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RISK MANAGEMENT Inc.
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Risk Management & Human Factors

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Presentation Objectives

- How risk management & human factors relate
- Human factors defined
- Application
- A human factors PLUS risk management = safe systems

Risk Management Principles

International Standards Organisation identifies the following principles of risk management –

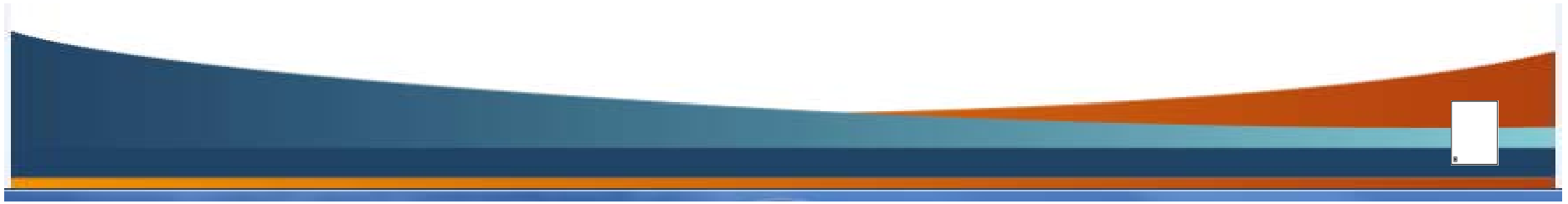
1. create value – resources expended to mitigate risk should be less than the consequence of inaction, or the gain should exceed the pain
2. be an integral part of organizational processes
3. be part of decision making process
4. explicitly address uncertainty and assumptions
5. be systematic and structured
6. be based on the best available information
7. be tailorable
8. be transparent and inclusive
9. be dynamic, iterative and responsive to change
10. be capable of continual improvement and enhancement
11. be continually or periodically re-assessed
12. ***take human factors into account***

So what is Human Factors?

Definition -

- The scientific study of people at work
- Fitting the task to the person not the person to the task

It is about the relationships between the parts that make up a system or organisation & how they contribute to system safety & performance



Origins

- Came from the military in WWII in a bid to create the most efficient fighting man
- It is a user-centric design approach to define the physical & cognitive limitations & capabilities of people in their work environments
- It is made up of a number of techniques or methodologies
- It takes from existing physical & cognitive sciences . . .

It is based in . . .

Physical

- Anthropometry
- Biomechanics
- Physiology
- Anatomy
- Thermal environment
- Noise & vibration
- Visual environment

} Actual measurements

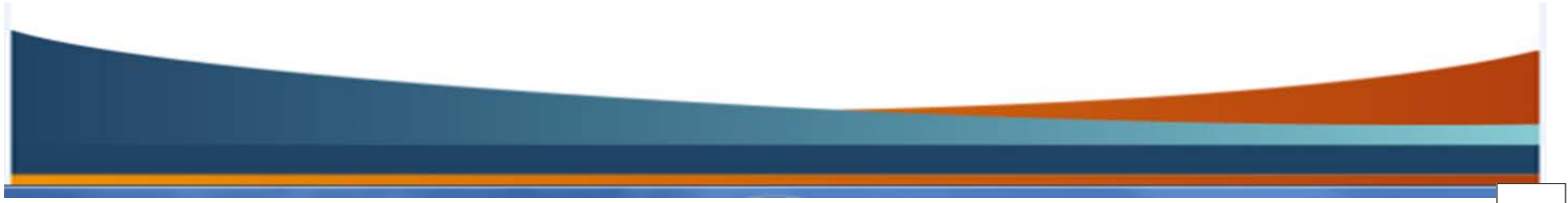
Cognitive

- Psychology
- Engineering
- Systems thinking
- Thermal environment
- Noise & vibration
- Visual environment
- Statistics

} Impact these may have upon the individual's ability to function mentally

Core Techniques

- Target Audience Description
- Task Analysis
  - interface assessment
  - physical workspace assessment
- Human Error Analysis
  - link & communication analysis
  - human error probability
  - workload assessment
- Training Needs Analysis



It is all in a word

Europe called it ergonomics from the Greek *ergo* meaning work and *nomos* meaning natural laws

