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21st of March 2024

Professor Michael Quinlan

Dear Michael,

It is always good to chat with you. Thank you for considering the following. It is sad the death of Kurt Hourigan at Mt Clear Gold Mine last week is another tragic reminder of the criticality of managing mining hazards.

Your book, Ten Pathways to Death and Disaster, is the most comprehensive analysis of past mining accidents there is. As you already know I have linked it to the Mine Accident and Disaster Database that I have created.

[Ten Pathways to Death and Disaster - Mine Accidents and Disasters](#)

But I have always believed that there should be more structure to the pathways. They do not exist as single contributing factors or even combined multiple pathways, rather they are part of a larger systematic process for safe work. To make the pathways more identifiable and relatable to current and future mine management, I have arranged the Pathways as Integrated Pathways to Death and Disaster. The following discussion explains how I have come to this conclusion.

I fully agree with your pathways but have integrated them into the current legislative and systematic requirements for safe mine management. Following your review of my following suggestions, I would be pleased to discuss your thoughts. What you have done is the best there is, I hope that this just makes it better.

Mark.

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Integrating the Pathways to Death and Disaster

The [Ten Pathways to Death and Disaster](#) is the most comprehensive analysis of past mining accidents and disasters available. Mining death and disaster (and illness) have occurred for centuries, but the systematic processes to prevent them are far more recent. These processes are now encompassed in mining legislation, but the pathways to death and disaster remain.

The Pathways are correct but should be viewed in the context of the current legislation and the development and implementation of safety and health management systems at mines intended to manage those risks. The standards that we have today for guidance may not have been available to Mine Operators at the time of past mine accidents and disasters, but they are now.

There has been an Australian Standard for OHS Management Systems since 1997 (4804), updated in 2001, which 20 years later was replaced by AS45001 in 2018. The main mining states introduced the requirements for an OHS Management System into legislation at different times, but now all require each mine to have a safety and health management system.

There is a Competency for the Establishment of a OHS Management System in the Australian Resources and Infrastructure Industry Training Package, [RIIWHS601](#). It was recommended for Site Senior Executives in Queensland following the death of [Shane Davis](#) at a Queensland mine in 2005. There is a competency for Supervisors to Apply the SHMS but because it is not prescribed it is rarely required or obtained, [RIIWHS403](#).

The table below demonstrates how the 10 Pathways to Death and Disaster are integrated into the current Legislation and Australian Standard for OHS Management Systems. It also demonstrates that some of the pathways are a subset of the parent pathways (7 Regulatory Flaws and 4 Flaws in Management Systems).

To demonstrate the integration, the pathways are highlighted below and aligned to the Australian Standard for Occupational Health and Safety Management Systems (AS 45001).

The Law Legislation and Enforcement	Pathway 7 - Flaws in Regulatory Oversight and Inspection
The legislation requires Safety and Health Management Systems to be established at each mine to ensure the safety and health of persons	
The legislation imposes Obligations or Duties (depending on which jurisdiction you are in) on persons to Develop, Implement, Apply and Comply with Safety and Health Management Systems. It also provides for Inspectors to enforce the Act. Inadequate legislation or a failure to enforce it is identified as Pathway 7.	
45001	Pathway 4 - Flaws in Management Systems
	It is arguable that the pathways below are specific examples of the overall Management System Flaws pathway.
5 Leadership Work Participation	
5.1 Leadership and Commitment	Pathway 6 - Economic pressure / compromising safety
5.2 OHS Policy	

5.3 Organisation roles, responsibilities and authorities	
5.4 Consultation and Participation of Workers	Pathway 8 - Worker, Consultant and Supervisor concerns prior to incident
6 Planning	
6.1.1 General	
6.1.2 Hazard ID, Assessment of Risks and Opportunities	Pathway 3 - Failures in Risk Assessment
6.1.3 Legal and other requirement	
6.1.4 Planning Action	
6.2.1 OHS Objectives	
6.2.2 Planning to achieve OHS Objectives	
7 Support	
7.1 Resources	
7.2 Competence	Not included as a Pathway, but perhaps underpins every pathway
7.3 Awareness	
7.4 Communication	Pathway 9 - Poor management/worker communication/trust
7.4.1 General	
7.4.2 Internal Communication	
7.4.3 External Communication	
Documented Information	
7.5.1 General	
7.5.2 Creating and Updating	
7.5.3 Control of documented information	
Operations	
8.1 Operational planning and control	
8.1.1 General	
8.1.2 Eliminating hazards and Reducing OHS Risks	Pathway 1 - Design, Engineering and Maintenance Flaws, This element includes all of the management plans required to contain the controls for the identified hazards (PHMP, HMP and SOP)
8.1.3 Management of Change	
8.1.4 Procurement	
8.2 Emergency Preparedness and Response	Pathway 10 - Flaws in emergency procedures / resources
9 Performance Evaluation	
9.1 Monitoring, Measurement, Analysis and Performance Evaluation	Pathway 2 - Failure to heed clear warning signs
9.1.1 General	
9.1.2 Evaluation of compliance	Pathway 5 - Flaws in system auditing
9.2 Internal Audit	
9.3 Management Review	

10 Improvement	
10.1 General	
10.2 Incident, nonconformity and corrective action	
10.3 Continual Improvement	

A key area not included in the Pathways, which in my view is a major contributing factor to these tragic events, is the competency of the persons responsible for the control and management of hazards at mines. This should be addressed as a separate topic however; each disaster inquiry identifies a contributing cause of the pathway failure as being contributed to by the inadequate competency of the responsible persons.

Pathway Integration Summary.

Mining Legislation in Australia requires Management Systems to control and manage mining risks. Historically they have not, because they either didn't exist, or their requirement was not adequately recognised. There are now Standards to provide guidance for the development and implementation of those Management Systems. The pathways to death and disaster remain. The analysis of the Ten Pathways and integrating them with the current legislation and Australian Standard requirements highlights several areas of priority.

1. The adequacy, implementation and enforcement of mining or work health and safety legislation is a fundamental requirement to provide a framework for the safe operation of any mine or workplace. (Pathway 7)
2. The persons responsible for the mine or workplace must prioritise safety and health above all other risks (particularly financial risk – production, Pathway 6)
3. The mine or workplace must establish an effective safety and health management system. This can be done by competent people (RIIWHS) following the guidance of the relevant Standard as well as legislative requirements. (Pathway 4)
4. There are parts of the safety and health management system which are perhaps more critical than the other parts (the pathways, 8,3,9,1, 10, 2, 5). Whilst the development and implementation of the system is important, there are parts of the system that are more important than others (critical components of the system) which have been identified as pathways to death and disaster.
5. A failure to establish, monitor and enforce the legislation that requires an effective safety and health management system, prioritising the critical pathways to Death and Disaster will result in a failure to protect the safety and health of our greatest resource, the mine worker.

I have developed the MSIA Mine Safety Management Model to assist mine operators and management understand how to develop and implement an effective management system to protect the safety and health of their mine workers.

[20231116-Mine-Safety-Management-Model-V2.pdf \(minesafetyinstitute.com.au\)](https://www.minesafetyinstitute.com.au/20231116-Mine-Safety-Management-Model-V2.pdf)

Best regards,

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