This conference is the twenty-fourth in the series of International Conferences on Paste, Thickened and Filtered Tailings (P&TT) initiated by the ACG in 1999, and reflects the developing maturity of P&TT management.

Paste 2021 seeks to explore the considerations needed to raise the mining industry leaders’ awareness of how important environmental stewardship is to long-term industry sustainability, with regard to their tailings facilities.

Over the past decade, the potential benefits to be gained from adopting thickened tailings technology on mining operations have become widely accepted, and there would be few mine feasibility studies presently undertaken that do not include this as an option to be evaluated.

Very interestingly, a number of operations are now retrofitting their plants and tailings storages from conventional to thickened technology. The reason for this is the increase in the mass of tailings that can be accommodated on a given footprint and, more importantly, the greater volume of water that can be recovered for re-use in the plant in arid areas.

This conference will be held as a traditional physical event in Fremantle, Western Australia, COVID-19 permitting, as well as an online event, allowing participation from anywhere in the world. Presentations will be available on-demand, post-event until 23 November 2021.

### CONFERENCE CO-CHAIRS

**Professor Andy Fourie**  
Professor of Civil & Mining Engineering and Program Director - Future Tails, The University of Western Australia

**Dr David Reid**  
Research Fellow  
The University of Western Australia

### KEYNOTE SPEAKERS

**Dr Ryan Veenstra**  
Global Backfill Specialist  
Newmont Australia  
*Using instrumentation in underground backfill systems*

**Stephen Newman**  
Practice Lead Tailings  
BHP  
*BHP long-term tailings strategy*

**Dr Danielle Risbey**  
Team Leader  
Department of Mines, Industry Regulation and Safety  
*Regulation of tailings in Western Australia*

### WHO SHOULD ATTEND

This conference presents a valuable opportunity for academics, designers, practitioners, consultants and suppliers to discuss best practice, improved methods and technology, all with an emphasis on safety, efficiency and environmental impact.