USA called it human factors

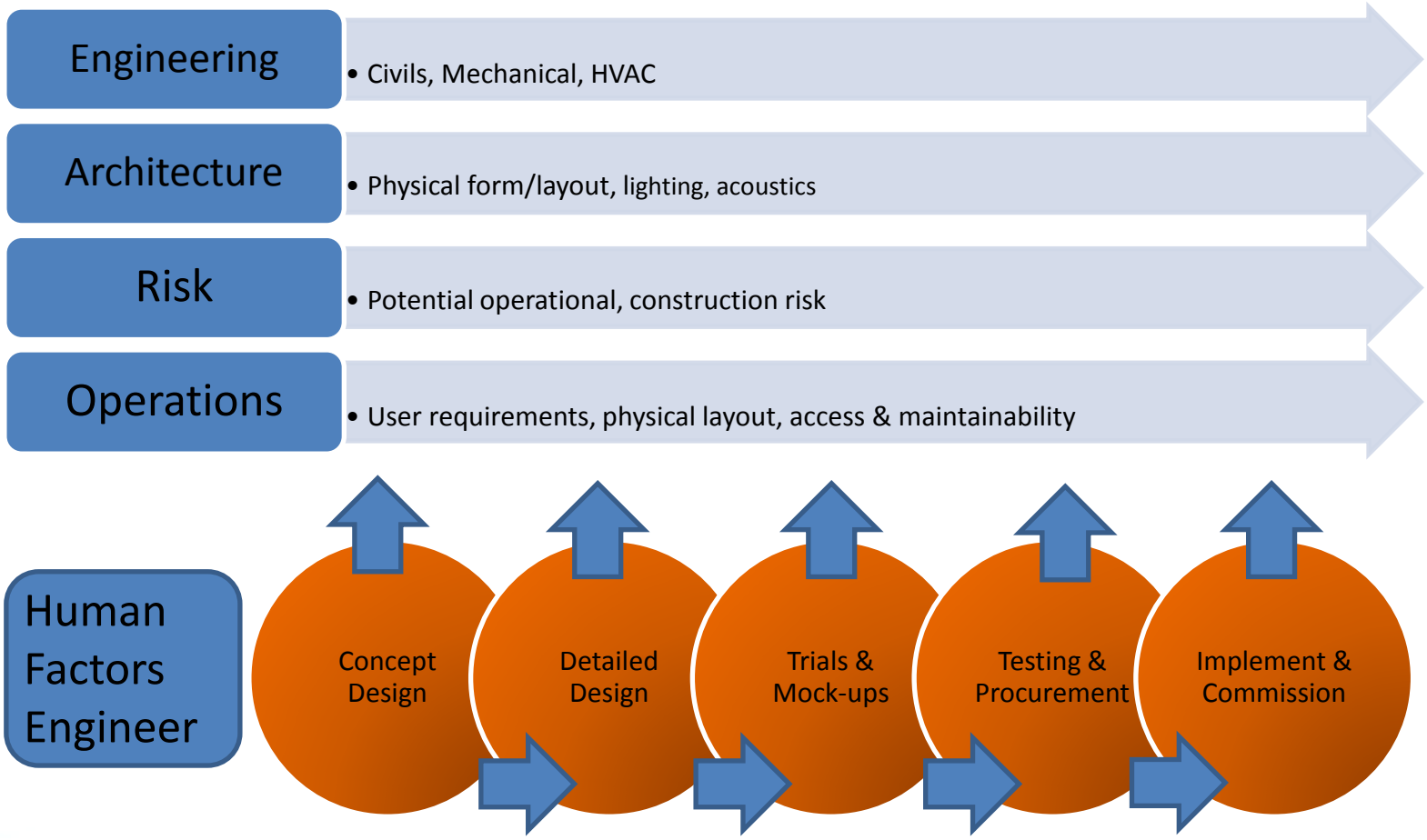
What it is not . . .

