

PERTH, AUSTRALIA
MARCH 12, 2007



Perth based Australian Centre for Geomechanics (ACG) presented a Rheology Workshop in Perth, Western Australia on 12 March 2007. Preceding the well attended ACG 10th International Seminar on Paste and Thickened Tailings Seminar, this workshop attracted over 50 professionals and researchers from all over the world including; South Africa, Botswana, Alaska, Chile and Canada. The number attending was restricted by the size of the venue and a desire to maximise the return from the “hands-on” sessions to those attending.

The workshop was designed to demystify the complexities of rheology, enabling attendees to further understand how slurry operations and minerals processing benefit from this innovative technology. Throughout the day, the science of rheology was discussed, potential solutions presented, and the challenges highlighted. The programme commenced with several presentations during the morning session, after which the workshop broke into two groups. The afternoon session took place at Rheochem Ltd's laboratory in Perth. Those in the two groups then alternated between practical sessions involving:

- Optimisation of flocculant addition to tailings
- Rheological properties of high density tailings

The keynote lectures began with Andy Fourie, principal – environmental geomechanics, Australian Centre for Geomechanics presenting a brief overview of why rheology is important to the minerals industry and how this science impacts on the design and operation of a range of unit operations in the minerals industry. The principles examined included: viscosity, yield stress and thixotropy.

Next, Angela Beveridge, technical specialist, CIBA Specialty Chemicals, defined and explained the importance of the selection and specification of flocculants. Beveridge explained that the “complex means by which flocculants react and form a floc structure within the thickening environment, together with the different ways in which they polymerise producing varying molecular weight distributions means that performance cannot be accurately predicted in advance and laboratory testing to assess different products performance becomes a necessity”. Richard Triglavcanin, director, Outokumpu Technology (now Outotec Pty Ltd), then spoke about the importance of design

parameters and thickener selection. The effect of preparation on rheology was presented by Fiona Sofra, Rheological Consulting Services. Sofra said that the process (and testing), as well as shear and chemical conditions can have dramatic effect on rheology. It is important to consider and account for the effects of material preparation and handling, and surface chemistry and flocculation when determining suspension (slurry/ paste) rheology. Angus Paterson, director, Paterson and Cooke spoke about lessons learned - rheology and pilot plant test work. Paterson has found that “many paste and thickened tailings are designed on the basis of extensive pilot plant test work. However it is common to find large discrepancies between actual mine operating conditions and those predicted by pilot plants”. He further states “many pilot plant test programmes are conducted independently of deposition and pumping tests and this could be a reason why there is often a large discrepancy between test data and operating experience. It is suggested that pilot test work include the simultaneous evaluation of geotechnical, pumping and preparation requirements”. Fiona Sofra then presented an informative discussion on real life rheology lessons - “leach tank rheology window”. Angus Paterson concluded the morning session with a presentation overviewing the points to be considered when designing laminar flow slurry pipelines.

In the afternoon session attendees took full advantage of Rheochem Ltd's laboratory by engaging in rheology measurement and manipulation exercises. MEP Instruments generously provided 10 Anton Parr viscometers for use at the workshop, enabling attendees to get “hands-on” experience in measuring slurry-like substances and seeing what happens to slurry when reagents and flocculants such as salt are added.

The ACG was enabled to host this event with the generous support of its sponsors, Rheochem Ltd, MEP Instruments/ Anton Parr, Outokumpu Technology Pty Ltd and CIBA Specialty Chemicals. To order copies of the Rheology Workshop proceedings, please contact Josephine Ruddle via acg@acg.uwa.edu.au

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