BLENDED LEARNING

**7 Self-Paced Modules +
3 Live Interactive Sessions**

Mining Risk Engineering

BLENDED LEARNING/ONLINE COURSE:

This course is about the scientific understanding of risk, its measurement and analysis, knowledge of which underlies the concepts of critical risks and their controls, as described in the ICMM Critical Control Management Guide.

February - April 2022	14 February - 1 April
7 Modules | Over 7 Weeks	

August - September 2022	15 August – 30 September
7 Modules | Over 7 Weeks	

KEY LEARNING OBJECTIVES

▶ Construct meaningful MUE registers

▶ Effective use of the Bow Tie Model

▶ Understanding risk in the context of real numbers

▶ Comprehensively identifying and understanding the effect of risk control measures

▶ Understanding social, legal and cost-effectiveness criteria for the selection of control measures

Our Expert Course Instructor

Derek Viner

Derek is a qualified professional mechanical engineer. For the past 35 years he has been a consulting risk engineer and management consultant in risk control, working in a wide variety of industries. During this time he has also been instrumental in the development and delivery of two post graduate courses in this field. Derek is recognised as one of the leaders in Australia in the theory and practice of risk management on a theoretical, technical and organisational level. He is the author of two books, editor of another and the author of numerous papers.

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ABOUT THE COURSE

This course is about the scientific understanding of risk, its measurement and analysis. This knowledge underlies the concepts of critical risks and their controls, as described in the International Council on Mining and Metals (ICMM) Critical Control Management Guide. The efficient use of the processes described in the Guide benefits from an understanding of "risk" and what is meant by "safety", the connect between "hazard" and "risk" and the foundation of engineering risk analysis methods.

There is much potential for misunderstanding in the used of terms and methods because of the numerous definitions of them in legislation and in the plethora of risk management standards: "Even within the ISO domain... I think there's about 40 different definitions of risk in different standards" (May 7, 2018: Grant Purdy interviewed by Alex Sidorenko in *https://riskacademy.blog/the-most-amazing-risk-management-interview-ever/)*

However, these terms are actually also the subject of good science. This science provides a sound foundation for understanding, identifying and ranking Material Unwanted Events (MUE), risk and the risk analysis principles simplified in Bow Tie Analysis. The science clarifies the differences between causes and controls and enables control measure possibilities to be comprehensively listed.

WHO WILL BENEFIT

Scientifically-educated professionals in the mining and minerals industries, e.g. engineers, geologists, metallurgists and surveyors.

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EXPERT COURSE INSTRUCTOR

Derek Viner

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Derek's working experience has taken him to Africa, India, Thailand, Saudi Arabia and throughout Australia. His consulting experience covers mining (deep and surface), electricity generation and transmission, integrated steel plants, heavy engineering and heavy construction, manufacturing, local government, hospitality, forestry, fish farming, petro-chemicals and universities. Derek's educational experience includes the conduct of post-graduate subjects in accident analysis, risk theory, risk management and risk analysis. His diverse experience ensures real-life examples are brought to any consultancy or educational role. A minor aspect of Derek's practice has been as an expert witness; at one stage the value of his evidence was tested in the High Court of Australia and was not found wanting.

Derek has an honours degree in Science (Mech Eng) from the University of Witwatersrand, Johannesburg, South Africa and a Master of Science (Air Transport Engineering) from Cranfield University of Technology, United Kingdom. He has long term associations with the Faculty of Engineering and Science at Swinburne University of Technology, Melbourne, Australia and with the University of Ballarat.

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Course Outline

This course consists of seven modules, which progressively explain the foundation science and its application in:

- Developing a register of MUE
- Risk analysis theory and its efficient use in Bow Tie Analysis
- Estimating risk using real numbers and comprehensively identifying and evaluating control measures including the use of cost benefit analysis.

MODULE 1

Conceptual Clarity & Science Applied To Understanding Risk - Course Introduction

- Biographical notes on the presenter
- Accident causation theory and its history
- Recognising accident causation ideas in modern world safety programmes
- Scientist's views on accident causation theory
- The qualities of models and theories arising from application of the scientific method
- Illuminating the differences.
- Structure and content of this course

MODULE 2

Knowing Your Risks

- The origins of the scientific understanding
- How damage happens 1
- How damage happens 2
- Categorising and cataloguing risks - creating sensible risk registers
- Risks in the mining industry

MODULE 3

The Time Structure of Damage Processes

- The time sequence damage process model, Part 1
- The time sequence damage process model, Part 2
- Risk engineering analytical methods in this context - Fault tree and Event Tree (Outcome Analysis)
- The meaning of the elements of the Bow Tie model
- Translating the ICMM Definitions and Acronyms

MODULE 4

Estimating Risk

- The parameters that determine risk, Part 1
- The parameters that determine risk, Part 2
- The Risk Diagram
- Estimating Risk, Part 1
- Estimating Risk, Part 2
- The practical value of understanding Risk in real numbers

MODULE 5

Control Over Risk

- Class A Risk controls in the Energy Damage Model
- Class A Risk controls in the Time Sequence Model
- Class B Risk controls
- The effect of Risk Controls (both Classes) on Risk parameters
- The effect of Risk Controls on the Risk Diagram

MODULE 6

Evaluating Risk Control Possibilities

- Social research on public perceptions of risk
- The legal origins of "reasonably practical" (SFARP, ALARP)
- Evaluation in the context of best practical and best possible control measures
- Understanding "the hierarchy of controls"
- A practical filter: the criteria for Must, Should and Could do controls
- When and how to use Cost Benefit Analysis on control options
- "Material Unwanted Events" in the context of the Risk Diagram and the Risk Register

MODULE 7

Bow Tie Analysis

- Defining Events in a consistent manner and recognising MUEs
- Understanding Mechanisms
- Understanding Outcomes and Consequences
- Using Bow Tie Analysis as a container for comprehensively listed control measures (Class A and B)
- Using Bow Tie Analysis in the context of Risk evaluation criteria

Live Interactive Session:	**14 February – 1 April 2022 Course** **15:00 AEDT** (4 March) **15:00 AEDT** (18 March) **15:00 AEDT** (1 April)
Live Interactive Session:	**15 August – 30 September 2022 Course** **15:00 AEST** (2 September) **15:00 AEST** (16 September) **15:00 AEST** (30 September)

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Course Code	Location	Course Parts	Month	Standard Price		4+ Dels Discount
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