- just behaviour
- belong to aviation
- ‘fluffy duck’ stuff

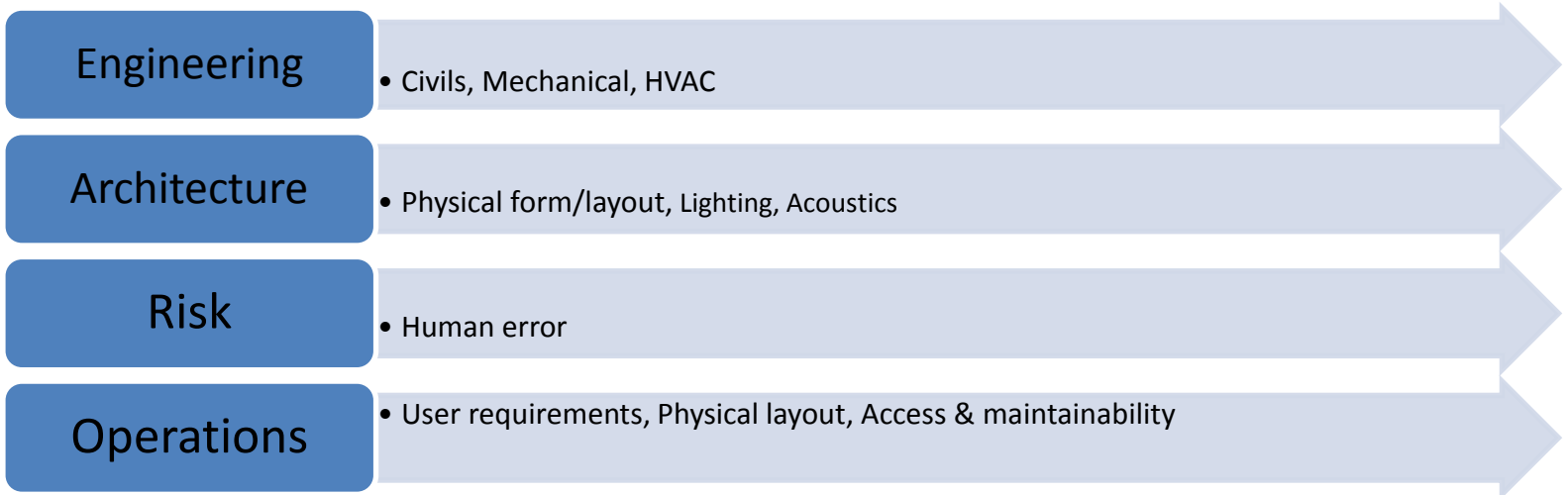
What it is . . .

- LINKED UP THINKING SYSTEMS approach that goes across discipline boundaries

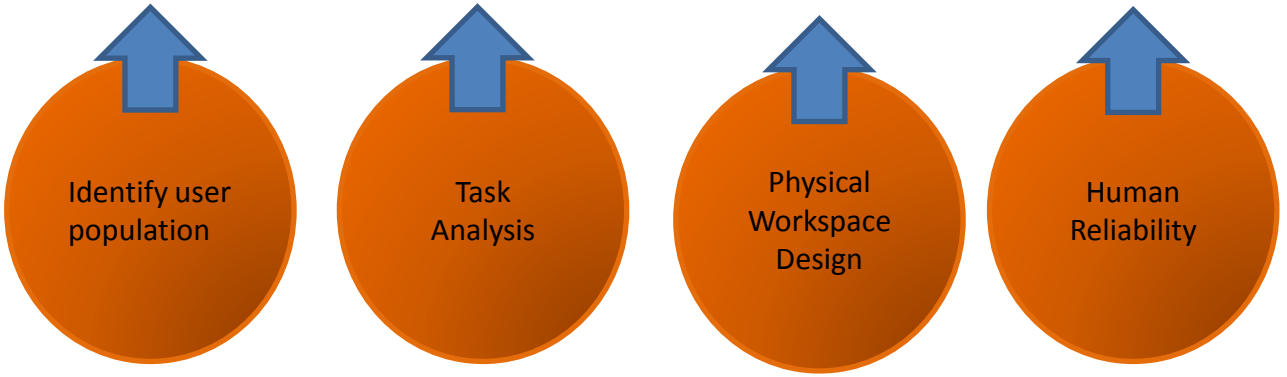
Its application – as a process



Its application – as discrete workpackages



Human Factors Engineer



Is there a relationship between risk management & human factors?

