

RISKGATE – a new software for the mining industry risk management

RISKGATE – um novo software para a gestão de riscos na mineração

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The coal mining industry is managing risks and its consequences more effectively in Australia by using an interactive online risk management system known as RISKGATE.

Developed by the SMI-MISHC (Sustainable Minerals Industry (Minerals Industry Safety and Health Centre) at the University of Queensland, Australia, RISKGATE contains detailed information about 17 high-consequence risk areas (called topics in the system) for opencut and underground coal mines. RISKGATE topics are focused on the industry activities - mining, processing, transport, storage. The existing topics include fires; strata control for underground mining; ground control for opencut mining; tires; isolation; collisions; explosions and explosives; manual tasks; trips, slips and falls.

The scope includes mine sites, lease areas and mine infrastructure (mobile, fixed plant, field equipment, buildings, road and rail transport) and all aspects of the mine life cycle from design to decommissioning. The topics uniformly recognize that a loss of control can result in injury or fatality, equipment damage, production loss, reputation loss and environmental damage. However, the priority focus for RISKGATE is the safety and health of mine personnel.

Data in RISKGATE was distilled from 400+ days of coal mining industry experts time engaged at structured action research workshops facilitated by MISHC and sponsored by ACARP (Australian Coal Association Research Program), a collaborative industry-funded and industry-driven program that stimulates

research on critical issues to the coal industry (see Table 1).

RISKGATE uses "bow-tie analysis", a methodological tool that looks at unwanted events and thoroughly analyses controls that prevent these unwanted events from occurring and also offers ways of mitigating the consequences should the event occur.

For example, under the topic "loss of control of explosives and associated chemicals during handling and shot firing operations", the user can drill down the list to select causes for this specific event, or find its preventive controls (see Table 2). Alternatively, the user can identify the mitigating controls for

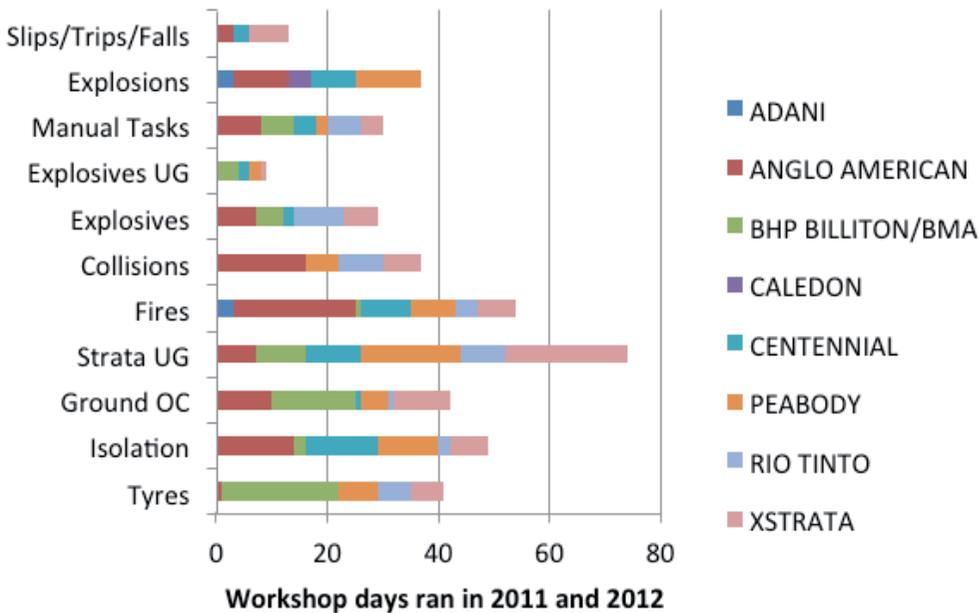


Table 1 Mining industry contribution on workshops to build RISKGATE. At vertical axis are RISKGATE topics.

RISKGATE

Home Topics About Log-out

Bowtie Tool

The RISKGATE Bowtie selector below provides control information for Causes and Consequences relating to Initiating Events.

Information

You can navigate through the Bowtie structure. Hovering over elements will provide more details. When you are ready please select the Checklist button.

Checklist

[Click here to create a Checklist from this Bowtie](#)

CAUSES

- Shot firing design is not suitable for material to be blasted
- Drill holes not positioned to shot firing design plan
- Operational factors compromise the integrity of the original shot firing pattern
- Inadequate preparation for charging the shot
- Explosives not loaded to design (including overload, underload, wrong sequencing, incorrect stemming)

Please choose a Cause to populate this Preventive Control panel

INITIATING EVENTS

Explosives Undergrounds

Loss of control of explosives during handling and shot firing operations

Please choose a Consequence to populate this Mitigating Control panel

CONSEQUENCES

- Personnel injury and/or fatality
- Post shot firing fume is not controlled and passes outside the shot firing exclusion zone
- Personnel/third party injury, fatality, equipment damage from unreconciled product outside explosive compound

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Table 2 Example of Bowtie initial analysis of RISKGATE for event of loss of explosives during handling and shot firing operations and its possible causes.

particular consequences, such as "personal injury or fatality on or near the mobile plant or field equipment used in the surface mining environment". The system contains more than 20,000 individual controls (www.riskgate.org).

In Australia, mining industry personnel use risk-based management approaches to control hazards to occupational health and safety: RISKGATE is in line with that approach and represents ACARP's largest investment in occupational health and safety research. Project manager and Professor at MISHC, Philipp Kirsch, affirms that the system has application across the mining industry and not only coal, as well as it is applicable to different contexts and realities. According to him, due to the clean structure of the bow-tie analysis modelling used to build the system, adaptation to other environments outside Australia is relatively straightforward.

The system underwent product testing repeatedly for improvements before commissioning. RISKGATE is now operating with 17 topics, and the final topic fitness for work (health and well-being) will be released in December 2014.

References

- KIRSCH, P., HARRIS, J., SPOTT, D. Vertical integration of risk management in the Hunter Valley Coal Chain – application of the coal industry's RISKGATE platform. *The AUSIMM Bulletin*, February, p. 45-49, 2013.
- WORDEN, S., SPOTT, D., WHITTAKER, B. Risk management competence in Australia: a boost from new software. *Mining Engineering Industrial Minerals Review*. v. 65, n. 7, p. 22-32, 2013.

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