AUSTRALIAN CENTRE FOR GEOMECHANICS

CSIRO | Curtin University | University of WA
Joint Venture

ANNUAL REPORT 05-06

technology transfer research training

contents

JOINT VENTURE PARTNERS

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION AUSTRALIA
Division of Exploration and Mining

CURTIN UNIVERSITY OF TECHNOLOGY
Western Australian School of Mines

THE UNIVERSITY OF WESTERN AUSTRALIA
Department of Civil and Resource Engineering

Cover photographs courtesy of Argyle Diamond Mines and Newmont Asia Pacific.

highlights 2005–2006

The Australian Centre for Geomechanics – Marty Hudyma, project leader – Mine Seismicity and Rockburst Risk Management – Phases I and II; Christine Neskudla, business manager; Yves Potvin, director, Josephine Ruddle, marketing manager; Andy Fourie, principal – environmental geomechanics; and Jill Hollinshead, events and administration

The Australian Centre for Geomechanics realises the importance of clearly identifying industry needs and research capabilities so that strategic themes can be developed and priorities agreed with companies that will fund research projects. The minerals industry continues to demonstrate its confidence in the quality of collaborative research projects facilitated by the ACG.

MINE SEISMICITY AND ROCKBURST RISK MANAGEMENT

Our leading research project continues to advance the responsible application of seismic monitoring systems in Australian and international mines and deliver strategies to quantify and mitigate the risk of mine seismicity and rockbursting. During 2006, Phase III of the project commenced and the team was pleased to have gained the support of 19 sponsors.

HIGH RESOLUTION SEISMIC MONITORING IN OPEN PIT MINES

In 2005 the ACG commenced a new research project into the intricate processes of slope failure in open pit mines in Australia. The project seeks to assist operations to minimise the financial and safety risks associated with potentially catastrophic slope failures by detecting and analysing the early microseismic warning emitted by the failing rock.

HANDBOOK ON MINE FILL

Future land use considerations and evolving community attitudes demand that industry comprehensively explores the use of fill, particularly fill generated from mining waste in a diverse range of underground and surface operations. With contributions from leading mine fill experts, the ACG launched this 179 page hardbound book in March 2005.

PASTE AND THICKENED TAILINGS – A GUIDE (SECOND EDITION)

With sponsorship and contributions from industry practitioners from throughout the world, the ACG launched this hardbound publication at Paste06 in Ireland in April 2006.

TRANSFER OF TECHNICAL KNOWLEDGE

The ACG's geomechanics training and education platform provides a solid base for the transfer of technological developments and practices based on knowledge gathered from local and international sources. More than 1250 mining personnel attended ACG events during 2005 and 2006.

SIXTH INTERNATIONAL SYMPOSIUM ON ROCKBURST AND SEISMICITY IN MINES

More than 150 delegates explored the latest advancements in seismic hazard and risk management, mine design and rockburst damage and support. The staging of RaSiM6 was particularly timely for Western Australia, with mine seismicity and rockbursting becoming an increasingly widespread industry problem.

FACILITATING COORDINATED RESEARCH, TECHNOLOGY TRANSFER AND IMPROVED EDUCATION AND TRAINING IN THE GEOMECHANICS DISCIPLINES

SECOND INTERNATIONAL SEMINAR ON STRATEGIC VERSUS TACTICAL APPROACHES IN MINING

Mining presents significant risks related to uncertainties, but potentially extraordinary rewards to stakeholders. Strategic versus Tactical 2006 provided a forum for over 120 mining professionals to reflect on and exchange their perceptions on how strategic thinking and planning processes are handled by different mining organisations, from global mining houses to small consultancies.

FIRST INTERNATIONAL SEMINAR ON MINE CLOSURE

One of the greatest challenges facing the global mining industry is the issue of economic and socially acceptable closure of mine sites. The ACG, in collaboration with the Centre for Land Rehabilitation, The University of Western Australia, was pleased to attract more than 310 delegates to Mine Closure 2006.

chairman's foreword

Mr Andrew Grubb
chairman

The ACG continues to establish a strong and growing presence which assists the international mining industry to achieve safety, productivity and environmental improvements in all areas covered by the geomechanics discipline.

Collaboration and continued focus on satisfying stakeholder expectations has ensured ongoing support in all core activity areas:

- research focussed on addressing the agreed needs of the mining industry;
- technical transfer of knowledge to related disciplines; and
- ongoing professional development of practitioners in the geomechanics disciplines.

The ACG has established an international reputation for facilitating symposia, seminars and workshops that help identify and share industry best practice. The resulting high quality proceedings, workbooks and definitive texts are in strong demand.

For each of the past six years the ACG has coordinated at least one major international event. 2007 has the challenge of three such events: the 10th International Seminar on Paste and Thickened Tailings, the 2007 International Symposium on Rock Slope Stability in Open Pit Mining and Civil Engineering, and the 4th International Seminar on Deep and High Stress Mining, in addition to an already comprehensive programme of industry focussed courses and workshops.

This exciting programme is only possible due to the consistent efforts of the ACG director, Yves Potvin, and his dedicated and enthusiastic staff. Their efforts are greatly appreciated by all who have any association with the ACG.

The sustained growth in the resource sector has continued to stretch the existing pool of industry practitioners in the geomechanics area. A strong commitment to ongoing professional development is a proven way to attract and retain key professionals.

It was encouraging to see a re-emergence of the Ground Control Group of Western Australia during 2005 and 2006. This independent and impartial body enables underground and open pit geotechnical engineers to meet, discuss and exchange ideas, techniques and experiences in a technical yet informal setting. The GCGWA is considered a valuable resource in providing feedback regarding current research activities and identifying new research concepts and ideas.

The ACG and its Joint Venture partners continue to address the challenges presented by open pits becoming larger and deeper (>500 m), and mechanised mines being developed to >1000 m below surface.

Mine seismicity is an increasingly common occurrence in our efforts to exploit deeper reserves by underground hardrock mining methods. The use of high resolution seismic monitoring in underground mines is now becoming common place. The ACG developed MS-RAP software is proving an effective tool in helping minesite staff to manage the myriad of data and respond more proactively to the hazards posed by mine seismicity and rockbursts.

The use of this technology in open pit applications is at its early stage with numerous worldwide trial installations. Early indications are that this enhanced slope monitoring capability may provide a useful tool to enable progressive slope design and minimise the financial and safety risks associated with potential slope failures. The early detection of slope movement will also allow for a tactical response to avoid or manage loss of slopes.

In 2005, CSIRO Exploration and Mining, led by research director John Read, launched the International Large Open Pit project. This project is aimed at reassessing the fundamentals of rockmass strength and slope failure mechanisms from first principles. The research is supporting parallel streams that seek to bring into the public domain the outcomes of the research, together with all current knowledge about geotechnical data collection and manipulation, uncertainty analysis, slope stability analysis, and risk management via updated slope design and risk management guidelines.

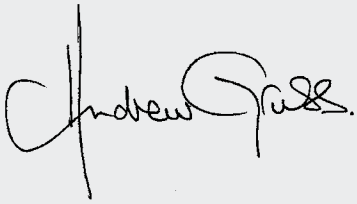
The Western Australian School of Mines (WASM) Rock Mechanics Research Group continues to maintain a strong presence with its ongoing world-class research activities in the following areas:

- characterisation and reconciliation of rock structure, stress and strength;
- discontinuous rock mass analysis;
- optimised excavation design and sequence;
- static and dynamic testing of ground support systems; and
- advanced ground support technology.

During 2005, WASM became a full member of CRC Mining. As well as providing important funding, this move will further strengthen the necessary links between industry, research organisations and education and government institutions that are required to ensure effective research outcomes.

I have the privilege of serving on a board which has an effective blend of university and research providers and industry representatives. It was pleasing to welcome the following new members to the board during the past two years: John Shipp, past regional vice president of Barrick Gold of Australia; and Ian Suckling, director mining, Newmont Asia Pacific, and Associate Professor Graeme Wright, Curtin University of Technology. Unfortunately, during this period we lost the services of John Shipp and Professor Peter Lilly due to other commitments. May I thank fellow board members for their ongoing efforts, involvement and support.

The outlook for most sectors of the Australian mining industry appears buoyant. The ACG requires ongoing and sustained close collaboration with, and encouragement and financial backing from industry to make further advances in mine safety.



