



## Determining Acceptable Risk

A presentation to the  
Queensland Mining Industry Health and Safety Conference  
Aug 2006

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## Determining Acceptable risk:

### • Three Questions:

- 1 - What do we mean by Risk?
- 2 - Risk acceptable to whom?
- 3 - What makes "The Risk" acceptable?

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## What do we mean by Risk?

- Risk means different things to different groups in our society
  - (often called stakeholders)
- 'Risk' is often used to describe 'Hazards'
  - (the potential for harm)
- Risk = Probability x Consequence
  - is a meaning developed by engineers and adopted by managers and legislators

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## To the 'average' person 'risk' means

- the potential for harm; or
  - an opportunity for increased wealth
  - The 'upside' rarely used formally in industry
- In OH & S (harm to people) terms;
  - also used to mean a 'Hazard'
- General public judgements on risk can be dismissed as 'irrational'
  - When viewed by risk experts
  - Can lead to 'Public Rage'
    - Derailing 'Enterprise' initiatives
  - With significant threat to organisations

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## In Common-law, risk used:

- Amongst a number of uses:
  - it is part of the “calculus of negligence”
  - It includes
    - Magnitude of risk of injury; and
    - the probability of it's occurrence
    - Weighed against
      - » Expense
      - » Difficulty
      - » Inconvenience



## In OH & S legislation

- Risk management is regularly referred to;
  - To paint a picture of a proactive, harm-minimisation process
  - An expectation of the legislation
- Risk is not quantified in any state legislation
- All states use the common law test of:
  - “best-practicable means” when assessing the outcomes of the risk management process
  - (Queensland legislation does this indirectly)



## Before we look for an acceptable risk answer

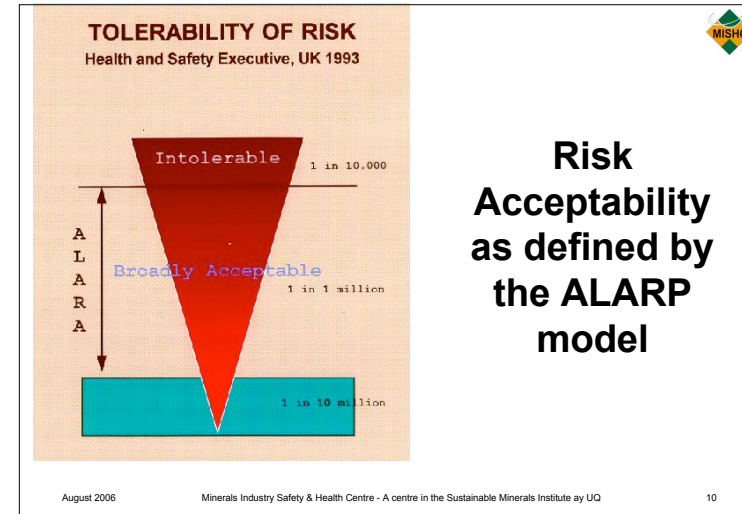
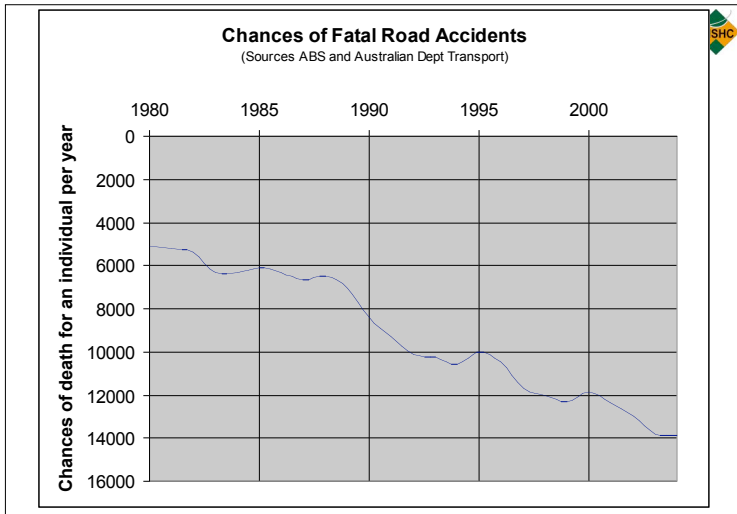
What is the background risk in which we live?



## What's the background Risk?

- From all sources (including disease) the risks we live with:
  - Annual death rate for 10 to 15 yrs olds
    - 1 in 10,000
  - For adults in the prime of life
    - 1 in 1000

(Figures from Flueler & Seiler 2003 – Figures based on Switzerland )



- ## Risk Acceptable to Whom?
- **Society?**
    - Represented by the legislator
    - Enforced by the inspectorate
    - Through the courts
  - **The individual?:**
    - As a member of society benefiting from the undertaking with the risk(s)
    - As a person paying the 'price' of a risk
      - Injury or loss
      - Where their benefits do not match the price of the risk
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- ## A scale of risk adversity
- The effect of risk imposition
- **Voluntary risk to satisfy personal desires**
    - Dangerous sports
    - 1:10<sup>?</sup> Unlimited?
  - **Wide choice of options with direct benefit**
    - Car driving
    - 1:10<sup>-3</sup> (Fleuler & Seiler)
  - **Narrow choice with some benefit**
    - Working conditions
    - 1:10<sup>-3</sup> (HSE)
  - **Involuntary imposed risk, low benefit**
    - Major hazard facility in your neighbourhood
    - Between 1:10<sup>-3</sup> and 1:10<sup>-5</sup> (Fleuler & Seiler)
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## Out of interest, where is our industry?



