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Guest editorial–Special issue on ground control in mining in 2017

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Ground control is the science of studying and controlling the behavior of rock strata in response to mining operations. Ground control-related research has seen significant advancements over the last 36 years, and these accomplishments are well documented in the proceedings of the annual International Conference on Ground Control in Mining (ICGCM) [1]. The ICGCM is a forum to promote closer communication among researchers, consultants, regulators, manufacturers, and mine operators to expedite solutions to ground control problems in mining [2–8]. Fundamental research and advancements in ground control science define the central core of the conference mission. Providing information to mine operators is a priority, as the conference goal is to offer solution-oriented information. In addition, the conference has included innovative technologies and ideas in mining-related fields such as exploration, geology, and surface and underground mining. Many new ground control technologies and design standards adopted by the mining industry were first discussed at ICGCM. Therefore, this conference is recognized as the best forum for introducing new ground control-related research and products.

Professor Syd Peng (West Virginia University), on his own initiative, organized the First Conference on Ground Control in Mining in the summer of 1981. Dr. Peng keenly recognized that in order to advance the state-of-the-art in ground control, a forum was urgently needed whereby researchers, practitioners, equipment manufacturers, and government regulators could meet regularly and exchange information in a timely manner. Beginning in 2016, the conference was taken over by the Society for Mining, Metallurgy & Exploration (SME). Four researchers, Brijes Mishra, Kyle Perry, Heather Lawson, and Michael Murphy, were chosen to serve as a secondary team from among the conference's organizing committee to ensure that the conference continues to advance the science of ground control and develop solutions to problems that have been evasive through current mine design strategies, operational practices, and engineering interventions.

The 36th International Conference on Ground Control in Mining was held on July 24–27, 2017, in Morgantown, WV. This year's event had 166 attendees with significant representation from government researchers, academia, and mine operators. The event

included 45 papers in 10 different sessions during the three days of the conference. The international community was represented with 18 attendees from five countries, with China sending nine representatives and Australia sending five. A remarkable number of industry representatives attended given the challenges currently faced by the mining industry.

The topics covered at this year's conference included a wide range of subjects including dynamic collapse, bumps, and rock-burst research, in-situ stress and global stability numerical modeling research, and presentations showcasing new ground control software and product development. Researchers from the National Institute for Occupational Safety and Health (NIOSH) Pittsburgh Mining Research Division (PMRD) Ground Control Branch presented three papers that discussed results from a comprehensive monitoring program to measure rock mass displacements, support response, and stress changes at a longwall tailgate entry in West Virginia. Dave Gearhart (PMRD) presented “Changes in Stress and Displacement Caused by Longwall Panel Retreats”, which gave an overview of the instrumentation plan at the West Virginia mine and analyzed the monitoring results. Essie Esterhuizen (PMRD) presented “Analysis of Monitored Ground Support and Rock Mass Response in a Longwall Tailgate Entry” and “Analysis of Global and Local Stress Changes in a Longwall Gateroad”. The research demonstrated that the monitoring results were able to validate support design strategies for tailgate entries, and that FLAC3D numerical models could be successfully calibrated to predict horizontal and vertical loading caused by an approaching longwall face.

Extreme ground condition research was also highlighted during the first day of the conference. Christopher Mark (MSHA) presented research that focused on the development mining coal burst experience in the United States, some of which occurred in environments with no retreat mining. The presentation closed with some lessons from history and suggestions for preventing such events in the future. Mark Van Dyke (PMRD) presented “Evaluation of Seismic Potential in a Longwall Mine with Massive Sandstone Roof under Deep Overburden”, which highlighted patterns of specific conditions where high magnitude seismic events were occurring. By analyzing 897 geophysical logs, 224 coreholes, and 1031 fiberscope holes, forecast maps were 74%–89% accurate in determining locations of events greater than 1.0 M_L.

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The conference also included presentations on new ground control products such as software and new support technologies. Christopher Newman (University of Kentucky) presented “A New Generation of Web-Based Applications for Mine Design”, which gave an overview of web Ground Control. This new design program provides operators the ability to access the NIOSH ground control software (ARBS, ALPS, and ARMPS), originally introduced at the conference in the 90 s, from any device with an internet connection. The software was beta tested by industry professionals during conference breaks and it is expected to officially launch for public access during the summer of 2018. Kevin Ma (Keystone Mining Services) presented “Development and Evaluation of Corrosion Resistant Coating for Expandable Rock Bolt Against Highly-Corrosive Ground Conditions”, which discussed the root causes of bolt corrosions and demonstrated laboratory and underground research on a new rock bolt product that combats corrosion issues.

A number of the papers, including the ones discussed above, from the 36th International Conference on Ground Control in Mining are included in this special issue of the International Journal of Mining Science and Technology. All other papers from this year's conference (and conferences from previous years) can be found at on the International Conference on Ground Control in Mining's

website (<http://icgcm.conferenceacademy.com/papers/allpapers.aspx>) and at OneMine (<http://www.onemine.org/>). We hope this special issue will provide useful references for engineers worldwide and for researchers and scholars in the field of ground control.

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