Lecture & Training Course on

Assessment of Seismic Hazard in Mines

18 March 2015
(Peppers, Launceston, concurrently with EAGCG Meeting)

08h45 - 12h00: **Lecture: Assessing the Long, Intermediate and Short Term Seismic Hazard for Mines**, Dr Aleksander J. Mendecki

12h00 - 13h00: Lunch

13h00 - 15h30: **Training Course: Seismic Hazard Assessment using IMS Vantage**, Gys Basson, Stephen Meyer

Cost: AU$150 per person

Attendees who would like to install IMS Vantage on their laptops are encouraged to come to the course room at 08h00. The course presenters will help to install the software and temporary licences. The demonstration Vantage projects will be provided as well.

For more information on registration please contact Gys.Basson@IMSeismology.org.
Lecture

Assessing the Long, Intermediate and Short Term Seismic Hazard for Mines

08h45 - 12h00

Lecturer:
Dr Aleksander Mendecki, Head of Research at the Institute of Mine Seismology.

Programme

1. Long, intermediate and short term hazard – Definitions and objectives
   1.1 Formal definition of seismic hazard.
   1.2 Seismic hazard and seismic hazard potential.
   1.3 Quality and integrity of data.

2. Maximum event size
   2.1 Maximum possible even size in a mine.
   2.1.1 Balance of the effective volume mined and maximum event size.
   2.1.2 Size of a mine and the maximum event size.
   2.1.3 Influence of local tectonic and regional mining.
   2.2 The size of the next largest event.

3. Intermediate term hazard
   3.1 Size distribution of seismic events in time and in volume mined domain.
   3.2 Parameter estimation of the size distribution and associated errors.
   3.3 Probabilities of exceedance vs event size for different time intervals.

4. Long term hazard
   4.1 Recurrence times and associated event sizes for long term hazard.
   4.2 Probabilities of exceedance vs time for selected event sizes.

5. Short term hazard
   5.1 Step loading and relaxation process.
   5.2 Probabilities of exceedance for short term intervals.
   5.3 Re-entry probabilities.

6. Uncertainty
   6.1 Types of uncertainty.
   6.2 Interpretation and bias.

The course is based on the “Mine Seismology Reference Book. Chapter 2: Seismic Hazard” by A. J. Mendecki, Institute of Mine Seismology, to be published in April 2015. Presentation will be made available in electronic format.
Training Course

Seismic Hazard Assessment using IMS Vantage

13h00 - 15h30

Course Instructors:
Gys Basson, Applied Seismologist at the Institute of Mine Seismology.
Stephen Meyer, Mine Seismologist at the Institute of Mine Seismology.

Programme

1. Quick introduction into Vantage
   1.1 Layout of a Vantage project.
   1.2 Vantage components.
   1.3 Events and creation of event filters.
   1.4 Import of production data.

2. Size of the next largest event
   2.1 Largest and record breaking events.
   2.2 Next record event: most likely record and expected upper limit.

3. Event size distribution
   3.1 Magnitude, log P, log E.
   3.2 Models: open ended and upper truncated, lower threshold.
   3.3 Probabilities of exceedance: table and plots.
   3.4 Switching between time and volume mined domains.

4. Long term hazard
   4.1 Recurrence times of large events.

5. Re-entry protocol
   5.1 Conventional analysis: historical rate of seismicity, fitting event decay rate using the Omori's law.
   5.2 Short term hazard assessment: fitting event decay rate using the streched exponential distribution, inhomogeneous Poisson process and probabilities of exceedance for intervals.