- Approximately 1:8700 chances of a fatal injury
- Or  $8.7 \times 10^{-3}$

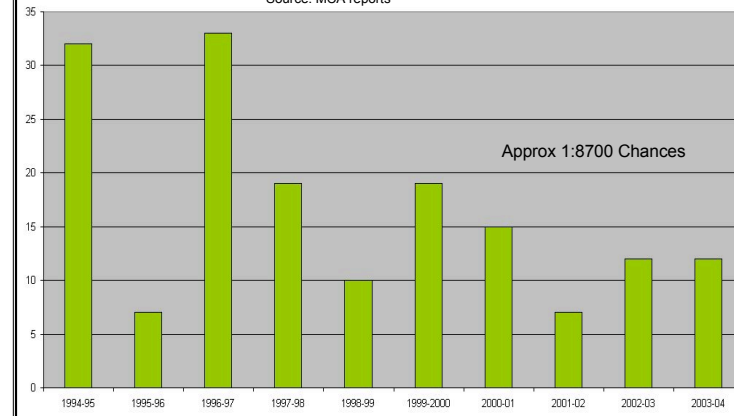
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CHART 1: Fatal injuries 1994-95 to 2003-04

Source: MCA reports



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## The clash between society and the individual views of risk



- Society may regard a  $1 \times 10^{-6}$  risk as an acceptable risk for a nearby MHF
- An individual, fatally injured in the MHF within the  $1 \times 10^{-6}$  tolerance would clearly not be convinced of that acceptability.
- Legislation recognises the problem

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## How do we deal with the risk acceptability challenge?



- The OHS law requires that employers provide a safe place of work
  - No level of risk is specified
  - ‘Safe’ is a state that results from management systems and its decision making processes
- The test of ‘safeness’ is based on “best practicable means”

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## How do we deal with the risk acceptability challenge?



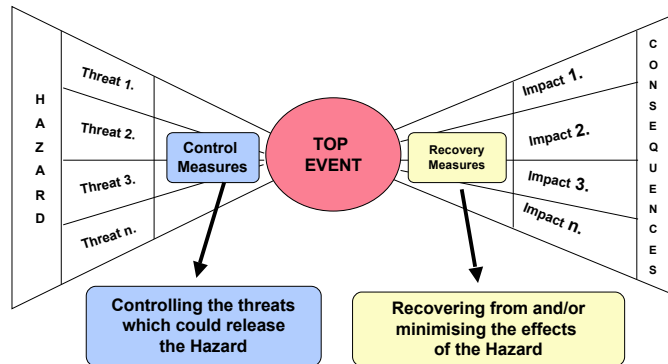
- The courts expect that the potential for injury will be searched for
  - The status quo is not the basis of decision-making
- The search for potential harm must include a recognition of misuse and abuse.
  - Protections must provide for the presence of human error.

## The risk management implications of Acceptable Risk

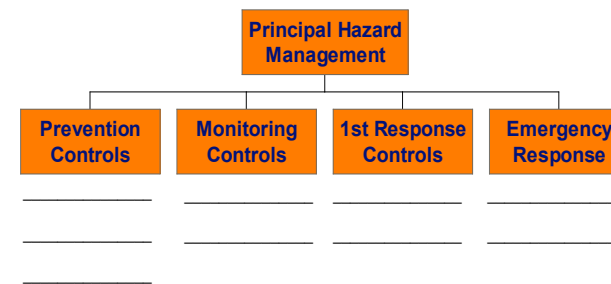


- Courts will judge what you have done on the basis of the practical protection of persons
  - In the presence of damaging energies
  - Regardless of the calculated or allocated risk rankings
- The value of the protection should be assessed on its 'failure' potential
  - When it fails, what will be impact?
  - Is there a need for further protection?

## BOWTIE ANALYSIS MODEL



## A Control Framework



## Control Adequacy Checklist



Defence Barrier Components	Prevention defences		Monitoring		1st Response Energy or Defence	Emergency Response	
	Primary	Backup	Energy	Defence		Rescue	Recovery
Fit-for-Purpose Equipment							
Competent People							
Rule sets (Work methods)							
Sustaining Management Systems							

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## Adequate Risk Control Checklist



A Best Practice Model for Harm to People risks ?	Consequence Severity		
	Non-medical Treated injury	Medically treated injury	Permanent loss of function
Rule 1: Decide on consequence severity			
Rule 2: Confirm that minimum set of barriers are in use (or will be)			
Operator understands the prevailing hazards			
Operator is aware of the state of hazards			
Available guidance on 'safe work method'			
Impending escape of energy produces a Warning of danger			
Capability to remove cause of impending energy escape			
Interpose 'Active' safety barriers			
Contain and direct escaped energy			
Interpose 'Passive' safety barriers			
Deflect escaping energy to avoid involvement of people			
Escape from energy pathway			
Rescue from escaping energy pathway			

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## What makes the risk acceptable?



- Adequate protection barriers for those who must work in the presence of the potentially harmful energies.
- Sets of protective barriers that will stand up in the presence of human error

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## Closing comments

- Risk ranking is useful in prioritising resource allocation
- For our society, the task of defining and gaining agreement to a risk 'number' is probably not a practical option
- An effective substitute for a risk number is the principle of 'best practical means' which delivers 'continuous improvement'
- A practical understanding of 'layers of protection' will provide effective energy controls
- Reducing injuries and fatalities through effective energy controls will produce a reducing risk



Thank you for your kind attention