

TABLE OF CONTENTS

Australian Centre for Geomechanics	iii
Committees	v
Reviewers.....	vi
Preface.....	vii
Sponsors.....	ix

P&TT – A DECADE ON

A personal perspective on paste and thickened tailings – a decade on	3
<i>D.V. Boger, Monash University; and The University of Melbourne, Australia</i>	

THICKENING

Keynote address

Dewatering to higher densities – an industry review	19
<i>F. Schoenbrunn, FLSmidth Inc., USA</i>	

Design and operational experience of the Cerro Lindo filtered tailings deposit.....	25
<i>J.L. Lara, Golder Associates Peru S.A., Peru; E. León, Compañía Minera Milpo S.A.A., Peru</i>	

Innovative coal refuse dewatering system	39
<i>M.J. Niederhauser, K. Wilson, FLSmidth Inc., USA</i>	

Paste dewatering with the Boozer disc filter	45
<i>J. Hahn, R. Bott, T. Langeloh, BOKELA GmbH, Germany</i>	

Optimising unit operations in paste dewatering	57
<i>J. Palmer, V. Viswanathan, Outotec Pty Ltd, Australia</i>	

Tailings treatment and water option study.....	67
<i>R. Harrison, AMEC Minproc, Australia</i>	

Pilot and full-scale validation of thickener and feedwell modelling	81
<i>P.D. Fawell, K. Simic, K. Mohanarangam, J.B. Farrow, Parker Centre (CSIRO Process Science and Engineering), Australia; D.W. Stephens, Parker Centre (CSIRO Mathematical and Information Sciences), Australia; M. Rudman, D. Paterson, CSIRO Mathematical and Information Sciences, Australia; W. Yang, CSIRO Process Science and Engineering, Australia</i>	

Challenges in the design of pilot tests.....	93
<i>S. Barrera, P. Chacón, H. Quelopana, ARCADIS, Chile; M. Becerra, ASMIN Industrial Ltda.</i>	

Collahuasi paste thickener – pilot and full scale results	101
<i>C. Loan, Outotec Pty Ltd, Australia; M.L. Villanueva, N. Saldia, Compañía Minera Doña Inés de Collahuasi, Chile</i>	

Caserones Project – analysis and interpretation of pilot tests results.....	111
<i>H. Quelopana, P. Chacón, S. Barrera, ARCADIS, Chile; R. Orellana, Caserones Project, Chile</i>	

RHEOLOGY

Rheology for thickened tailings and paste – history, state-of-the-art and future directions	121
<i>F. Sofrà, Rheological Consulting Services Pty Ltd, Australia; D.V. Boger, Monash University; and The University of Melbourne, Australia</i>	

Step change improvements in underflow rheology.....	135
<i>A. Berger, S. Adkins, BASF Construction Polymers, Germany; S. Hess, BASF SE, Germany; I. Flanagan, P. Stocks, BASF Performance Products, UK</i>	

Ore types impact on flocculation and the treatment strategies for different types of oil sand tailings.....	143
<i>X.S. Yuan, Syncrude Canada Ltd., Canada</i>	

Mature fine tailings drying – technology update	155
<i>P.S. Wells, A. Revington, O. Omotoso, Suncor Energy Inc., Canada</i>	

A technique for measuring the reduction of yield stress of thickened tailings.....	167
<i>E.U. Pornillos, Golder Associates Peru S.A.; Golder Paste Technology Ltd., Peru</i>	
The rheology and flow behaviour of fly ash and brine paste slurries.....	175
<i>Y. Maree, Sasol Technology R&D, South Africa; P.L. Moolman, F.P. van Sittert, A.J.C. Paterson, Paterson & Cooke, South Africa</i>	

TAILINGS DISPOSAL

Keynote address

Paste and thickened tailings – friend against acid and metalliferous drainage?.....	187
<i>G.M. Mudd, Monash University, Australia</i>	

Case study – bauxite residue management at Rio Tinto Alcan Gove, Northern Territory, Australia [®]	203
<i>H. Li, S. Pedrosa, A. Canfell, Rio Tinto Alcan, Australia</i>	

Oil sands tailings dewatering – can it be done?.....	213
<i>S. Longo, R. Francoeur, M. Labelle, Golder Paste Technology Ltd., Canada; I. Wislesky, Golder Associates Ltd., Canada</i>	

Thickened tailings disposal at Musselwhite Mine	225
<i>S. Kam, Golder Associates Ltd., Canada; J. Girard, N. Hmidi, Goldcorp Canada, Canada; Y. Mao, Golder Associates Ltd., Canada; S. Longo, Golder Paste Technology Ltd., Canada</i>	

The Sarcheshmeh thickened tailings disposal project.....	237
<i>L. MacNamara, FLSmidth Ltd, UK; N. Khoshniaz, National Iranian Copper Industries Company, Iran; S. Hashemi, CanyMes Engineering and Technical Services, Iran</i>	

Salitre Project – dewatered phosphate rocks tailings as alternatives to conventional tailings disposal, Vale Fertilizantes Minas Gerais State, Brazil	245
<i>M. e Silva Marques, J.L. Lara, Golder Associates Peru S.A., Peru; P. Primeau, Golder Paste Technology Ltd., Canada; F. Palkovits, Mine Paste Engineering, Canada; N. Kuyucak, Golder Paste Technology Ltd., Canada; L.L.A.C. Costa, Vale Fertilizantes, Brazil</i>	

Case study – operation of three paste disposal facilities	261
<i>R.A. Cooper, M.E. Smith, Stefanutti Stocks Mining Services, South Africa</i>	

