11th World Congress on Computational Mechanics (WCCM XI)
5th European Conference on Computational Mechanics (ECCM V)
6th European Conference on Computational Fluid Dynamics (ECFD VI)
July 20 - 25, 2014, Barcelona, Spain

EFFECT OF PARTICLE SURFACE FRICTION ON CONSTITUTIVE RELATION FOR STEADY GRANULAR FLOW

Ken Kamrin[1], **Georg Koval**[2*]

[1] Department of Mechanical Engineering, Massachusetts Institute of Technology (MIT), Cambridge, MA 02139, USA, kkamrin@mit.edu, http://web.mit.edu/kkamrin/www/
[2] ICube Laboratory, National Institute of Applied Sciences of Strasbourg (INSA), Strasbourg, France, georg.koval@insa-strasbourg.fr, http://icube-gc.unistra.fr/index.php/Georg_Koval

Key Words: *Granular flow, Nonlocal rheology, Discrete element simulations.*

Nonlocal rheology based on the concept of nonlocal granular fluidity has demonstrated predictive capabilities in multiple geometries for (inertial and quasi-static) granular flow [1]. We investigate the effect of the surface friction of the grains on the continuum parameters, with a focus on the nonlocal amplitude, the model's one new parameter. In our study, two-dimensional discrete element simulations of flowing disks are compared to numerical solutions of the nonlocal model in planar shear and several annular shear geometries. We observe an increase of the nonlocal amplitude as the surface friction decreases. This effect becomes especially stronger for very low values of coefficient of friction.

REFERENCES

[1] K. Kamrin, G. Koval, Nonlocal constitutive relation for steady granular flow. *Physical Review Letters*, 108:178301, 2012.