Mr Andrew Grubb – chairman

Paste07 will be held in Perth in March 2007

The Mine Seismicity and Rockburst Risk Management team – Paul Harris, Daniel Heal, Yves Potvin and Michelle Owen

director's report

Professor Yves Potvin
director

2005 and 2006 were strong years for the Australian Centre for Geomechanics. Several important milestones were achieved and the Centre continued to grow in a sustainable way.

For the first time in its 13 years of operation, the ACG realised an annual cash flow exceeding one million Australian dollars. The significance of this is that more industry personnel are learning about good geomechanics practices. Mining professionals are purchasing more training materials and reference books, and they are investing more into our world-class research projects. The impact has been noticeable with the Australian mining industry which is now at the forefront of best geomechanics practice and research.

For more than five years, the core research area at the ACG has been mine seismicity. Phase Two of our well known Mine Seismicity and Rockburst Research Project (MSRRP) was completed in 2005. Perhaps the most significant indicator of the outstanding success of this project is the renewal of the industry funding for a further three years. The third phase of the programme commenced in 2006 with a budget exceeding one million Australian dollars. The main deliverable of the initial two phases was the Mine Seismicity Risk Assessment Programme (MS-RAP) software, which is currently being used as a tool to manage seismic risk by fifteen Australian and two Canadian mines. Another significant contribution of the project is the development of "home-grown" mine seismicity specialists. Dr John Albrecht, the latest PhD student to graduate from the MSRRM programme, is to be congratulated.

During 2006 the ACG research project "High Resolution Seismic Monitoring in Open Pit Mines" completed its second year of work. Progress has been slower than expected due mainly to unforeseen delays in the installation of monitoring equipment at sponsors' sites. However, the data collected from BHP Nickel West's Mount Keith Operation has provided a strong indication of the exceptional potential of applying seismic monitoring to manage open pit slope stability.

Providing geomechanics practitioners with better tools to implement best practices in their mines is an increasing focus of the ACG. For many years, there was a well-known gap in the "tool box" of the industry: a reference manual on mine fill. It took over two years of sustained effort from the ACG to produce the landmark reference "Handbook on Mine Fill". Many authors have donated their precious time to write the eleven chapters of this long awaited handbook and the contributions of the core team of authors: Tony Grice, Angus Henderson, Kugan Kuganathan, Adrian Lang, Ed Thomas, as well as many other collaborators are kindly acknowledged.

The Centre has continued its development of training videos/DVDs with the release of "Reading the Ground", a production designed to enable underground metal mining personnel to identify rockfall hazards.

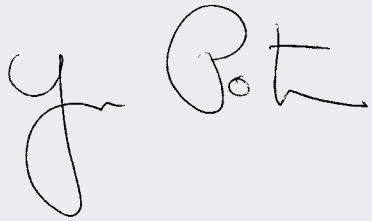
Since 2000, the ACG has organised an annual international event. In 2005, the Centre hosted the 6th International Symposium on Rockburst and Seismicity in Mines (RaSiM6). The symposium attracted more than 150 attendees from 16 countries. The RaSiM6 proceedings were produced in-house by the ACG and contain 78 fully refereed papers of international calibre. This is a valuable source of recent technical reference worldwide in this important area of geomechanics.

The ACG was also delighted to host the 2nd International Seminar on Strategic Versus Tactical Approaches in Mining in March 2006, which attracted more than 120 local and international mining professionals.

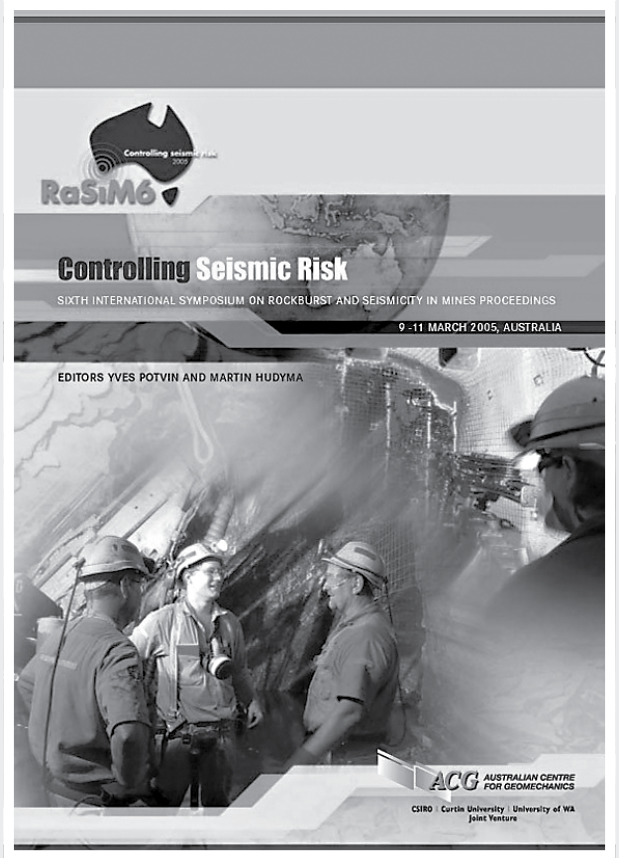
The main growth area for the Centre is environmental geomechanics and tailings, and this has been made possible with the addition of Professor Andy Fourie to our team. In his first year with the Centre, Andy co-edited the Handbook on Mine Fill with Yves Potvin and Ed Thomas, and the "Paste and Thickened Tailings – A Guide (Second Edition)" in collaboration with ACG's former director, now senior consultant, Richard Jewell. Andy has also developed a successful new course on stockpiles and rockdumps, as well as providing multiple on-site training courses at sponsors' sites. Andy chaired the very successful "First International Seminar on Mine Closure" that was held in Perth in March 2006, attracting more than 310 attendees.

The ACG secured the rights to produce the proceedings of the very successful annual series of International Seminars on Paste and Thickened Tailings. During 2005–2006 we published the hardbound proceedings of the "8th International Seminar on Paste and Thickened Tailings", Santiago, Chile, and the "9th International Seminar on Paste and Thickened Tailings", Limerick, Ireland.

The Australian Centre for Geomechanics is now a well-established institution very active internationally with strong expertise in underground mining and environmental geomechanics. The focus in the near future will be to continue our growth in the environmental geomechanics area, whilst the long-term goal will be to expand our foundation of expertise by creating a new expert position focussing on open pit mining.



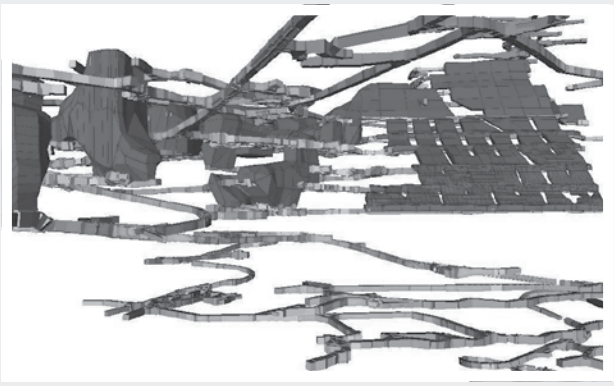
Professor Yves Potvin – director



The ACG provides industry with an excellent source of geomechnical knowledge through our event proceedings

Mine Closure 2006 explored one of the biggest challenges facing industry: the issue of the economic and socially acceptable closure of mine sites

mine seismicity and rockburst risk management – phase II



The seismic hazard mapping technique in MS-RAP provides a significant step forward for seismic data analysis in mines

In January 2002, Phase II of the Mine Seismicity and Rockburst Risk Management project (MSRRM) commenced at the Australian Centre for Geomechanics. Phase II focussed on the development of the Mine Seismicity Risk Analysis Programme (MS-RAP) and was completed in December 2005. The main project objectives were:

- Maximise the use of seismic monitoring data for understanding seismicity in mines.
- Develop a quasi-real-time seismic hazard map.
- Perform seismic risk analyses.

By the end of Phase II, MS-RAP was being used in 15 Australian and 2 Canadian mines.

Rockburst risk is the product of three probability terms incorporating the following key factors:

- Seismic hazard is the probability of initiation of a seismic source to produce a certain magnitude event.
- Excavation vulnerability potential (EVP) is the probability of damage occurring at each excavation site of interest and involves local site characteristics and the proximity of the seismic hazard.
- Workforce exposure is the probability and degree of exposure of elements at risk.

