Australian Government
Australian Radiation Protection and Nuclear Safety Agency

From Theory to Application
Developing an Holistic Safety Approach

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ARPANSA's Challenge

"Smart people learn from their mistakes, but real sharp ones learn from the mistakes of others" (Brandon Mull)

- How could ARPANSA achieve this?
- How could we further influence and improve safety when the current performance of our operators appears good?
- How could we measure/indicate safety?

Topics

- Our strategy
- Our research (and other peoples research)
- Our approach in developing guidance
- Our development of assessment tools
- Our ongoing regulatory process

Our Strategy for Holistic Safety

- To make people mindful of their strengths and vulnerabilities.
- To empower organisations to understand the complexity of their operations.
- To develop holistic understanding.
- To promote cross organisational improvements through the sharing of experience and learning.

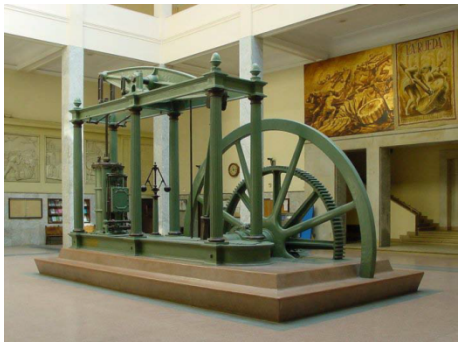
Allies and Supporters

- ARPANSA Senior Management
- ARPANSA Committees and Advisory Bodies
- IAEA
- Operators

It is better to persuade stakeholders that operator and regulatory interests are the same than to impose regulation directly

Developments in Safety Management

- Retribution
- Technological
- Human factors
- Organisational
- Holistic/systems safety



Common contributing causes

- Leadership issues
- Operational attitudes and behaviours
- Organisational (business) environment
- Competence
- Risk assessment and management
- Oversight and scrutiny
- Organisational learning
- External regulation

These factors have been identified through a study into the causes of major disasters[1]. The same factors run through all accidents. Poor communication runs across each group.

[1] Prof. Richard Taylor, University of Bristol (UK), Safety Systems Research Centre

Australia - The Lucky Country

"She'll be right"

(everything will be ok in the end)

Not this time! - Ashes Cricket 2011

- "It can't happen here" – a myth we all must dispel
- How could we further influence and improve safety when the current performance of our operators appears good?
- How could we measure/indicate safety?

Longford Gas Plant, Victoria, Australia, 1998

Waterfall Train Crash, NSW, Australia, 2003

Montara Oil Spill, Timor Sea off WA, Australia, 2009

Black Saturday Bush Fires, Vic, Australia, 2009

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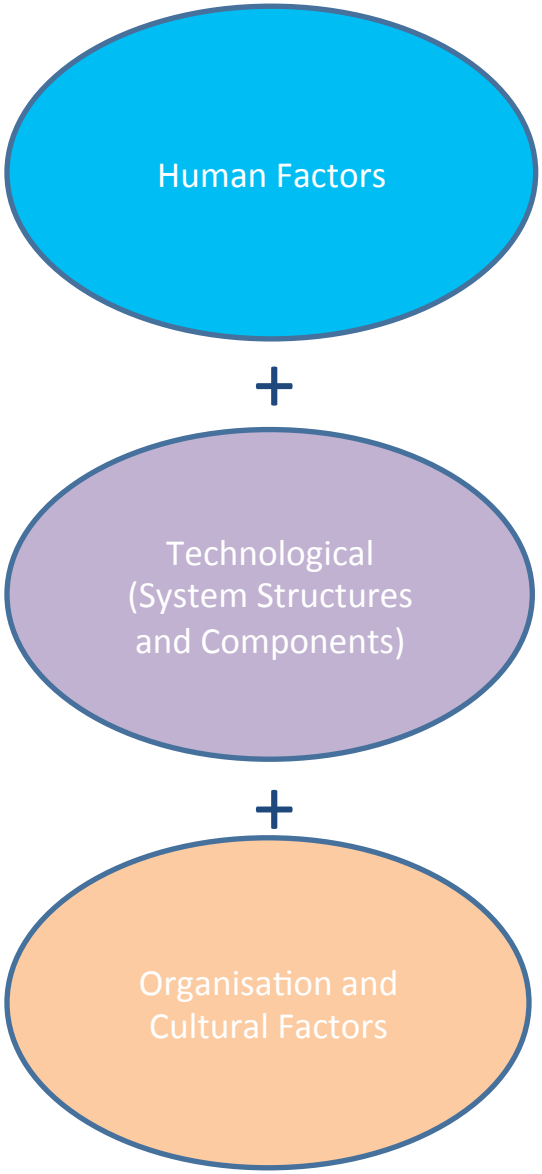
Holistic (Systemic) Safety