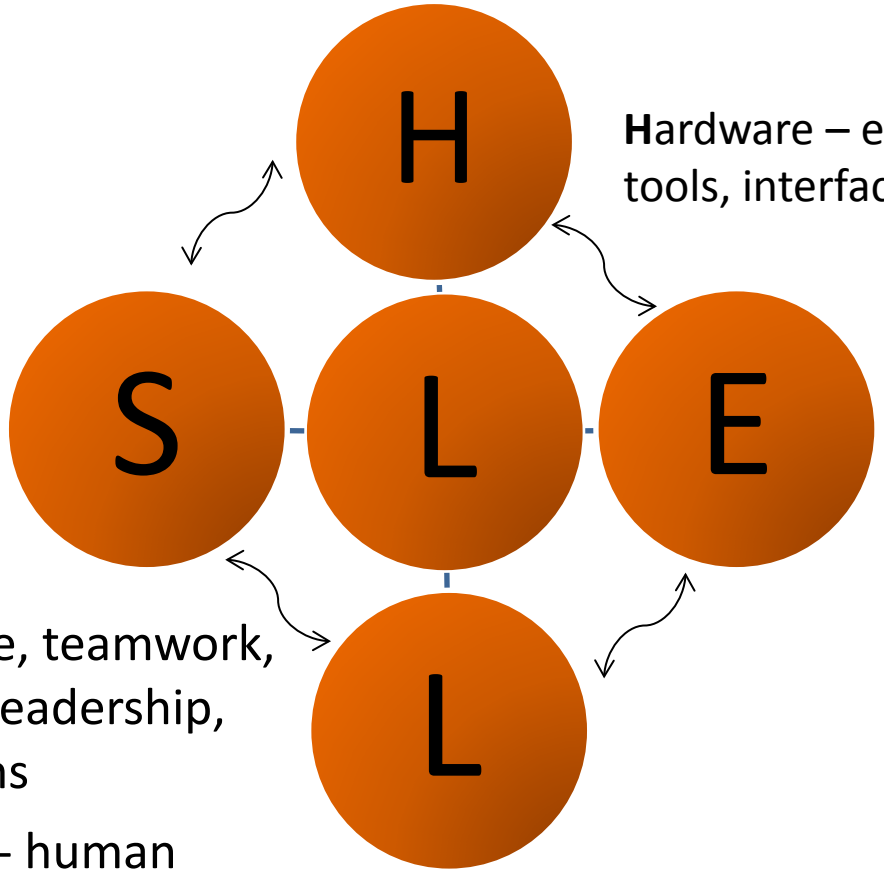
Risk Management Approach

- Problem
- Analysis
- Solution

Human Factors Approach

- Problem – who is involved, what do they do, what do they use
- Analysis – what are the relationships between the people, equipment, procedures, environment;
- Where are the potential points of human error; what level of risk is associated with this
- Solution – trials, mock-ups; assess these against the list of identified errors

SHELL - an easy Human Factors model



Hardware – equipment, tools, interfaces

Software – policies, Procedures, rules

Environment – climate, temperature, vibration & noise; also socio-political & economic factors

Liveware – people, teamwork, communication, leadership, behavioural norms

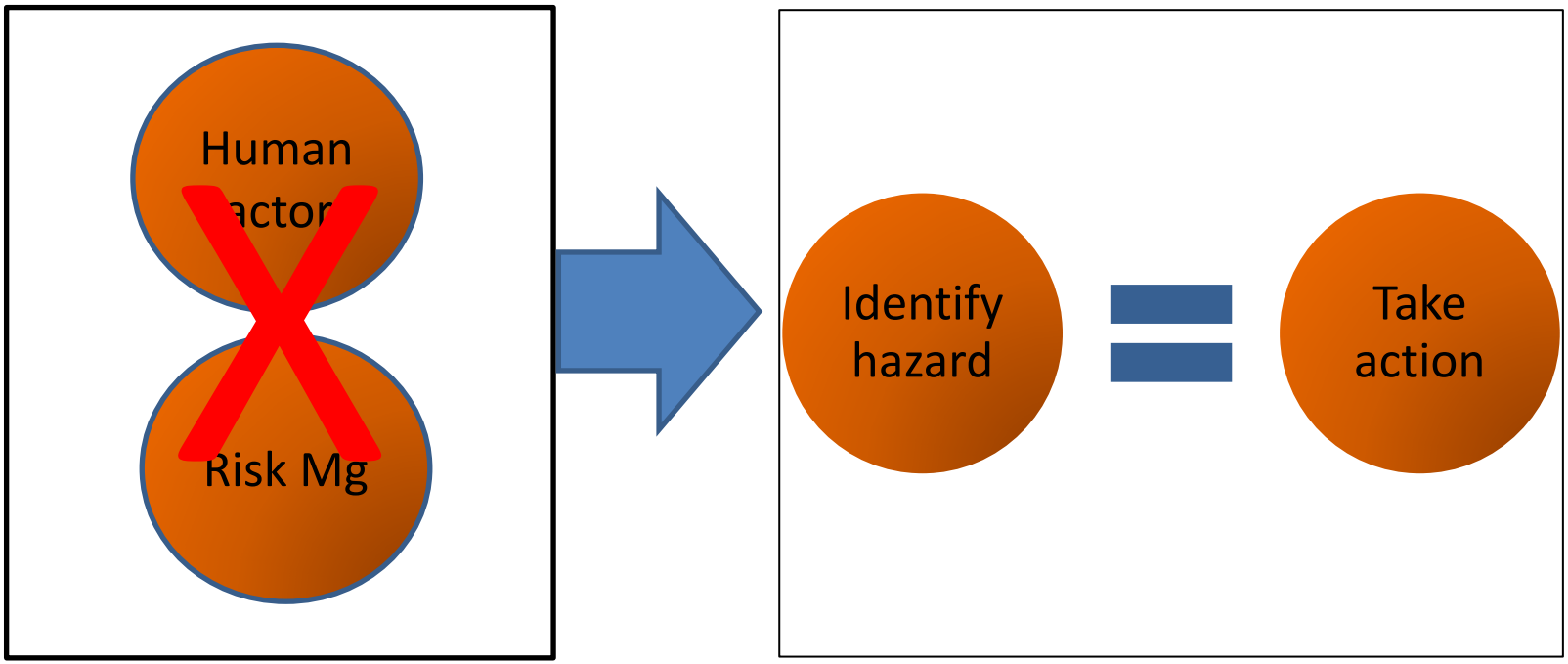
Central Liveware - human elements such as knowledge, attitudes, cultures and stress.