The seismic hazard scale (SHS) can be used to estimate dynamic loading of excavations in terms of the peak particle velocities (PPV). Combining PPV with EVP provides a measure of the rock damage potential (RDP) of the excavation. Phase II produced detailed methodologies for quantitatively describing each of the three key terms; seismic hazard, excavation vulnerability and workforce exposure in order to complete an assessment of rockburst risk in the workplace.

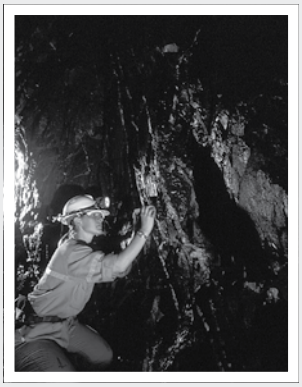
Currently MS-RAP produces maps of seismic hazard (Figure 1) while future versions will incorporate EVP (Figure 2) and exposure measures to move closer to the goal of real-time seismic risk mapping.

ACKNOWLEDGEMENTS

Funding for this project was through the Mine Seismicity and Rockburst Risk Management research project at the Australian Centre for Geomechanics. Phase II of this research project was financially supported by:

- Agnico-Eagle Mines Ltd
- Barrick Gold of Australia Ltd
- BHP Billiton Nickel West
- Gold Fields Australia Pty Ltd
- Harmony Gold Australia Ltd
- Independence Gold Lightning Nickel
- Kalgoorlie Consolidated Gold Mines Pty Ltd
- LionOre Australia Pty Ltd
- Minerals and Energy Research Institute of Western Australia
- Perilya Mines NL
- Placer Dome Asia Pacific

Daniel Heal, project leader – Phases II and III



As many operations mine deeper it is expected that the conditions conducive to mine seismicity and rockbursting will increase

A number of individuals played a significant role in this project:

- Chris Langille was involved in the initial data collection for the excavation vulnerability potential index.
- Adrian Mikula developed a neural network on the mine seismicity survey data and developed the SeisHaz programme.
- Brad Simser provided a number of high quality rockburst case histories for the excavation vulnerability potential index.

Individuals at sponsor mine sites also provided their time, data, constructive comments, and inspiration. Alphabetically, these people are: Don Barrett, Richard Butcher, Dianmin Chen, Jim Coxon, Graeme Crone, David Finn, David Gaudreau, Odwyn Jones, Emma Kinnersly, Ronald Lachenicht, Peter Mikula, Ben Morin, Ellen Morton, John Player, Peter Saunders, John Slade, Iain Thin, Duncan Tyler, Francois Vezina, and Mekoya Wondrad.

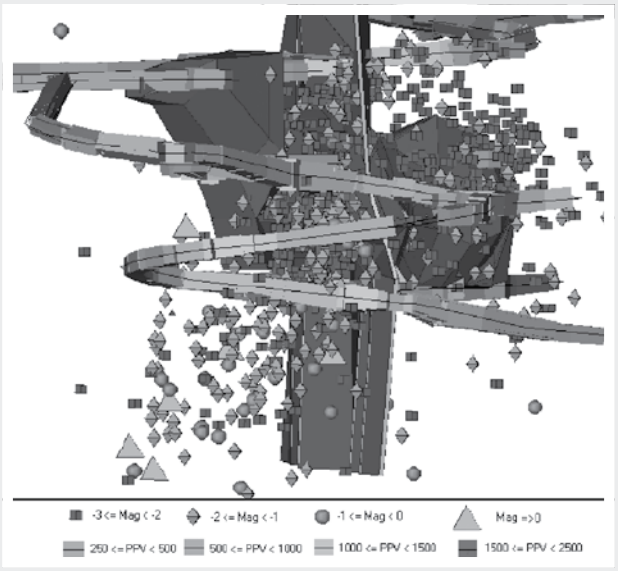


Figure 1 Three dimensional mine plan plotting with MS-RAP, showing the location of seismic events, mine stopes and a mine fault. Mine development is shown by far field PPV based on the seismic hazard associated with the seismic events

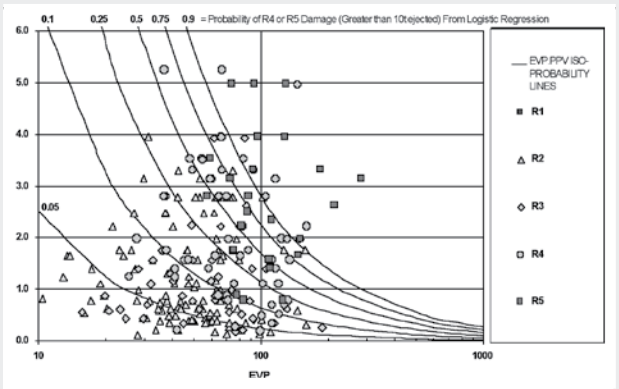


Figure 2 EVP versus estimated PPV for 254 damage locations showing rockburst damage potential isolines compared to the Rockburst Damage Scale (RDS) (Heal et al., 2006)

high resolution seismic monitoring in open pit mines

Gordon Sweby, project leader

The ACG research project entitled "High Resolution Seismic Monitoring in Open Pit Mines" continued into its second year during 2005 and 2006. This three-year project is sponsored by BHP Billiton Nickel West, Xstrata Zinc Mount Isa Mines and The Minerals and Energy Research Institute of WA (MERIWA), and aims to minimise the financial and safety risks associated with slope instability by detecting and analysing the early microseismic warning emitted by the rock.

Microseismic monitoring has been used in underground mines for over 20 years. It is a well established and powerful technology that essentially captures the vibration signal emitted by rock mass failure. High resolution seismic monitoring deploys a dense array of sensors resulting in high monitoring sensitivity. It can identify the location of fracture initiation with precision and has the potential to provide detailed information on the fracture processes and mechanisms. To date, there has been no systematic study on the application of high resolution seismic monitoring to the problem of open pit slope stability and thus there is an opportunity to significantly enhance the capability to monitor pit slopes. In addition to the early detection of deep-seated and/or surface instability, it has the potential to identify new stress induced slope failure mechanisms and enhance numerical modelling capabilities.

Monitoring at BHP Billiton Nickel West's Mt Keith Operation. Photographs courtesy of BHP Billiton Nickel West

Two research sites have been provided by the sponsors, namely BHP Billiton Nickel West's Mt Keith Operation in Western Australia and Xstrata Zinc's Black Star Open Cut at Mt Isa in Queensland. At Mt Keith the project took the form of initial trials to establish the optimum monitoring location, while Black Star opted for a full high resolution array from the outset.

Mt Keith is progressing with the trials and data collected from trial array, consisting of six uniaxial geophones installed in three, approximately 200 m deep drillholes, was encouraging and demonstrates that significant microseismic activity is associated with open pit walls, even at modest depths. Significant differences between the characteristics of the seismicity when compared with underground data were also found. These characteristics will be the subject of further research once the full high resolution array swings into action.

Black Star Open Cut later joined the project and has not yet installed their high resolution seismic array. Hardware is on-site and drilling for sensor installation was completed in February 2007.

The Black Star site offers a unique opportunity to monitor, from a stress/deformation perspective, the progression of the pit floor with depth and the interaction with underground voids.

The ACG acknowledges the financial support and in-kind contributions made by the sponsors.

ADVANCING THE UNDERSTANDING OF

SLOPE FAILURE IN OPEN PIT MINES

geomechanics education and training courses

As mining practices and applications continue to rapidly evolve, operations need not only highly skilled and experienced workers but also require access to state-of-the-art and highly relevant technology and information. One of the main objectives of the ACG is to provide specialist and advanced training and education for mining personnel and geotechnical practitioners in mining and environmental geomechanics.

The continued success of the ACG's further training and education programme is evident in the consistent high number of mining professionals that attend our events (see Figure 1).

DELIVERING THE LATEST TECHNOLOGIES AND INFORMATION TO THE MINING WORKFORCE

2005 EVENTS

MANAGING ROCK DUMPS AND STOCKPILES

Perth, Western Australia, 26–27 May 2005

RASIM6 – SIXTH INTERNATIONAL SYMPOSIUM ON ROCKBURST & SEISMICITY IN MINES

Perth, Western Australia, 9–11 March 2005

RaSiM6 was held in conjunction with The AusIMM's 9th Underground Operators' Conference (7–9 March 2005)

GROUND SUPPORT IN MINING

Brisbane, Queensland, 5–8 April 2005

ADVANCED GEOMECHANICS SEMINAR SERIES

A series of four 1-day workshops.