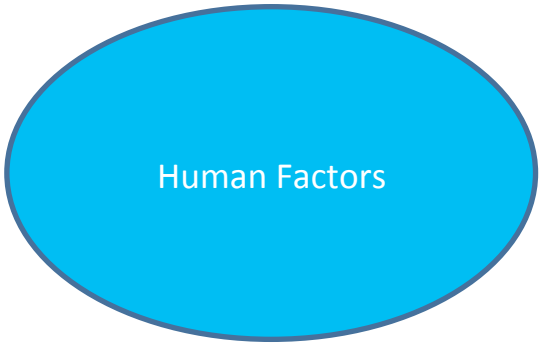
- Encapsulates each previous approach to safety
- Considers the relative contribution that each provides
- Examines the relationships and inter-dependence to each other
- Develops a deep understanding of the operating organisation including the identification of strengths and vulnerabilities
- Can identify previously un-recognised relationships, and encourage widespread, shared, ownership of safety.



Developing Holistic Safety Characteristics and Attributes

- Lots of reading
- Consideration of observed cultures
- Review of regulatory inspections
- Consultation
- Review by external committees

Holistic Safety Characteristics

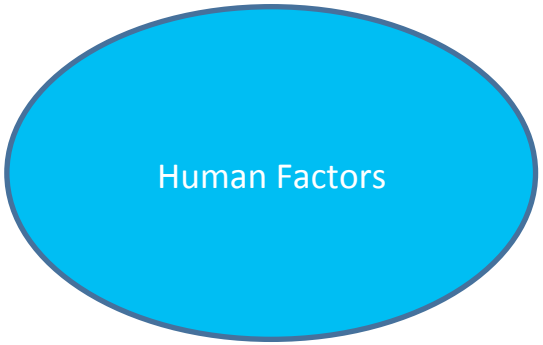


1 – Human Aspects

Safe organisations take account of weaknesses and strengths in human performance

- Suitably qualified, experienced, competent people - SQEP
- Adequate training that is shown to be effective
- Accounting for Human Factors
  - In equipment and machine design
  - In process design
  - In the operating/business environment

Holistic Safety Characteristics

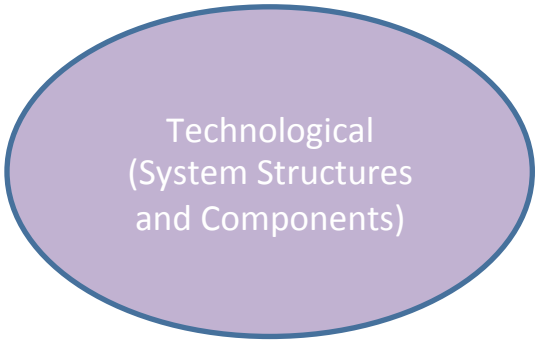


2 – Non Technical Skills

Safe organisations will possess and utilise effective non-technical skills

- Communication
- Leadership
- Team working
- Decision making
- Situational awareness

Holistic Safety Characteristics



3 – Defence in Depth

Safe organisations will apply defence in depth throughout

- Prevent Failures – conservative, proven, quality, design
- Maintain desired operational states and detect failures
- Protect from DB accidents – safety systems
- Limit progression of an accident by design
- Mitigate consequences of BDB accidents (emergency management)

Holistic Safety Characteristics

4 – Management System

Safe organisations integrate safety and environmental protection seamlessly

- Safety and environmental protection processes are fully integrated in the business management system
- All business activities consider implications for safety and environmental protection.

Holistic Safety Characteristics

5 – Resilience

Safe organisations will engineer resilience into the system

- The ability to respond
- The ability to monitor
- The ability to anticipate
- The ability to learn

Holistic Safety Characteristics

6 – Safety Culture

A safe organisations will at all levels possess shared values and beliefs for safety that produce behavioural norms that provide an appropriate and demonstrable attention to safety.

