

GELSENKIRCHEN, GERMANY
NOVEMBER 7TH - 8TH, 2002

More than 100 scientists and engineers from 24 countries have attended the 1st International PFC-Symposium and the 1-day PFC training course the day before. The conference was focused on the theory and application of particle based methods. Particle methods have seen increasing use in several engineering and scientific fields during the past few years, both because of their unique modelling capabilities and the availability of the necessary computational power. Although most of applications presented during the conference are based on PFC (Particle Flow Code), a broad spectrum of alternative approaches and codes were discussed by speakers from all continents. Therefore, the proceedings give an excellent overview about the state-of-the-art of the particle based methods. The presented papers, oral presentations and discussions are directed to new developments and applications in the following fields:

- Rock mechanics and mining
- Soil mechanics

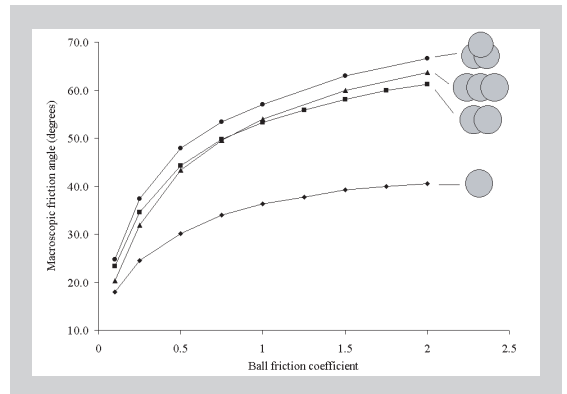
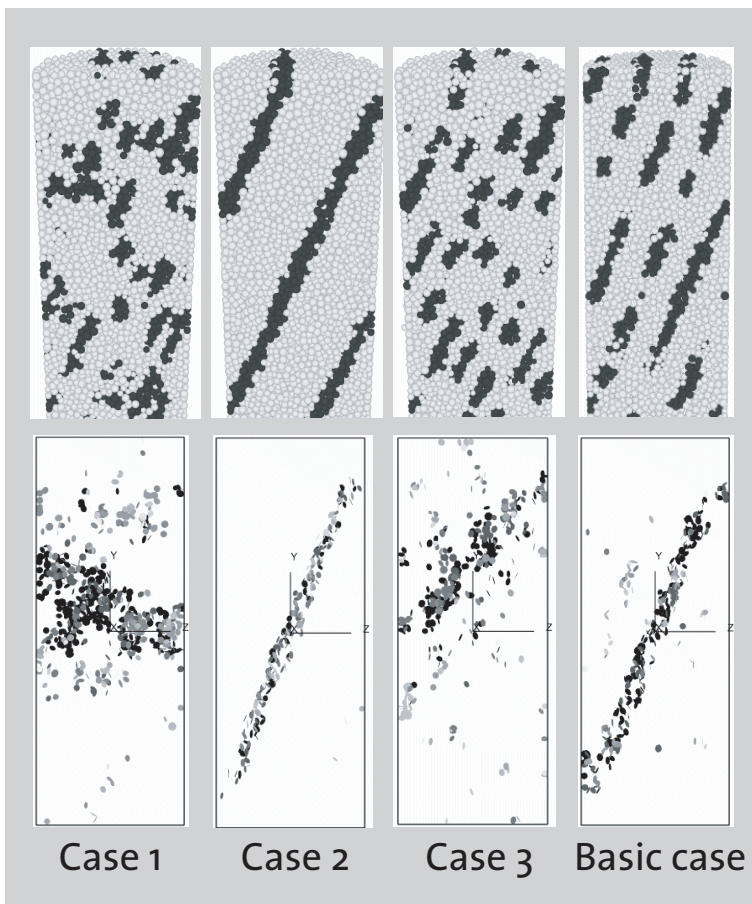


Figure 1 (left below): Model set up (above) and corresponding fracture pattern (below) for uniaxial compression tests for 4 samples with different anisotropy (Wanne T).