Sirovision—3D Mapping for Open Pit and Underground Applications; Numerical Modelling and Seismic Monitoring; New Developments in Ground Support and Case Studies; and FLAC^{3D}

Perth, Western Australia, 2–5 August 2005

BLASTING FOR STABLE SLOPES

Perth, Western Australia, 6–7 October 2005

UNDERGROUND MINING SEMINAR SERIES

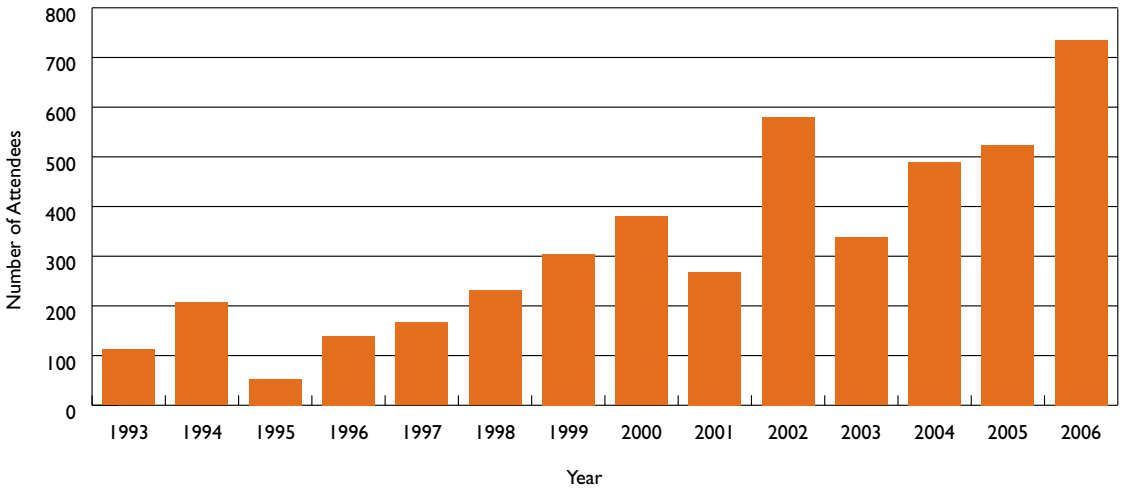
Open Stope Mining Geomechanics and Caving Geomechanics

Perth, Western Australia, 25–28 October 2005

TAILINGS AND PASTE MANAGEMENT, AND DECOMMISSIONING AND WATER MANAGEMENT

Perth, Western Australia, 30 November – 2 December 2005

Figure 1 ACG Symposia, Seminar and Course Attendances 1993–2006



geomechanics education and training courses

2006 EVENTS

GEOMECHANICS REGULATIONS, RISKS AND LIABILITIES

Perth, Western Australia, 7 March 2006

SECOND INTERNATIONAL SEMINAR ON STRATEGIC VERSUS TACTICAL APPROACHES IN MINING

Perth, Western Australia, 8–10 March 2006

GEOTECHNICAL ENGINEERING FOR OPEN PIT MINES

Perth, Western Australia, 3–5 May 2006

DEVELOPMENT AND PRODUCTION BLASTING IN UNDERGROUND MINES

Perth, Western Australia, 2–3 August 2006

PREPARING AND IMPLEMENTING A TAILINGS STORAGE FACILITY OPERATIONS MANUAL

Perth, Western Australia, 11 September 2006

FIRST INTERNATIONAL SEMINAR ON MINE CLOSURE

Perth, Western Australia, 13–15 September 2006

BLASTING FOR STABLE SLOPES

Perth, Western Australia, 5–6 October 2006

GROUND SUPPORT IN OPEN PIT AND UNDERGROUND MINES

Perth, Western Australia, 31 October – 3 November 2006

GEOSYNTHETICS IN MINING SEMINAR

Perth, Western Australia, 6–8 December 2006

ON THE HORIZON

TENTH INTERNATIONAL SEMINAR ON PASTE AND THICKENED TAILINGS

Perth, Western Australia, March 2007

Initiated by the ACG, this annual event returns home after being held in countries such as South Africa, Ireland, Chile and Canada. Paste07 will explore the latest advances in the preparation, transportation and deposition of paste and thickened tailings (P&TT) that will be reinforced by current case studies, The seminar will also address the important part that P&TT plays in incremental rehabilitation and its impact on mine closure goals.

2007 INTERNATIONAL SYMPOSIUM ON ROCK SLOPE STABILITY IN OPEN PIT MINING AND CIVIL ENGINEERING (TO BE HELD IN CONJUNCTION WITH THE AUSIMM'S SIXTH LARGE OPEN PIT MINING CONFERENCE)

Perth, Western Australia, September 2007

Globally, open pits are being planned to significant depths, often beyond industry's current experience and knowledge base. Present understanding of the mechanisms of slope behaviour and failure, and methods of stability analysis for such slopes, is considered to be lacking. In an attempt to bring together the state-of-the-art developments in these fields, as well as new research and developments, the ACG is pleased to host Slope Stability 07.

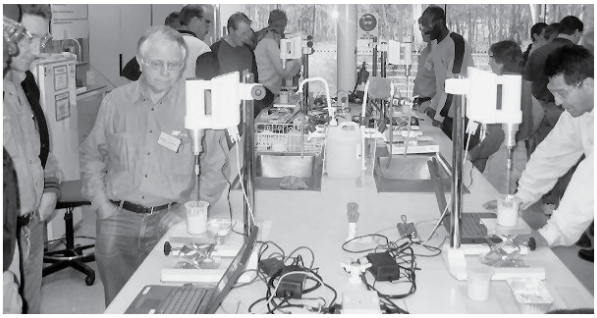
www.slopestability07.com

FOURTH INTERNATIONAL SEMINAR ON DEEP AND HIGH STRESS MINING

Perth, Western Australia, November 2007

As industry matures in many regions of the world, its future becomes increasingly dependant on its ability to exploit deep mineral resources safely and efficiently. As such, mining in a deep and high stress environment poses specific engineering challenges and, in some cases, elevated risks. This ACG seminar will provide industry with a forum to share its experiences and knowledge.

www.deepmining07.com



FIRST INTERNATIONAL SEMINAR ON THE MANAGEMENT OF ROCK DUMPS, STOCKPILES AND HEAP LEACH PADS

Perth, Western Australia, March 2008

As mining practices result in deeper mines so does the need to effectively manage the resulting rock dumps, stockpiles and heap leach pads. Rock Dumps 08 will explore slope failure, environmental and rehabilitation issues, landform modelling, acid mine drainage, geosynthetics and hydrological implications.

www.rockdumps08.com

FIRST SOUTHERN HEMISPHERE INTERNATIONAL ROCK MECHANICS SYMPOSIUM

Perth, Western Australia, September 2008

Following the model of the North American Rock Mechanics Symposium, recently re-badged the Canada-US Rock Mechanics Symposium, the ACG aims to create a similar forum in the southern hemisphere involving the very active South American, South African, Asian, New Zealand and Australian rock mechanics communities. The three main technical streams are mining rock mechanics, civil rock mechanics and fundamental rock mechanics.

www.shirms.com

financial statement 2005–2006

BALANCE SHEET AS AT 31 DECEMBER 2006

	2006 A$	2005 A$	2004 A$
Cash	795,260	357,145	336,185
Receivables	11,021	28,427	26,920
Total current assets	806,281	385,572	363,105
Plant & equipment	80,600	77,915	60,566
Total non-current assets	80,600	77,915	60,566
Total assets	886,881	463,487	423,671
Creditors and borrowings	8,606	24,988	8,739
Provisions (leave liabilities)	128,538	111,479	84,523
Total current liabilities	137,144	136,467	93,262
Net assets	749,737	327,020	330,409
Shareholder's equity			
Partner contributions	243,980	243,980	243,980
Retained profits/acc (losses)	505,757	83,040	86,429
Total shareholder's equity	749,737	327,020	330,409

The balance sheet should be read in conjunction with the accompanying notes.