### PROGRAM

<table>
<thead>
<tr>
<th>MONDAY</th>
<th>20 SEPTEMBER</th>
<th>TUESDAY</th>
<th>21 SEPTEMBER</th>
<th>WEDNESDAY</th>
<th>22 SEPTEMBER</th>
<th>THURSDAY</th>
<th>23 SEPTEMBER</th>
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<tbody>
<tr>
<td>Is the Future Filtered? Paste and Thickened Tailings Hybrid Short Course</td>
<td>Paste 2021</td>
<td>Conference Dinner</td>
<td>Sirius Ballroom, Esplanade Hotel, Fremantle, Western Australia</td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chaired by</th>
<th>Presenters</th>
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<tbody>
<tr>
<td>07:00</td>
<td>Registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08:00</td>
<td>Welcome and introduction</td>
<td>AB Fourie, Paste 2021 Conference Co-Chair, The University of Western Australia, Australia</td>
<td></td>
</tr>
<tr>
<td>08:15</td>
<td>KEYNOTE ADDRESS &amp; THICKENING AND FILTRATION (1)</td>
<td>J Rola, SRK Consulting</td>
<td></td>
</tr>
<tr>
<td>08:15</td>
<td>KEYNOTE: BHP long-term tailings strategy</td>
<td>S Newman, BHP, Australia</td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>Achieving the design intent, reducing risk and saving costs of tailings storage facilities</td>
<td>J Coffey, J Plunkett, A Patel, J Oliver, M Gunner, A Carneiro, Rio Tinto, Australia</td>
<td></td>
</tr>
<tr>
<td>09:30</td>
<td>Comprehensive thickening analysis strategy</td>
<td>P Garrido, W Montes, K Andrade, Centro de Investigación JRI S.A., Chile</td>
<td></td>
</tr>
<tr>
<td>10:00</td>
<td>Principal sponsor presentation: SRK Consulting</td>
<td>JJ Moreno, SRK Consulting, Australia</td>
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<tr>
<td>10:05</td>
<td>MORNING TEA</td>
<td></td>
<td></td>
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<tr>
<td>10:35</td>
<td>THICKENING AND FILTRATION (2)</td>
<td>GI McPhail, Water, Waste and Land</td>
<td></td>
</tr>
<tr>
<td>10:35</td>
<td>Towards prediction of cake detachment in tailings filtration</td>
<td>B Fränkle, P Morsch, H Nirschl, Karlsruhe Institute of Technology, Germany</td>
<td></td>
</tr>
<tr>
<td>11:05</td>
<td>Lessons learned from thickening and filtering tailings for dry stacking</td>
<td>D Connelly, METS Engineering Pty Ltd, Australia</td>
<td></td>
</tr>
<tr>
<td>11:35</td>
<td>Assessing oil sands tailings consolidation using a modified benchtop filter press</td>
<td>TH Qureshi, Y Li, A Sedgwick, H Kaminsky, J Ng, Northern Alberta Institute of Technology, Canada</td>
<td></td>
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<tr>
<td>12:05</td>
<td>LUNCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:05</td>
<td>THICKENING AND FILTRATION (3)</td>
<td>C Hore, AngolGold Ashanti</td>
<td></td>
</tr>
<tr>
<td>13:05</td>
<td>Mixing requirement for ultra paste tailings</td>
<td>A Roshdieh, S Javadi, MPA Williams, ATC Williams Pty Ltd, Australia; E Karamad, National Iranian Copper Industries Co., Iran</td>
<td></td>
</tr>
<tr>
<td>13:35</td>
<td>Thickener feedwell internal trough slurry distribution method</td>
<td>SM Viduka, B Henriksson, Metso Outotec, Australia</td>
<td></td>
</tr>
<tr>
<td>14:05</td>
<td>Investigation of geotechnical, hydromechanical and chemical behaviour of polymer-treated tailings</td>
<td>M Boshrouyeh Ghandashtani, M Edraki, The University of Queensland, Australia; A Costine, CSIRO Minerals Resources, Australia; T Baumgartl, Federation University, Australia</td>
<td></td>
</tr>
<tr>
<td>14:35</td>
<td>A comparison of dewatering technologies for fine coal tailings</td>
<td>S Meiring, Ausenco Limited, Australia</td>
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<tr>
<td>15:05</td>
<td>AFTERNOON TEA</td>
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<tr>
<td>15:35</td>
<td>RHEOLOGY</td>
<td>RL Veenstra, Newmont Australia</td>
<td></td>
</tr>
<tr>
<td>15:35</td>
<td>Clay-bearing mine tailings analysis and implications in large filter press design</td>
<td>A Grosso, F Kaswalder, Aqseptence Group S.r.l., Italy; A Hawkey, Aqseptence Group, Australia</td>
<td></td>
</tr>
<tr>
<td>16:05</td>
<td>Online yield stress measurement for real time process control</td>
<td>F Sofrá, Rheological Consulting Services Pty Ltd, Australia; P Bhattacharjee, Rheology Solutions Pty Ltd, Australia</td>
<td></td>
</tr>
<tr>
<td>16:35</td>
<td>Thickened tailings loop test to corroborate the hydraulic Hanks model and Buckingham equation</td>
<td>L Vilela, D Pinto, G Ramos, Brass do Brasil, Brazil</td>
<td></td>
</tr>
<tr>
<td>17:05</td>
<td>EMERGING ISSUES AND TECHNOLOGY</td>
<td>D Rodriguez, BHP</td>
<td></td>
</tr>
<tr>
<td>17:05</td>
<td>The balance between energy and water preservation in the deposition of tailings in wet climates</td>
<td>JB Kruyswijk, Weir Minerals, The Netherlands</td>
<td></td>
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<tr>
<td>17:35</td>
<td>DAY ONE CLOSE</td>
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</tbody>
</table>

*The conference program may be subject to change. The presenter’s name is underlined. Please see acgpaste.com/paste-2021-program for program updates.*
## KEYNOTE ADDRESS & CASE STUDIES

**Chair** J Boshoff, Gold Fields Ltd

### Keynote: Regulation of tailings in Western Australia

08:00  
**Presenter:** D Risbey, Department of Mines, Industry Regulation and Safety, Australia

