

## PREFACE

The mining industry faces significant challenges associated with the extraction of deeper ore deposits having increasingly more complex geotechnical and geological conditions. This inevitably led to much greater attention to personnel and equipment safety research and practice. In addition to this development, safety science itself has made remarkable progress in recent decades owing to leap advancements in engineering technologies, human physiology, data analysis and processing, as well as new business and organization structures. In this scope, mining, nuclear and aerospace industries allocate important resources and create initiatives to engage increasingly more safety science and research. In line with this, McGill University organized and hosted the 3rd International Symposium on Mine Safety Science and Engineering (ISMS 2016) in Montreal in collaboration with its partners, the University of Science and Technology Beijing, China University of Mining and Technology (Beijing), and Henan Polytechnic University. The symposium was held from August 13 to 19, 2016 with the theme “Operational and Environmental Mine Health and Safety Practice and Innovation”.

Essential objectives of ISMS 2016 were to discuss safety-related problems; to create awareness, synergy and recognition to mine safety; and, to ensure knowledge transfer and mobilization amongst industry practitioners, mining engineers and academics. The authors of the 119 papers in this volume of proceedings come from 12 countries – a testimony to the true international flavour of this symposium. The volume is organized in three main sections: (i) Hardrock (Seismicity and rock burst, blasting, support design, pillar and backfill stability, ground control, subsidence and slope stability); (ii) Technology (equipment, occupational health and safety, organizations and human factors); and (iii) Coal (gas and ventilation, ground control and coal mining techniques). All papers included in this set of proceedings have been peer-reviewed, edited and formatted to a uniform layout. The proceedings can be found online at

<http://isms2016.proceedings.mcgill.ca>

We would like to thank all the symposium sponsors for their generous support. We are indebted to members of the International Advisory Committee for their relentless efforts. Special thanks are due to the paper reviewers.

We sincerely hope that this volume of proceedings will be interest to mine safety practitioners, researchers and technology developers.

Editors

Hani Mitri

Shahe Shnorhokian

Mustafa Kumral

Agus Sasmito

Atsushi Sainoki