The Australian Society Of Rheology, Inc.

2021 Industry Lecture Series

CAV Reg. No. A0055806E

Calendar details

Date:	**Tuesday, 2 February 2021**
Time:	**03:00 pm - 04:00 pm (Melbourne, Australia)**
Event Registration:	**https://www.eventbrite.com.au/e/australian-society-of-rheology-industry-lecture-2-february-2021-registration-133167783425**

Invited lecture

Speaker: Gordon McPhail (Organisation: Water, Waste and Land)

Presentation Title: Estimation of the rheology of liquefied bauxite refinery residue for application in dam break analysis

Abstract: Dramatic and regrettable failure of tailings storage facilities over the past six years have sensitised the mineral processing industry to the importance of emergency planning in evacuating and protecting potentially affected parties in proximity to dam break and flow slide failure of a storage facility. Such planning requires estimation of the potential zone of inundation by the failure using fluid mechanics. Since the flowing slurry is the product of liquefaction of materials that were originally discharged as a slurry onto the facility and allowed to settle out and consolidate as a loose agglomeration of particles the rheology of the re-liquefied material is unlikely to be the same as the original slurry discharged onto the facility. Rheology is a key input parameter to the fluid mechanics and it is vital to apply representative rheology in the flow modelling given the use and application of the modelling results. This presentation sets out tests and analyses conducted by Water, Waste and Land to evaluate the liquefied rheology of bauxite residue using pilot scale dam breaks and back analysis of the flow characteristics from the pilot scale tests. These data are referenced with rotary viscometer testing on the material immediately before and after flow. The results indicate a significant increase in the rheology with increasing shear to a peak followed by a drop off in shear resistance. The presentation will describe the testing and the results as well as the method of application of the results in the dam break modelling.

Speaker Biography: Gordon McPhail is a civil/geotechnical engineer with more than 40 years of experience with the evaluation, design, construction, management and closure of tailings and residue storage facilities for the mineral processing industry. Following completion of his doctorate on the prediction of the beaching characteristics of hydraulically placed tailings in 1995 Gordon has focused strongly on understanding the rheology of tailings slurries and has developed several testing techniques that seek to address issues with estimation of the rheology of mineral tailings. Recently Gordon has turned his attention to the estimation of the rheology of partially consolidated tailings that liquefy during a dam break.

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