### Paste thickeners in India's iron and steel industry

08:45  
**Presenters:** JL Johnson, WesTech Engineering, LLC, USA; BP Misra, WesTech Process Equipment India Pvt Ltd, India

### The benefits of integrating long-term tailings and mine plans

09:15  
**Presenters:** J Coffey, J Plunkett, A Carneiro, Rio Tinto, Australia

### Dam break analysis for BRDA 5 at Worsley Alumina Refinery

09:45  
**Presenters:** GI McPhail, Water, Waste and Land, Australia; South32, Australia; Water, Waste and Land, Australia

### MORNING TEA

10:15

## SURFACE DISPOSAL

**Chair** A Carneiro, Rio Tinto

### Some considerations when preparing thickened tailings for shear strength testing in the laboratory from a slurry

10:45  
**Presenters:** D Reid, The University of Western Australia, Australia; R Fanni, Golder Associates, Australia; AB Fourie, The University of Western Australia, Australia

### The geomechanics of thickened and paste tailings

11:15  
**Presenter:** K Seddon, ATC Williams Pty Ltd, Australia

### Numerical modelling of dry stacking tailings heaps

11:45  
**Presenters:** GC Vizcarra, Vale S.A., Brazil

### Revaluing paste and thickened tailings for large tonnage applications

12:15  
**Presenters:** AJ Vietti, Vietti Slurrytec (Pty) Ltd, South Africa

### LUNCH

12:45

## TRANSPORTATION (1)

**Chair** J Oliver, Rio Tinto

### A simple test to determine the settling behaviour of slurries in piston diaphragm pumps

13:45  
**Presenters:** H Krimpenfort, D Nägel, Feluwa Pumpen GmbH, Germany

### Safety and efficiency benefits from using automated diverter valves on Kirkland Lake Gold Fosterville mine's paste reticulation system

14:15  
**Presenters:** R Evans, Kirkland Lake Gold, Canada; G Trinker, Victaulic Co., USA; M Carriere, Victaulic Co., Canada

### AFTERNOON TEA

14:45

## TRANSPORTATION (2)

**Chair** L McDonald, Fortescue Metals Group Ltd

### Pulsation reduction system for positive displacement pumps

15:15  
**Presenters:** T Hendriks, R Jansen, MHWirth GmbH, Germany

### Steel wire reinforced pipe: the new technology for paste reticulation

15:45  
**Presenters:** MB Revell, RT Pearce, Backfill Pipeline Solutions Pty Ltd, Australia

## INSTRUMENTATION AND MONITORING OF TAILINGS

**Chair** W Dressel, Red Earth Engineering

### Tailings storage facility surface moisture mapping for prediction of dusting events, and other benefits

16:15  
**Presenters:** J Thompson, L McDonald, Fortescue Metals Group, Australia; J Kelcey, NGIS Australia International (Aust) Pty Ltd, Australia; J Dixon, Fortescue Metals Group, Australia

### Operational optimisation of a tailings storage facility based on statistical analysis of historical monitoring records

16:45  
**Presenters:** J Ezama, S Pastine, SRK Consulting, Argentina; J Pinheiro, AngloGold Ashanti Ltd, South Africa

### DAY TWO CLOSE

17:15

### CONFERENCE DINNER - BATHERS BEACH HOUSE

18:30

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**Personal Development Hours**

Participation in this event may contribute towards your professional development accreditation. The ACG makes no guarantee of this and recommends you contact your respective professional organisation/s. The ACG can provide a certificate of attendance at an ACG further education and training event, post-event attendance. Please contact info-acg@uwa.edu.au for details.

