



Fatigue & Safety in Mining —A Distraction?

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InterSafe

Fatigue

**Impairment of mental and
physical function**

Hypothesis

Effective Fatigue Management will not significantly alter on-site personal damage – fatal and non-fatal

Frameworks of Thinking

1. Damage Classification
2. Pareto Principle (principle of Critical Few)
3. Energy Damages
4. Patterns of Damage
5. Appropriate Models

Damage Classification & Pareto Principle (80/20 Rule)

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- i. Permanent
 - Fatal
 - Non Fatal
 - ii. Temporary
 - iii. Minor

Numbers of People Involved in Non-Fatal Permanent Damage

Australia (All Industries)

175 / Day

Permanent Incapacity - Mining

Year	Qld Mining	NSW Mining
2005-2006	-	134
2006-2007	3	168
2007-2008	7	204
2008-2009	39	62

Likelihood (Chance) of Permanent Damage (NSW Mining)

2007-2008	1 : 98 employee years
2008-2009	1 : 322 employee years

Energy Damages

1. Stable
2. Metastable
3. Unstable
4. Damage
5. Recovery / Repair
6. Stable

**Damaging
Energy**



Pareto Damaging Energies – Fatal and Non-Fatal Permanent

- **Vehicular**
- **Gravitational**
- **Human**

Appropriate Models

- **Egocentric**
- **Ergonomic**

Appropriate Models

- **Egocentric**

- Safe acts and conditions
- Unsafe acts and conditions

- **Ergonomic**

- Did/did not
- Present/Absent

Observations of an Incident

- **Essential**
- **Contributory**
- **Non Essential**

Human Energy – Over-exertion

Solve by which strategy -

- Training in lift technique?
- Fatigue management?
- Task Ergonomics?

Gravitational Energy – Fall to Same Level

Solve by which strategy -

- Watch where you're walking?
- Fatigue Management?
- Underfoot surface conditions?

Vehicular Energy – Jolt/Jar/Vibration

Solve by which strategy -

- Watch where you're driving?
- Fatigue Management?
- Road conditions (short term)?
- Equipment design (longer term)?

Gravitational Energy – Descend Mobile & Fixed Plant

Solve by which strategy -

- Training in 3 points of contact?
- Fatigue Management?
- “Ergonomic” Designs?

Vehicular Energy – Fatal – Over Embankment / Edge

Solve by which strategy -

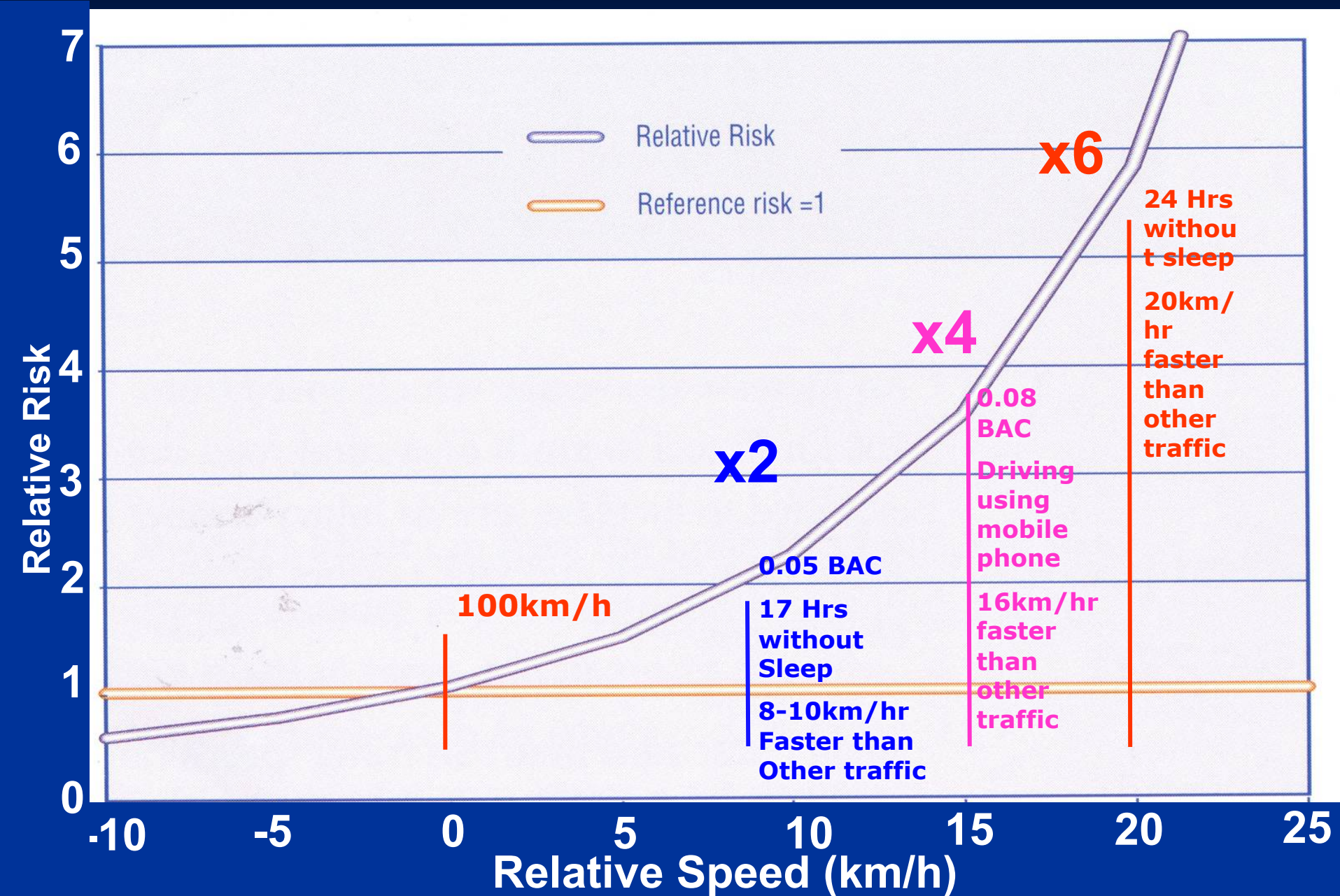
- Be Careful?
- Fatigue Management?
- Some combination of Bunds, Berms, Seatbelts, ROPS, Lighting, Drainage etc.

Proposition

Effective Fatigue Management
will not significantly alter 'on site'
personal damage (fatal, non-fatal)

Proposition - TRUE

Summary of Relative Risk



Peak Downs Highway

(Gregory Development Road – Hazledean)

Serious Casualties as a result of 41 crashes – 2004-2008

- **5 Fatalities**
- **47 Hospitalisations**

Age Groups

- Over 24 - 73%
- Under 24 - 25%

**Males & Single Vehicle
accidents over-represented**

Time of Day



• Midnight – 6am	-	9.6%
• 6am – Noon	-	26.9%
• Noon – 6pm	-	48%

- Head On - 17.3%
- Off Carriageway - 36.5%
- Other - 46.1%

Fatigue – 38%

**Driver – fatigue related
by definition
(2pm – 4pm) (10pm – 6am)**

21%

**Driver – fatigue – fell
asleep**

17.3%

Closing Comment

- Fatigue and Health
- Fatigue and Off-Site Road Incidents (Fatal & Hospital)



THE END

THANK YOU