PROFIT & LOSS FOR THE YEAR ENDED 31 DECEMBER 2006

	2006 A$	2005 A$	2004 A$
Income			
Affiliate membership fees	60,545	57,000	67,000
Sponsorship environmental position	100,000	100,000	0
Project administration	63,154	54,026	58,553
Project income – staff time	102,027	133,263	134,806
Project income – reimbursements	21,813	20,483	0
Course fees and sponsorships	1,110,927	499,169	532,981
Publications & training materials	141,664	131,046	80,762
Publications sponsorships	39,000	45,067	15,000
Government grants	0	0	0
Interest	0	4,357	3,051
Profit on trade-in of vehicle	0	0	168
UWA student & research allocation	65,921	36,585	41,663
Industry funding student projects	46,860	10,000	10,000
Total income	1,751,911	1,090,996	943,984
Expenses			
Personnel	613,064	540,755	346,265
Personnel – relocation expenses	0	25,012	0
Provisions – personnel	128,538	111,479	84,523
Office space incl. furniture	32,035	32,403	37,885
Project related expenses	43,442	25,633	15,554
Courses, training and royalties	363,262	268,835	337,137
Travel, conferences & MV allowances	21,657	15,306	13,980
Operating overheads incl. printing	51,209	54,905	56,883
Professional services	15,300	25,200	25,200
Depreciation	17,573	15,910	12,363
Loss on trade-in of vehicle	20,757	4,468	0
Printing of books	33,759	38,506	33,803
Student related expenses incl. student projects	116,023	20,496	41,892
Total expenses	1,456,619	1,178,908	1,005,485
Net profit (loss)	295,292	-87,912	-61,501
Opening retained earnings	-169,545	-81,633	-20,132
Closing retained earnings	125,747	-169,545	-81,633

The profit & loss account should be read in conjunction with the accompanying notes.

financial statement 2005–2006

STATEMENT OF CASHFLOWS
Year Ended 31 December 2006

	2006 A$	2005 A$	2004 A$
Cash flow from operating activities			
Receipts from customers	1,748,833	1,086,416	951,890
Payments to suppliers and employees	–1,285,649	–1,032,086	–899,861
Government grants	0	0	0
Interest received	0	4,357	3,051
Net cash flows from/(used in) operating activities	463,184	58,687	55,080
Cash flows from investing activities	0	0	0
Acquisitions of plant & equipment	–25,069	–37,727	–42,245
Net cash flows from/(used in) investing activities	–25,069	–37,727	–42,245
Cash flows from financing activities			
Partners contributions	0	0	0
Net cash flows from (used in) financing activities	0	0	0
Net increase/(decrease) in cash held	438,115	20,960	12,835
Add: Opening cash brought forward	357,145	336,185	323,350
Closing cash carried forward	795,260	357,145	336,185

The statement of cash flows should be read in conjunction with the accompanying notes.

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS AT 31 DECEMBER 2006

1 Summary of Significant Accounting Policies

The financial statements have been prepared in accordance with the historical cost convention. Cost in relation to assets represents the cash amount paid or the fair value of the asset given in exchange.

The financial statements have been made out in accordance with applicable accounting standards.

The accounting policies adopted are consistent with those of the previous year unless otherwise specified.

(a) Depreciation

Depreciation is provided on a straight line basis on all tangible fixed assets, other than freehold land, at rates calculated to allocate their cost or valuation less estimated residual value, against the revenue derived over their estimated useful lives.

(b) Income Tax

Tax effect accounting procedures are not applied as the Australian Centre for Geomechanics is a tax free research and education centre run on a not for profit basis.

(c) Income Recognition

Government grants are recorded as income when received.

Membership fees are recognised as income in line with the membership period covered in the subscription.

(d) Employee Entitlements

Provision is made for long service leave and annual leave estimated to be payable to employees on the basis of statutory and contractual requirements. Vested entitlements are classified as current and non-current liabilities.

The contributions made to superannuation funds by the entity are charged against profit.

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
AT 31 DECEMBER 2006 (continued)

		2006 A$	2005 A$	2004 A$
2	Operating Profit/(Loss)			
a.	The operating profit/(loss) before income tax is arrived at after charging/(crediting) the following items			
	Depreciation – plant & equipment	17,573	15,910	12,363
	Provision for employee entitlements	128,538	111,479	84,523
b.	Included in the operating profit/ (loss) are the following items of operating revenue			
	Affiliate membership fees	60,545	57,000	67,000
	Industry funding environmental position	100,000	100,000	0
	Industry funding special projects	46,860	10,000	10,000
	Project administration and staff time	186,994	207,772	193,359
	Course fees and sponsorships	1,110,927	499,169	532,981
	Publications and training materials	141,664	131,046	80,762
	Interest – other persons/corporations	0	4,357	3,051
	Profit on sale of vehicles	0	0	168
	Industry sponsorships for publications	39,000	45,067	15,000
	UWA student and research allocation	65,921	36,585	41,663
	Total revenue	1,751,911	1,090,996	943,984
3	Receivables			
	Other debtors	11,021	28,427	26,920
	Partners receivables	0	0	0
	Total receivables	11,021	28,427	26,920
4	Plant & Equipment			
	At cost	176,097	170,217	142,872
	Provision for depreciation	-95,497	-92,302	-82,306
	Total plant & equipment	80,600	77,915	60,566

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
AT 31 DECEMBER 2006 (continued)

		2006 A$	2005 A$	2004 A$
5	Creditors & Borrowings (current)			
	Trade creditors and accruals	8,606	24,988	8,739
6	Provisions (current)			
	Employee entitlements	128,538	111,479	84,523
7	Partner Contributions			
	CSIRO opening/closing balance	60,320	60,320	60,320
	WA School of Mines opening/closing balance	60,320	60,320	60,320
	UWA Geomechanics opening/closing balance	60,520	60,520	60,520
	UWA Geology	60,320	60,320	60,320
	DME* (now DoIR) opening/closing balance * contribution mainly provided in-kind	2,500	2,500	2,500
	Total partner contributions	243,980	243,980	243,980
8	Statement of Cash Flows			
	Reconcilitation of net profit/(loss) to the net cash flow from operations			
	Net profit/(loss)	295,292	-87,912	-61,501
	Changes in assets & liabilities			
	– Other debtors	17,406	-1,507	18,303
	– Trade creditors and accruals	-16,382	16,249	1,560
	– Employee entitlements provision	128,538	111,479	84,523
	Depreciation	17,573	15,910	12,363
	Loss on sale of vehicles	20,757	4,468	-168
	Net cash flow from operating activities	463,184	58,687	55,080

We gratefully acknowledge the support of Mr Ian Thorson – Faculty Accountant, University of Western Australia, who provided support in the preparation of the asset register.

publications

The Australian Centre for Geomechanics provides industry with an excellent source of geomechanical knowledge through our event proceedings and research reports. In response to industry need for high quality, comprehensive and state-of-the-art information the ACG now produces peer and technically reviewed symposium and seminar proceedings.

During 2005–2006 the following international event proceedings were published by the ACG.

Potvin, Y. and Hudyma, M. (2005) Controlling Seismic Risk. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Australian Centre for Geomechanics, ISBN 0-9756756-1-3, Perth, Australia, 9–11 March 2005, 464 pages.

Jewell, R.J. and Barrera, S. (2005) Proceedings 8th International Seminar on Paste and Thickened Tailings. ISBN 0-9756756-3-X, Santiago, Chile, Australian Centre for Geomechanics, April 2005, 421 pages.

Potvin, Y. (2006) Proceedings 2nd International Seminar on Strategic Versus Tactical Approaches in Mining. Australian Centre for Geomechanics, Perth, Australia, 8–10 March 2006, 42 Sections.

Jewell, R.J., Lawson, S. and Newman, P. (2006) Proceedings 9th International Seminar on Paste and Thickened Tailings. Limerick, Ireland, Australian Centre for Geomechanics, ISBN 0-9756756, 5–6, April 2006, 443 pages.

Fourie, A.B. and Tibbet, M. (2006) Proceedings 1st International Seminar on Mine Closure. Australian Centre for Geomechanics, ISBN 0-9756756-6-4, Perth, Australia, 13–15 September 2006, 844 pages.