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<table>
<thead>
<tr>
<th>Time</th>
<th>Session Title</th>
<th>Speaker(s)</th>
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</thead>
<tbody>
<tr>
<td>08:30</td>
<td>KEYNOTE: Using instrumentation in underground backfill systems</td>
<td>RL Veenstra, Newmont Australia, Australia</td>
</tr>
<tr>
<td>09:15</td>
<td>Optimisation of backfill operations at Mavres Petres mine</td>
<td>E Palatos, Eldorado Gold Corporation, Greece; M Yumlu, Backfill Geotechnical Mining Consultants Pty Ltd, Australia</td>
</tr>
<tr>
<td>09:45</td>
<td>Investigation on inhomogeneous properties of backfill samples to explore a new quantitative criterion for cemented paste backfill identification</td>
<td>XP Peng, LJ Guo, GS Liu, XC Yang, CC Wan, BGRIMM Technology Group, China</td>
</tr>
<tr>
<td>10:15</td>
<td>In situ backfill monitoring database</td>
<td>J Oke, A Hashemi, RockEng Inc., Canada</td>
</tr>
<tr>
<td>10:45</td>
<td>MORNING TEA</td>
<td></td>
</tr>
<tr>
<td>11:15</td>
<td>Strain localisation behaviour of cemented paste backfill</td>
<td>Y Zhao, LJ Guo, BGRIMM Technology Group, China; A Taheri, M Karakus, A Derg, The University of Adelaide, Australia</td>
</tr>
<tr>
<td>11:45</td>
<td>Paste backfill continuous pour: Red Lake operations case study</td>
<td>J Oke, RockEng Inc., Canada; K Hawley, Evolution Mining, Canada; T Belem, Université du Québec en Abitibi-Témiscamingue, Canada; A Hashemi, RockEng Inc., Canada</td>
</tr>
<tr>
<td>12:15</td>
<td>The development and practice of new quick-setting paste filling materials prepared by total industrial wastes</td>
<td>AX Wu, GZ Jiang, YM Wang, ZE Ruan, University of Science and Technology Beijing, China</td>
</tr>
<tr>
<td>12:45</td>
<td>A comparison of cemented paste backfill shotcrete barricade design methods</td>
<td>RL Veenstra, Newmont Australia, Australia; X Zhao, AB Fourie, The University of Western Australia, Australia; JJ Grobler, Newmont Corporation, USA</td>
</tr>
<tr>
<td>13:15</td>
<td>LUNCH</td>
<td></td>
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<tr>
<td>14:15</td>
<td>Paste backfill thermal contraction: Red Lake operations case study</td>
<td>J Oke, RockEng Inc., Canada; K Hawley, Evolution Mining, Canada; T Belem, Université du Québec en Abitibi-Témiscamingue, Canada; A Hashemi, RockEng Inc., Canada</td>
</tr>
<tr>
<td>14:45</td>
<td>The new cemented paste backfill recipes selection method at Newmont Éléonore mine</td>
<td>C Carlier, RL Veenstra, Newmont Australia, Australia</td>
</tr>
<tr>
<td>15:15</td>
<td>The effect of changing grinding cycle on the flowability of cemented paste backfill: effect of particle size distribution</td>
<td>A Safarizadeh, A Taheri, The University of Adelaide, Australia</td>
</tr>
<tr>
<td>15:45</td>
<td>AFTERNOON TEA</td>
<td></td>
</tr>
<tr>
<td>16:15</td>
<td>Optimising the design stability of cemented paste backfilled stopes</td>
<td>RL Veenstra, Newmont Australia, Australia; JJ Grobler, Newmont Corporation, USA</td>
</tr>
<tr>
<td>16:45</td>
<td>Closing address</td>
<td>D Reid, Paste 2021 Conference Co-Chair, The University of Western Australia, Australia</td>
</tr>
<tr>
<td>17:00</td>
<td>CONFERENCE CLOSE</td>
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*The conference program may be subject to change. The presenter’s name is underlined. Please see acgpaste.com/paste-2021-program for program updates.*
IS THE FUTURE FILTERED? PASTE AND THICKENED TAILINGS SHORT COURSE

20 SEPTEMBER 2021 | ONLINE | SIRIUS BALLROOM, ESPLANADE HOTEL, FREMANTLE, WESTERN AUSTRALIA

Drawing on experiences from a number of operational filtered tailings facilities, this short course will discuss available technologies, appropriate test programs to determine relevant design parameters, operational challenges and cost comparisons.

