

## ORAL PRESENTATIONS

\* **Bold name** is the presenter.

\* **Presentation time** is 15 min for ordinary presentations and 20 min for theme speeches.

**26 June 2018**

### **Parallel session A1 (10:55 – 12:15 in Room EL6): Laboratory dynamic testing of rock**

**Chair:** *Dr. Wenge Qiu / Dr. Zilong Zhou*

- 10:55 - 11:15 **Theme speech:** Shear behavior of planar rock joints under dynamic normal load (DNL) conditions  
*W. Dang, H. Konietzky & T. Frühwirt*
- 11:15 – 11:30 Experimental characterization of Himalayan limestone  
*S. Mishra, T. Chakraborty, V. Matsagar & D. Basu*
- 11:30 – 11:45 Monitoring of damage evolution in granite under uniaxial compression by AE and P-wave velocity  
*T. Zhou & J.B. Zhu*
- 11:45 – 12:00 Dynamic increase factors of rock strength  
*K. Liu, Q.B. Zhang & J. Zhao*
- 12:00 – 12:15 Dynamic Mode II fracture toughness determination of rocks with short cores in compression method  
*S.W. Oh, G. J. Min, S.W. Park, S. H. Cho & Y. H. You*

### **Parallel session A2 (10:55 – 12:15 in Auditorium EL5): Dynamic rock support**

**Chair:** *Dr. Bruce Hebblewhite*

- 10:55 - 11:15 **Theme speech:** Monitoring pillar behaviour while driving towards a Shear Zone in highly stressed ground at Vale's Creighton Mine.  
*A. Punkkinen, B. Forbes, A. Hyett & J. Whitmore*
- 11:15 – 11:30 The need for additional dynamic testing methods for ground support elements  
*P. Mikula & B.M. Brown*
- 11:30 – 11:45 Dynamic test of flexi-bolts reinforcement system and its performance in hard rock underground mining  
*F. Sengani & T. Zvarivadza*
- 11:45 – 12:00 Increased agility for the research and development of dynamic roof support products  
*G. Knox & A. Berghorst*
- 12:00 – 12:20 **Theme speech:** Relationship between energy per impulse and dynamic capacity of a rockbolt  
*K. Bosman, M. Cawood & A. Berghorst*

### **Parallel session A3 (10:55 – 12:15 in Room EL3): Theoretical study and numerical modelling**

**Chair:** *Dr. Ömer Aydan*

- 10:55 - 11:15 **Theme speech:** Numerical study on the strain-rate sensitivity of rock: meso-mechanical approach  
*T. Saksala*
- 11:15 – 11:30 Application of dominant crack algorithm (DCA) to dynamic tensile failure of rocks  
*B. Wu, Q. Wang & K. Xia*
- 11:30 – 11:45 Dynamic rock slope stability analysis using UDEC software  
*B.H.V. Sekar & S. R. Naik*
- 11:45 – 12:00 DEM analysis of the effect of discontinuities on coal mass brittleness  
*O. Vardar, C. Zhang, F. Tahmasebinia, I. Canbulat & B. Hebblewhite*
- 12:00 – 12:15 A numerical study of spalling under different dynamic loads using PNMM  
*X. Li, Q.B. Zhang, J. Zhao & J.C. Li*

### **Parallel session A4 (10:55 – 12:15 in Room EL4): Other relevant topics**

**Chair:** *Dr. Caichu Xia*

- 10:55 - 11:15 **Theme speech:** Experimental protocol for stress corrosion cracking for full-size cable bolts  
*S. Wu, H. L. Ramandi, P. C. Hagan, S. Saydam & B. Hebblewhite*
- 11:15 – 11:30 Support Mechanism of 4D Force-transferring Block Set  
*Z.G. Ma, N. Cui & P. Gong*
- 11:30 – 11:45 The performance of mechanical anchors in South African mechanized deep level gold mining  
*F. Sengani & T. Zvarivadza*

- 11:45 – 12:00 Evaluation of in-stope pillar failure: a case study of deep to ultra-deep level gold mining in South Africa  
*T. Zvarivadza & F. Sengani*
- 12:00 – 12:15 Case studies related to real time geotechnical monitoring systems for an open pit coal mine in Western Canada.  
*G. Bonci*