PROFESSOR YVES POTVIN (DIRECTOR)

Books (Editor)

Potvin, Y. and Hudyma, M.R. (2005) Controlling Seismic Risk. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Australian Centre for Geomechanics, ISBN 0-9756756-1-3, Perth, Australia, 9–11 March 2005. 464 pages.

Potvin, Y., Thomas, E. and Fourie, A.B. (2005) Handbook on Mine Fill, Australian Centre for Geomechanics, ISBN 0-9756756-2-1, Perth, Australia, 2005, 179 pages.

Potvin, Y. (2006) Proceedings 2nd International Seminar on Strategic Versus Tactical Approaches in Mining. Australian Centre for Geomechanics, Perth, Australia, 8–10 March 2006, 42 Sections.

Book chapter

Potvin, Y. (2005) Chapter 1. Introduction. Handbook on Mine Fill. Ten Chapters, Australian Centre for Geomechanics, ISBN 0-9756756-2-1, Perth, Australia, 2005, pp. 1–10.

Proceedings of conferences, symposia and seminars

Hudyma, M. and Potvin Y. (2005) Consequences of Mining-Induced Seismicity in Underground Mechanised Hardrock Mines – Result of a World-Wide Survey. 1st International Seminar on Strategic versus Tactical Approaches in Mining, The Southern African Institute of Mining and Metallurgy Symposium Series 40, ISBN 1-919783-78-4, Johannesburg, South Africa, 19–21 September 2005, pp. 241–268.

Potvin, Y. and Fourie, A. (2005) Paste Fill in Australia. Proceedings CIM Symposium 2005 – Mines and the Environment, Rouyn-Noranda, May 2005. (CD only).

Albrecht, J. and Potvin, Y. (2005) Identifying the Factors that Control Rockburst Damage to Underground Excavations. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Australian Centre for Geomechanics, ISBN 0-9756756-1-3, Perth, Australia, 9–11 March 2005, pp. 519–528.

Potvin, Y. and Slade, N. (2006) Controlling Extreme Ground Deformation: Learning from Four Australian Case Studies. Proceedings 3rd International Seminar on Deep and High Stress Mining. Quebec City, Canada, 2–4 October 2006, Section 33.

Hudyma, M., Potvin, Y. and Heal, D. (2006) The Mine Seismicity Risk Analysis Program (MS-RAP) transforming microseismic data into rock engineering knowledge. Proceedings 3rd International Seminar on Deep and High Stress Mining. Quebec City, Canada, 2–4 October 2006, Section 29.

Heal, D., Potvin, Y. and Hudyma, M. (2006) Evaluating Rockburst Damage Potential in Underground Mining. Proceedings 41st U.S. Symposium on Rock Mechanics (USRMS). American Rock Mechanics Association (ARMA), Ref. No. ARMA/USRMS 06-1020. 50 Years of Rock Mechanics – Landmarks and Future Challenges. Golden, Colorado, USA, 17–21 June 2006. (CD only).

PROFESSOR ANDY FOURIE (PRINCIPAL – ENVIRONMENTAL GEOMECHANICS)

Books (Editor)

Potvin, Y., Thomas, E. and Fourie, A.B. (2005) Handbook on Mine Fill. Australian Centre for Geomechanics, ISBN 0-9756756-2-1, Perth, Australia 2005, 179 pages.

Jewell, R.J. and Fourie, A.B. (2006) Paste and Thickened Tailings – A Guide (Second Edition). Australian Centre for Geomechanics, ISBN 0-9756756-4-8, Perth, Australia, 2006, 242 pages.

Fourie, A.B. and Tibbet, M. (2006) Proceedings 1st International Seminar on Mine Closure. Australian Centre for Geomechanics, ISBN 0-9756756-6-4, Perth, Australia, 13–15 September 2006, 844 pages.

Book chapters

Fourie, A.B., Fahey, M., Davies, M. and Lowson, R. (2006) Material Characterisation (Chapter 4). Paste and Thickened Tailings – A Guide (Second Edition). R.J. Jewell and A.B. Fourie (editors). Australian Centre for Geomechanics, ISBN 0-9756756-4-8, Perth, Australia, 2006, pp. 41–55.

Fourie, A.B., Bentel, G., Williams, M.P.A. and McPhail, G. (2006) Above Ground Disposal (Chapter 9). Paste and Thickened Tailings – A Guide (Second Edition). R.J. Jewell and A.B. Fourie (editors). Australian Centre for Geomechanics, ISBN 0-9756756-4-8, Perth, Australia, 2006, pp. 147–163.

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Heibaum, M., Fourie, A.B., Girard, H., Karunaratne, G.P., Lafleur, J. and Palmeira, E.M. (2006) Hydraulic Applications of Geosynthetics. Keynote Lecture. 8th International Conference on Geosynthetics. Yokohama, Japan, September 2006. Vol. 1, pp. 79–120.

Fourie, A.B. and Tibbet, M. (2006) Minimising Closure Costs by Integrating Incremental Rehabilitation into Mining Operations, Proceedings 2nd International Seminar on Strategic Versus Tactical Approaches in Mining. Australian Centre for Geomechanics, Perth, Australia, 8–10 March 2006, Section 17.

Fourie, A.B. (2006) Liquefaction Potential of Surface Deposits of High-Density Thickened Tailings. Proceedings 9th International Seminar on Paste and Thickened Tailings. ISBN 0-9756756-5-6, April 2006, Limerick, Ireland, pp. 107–116.

Helinski, M., Fourie, A.B. and Fahey, M. (2006) Mechanics of Early Age Cemented Paste Backfill. Proceedings 9th International Seminar on Paste and Thickened Tailings. ISBN 0-9756756-5-6, April 2006, Limerick, Ireland, pp. 313–322.

Fourie, A.B. (2006) Harnessing the Power: Opportunities for Electrokinetic Dewatering of Mine Tailings. Geotechnical News, June 2006, pp. 27–32.

MR MARTY HUDYMA (PROJECT LEADER)

Book (Editor)

Potvin, Y. and Hudyma, M.R. (2005) Controlling Seismic Risk. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Australian Centre for Geomechanics, ISBN 0-9756756-1-3, Perth, Australia, 9–11 March 2005. 464 pages.

Proceedings of conferences, symposia and seminars

Heal, D., Hudyma, M.R., Langille, C., Potvin, Y., Butcher, R., Ball, R. and Hartmann, B. (2005). In-situ Testing of Ground Support Performance under Strong Dynamic Loading. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Y. Potvin and M.R. Hudyma (editors), Perth, Australia, 9–11 March 2005, pp. 85–94.

Chen, D., Gray, L. and Hudyma, M.R. (2005) Understanding Mine Seismicity. A Way to Reduce Mining Hazards at Barrick's Darlot Gold Mine. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines, Y. Potvin and M.R. Hudyma (editors), Perth, Australia, 9–11 March 2005, pp. 269–274.

Heal, D., Hudyma, M. and Vézina, F. (2005) Seismic hazard at Agnico-Eagle's Laronde mine using MS-RAP. ME/MO 2005, CIM Maintenance Engineering and Mine Operators Conference, Canadian Institute of Mining, Sudbury, Canada, 20–24 February 2005. (CD only).

MR DANIEL HEAL (ACG/UWA CIVIL & RESOURCE ENGINEERING PHD STUDENT AND PROJECT LEADER)

Proceedings of conferences, symposia and seminars

Heal, D., Hudyma, M., Langille, C., Potvin, Y., Butcher, R., Ball, R. and Hartmann, B. (2005) In-Situ Testing of Ground Support Performance under Strong Dynamic Loading. Proceedings 6th International Symposium on Rockbursts and Seismicity in Mines. Y. Potvin and M.R. Hudyma (editors), Perth, Australia, 9–11 March 2005, pp. 85–94.

publications

Heal, D., Hudyma, M. and Vézina, F. (2005) Seismic hazard at Agnico-Eagle's Laronde mine using MS-RAP. ME/MO 2005, CIM Maintenance Engineering and Mine Operators Conference, Sudbury, Canada, 20–24 February 2005. (CD only).

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Heal, D., Potvin, Y. and Hudyma, M. (2006) Evaluating Rockburst Damage Potential in Underground Mining. Proceedings 41st U.S. Symposium on Rock Mechanics (USRMS). American Rock Mechanics Association (ARMA), Ref. No. ARMA/USRMS 06-1020, 19–21 June 2006, Golden, Colorado, USA. (CD only).