- Safety and security are clearly recognised values
- Leadership for safety and security is clear
- Accountabilities are clear
- Safety and security are integrated into all activities
- Safety and security is learning driven
- Integration across organisational boundaries

Holistic Safety Characteristics

7 – Protective Security and Nuclear Security Culture

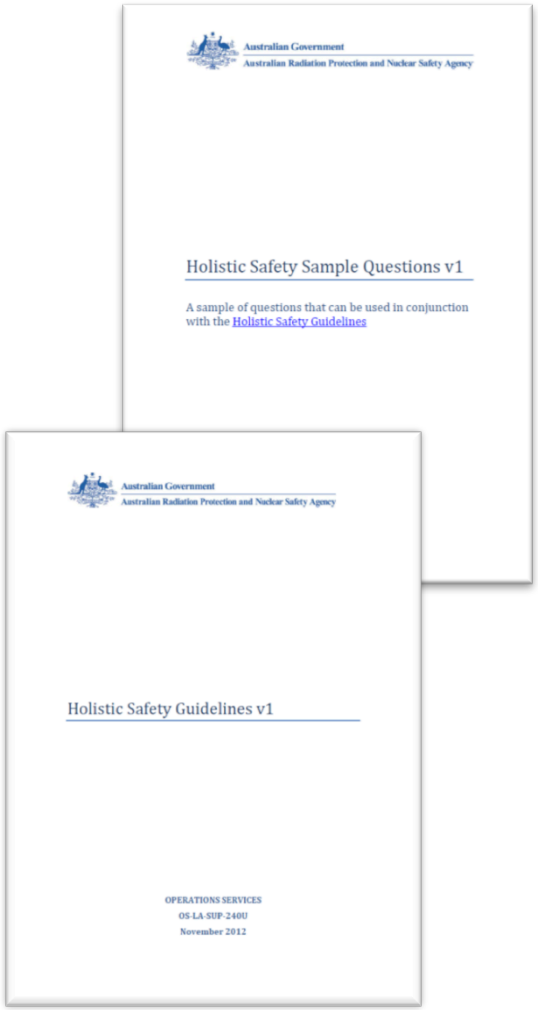
Organisations with a good security culture will at all levels possess shared characteristics, attitudes and behaviours which serve as a means to support and enhance security

- Security Management is informed and integrated

Holistic Safety Guidelines

Set out organisational CHARACTERISTICS and ATTRIBUTES for holistic safety with associated GUIDELINES

- Human aspects
- Non-technical skills
- Defence in depth
- Management systems
- Resilience
- Safety culture
- Protective security and nuclear security culture



These documents have been published on ARPANSA's website – www.arpansa.gov.au

Holistic Assessment Tool

- Uses characteristics and attributes
- Considers, IMS requirements and compliance with these
- Looks at performance internally
- Considers regulatory performance data (inspections, assessments, events)
- Characteristics, attributes and questions can be weighted to individual applications

This tool used to map strengths and vulnerabilities. It is a method to focus attention in areas of need and a starting point to discuss performance.

It is not, in itself, a compliance assessment tool

control	level	values for colour coding
very good	1	1-2.5
good	2	
satisfactory	3	2.5-3.5
inadequate	4	3.5-5
poor	5	