This course will be held as a traditional physical event in Fremantle, Western Australia, COVID-19 permitting, as well as an online event.

For full details on course presenters, visit acgpaste.com/associated-event

Program*

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<thead>
<tr>
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<tr>
<td>07:45</td>
<td>REGISTRATION</td>
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<tr>
<td>08:30</td>
<td>Welcome and introduction</td>
</tr>
<tr>
<td>08:30</td>
<td>Professor Andy Fourie, The University of Western Australia</td>
</tr>
<tr>
<td>09:00</td>
<td>Evaluation of material properties to enable the selection of appropriate filter technology</td>
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<tr>
<td>09:45</td>
<td>Harnessing the benefits</td>
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<tr>
<td>10:30</td>
<td>MORNING BREAK</td>
</tr>
<tr>
<td>11:00</td>
<td>Design versus field performance</td>
</tr>
<tr>
<td>11:45</td>
<td>Tailings – the inevitable variable</td>
</tr>
<tr>
<td>12:30</td>
<td>Open discussion: Choosing the most appropriate filtration technology</td>
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<tr>
<td>13:00</td>
<td>LUNCH</td>
</tr>
<tr>
<td>14:00</td>
<td>The 2016 failure of a red mud filter stack in Luoyang, China</td>
</tr>
<tr>
<td>14:45</td>
<td>Filtered (‘dry-stack’) TSFs: strength and structural zone at the design stage</td>
</tr>
<tr>
<td>15:30</td>
<td>AFTERNOON BREAK</td>
</tr>
<tr>
<td>16:00</td>
<td>Establishing an independent, global tailings management institute</td>
</tr>
<tr>
<td>16:30</td>
<td>Open discussion: Geotechnical considerations – testing and field verification</td>
</tr>
<tr>
<td>17:30</td>
<td>COURSE CLOSE</td>
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*The short course program may be subject to change. Please see acgpaste.com/associated-event for program updates.

Collaborating Organisations

FUTURE TAILS

Course facilitator:
Professor Andy Fourie
Professor of Civil & Mining Engineering and Program Director - Future Tails, The University of Western Australia

Personal Development Hours

UP TO 6.5 PD HOURS
CONFERENCE VENUE – ESPLANADE HOTEL, FREMANTLE

Esplanade Hotel, Fremantle
46-54 Marine Terrace, Fremantle WA 6160

Esplanade Hotel, Fremantle has a rich history dating back to 1850. The hotel is an iconic landmark in Western Australia.

For full information on discounted accommodation and conference delegate parking at the hotel, visit acgpaste.com/venue

CONFERENCE DINNER – BATHERS BEACH HOUSE

Venue: Bathers Beach House
47 Mews Road, Fremantle WA 6160
bathersbeachhouse.com.au

Date: Wednesday 22 September 2021
Time: 6:30–10pm

We look forward to welcoming Paste 2021 delegates to the Bathers Beach House first floor function space which features stunning floor to ceiling glass providing 180° panoramic views of Fremantle’s iconic Bathers Beach.
paste 2021 hybrid conference (2115)  
21–23 september 2021

<table>
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<th></th>
<th>standard</th>
<th>acg affiliate†</th>
<th>student^</th>
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<tr>
<td>paid after 6 aug 2021</td>
<td>1,980</td>
<td>1,760</td>
<td>550</td>
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^ students are required to provide proof of full-time enrolment.
† acg.uwa.edu.au/corporate-affiliate

paste 2021 conference dinner  
22 september 2021

conference papers will be accessible at papers.acg.uwa.edu.au  
from 13 september 2021.

paste 2021 conference printed proceedings  
(softbound, colour) (conference special)

is the future filtered? paste and thickened tailings  
hybrid short course (2114)  | 20 september 2021

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<tr>
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<td>990</td>
<td>770</td>
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^ additional aCG publication purchase.  
full range at acg.uwa.edu.au/shop

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CRICOS Code: 00126G

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PAYMENT

Total payment AUD __________________

Payment to be received by 17 september 2021. All bank fees are the responsibility of the registrant. All prices include GST.

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