Hudyma, M., Potvin, Y. and Heal, D. (2006) The Mine Seismicity Risk Analysis Program (MS-RAP) – Transforming microseismic data into rock engineering knowledge. Proceedings 3rd International Seminar on Deep and High Stress Mining. 2–4 October 2006, Laval University, Quebec City, Canada, Section 29.

MR RICHARD JEWELL (SENIOR CONSULTANT)

Books (Editor)

Jewell, R.J. and Barrera, S. (2005) Proceedings 8th International Seminar on Paste and Thickened Tailings. ISBN 0-9756756-3-X, Santiago, Chile, Australian Centre for Geomechanics, April 2005, 421 pages.

Jewell, R.J. and Fourie A.B. (2006) Paste and Thickened Tailings – A Guide (Second Edition), Australian Centre for Geomechanics. ISBN 0-9756756-4-8, Perth, Australia, 2006, 242 pages.

Jewell, R.J., Lawson, S. and Newman, P. (2006) Proceedings 9th International Seminar on Paste and Thickened Tailings, Limerick. Ireland, Australian Centre for Geomechanics, ISBN 0-9756756-5-6, April 2006, 443 pages.

Book chapters

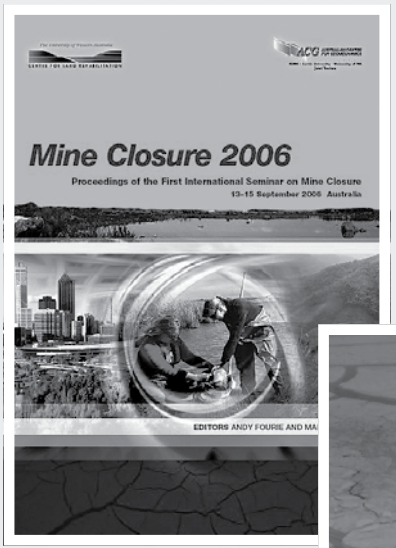
Jewell, R.J. (2006) Introduction (Chapter 1). Paste and Thickened Tailings – A Guide (Second Edition). R.J. Jewell and A.B. Fourie (editors). Australian Centre for Geomechanics, ISBN 0-9756756-4-8, Perth, Australia, 2006, pp. 41–55.

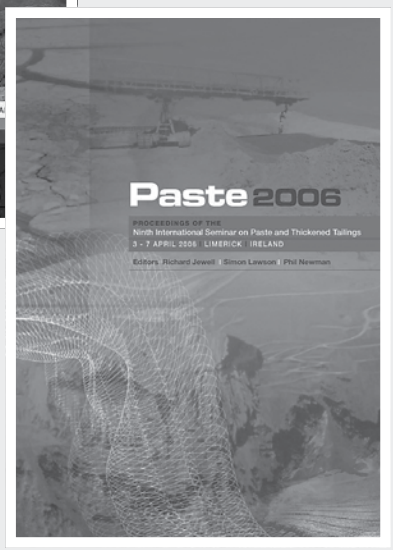
Jewell, R.J. (2006) Case Studies (Chapter 12). Paste and Thickened Tailings – A Guide (Second Edition). R.J. Jewell and A.B. Fourie (editors). Australian Centre for Geomechanics, ISBN 0-9756756-4-8, Perth, Australia, 2006, pp. 147–163.

DR JOHN ALBRECHT (ACG/UWA CIVIL & RESOURCE ENGINEERING PHD STUDENT)

Proceedings of symposia

Albrecht, J. and Potvin, Y. (2005) Identifying the factors that Control Rockburst Damage to Underground Excavations. Proceedings 6th International Symposium on Rockburst and Seismicity in Mines. Australian Centre for Geomechanics, ISBN 0-9756756-1-3, Perth, Australia, 9–11 March 2005, pp. 519–528.



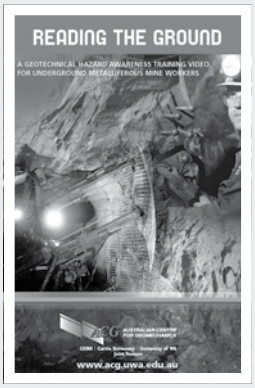


geomechanics training products

Recognising the vital importance of employee training and education to improve mine safety and production performance, the ACG's training platform is designed to enhance the competency, knowledge and skill base of the mining workforce.

READING THE GROUND

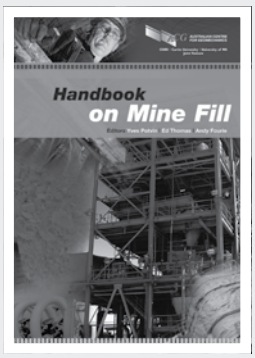
Following on from the successful Securing the Ground – a training DVD/video for underground mine workers, the ACG sought industry support to develop a new DVD/video entitled Reading the Ground. The first video provided instructions on how to minimise the risk of rockfalls by employing techniques such as barring down and ground support. Reading the Ground aims to help mine workers understand basic geomechanics principles, identify the risks and to implement the appropriate procedures to secure the ground. The Reading the Ground DVD/video and accompanying training assessment materials were launched in early 2005.



PROJECT SPONSORS

- AngloGold Ashanti Australia Ltd
- Newmont Australia
- Placer Dome Asia Pacific
- WMC Resources Ltd
- Xstrata Mount Isa Mines

HANDBOOK ON MINE FILL



In mid 2003, a group of mining professionals convened to initiate the development of a comprehensive guide on the state-of-the-art mine backfill procedures. With industry support and input the publication explores the many different types of backfill and their specific function and engineering requirements that are intimately related to mining methods. For example, paste backfill is a recent addition to the suite of engineered backfills utilised to fill mining voids. It presents an advantage over traditional backfills such as slurry and rock in that a higher proportion of tailings are disposed underground. As the mining industry worldwide is being forced to consider the impact of its activities on the environment and the community, paste backfill may provide significant advantages by placing a large proportion of the tailings underground.

The book was launched at the ACG's Sixth International Symposium on Rockburst and Seismicity held in Perth in March 2005.

BOOK SPONSORS

- CSA Cobar
- WMC Resources Ltd

PASTE AND THICKENED TAILINGS – A GUIDE (SECOND EDITION)

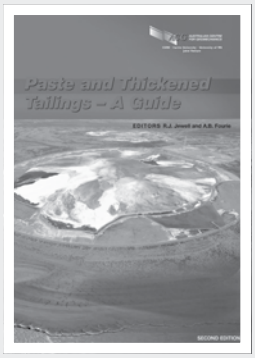
Paste and thickened tailings (P&TT) has rapidly evolved and gained acceptance in industry primarily due to the advancement of its preparation and distribution methods. In 1999, approximately three to four mining operations were actively using P&TT. In 2006, more than 25 operations have embraced this technology worldwide.

Since March 2002, almost 1000 copies of the first edition of the ACG's "Paste and Thickened Tailings – A Guide" were distributed to the global mining industry. This book is considered by many to be the definitive reference on this technology. Significant advances in technology have occurred since then, resulting in the need for a new, updated guide.

The new, revised second edition features two new chapters on slurry chemistry and reagents. It includes completely rewritten chapters on surface disposal, mine backfill and transport, the inclusion of filtering equipment for thickening and a number of new case studies. Particular emphasis is placed on the relative costs of different solutions.

COLLABORATING WITH INDUSTRY TO DEVELOP STATE-OF-THE-ART TRAINING AND AWARENESS MATERIAL FOR MINE WORKERS

geomechanics training products



The book remains a guidance and advice handbook aimed at providing industry personnel with the information that will assist them in evaluating the potential of the technique for their operations and to relate to and brief their design consultants.

BOOK SPONSORS

Level One

- Aran International Pty Ltd
- Dorr-Oliver Eimco
- Lightnin Africa
- Metago Environmental Engineers
- Outokumpu Technology
- PasteThick Associates
- SRK Consulting

Level Two

- AMC Consultants Pty Ltd
- AMEC Earth & Environmental
- Australian Tailings Consultants
- Coffey Mining

ON THE HORIZON

TAILINGS – FROM CONCEPT TO CLOSURE

Best practices for tailings disposal – A training DVD for owners and operators of tailings storage facilities

This new ACG training initiative aims to assist operators to recognise and react to the potential hazards involved in managing and operating a tailings storage facility.

