

Preface

As mines proceed to ever greater depth and into more and more complex geological settings, the topic of this symposium “controlling seismic hazard and sustainable development of deep mines” is highly relevant, and, indeed, the series of RaSIM-Rockburst and Seismicity in Mining-Symposia is as timely as ever. Each of the preceding RaSIM events has made significant contributions to the advancement of the state-of-the-art in dealing with seismicity and in managing rockburst; all leading to astonishing improvement in work place safety in many parts of the world. The previous events lead, in sequence, by Drs Gay and Wainwrigth (Johannesburg, S.A., 1982), Fairhurst (Minneapolis. U.S.A., 1988), Young (Kingston, Canada, 1993), Gibowicz and Lasocki (Kraków, Poland, 1997), van Aswegan, Durrheim and Ortlepp (Hartbeespoort (Pretoria), South Africa, 2001), and Potvin and Hudyma (Perth, Australia, 2005), highlighted major technological advances and I’m convinced that this event under the leadership of Dr. Tang Chunan and the Chinese collaborators will be able to make another critically important contribution to the enhancement of safety in underground mining.

When mining in highly stressed ground, increasing safety standards and aiming for high productivity demands sophisticated engineering to maximize value and minimize risk - for workers and investors. Lack of state-of-the-art engineering when mining at depth, particularly in highly stressed, brittle rock often leads to unanticipated failures, unnecessary delays and extra costs; workers are often exposed to unnecessary risks. Furthermore, brittle failing rock at depth poses unique problems as stress-driven failure processes often dominate the excavation behavior and related energy release mechanisms are difficult to control. Such failure processes can lead to shallow unraveling or to strainbursting modes of instability that cause difficult and dangerous conditions underground. Furthermore, when mining, we disturb the energy balance and this leads to movements along weakness structures, slippage of faults, or the failure of remnant pillars. This energy release can be disastrous leading to partial or full mine collapses, situations that are simply no longer acceptable to a human society.

Innovative solutions to overcome related challenges must be found and implemented. It can be easily demonstrated that many new developments have helped to reduce the cost of large construction or mining projects by hundreds of millions of dollars. This economic opportunity and the related technical challenges are the driver for innovation and must guide our path of discovery in rock mechanics in general and in burst-prone ground in particular..

The symposium covers applications related to all study areas of rockbursts and mine seismicity, with an emphasis on topics related to controlling rockburst hazard and sustainable development in deep mines. Specific topics were wisely selected to strategically focus on areas that are of high relevance for advances in this field:

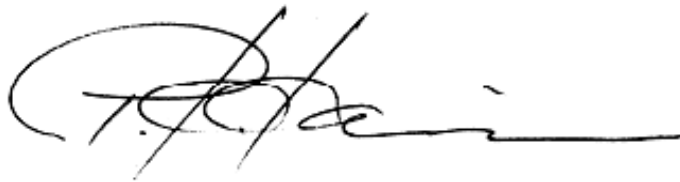
(1) Understanding seismic hazard: theoretical research and laboratory experiments; source models and mechanisms of seismicity; Numerical simulation of rock failure; and associated seismicity.

(2) Mine seismicity and induced earthquakes: understanding and managing seismic hazard; rockburst damage and ground support under static and dynamic loading; instrumentation, monitoring and data analysis; integration of seismicity and numerical modeling;

(3) Deep mine design: case studies in underground hard rock, coal and soft rock mines.

Beyond mining applications, civil engineering projects are being advanced at greater depth and transportation as well as hydropower projects are challenged by violent rock mass failure processes called strainbursts. Our Chinese colleagues have many challenging projects under construction and are experiencing severe strainburst conditions. This meeting is there for timely from a regional perspective and it is hoped that the many contributions will assist in the completion of these extraordinary projects.

The organizers of this symposium are to be congratulated for having attracted contributors from around the world that are making outstanding contributions and are sharing their newly acquired knowledge for the benefit of us all. We owe our gratitude to the organizing team lead by Dr. Tang Chunan for their tireless efforts on our behalf. We look forward to stimulating discussions and a rewarding event.

A handwritten signature in black ink, appearing to read 'P. Kaiser', with a large, stylized initial 'P' and a long horizontal stroke extending to the right.

Peter K. Kaiser