**Parallel session B1 (13:10 - 14:20 in Room EL6): Laboratory dynamic testing of rock**

**Chair:** *Dr. Tanusree Chakraborty*

- 13.10 – 13:30 **Theme speech:** Dynamic tests of marble specimens with artificial defects under impact loading by SHPB  
*D.Y. Li, Z.Y. Han, X.B. Li, X.L. Sun, Y. Shi, & T. Zhou*
- 13:30 – 13:45 Stress redistribution of dynamic loading incident through a pre-stressed cavity  
*M. Tao, H.T. Zhao, Z.W. Li, A. Ma, Z.X. Hong & S.F. Ren*
- 13:45 – 14:00 Experimental study of strength characteristics of coal specimens under static and dynamic loadings  
*W. Wang, H. Wang, H.Z. Zang, H.M. Li & D.Y. Li*
- 14:00 – 14:15 Dynamic characteristic of rock under in-situ stress and blast loading  
*C.L. He & J. Yang*

**Parallel session B2 (13:10 - 14:20 in Auditorium EL5): Rockburst, seismicity and seismic monitoring**

**Chair:** *Dr. Jian Deng*

- 13.10 – 13:30 **Theme speech:** Inducing mechanism of rockburst with its prediction and prevention principle in metal mines  
*M.F. Cai*
- 13:30 – 13:45 Practice of face-perpendicular preconditioning for safe remnant extraction  
*T. Zvarivadza & F. Sengani*
- 13:45 – 14:00 Rock fracturing related to strain burst in quartzite rock mass  
*C.C. Li, D. Sandström & A. Nyström*
- 14:00 – 14:20 **Theme speech:** Stress evolution and induced seismicity in mining: lab test, observation and modelling  
*L.A. Nazarova, V.N. Zakharov, L.A. Nazarov, V.L. Shkuratnik, M.I. Protasov & P.V. Nikolenko*

**Parallel session B3 (13:15 - 14:20 in Room EL3): Theoretical study and numerical modelling**

**Chair:** *Dr. Xing Li*

- 13.15 – 13:30 A dynamic stress state analysis at the pressure tunnel of Upper Tamakoshi HPP, Nepal  
*K.K. Panthi & C.B. Basnet*
- 13:30 – 13:45 Research on the dynamic behaviour of rock material: rate dependency and pulverization  
*X.F. Li, H.B. Li, Q.B. Zhang & J. Zhao*
- 13:45 – 14:00 Analysis of elastic wave attenuation in different rock samples  
*X.L. Liu, G.Y. Zhao, J.H. Cui, X.B. Li & Q. Guo*
- 14:00 – 14:15 Sensitivity analysis of block stability under seismic loading  
*A. Bolin & R. Ghazal*

**Parallel session B4 (13:15 - 14:20 in Room EL4): Laboratory dynamic testing of rock**

**Chair:** *Dr. Jianbo Zhu*

- 13.15 – 13:30 Deformation characteristics of Beishan granite under low-cyclic loading  
*L. Shi, X. Zhang & C.C. Li*
- 13:30 – 13:45 Rock energy evolution under triaxial cyclic loading-unloading compression  
*M.W. Zhang, S.D. Liu, Q.B. Meng, D.Y. Qian & N. Zhang*
- 13:45 – 14:00 Dynamic shear (Mode II) fracture toughness testing of brittle rock with punch-through cylindrical specimens  
*Q.H. Rao, W.D. Liang & H.L. Zhao*
- 14:00 – 14:15 Study on rock breakage by disc cutter under coupled static and dynamic loads  
*Q.B. Lin, P. Cao & Y. Chen*