Proposed content includes:

- Risk management and geotechnical issues in tailings disposal
- Failure types – recognition of mechanisms
- Operational issues that lead to instability problems
- Recognising the importance of the water balance
- Best practice in tailings storage operation and management

PROJECT SPONSORS

- Barrick Gold of Australia Ltd
- BHP Billiton Nickel West
- Newmont Asia Pacific
- Rio Tinto
- Worsley Alumina

This training DVD is anticipated to be completed in July 2007.

ROCKBURSTS – UNLEASHING THE EARTH'S ENERGY

Following the rockfall incident at the Beaconsfield mine in April 2006 in Tasmania, Australia, and the associated global media attention, it has become evident that the phenomenon of rockburst and seismicity in mines is poorly understood by the general population and, more importantly, by a large portion of the mining community. Given that the future of the Australian mining industry lies in deep mines, it is important that industry remains proactive in educating its workforce and stakeholders on this increasingly important hazard.

The ACG proposes to develop a state-of-the-art training DVD that will explain, in novice terms, the phenomenon underlying mine seismicity and rockbursts in mines. Underground mine workers will be equipped with essential knowledge to understand this hazard, including understanding the difference between natural seismicity and mine induced seismicity, what makes a mine seismically active, the pre-cursors, and how to control seismic hazards.

Proposed content includes:

- What is a seismic event?
- What is a rockburst?
- Is there a pre-cursor to large rockbursts?
- How to control the risk of rockburst?

PROJECT SPONSORS

- AngloGold Ashanti Australia Ltd
- Barrick Gold of Australia Ltd
- Beaconsfield Mine Joint Venture
- BHP Billiton Nickel West
- Independence Group Lightning Nickel Pty Ltd
- Newmont Asia Pacific

The DVD is anticipated to be completed in September 2007.

CHALLENGES IN DEEP AND HIGH STRESS MINING BOOK

In 2002, the ACG hosted the First International Seminar on Deep and High Stress Mining. This seminar was the first in a series of seminars held in three countries with recognised deep and/or high stress mining conditions – Australia (2002), South Africa (2005) and Canada (2006). The ACG will release a hardbound publication featuring the highest quality papers from the three seminars at the 4th International Seminar on Deep and High Stress Mining to be held in Perth in November 2007.

COLLABORATING ORGANISATIONS

- Laval University, Canada
- University of the Witwatersrand, South Africa

The ACG's training and further education tools would not have been developed if it were not for the support and encouragement of various mining companies, research organisations and industry suppliers. It is this collaborative approach that both consolidates and validates ACG's role in the development of safety training tools and techniques. Through this spirit of cooperation, the ACG continues to work with mining stakeholders and research organisations toward the common vision of creating a safer working environment within the Australian minerals industry.

ACG membership

During 2005–2006, the Australian Centre for Geomechanics welcomed onboard BHP Billiton Cannington Pty Ltd, GHD Pty Ltd, Golder Associates Pty Ltd and PT Freeport Indonesia as the newest members of the Corporate Affiliate Programme. Corporate and technical affiliate members assist the ACG to provide research excellence, training and education in the geomechanics disciplines. These memberships are fundamental in alerting funding bodies of the need to support the Centre. Contributions by affiliates are used by the Centre to promote research excellence, education and training in geomechanics areas.

The ACG was delighted to have the following Corporate and Technical Affiliate Members for 2005–2006.

CORPORATE AFFILIATES

AngloGold Ashanti Australia Ltd

Argyle Diamond Mines Pty Ltd

Barrick Gold of Australia Ltd

BHP Billiton Cannington Pty Ltd

BHP Billiton Iron Ore Pty Ltd

Coffey Mining Pty Ltd

GHD Pty Ltd

Golder Associates Pty Ltd

Gold Fields Ltd

Kalgoorlie Consolidated Gold Mines Pty Ltd

Newmont Australia Limited

PT Freeport Indonesia

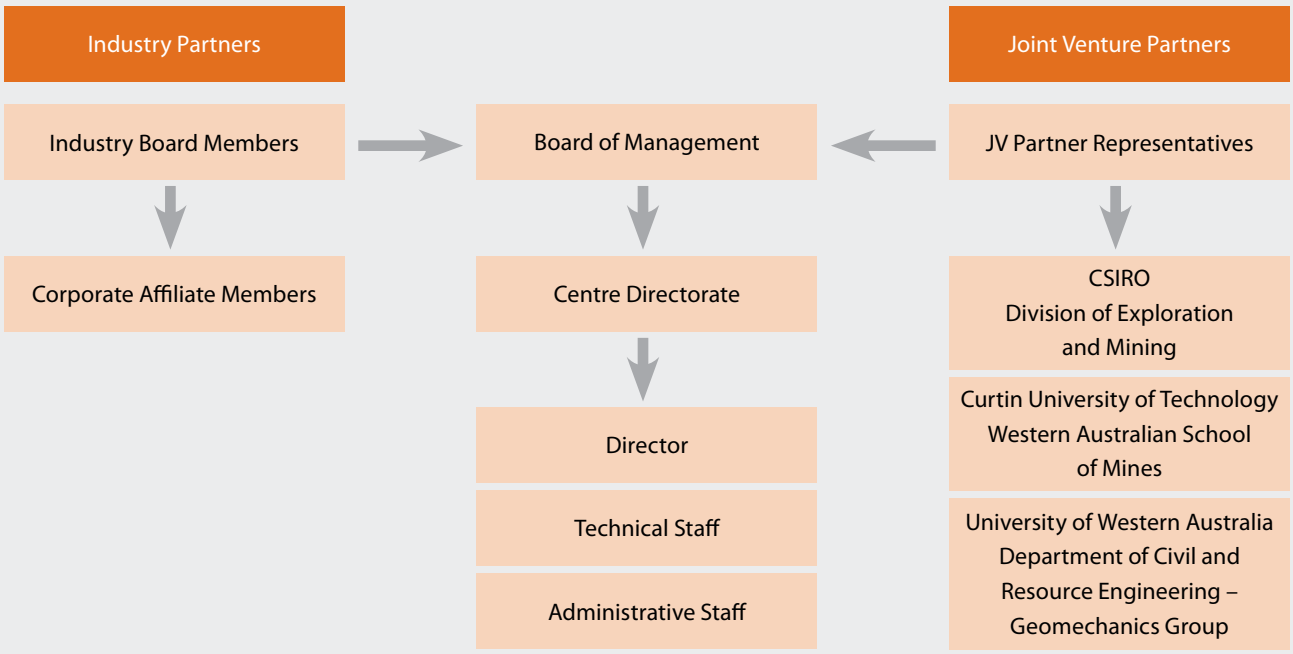
Rock Engineering (Australia) Pty Ltd

SRK Consulting

TECHNICAL AFFILIATE

Mr M. Sandy (AMC Consultants Pty Ltd)

management structure



AUSTRALIAN CENTRE FOR GEOMECHANICS BOARD OF MANAGEMENT

The Australian Centre for Geomechanics Board of Management comprises of an independent chairman, director of the Centre and industry and joint venture partner representatives. The Board meets up to four times a year to present strategic direction for the Centre, review and approve activities and operations and to provide counsel.

Joint Venture Partner Representatives (3)

Dr Steve Harvey
(CSIRO DEM)

Professor Peter Lilly/Associate Professor Graeme Wright
(Curtin University of Technology – WASM)

Professor Mark Bush
(The University of Western Australia – Civil & Resource Engineering)

Chair (from industry)
Mr Andrew Grubb
AngloGold Ashanti Australia Ltd

Centre Director
(non-voting)
Professor Yves Potvin
(Australian Centre for Geomechanics)

Industry Representatives (up to 4)

Mr Mark Adams
(Iluka Resources Ltd)

Mr John Shipp
(Barrick Gold of Australia Ltd)

Mr Ian Suckling
(Newmont Australia Ltd)

technology transfer research training

AUSTRALIAN CENTRE FOR GEOMECHANICS

CSIRO | Curtin University | University of WA
Joint Venture

PO Box 3296 – Broadway
Nedlands
Western Australia 6009
Phone + 61 8 6488 3300
Fax: + 61 8 6488 1130
acginfo@acg.uwa.edu.au

www.acg.uwa.edu.au