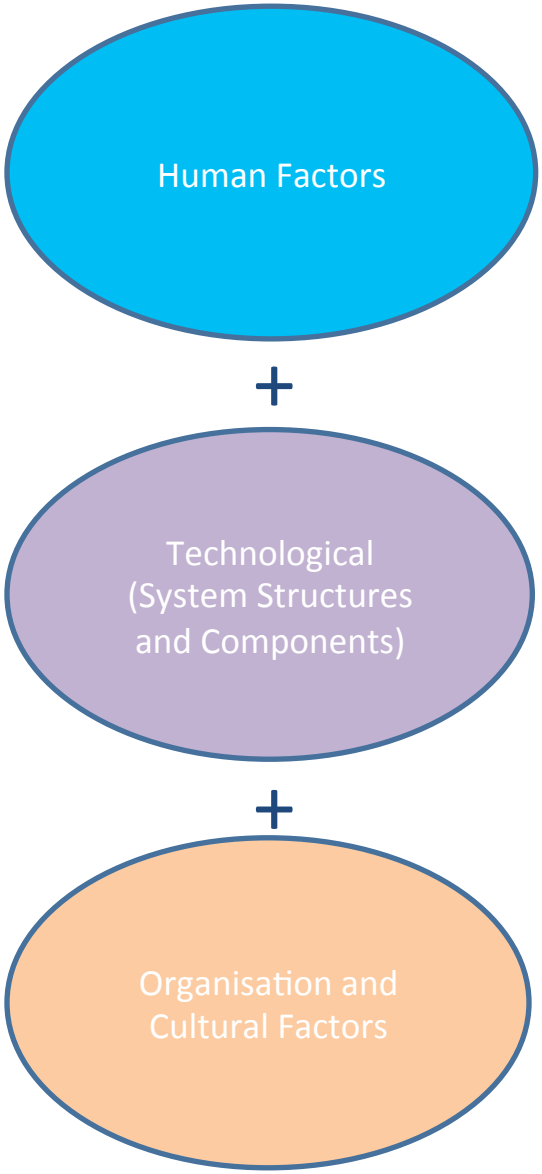
1.1 Selection of SQEP

	question	observed control level	weighing factor	weighed control level	reasoning
a)	What is the quality of the system that determines the positions that have important safety and security functions?	2	1	2	Each procedure and instruction provides a list of participant responsiblities. Each authorised or accredited position + engineering and maintenance position have a defined list of training criteria which must be met (OM 02). These requirements are embedded in job descriptions and performance reviews. The link between responsibilities and training is not always apparent and there have been a few events where staff have struggled with understanding the requirements on them. (See note 1.001)
b)	How well are the skills and competencies defined/determined?	2	1	2	Skills and compentencies are well defined in training manual for each authorised and accrediited person + engineering and maintenance staff. There is less direct control of competences on internal service providers such as nuclear analysis and some engineering support. Control of contractor competence is at organisational level. An assessment of contractor personnel knowledge and safety culture has not been undertaken but generally this work is undertaken with supervision of operator staff. Not issues currently identified through events.
c)	What is the quality of the systems for the personnel selection to perform in a SQEP position? How well is it documented?	3	1	3	Provisions are very well specified in training manual (OM 02). Regulator observes accreditation interviews for facility control positions. Some candidates have been deferred for further training and one has been rejected. There has been some concern regarding the maintenance of up to date information and at least one candidate has been deferred on re-accreditation. There has been one non-compliance identified through regulatory inspection (operator found in breach 2008)Maintenance of knowledge remains under regulatory scutiny but performacne of operating staffs appears to be satifiactory. Provisions for other positions, including engineering and maintenance, are less formal and could be improved.
d)	How well does the system ensure that the person making the decision is sufficiently qualified, experienced and suitable?	3	1	3	The requirements of operating staff is specified in training manual (OM 02) and are well defined. There have been very few events that have identifed poor decision making as a contributor. There is acedental evidence that some operational decisions would be left for the control and protection systems in an accident (as seen during exercises).
e)	How well does the system ensure that suitability of the personnel in SQEP positions is maintained?	3	1	3	Requirements for personnel are specified in plans and arrangements. Any changes to these requirements must invoke change control systems and will be categorised in terms of safety significance. These will invoke internal peer review and approval and regulatory notification. If significant to safety the change must be approved by regulator before implementation.
f)	How well does the system ensure that the above assessment is sufficiently thorough and up to date?	4	1	4	There is little apparrent active feed back of operational experience into the selection and maintenance of SQEP. Toolbox meetings are held regularily but the feedback to training is sporadic and a little clunky. Inspections have also identified that there is little verification that trainned practices are implemented in front end workpractices after initial implementation so there is no verification that practices do not drift over time.. In reagrd to facility control there is good technological defence in depth that tends to prevent significant deviation from standard procedures.
	Total			2.8	

Holistic Safety Benefits

Holistic Safety is a study of the right way to do things which:

