Considering Human Factors in Practice

Peter Farrant
Rio Tinto Iron Ore
2016 CME Safety & Health Innovation Awards

People Category
Top 11 Human Factors

1.1 – Preventing human failure

7.0 – Designing for people
The context...

1/2 2014 injuries

How would we go about doubling our production?

How would we go about halving our operating costs?
- 0% of historic performance less than target
- Probability of success: 14.2%
- Worse than a 1 in 7 chance
If you had a 1 in 7 chance of hitting your production target for the year would you do the same things that you’ve always done?

What should we do differently?

DMAIC Kaizen – Safety Focus
DMAIC Kaizen

- 5 days
- Full time
- Frontline personnel
- Subject Matter Experts
- The people with the money
- Try-storming
- Large investment
- Lot of preparation
DMAIC Kaizen

Data

WA Mining – 60d+ LTI: 2003-2009

WA Mining – 60d+ LTI: 2009–2013

Site – All injuries previous year

Site – All recordables last 5 years
DMAIC Kaizen

Focus

- Manual handling injuries
- Injuries from using tools
- Maintenance Departments
Top 11 Human Factors

1.1 – Preventing human failure

7.0 – Designing for people
1.1 – Preventing human failure

‘Guys we’re going to look at how to stop people getting hurt when using tools.’
1.1 – Preventing human failure

‘If they were decent tradespeople they wouldn’t get hurt.’
1.1 – Preventing human failure

‘They clearly need more training.’
1.1 – Preventing human failure

Need to understand human failure

Human Error Types

- Slips
- Lapses
- Knowledge & Rule Based

Skill-based error

Mistakes
Tooling Injuries

Question 1: When people get hurt using tools are they normally doing a familiar task or something they’ve never done before?

Question 2: Is it experienced or inexperienced people who hurt themselves with tools?
Tooling Injuries

• What does this mean?

• When we’re trying to stop tooling injuries we need to find a way to stop the 1 time in 10,000 that skilled workers make mistakes.
How people get things wrong

There’s different ways:

- KNOWLEDGE
- FORGETTING
- ACCURACY & CONTROL
What the smart people say

• These mistakes involve a simple, frequently performed physical action going wrong.

• They are often made by experienced, highly-trained, well motivated staff: additional training is not valid.
1.1 – Preventing human failure

Need to understand human failure

Human Error Types

- Slips
- Lapses
- Knowledge & Rule Based
- Mistakes

Skill-based error
Top 11 Human Factors

1.1 – Preventing human failure

7.0 – Designing for people
7.0 – Design for people

‘We already do that.’
7.0 – Design for people

Provide baseline understanding
7.0 – Design for people

Choose your weapon

Risk Matrix?

Snook’s Liberty Mutual Tables

Company Tool

NIOSH Lifting Equation
7.0 – Design for people

**Before**

35kg overhead lift:
- Safe for 28% male and 0% females

ErgoAnalyst:
- Shoulder Exertion — *Maximum*
- Acute Score — *Highest Possible (12)*

Hands: ‘Not a time when you don’t hurt them’ — *Multiple Maintainers*

Quantify baseline and set the challenge
7.0 – Design for people

Quantify the end result and compare

**Before**

35kg overhead lift*:
- Safe for 28% male and 0% females

ErgoAnalyst:
- Shoulder Exertion – Maximum
- Acute Score – Highest Possible (12)

Hands: ‘Not a time when you don’t hurt them’ – Multiple Maintainers

**After**

<5kg manoeuvring force:
- Safe for >95% male and females

ErgoAnalyst:
- Shoulder Exertion – Low
- Acute Score – Moderate (5)

Takeaways

- Human Error
  
  o There are benefits in using these frameworks in our business.

  o This information can be easily understood by frontline personnel – it does not need to exist only in the realm of our health and safety teams.
Takeaways

- Design for people
  - Really? Prove it.
  - Choose the appropriate weapon.
  - Codify and quantify. Improve. Repeat.
  - Design for people, not for human bodies.