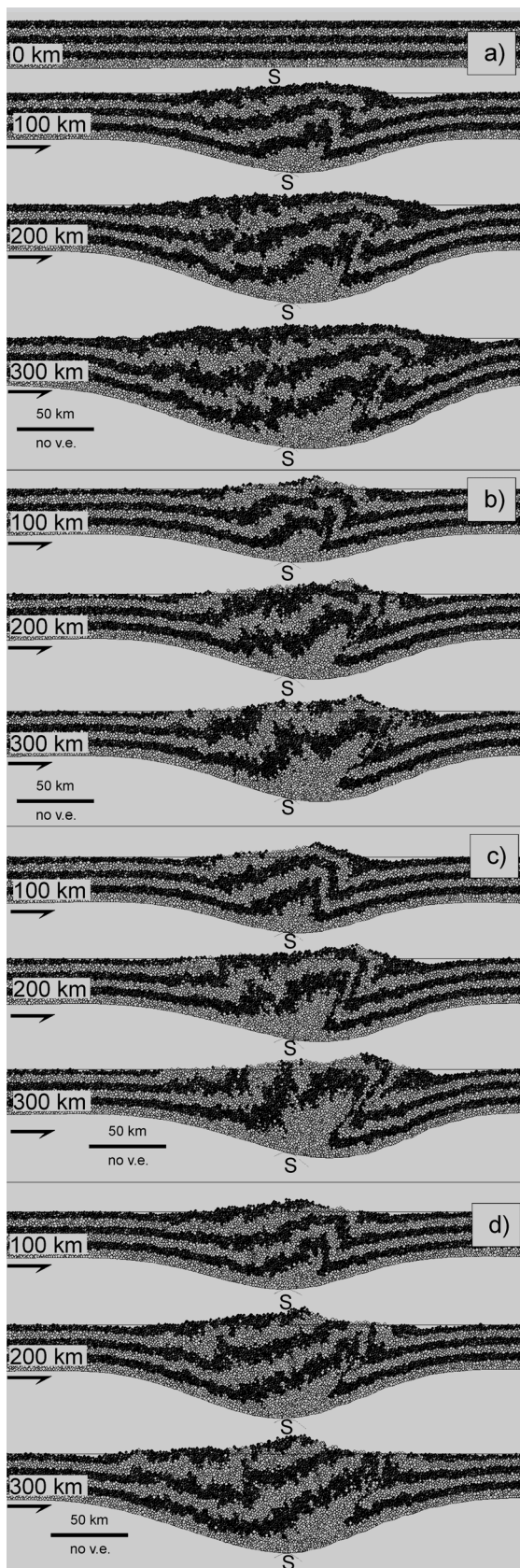
Figure 2 (right above): Simulated triaxial test of granular material: influence of particle shape on the relation between microscopic contact (ball) friction and macroscopic friction angle (Pierce ME et al.).

- Highly dynamic processes
- Process engineering
- Chemical industry
- Geological and environmental processes
- Material science
- Civil engineering
- Simulation of lab tests
- Algorithm related issues
- Constitutive laws



The main scientific aspects under discussion are: Use of superparticles (clumps or clusters) to account for rolling resistance, dilatancy effects and crushing effects, hydro-mechanical coupling: inter-particle cohesion taken into account by modelling liquid bridges in pendular state; full HM-coupling by a network of pipes and pores, modelling of landslides, rockfall, collisional orogeny, magma ascent, fault dynamics and liquefaction, fracture and damage mechanical approaches for brittle material including cyclic fatigue and anisotropic material, modelling of silo flow problems, development of an Adaptive Continuum/Discontinuum Code, detailed mod-





elling of shear tests under consideration of dilatancy, peak and residual strength as well as cohesive components. Exemplary, Figures 1 to 3 show selected modelling results presented by different authors during the symposium.

The conference proceedings with 320 pages and 50 articles were published by A.A. Balkema: Konietzky, H. (Ed.), Numerical Modeling in Micromechanics via Particle Methods, ISBN 90-5809-532-0

Heinz Konietzky
 ITASCA Consultants GmbH
 Leithestrasse 111
 45886 Gelsenkirchen
 Germany
 Fax: x49.209.1475632
 hkonietzky@itasca.de

Figure 3 (left): Evolution of model experiment in steps of 100 km convergence: a) no surface erosion, b) symmetric surface erosion, c) erosion focussed on pro-wedge, d) erosion focussed on retro-wedge (Vietor T).

1st International PFC Symposium

Numerical Modeling
in **Micromechanics**
via Particle Methods

ITASCA Consultants GmbH

November 6-8, 2002
Gelsenkirchen, Germany