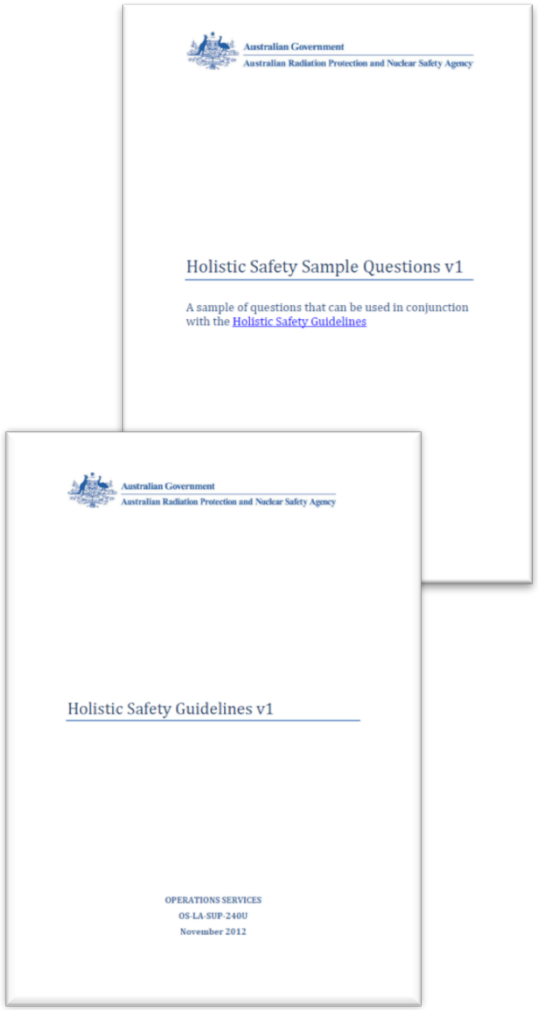
- Aids efficiency (and profit)
- Improves the wellbeing of people and the environment
- Improves business resilience
- Reduces staff turnover
- Improves recruitment
- Enhances reputation



Holistic Safety Regulation

- We socialise our holistic expectations (meetings, conferences, forums, workshops, internet)
- ARPANSA expects licence holders to address the holistic characteristics and attributes (graded)
- Inspections examining performance against our holistic characteristics
- We will promote learning across our stakeholders based on our inspection findings (strengths and vulnerabilities)
- We are starting our own assessments of our licence holders

Our aim is to assist licence holders to identify and shore up any safety or security vulnerabilities



Summary

- Without detracting from existing approaches, ARPANSA is shifting focus to an holistic approach to safety
- Holistic Safety has benefits to safety and security. It is attractive for wider operational reasons
- Guidance on holistic safety has been developed and is published on our website (www.arpansa.gov.au)
- We are co-operatively promoting holistic approaches to safety
- We will incorporate holistic safety into our inspection and incident investigation processes
- We are currently trialling an Holistic Assessment Tool

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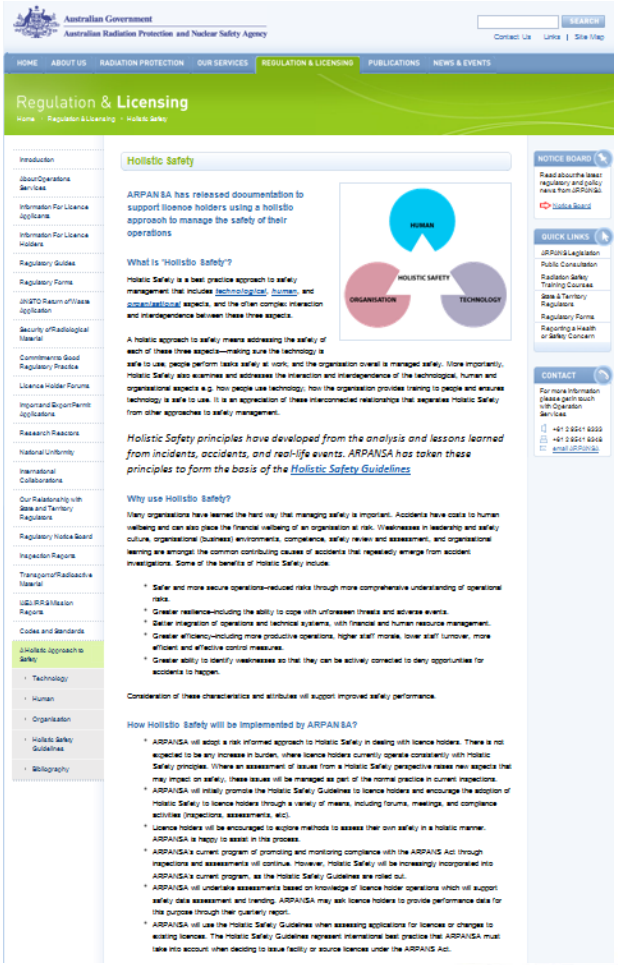

THANK YOU

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ARPANSA's Holistic Safety Webpage
www.arpansa.gov.au/Regulation/Holistic