## 27 June 2018

### Parallel session C1 (10:40 - 12:30 in Room EL6): Earthquake damage & blasting

**Chair:** *Dr. Tawanda Zvarivadza*

- 10:40 – 11:00 **Theme speech:** Seismic effect and aseismic in mountain tunnels  
*W.G. Qiu*
- 11:00 – 11:15 A case study of determining the safety threshold of blasting vibration for tunnel lining  
*C.C. Xia, F. Xue & J.K. Gao*
- 11:15 – 11:30 An experimental investigation on dynamic responses of granite blocks under blast loading  
*L. Chi, A. Aalberg, Z.X. Zhang & C.C. Li*
- 11:30 – 11:45 Seismic response of a tunnel embedded in compacted sand through large-scale shake table testing  
*H. Zhou & X.H. Wang*
- 11:45 – 12:00 Dynamic response of a shallow tunnel with imperfect interface in anisotropic medium  
*X.P. Zhang & Y.J. Jiang*
- 12:00 - 12:15 Seismic response of shallow buried rock tunnel: shaking table test and numerical simulation  
*J.T. Chen, H.T. Yu & Y. Yuan*
- 12:15 – 12:30 Strain and energy parameters of burst-prone rocks: study and analysis  
*N.N. Kuznetsov, I.V. Fedotova & A.K. Pak*

### Parallel session C2 (10:40 - 12:30 in Auditorium EL5): Rockburst, seismicity and seismic monitoring

**Chair:** *Dr. Diyuan Li*

- 10:40 – 11:00 **Theme speech:** Dynamic buckling mechanism of pillar rockbursts induced by stress waves  
*J. Deng*
- 11:00 – 11:15 Microseismic monitoring in twin TBM tunnels in the Lower Himalayas  
*A.K. Khan, G. Peach, G.A. Rosario, H.-S. Xioang, X.-T. Feng, B. Chen, Y. Xiao & G. Feng*
- 11:15 – 11:30 Comparison of microseismic monitoring and actual rockbursts in twin TBM tunnels in the lower Himalayas  
*G. Peach, G.A. Rosario, H.-S. Xiong & X.-T. Feng*
- 11:30 – 11:45 A numerical modeling methodology for assessing rock failure stabilities  
*Z. Khademian & U. Ozbay*
- 11:45 – 12:00 Forecast the deformation of the surrounding rock using MS monitoring  
*N.W. Xu, F. Dai, T. Zhao, Z. Zhou & C. Sha*
- 12:00 - 12:20 **Theme speech:** Triggering mechanism of fault-slip rockburst induced by dynamic disturbances  
*Q.H. Qian*

### Parallel session C3 (10:45 - 12:30 in Room EL3):

#### **JRDC-SS1: Experimental studies and wave propagation**

(JRDC-SS = Japan Rock Dynamic Commission Special Session)

**Chair:** *Dr. K. Kamemura*

- 10:45 – 11:00 Two-ways dynamic shear testing of rock discontinuities  
*Ö. Aydan, N. Tokashiki, N. Z. Nasiry, N. Iwata & R. Kiyota*
- 11:00 – 11:15 Numerical simulations on failure and stress wave propagation in solid materials using a 3D lattice spring model  
*T. Nishimura, M. Kohno & K. Fumimura*
- 11:15 – 11:30 Dynamic response of support systems during the excavation of underground openings  
*Ö. Aydan, F. Ito & T. Ito*
- 11:30 – 11:45 Dynamic stability of rock slopes and the effect of reinforcement against planar sliding  
*Y. Takahashi, N. Iwata, R. Kiyota, K. Adachi, Ö. Aydan & N. Tokashiki*
- 11:45 – 12:00 Stick-slip behavior of rock discontinuities by difference in rock types  
*R. Kiyota, N. Iwata, Y. Takahashi, K. Adachi & Ö. Aydan*
- 12:00 - 12:15 Experimental study on seismic stability of foundation rocks under critical facilities  
*M. Ishimaru, A. Sekiguchi, T. Okada, K. Hiraga & K. Ozawa*
- 12:15 – 12:30 Validation of a mathematical model for evaluating the dynamic shear strength of rock  
*T. Okada & T. Naya*

