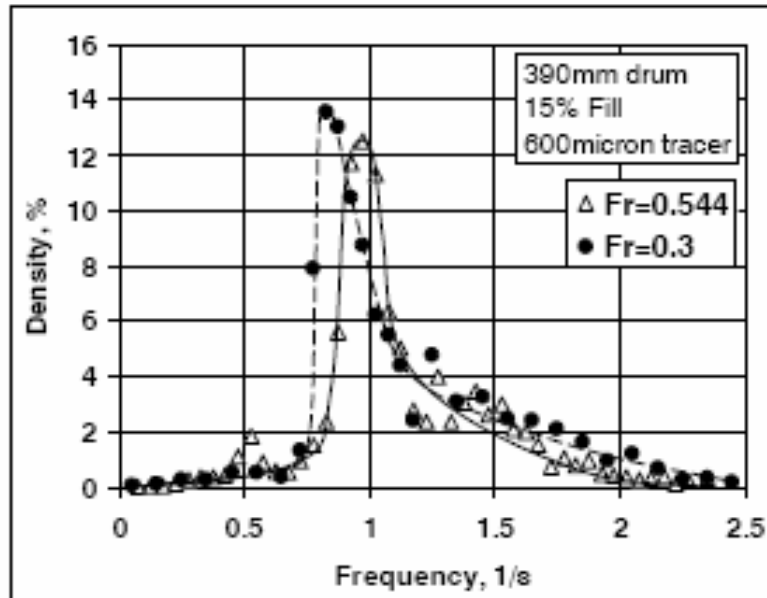
Comparison of coarse and fine particles



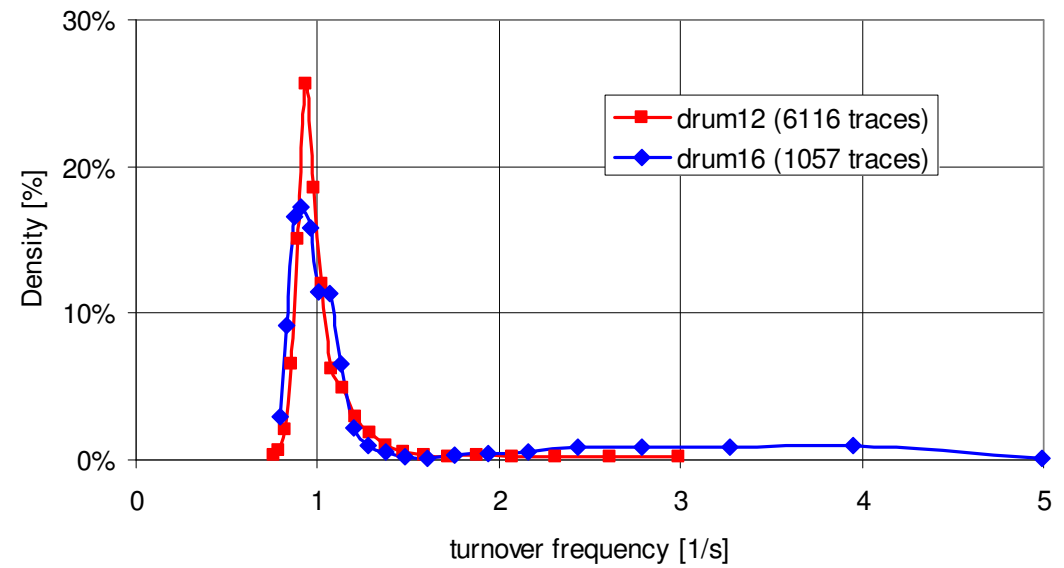
Comparison of cohesive and cohesionless particles



Turnover frequency



Results from PEPT measurements



Results from simulations

Thank you for your attention!

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