Field trials of thin-lift deposition of amended mature fine tailings at the Muskeg River Mine in Northern Alberta	271
<i>J.G. Matthews, N. Dhadli, P. House, Shell Canada, Canada; P. Simms, Carleton University, Canada</i>	

Realistic beach slope prediction and design	281
<i>K.D. Seddon, T.G. Fitton, ATC Williams Pty Ltd, Australia</i>	

Analysis of tailings beach slopes based on slurry pipeline experience.....	295
<i>A. Thomas, Slurry Systems Pty Limited, Australia; T.G. Fitton, ATC Williams Pty Ltd, Australia</i>	

Prediction of tailings beach slopes and tailings flow profiles.....	307
<i>A.L. Li, Golder Associates Ltd., Canada</i>	

Beaching angles and evolution of stack geometry for thickened tailings – a review	323
<i>P. Simms, Carleton University, Canada; M.P.A. Williams, T.G. Fitton, ATC Williams Pty Ltd, Australia; G. McPhail, Metago Environmental Engineers (Australia) Pty Ltd, Australia</i>	

Design, construction and operation of a partially lined dense phase ash storage facility constructed from mine waste.....	339
<i>T. Mortimer, J. McNicol, CS Energy Ltd, Australia; P. Keefer, W. Ludlow, Golder Associates Pty Ltd, Australia</i>	

TRANSPORT

Keynote address

The pipeline transport of high density slurries – a historical review of past mistakes, lessons learned and current technologies	351
<i>A.J.C. Paterson, Paterson & Cooke, South Africa</i>	

Assessing the flowability of bauxite tailings at East Weipa, Queensland.....	367
D.J. Williams, The University of Queensland, Australia; G. Price, Golder Associates Pty Ltd, Australia; H. Li, Rio Tinto Alcan, Australia	
The laminar/turbulent transition for paste sheet flow	381
P.T. Slatter, Rheology and Materials Processing Centre, RMIT University, Australia; R. Haldenwang, Cape Peninsula University of Technology, South Africa; R.P. Chhabra, Indian Institute of Technology, India	
What's going on in there?.....	389
L. Pullum, Australia	
Performance of different centrifugal slurry pump impeller configurations when pumping thickened tailings	405
A. Sellgren, Luleå University of Technology, Sweden; A. Mustafa, Golder Paste Technology Ltd., Canada; G. Addie, L. Whitlock, GIW Industries Inc., USA	
Diaphragm valve head loss coefficients for coarse particles transported in a non-Newtonian carrier fluid	417
V.G. Fester, A.M. Kabwe, Cape Peninsula University of Technology, South Africa; P.T. Slatter, Rheology and Materials Processing Centre, RMIT, Australia	
Increased capacity with world-class piston diaphragm pumping technology	427
J. Kuenen, GEHO Pumps, Weir Minerals Netherlands b.v., Netherlands	
Direct numerical simulation (DNS) investigation of turbulent open channel flow of a Herschel–Bulkley fluid	439
R. Guang, Rheology and Materials Processing Centre, RMIT University, Australia; M. Rudman, CSIRO Mathematical and Information Sciences, Australia; A. Chryss, CSIRO Process Science and Engineering, Australia; P.T. Slatter, S. Bhattacharya, Rheology and Materials Processing Centre, RMIT University, Australia	
Cost and energy-efficient pumping of paste and thickened tailings – the pump ace – quintuplex double hose-diaphragm pump.....	453
H.M. Nägel, FELUWA Pumpen GmbH, Germany	
MINE FILL	
Utilisation of sodium silicate activated blast furnace slag as an alternative binder in paste backfill of high-sulphide mill tailings.....	465
F. Cihangir, B. Erçikdi, Mining Engineering Department, Karadeniz Technical University, Turkey; A. Turan, Koza Altın Isletmeleri, Turkey; A. Kesimal, H. Deveci, Mining Engineering Department, Karadeniz Technical University, Turkey; M. Yazıcı, K. Karaoglu, Cayeli Bakır Isletmeleri, Turkey	
Status and development trends of paste disposal technology with ultra-fine unclassified tailings in China	477
A-X. Wu, H-Z. Jiao, H-J. Wang, S-K. Yang, L. Li, University of Science and Technology Beijing, China; Q-W. Yan, Yunnan Chihong Zn and Ge Co., Ltd, China; H-J. Liu, Inner Mongolia Mining Industry Co. Ltd, China National Gold Group, China	
In situ pressures in cemented paste backfill – a review of fieldwork from three mines.....	491
B.D. Thompson, M.W. Grabinsky, R. Veenstra, W.F. Bawden, University of Toronto, Canada	
Kidd Mine paste fill binder research study.....	505
C.M. Aldea, B.J. Cornelius, AMEC Earth and Environmental, Canada; M. McGuinness, Xstrata Copper, Canada	
Comparison of cemented paste backfill and cemented rock fill systems	517
J.G. Haan, AMEC Mining and Metals, USA	
Admixtures in backfill applications for cost and performance benefits	523
Z. Martic, BASF Construction Chemicals, MEYCO Global Underground Construction, Switzerland; J.E. Gelson, BASF Construction Chemicals, MEYCO Global Underground Construction, Australia; J. Champa, BASF Construction Chemicals, MEYCO Global Underground Construction, USA; B. Knight, BASF Construction Chemicals, MEYCO Global Underground Construction, Canada	
A laboratory study of backfilling bord and pillar voids using fly ash slurry.....	537
D.J. Williams, M. Ramlackhan, D. Spriggs, The University of Queensland, Australia; H. Alehossein, B. Shen, CSIRO, Australia	
Author Index	551