**Parallel session D1 (13:30 - 15:20 in Room EL6): Laboratory dynamic testing of rock**

**Chair:** *Dr. Timo Saksala*

- 13:35 – 13:50 Development of impact loading test device for gas-containing coal  
*Z. Q. Yin, Z. D. Wei, Z. Zhang, J. C. Chang, C. M. Li, H. F. Ma, G. M. Zhao, X. Y. Zhang, W. B. Shi & M. Tu*
- 13:50 – 14:05 Effects of water-filled rock joints on ultrasonic P-wave propagation  
*H. Yang, H.F. Duan & J.B. Zhu*
- 14:05 – 14:20 A preliminary study of using high-speed digital image correlation (DIC) to characterize the penetration on geomaterial  
*H.Z. Xing, G.LN. Wu, Q.B. Zhang, J. Zhao & S. Dehkhoda*
- 14:20 – 14:35 Simple rock cutting testing  
*S. Yasar*
- 14:35 – 14:50 Dynamic fracture behavior of dry and saturated sandstone  
*X. Cai, Z.L. Zhou, D. Ma, X.B. Li & G.Y. Zhao*
- 14:50 – 15:05 Shear behavior and acoustic emission characteristics of regular dentate joint  
*C.D. Su, H.Z. Zang, J.Q. Guo, Y.N. Sun, C.S. Song & W. Wang*

**Parallel session D2 (13:30 - 15:20 in Auditorium EL5): Dynamic rock support**

**Chair:** *Dr. Serkan Saydam*

- 13:30 – 13:50 **Theme speech:** Development of the MDX Bolt and in-situ dynamic testing at Telfer Gold Mine  
*B. Darlington, M. Rataj, G. Balog & D. Barnett*
- 13:50 – 14:05 Towards improved design of rock reinforcement systems in burst-prone rock masses  
*W. Breure, D.J.M. Ngan-Tillard & C.C. Li*
- 14:05 – 14:20 Mechanical response of fully bonded bolts under cyclic loading  
*X.W. Feng*
- 14:20 – 14:35 Garford hybrid dynamic bolt reinforcement system on trial in deep level gold mines of South Africa  
*T. Zvarivadza & F. Sengani*
- 14:35 – 14:50 Dynamic response of rock bolts to blasting vibrations  
*S.H. Chen & S.W. Hu*
- 14:50 – 15:05 Application of the MD bolt in the Fosterville Gold Mine  
*A. Stiehl, B. Darlington, M. Rataj & P. Young*
- 15:05 – 15:20 The development and optimization of face-perpendicular preconditioning technique for development ends  
*F. Sengani & T. Zvarivadza*

**Parallel session D3 (13:30 - 15:20 in Room EL3):**

**JRDC-SS2: Earthquake related topics**

(JRDC-SS = Japan Rock Dynamic Commission Special Session)

**Chair:** *Dr. T. Nishimura*

- 13:35 – 13:50 Seismic characteristics of field measurements and numerical analyses of an underground quarry in Oya  
*T. Seiki, T.K.M. Dintwe, R. Yamaguchi, S. Noguchi & T. Ohmura*
- 13:50 – 14:05 Some considerations on the stability and design of underground structures during earthquakes  
*K. Kamemura & Ö. Aydan*
- 14:05 – 14:20 Damage to rock engineering structures induced by the 2016 Kumamoto earthquakes  
*Ö. Aydan, J. Tomiyama, H. Matsubara, N. Tokashiki & N. Iwata*
- 14:20 – 14:35 Dynamic response and stability of some historical masonry structures subjected to ground shaking  
*N. Tokashiki, Ö. Aydan, N. Z. Nasiry, T. Ito & M. Geniş*
- 14:35 – 14:50 Simulation of strong motions and surface rupture of the 2014 Northern Nagano Earthquake  
*N. Iwata, R. Kiyota, et al. K. Adachi, Y. Takahashi, Ö. Aydan, F. Miura & T. Ito*
- 14:50 – 15:05 Status of rock dynamics study in Horonobe Underground Research Laboratory, Japan  
*T. Sato, K. Aoyagi, Y. Matsuzaki, N. Miyara & K. Miyakawa*
- 15:05 – 15:20 Design and performance of the foundation of the tsunami protection wall at the Hamaoka Nuclear Power Station  
*Masaaki Wani*