Human Error or consequence

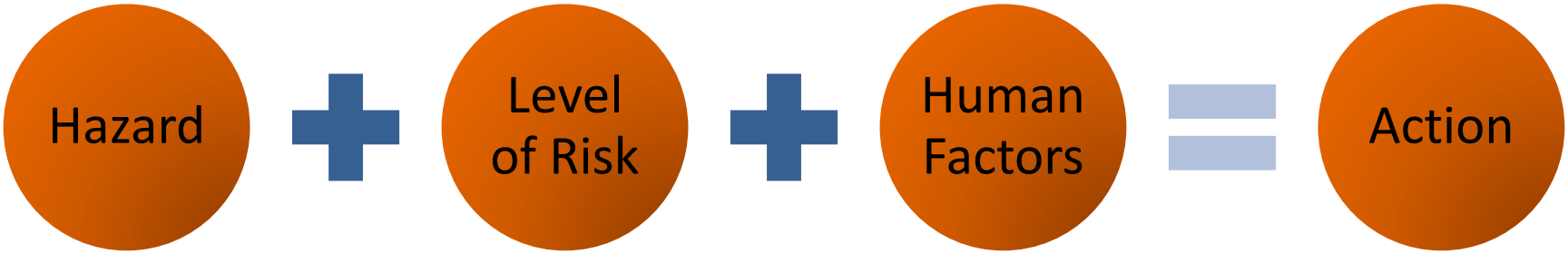
- Human error is the consequence of a series of actions or conditions that come together at the same time
- Arises when there is a mismatch between –
  - what the person is cognitively & physically capable of doing
  - what is expected of them by the organisation, the task, the equipment they are using, the organisational culture
  - the physical workplace layout and the thermal environment
- If something exceeds an individual's ability to perform there is potential for an error to be made – if not now then some time in the future
- Part of ensuring something is safe is looking at the potential consequence of any proposed change

So what is the current state of play?

Safety management in New Zealand currently hazard-based



Hazard identification & beyond



How do you get from there to here?

Item No.	Date Raised	Hazard Description	Existing Controls (if any)	Pre-mitigation			Additional Controls (if required)	Post-mitigation			Current Status – open/closed	Raised by	Last Updated
				Likelihood – 1,2,3,4,5	Consequence – moderate, high, extreme	Level of Risk		Likelihood – 1,2,3,4,5	Consequence – moderate, high, extreme	Level of Risk			

