Contribution ID: **63** Type: **Oral Presentation**

An investigation of granular rheology using Positron Emission Particle Tracking

Wednesday, 9 July 2014 11:30 (20 minutes)

Abstract content
   (Max 300 words)
Formatting &
Special chars

We consider the rheological drivers of granular flows comprising mono-sized (5 mm) glass beads in a 300 mm diameter rotating drum operated in the cascading-to-cataracting Froude regime. By combining the inherent frictional nature of particles within a dense flow regime and noting that industrial rotating drums (tumbling mills) are typically characterised by collisional and turbulent stresses, a theoretical expression of the effective friction coefficient is derived, yielding a customised granular rheology for athermal, free surface granular flows. The input data to the model (velocity, solids concentration, pressure and flow depth) are obtained directly from non-invasive measurement using a nuclear imaging technique: Positron Emission Particle Tracking (PEPT). Using the new rheology, we derive the in-situ power dissipation and show that shear stresses drive the energy dissipation in the tumbling mill.

Apply to be
 considered for a student
   award (Yes / No)?

Yes

Level for award
 (Hons, MSc,
   PhD)?

PhD

Main supervisor (name and email)
and his / her institution

Dr.Indresan Govender, indresan.govender@uct.ac.za,
University of Cape Town

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Dr GOVENDER, Indresan (University of Cape Town)

Co-authors: Dr RICHTER, Maximilian (University of Cape Town); Mr PATHMATHAS, Thirunavukkarasu (University of Cape Town)

Presenter: Mr PATHMATHAS, Thirunavukkarasu (University of Cape Town)

Session Classification: Applied

Track Classification: Track F - Applied Physics