Risk Matrix

Likelihood		Consequence: 1 – Insignificant	2 – Minor Dealt with by inhouse first aid	3 – Moderate External medical help needed	4 – Major Permanent disabling injury	5 – Catastrophic Death
5	Almost certain to occur in most circumstances	High (H)	High (H)	Extreme (E)	Extreme (E)	Extreme (E)
4	Likely to occur frequently	Moderate (M)	High (H)	High (H)	Extreme (E)	Extreme (E)
3	Possible and likely to occur at some time	Low (L)	Moderate (M)	High (H)	Extreme (E)	Extreme (E)
2	Unlikely to occur but could happen	Low (L)	Low (L)	Moderate (M)	High (H)	Extreme (E)
1	May occur but only in rare & exceptional circumstances	Low (L)	Low (L)	Moderate (M)	High (H)	High (H)

Extreme (E)	**Act immediately to mitigate the level of risk.** Eliminate, substitute or implement control measures. Notify Senior Management and Health & Safety Manager, possibly Department of Labour notification if no action taken.	Remove hazard at source – administrative controls or PPE are not to be used on an identified extreme risk even in the short term.
High (H)	**Act immediately to mitigate the risk.** Eliminate, substitute or implement control measures. If these controls are not immediately accessible set up a time frame for their implementation, establish interim risk reduction strategies the set time frame. Notify Senior Management and Health & Safety Manager.	An achievable timeframe must be established to ensure that elimination, substitution or controls are implemented.
Moderate (M)	**Take all reasonable steps to mitigate the risk.** Until elimination, substitution or control measures can be implemented instigate administrative or PPE controls. These lower level controls must not be considered permanent solutions. The time for which they are established must be based upon the level of risk. At the end of the timeframe if the level of risk has not been addressed by elimination, substitution or control measure a further risk assessment must be undertaken. Specific monitoring or procedures are required, management responsibility specified and notified.	Interim measures until permanent solutions can be implemented – • develop administrative controls to limit access • provide supervision and specific training related to the issue of concern
Low (L)	**Take reasonable steps to mitigate and monitor the level of risk.** Instigate permanent controls in the long term. Permanent controls may be administrative in nature if the hazard has low frequency, rare likelihood or insignificant consequences.	

Human Factors in a Nutshell

- It is about understanding the role people play in the organisation & operations
- It provides the tools to identify –
  - who is involved – their characteristics, level of training, understanding of their role in the operations
  - the equipment/tools are being used, the quality of the technical interfaces
  - the information provided to perform the task/operations correctly
  - the external environmental conditions the people working under
  - the organisational conditions – is it a Blame Culture are people scared to raise an issue
- It provides the tools to *create* conditions that fit the people physic ally & cognitively

Finally –

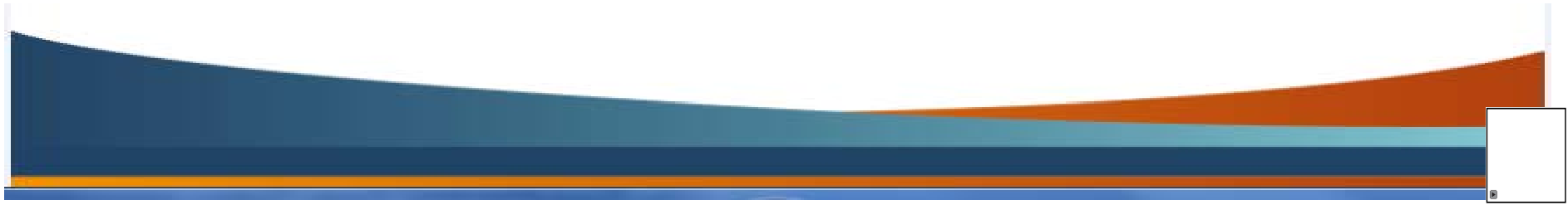
- Look at the 12 risk management principles presented at the beginning in light of what you know about human factors now – is there a synergy

  - adds value – reduces need to re-design or re-work existing structures
  - can easily be integrated into existing organisations – change the focus to include the people requirements
  - humans are the greatest asset of any organisation so have to be included in any decision that could adversely impact upon them thereby introducing potential human error & risk
  - a user-centric design approach gets greater buy-in, removes the unknown
  - it is systematic & structured
  - based upon what *is* not what you *think* it is
  - the approach can be tailored to suit the project or organisation
  - it is an iterative process, responding to other disciplines
  - continuously improved & enhanced as new techniques are developed

Something to think about . . .

"Human error does not really exist - more like human consequence from a long chain of decision cutbacks and the like which have been based on decisions with little information, no risk assessment or insight into the systems impacts of organisational change"

Comment recently made by a major national company



Questions