

High Reliability Organisation (HRO) Mindfulness: Ensuring Nuclear Safety

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Overview

- Safety as retrospective and prospective
- High Reliability Organisations (HROs)
- HRO mindfulness
- Measuring mindfulness
 - Issues
 - Approaches

Understanding Organisational Safety

- Man-made disasters – failure of foresight
- Normal Accident Theory – inevitable consequence of complex systems - fatalism
- High Reliability Organisations (HROs) – safe, reliable operations as a result of design and management – possible foresight

High Reliability Organisations (HROs)

- Original study group
 - Nuclear power and electrical distribution
 - Nuclear powered aircraft carriers
 - Air Traffic Controllers
- Now includes
 - Oil & Gas production
 - Healthcare
 - Fire Fighters

What do High Reliability Organisations have in common?

- Complex socio-technical systems
 - Redundancy
 - Constant, long-term learning
 - Command and Control
 - Decentralised decision making
 - Heedful interrelating

HROs as “mindful” organisations



Five mindfulness factors

Reluctance to Simplify	Not being afraid to ask stupid questions Watching out for 'Groupthink' Watching for 'Normalisation' and 'Practical Drift'
Focus on Failure	Having 'Chronic Unease' Actively looking out for weak signals Onus of proof
Sensitivity to Operations	Collective puzzle solving Developing Situational Awareness Avoiding parallel worldviews
Deference to Expertise	Empowering workers at 'the sharp end' Knowledge of who holds knowledge Building 'requisite variety'
Commitment to Resilience	Redundancy, to avoid 'single point failure' Fast learning from errors Not crippled when errors occur

Measuring mindfulness

What's been achieved:

- Five mindfulness factors have been validated against each other

What needs to be done:

- Operationalising all five factors
 - Focus on Failure can be seen as weak signals and near misses
 - But, difficulty operationalising all factors e.g. Sensitivity to Operations

How do we operationalise the five mindfulness factors?



Psychometric assessment

- Literature review for attitudes and behaviours
- Initial pilot psychometric used direct questions for the five mindfulness factors
- Next-stage psychometric assesses an individual's:
 - Reasoning
 - Interaction
 - Coping styles
- Also measures nuclear behavioural competencies

Psychometric assessment

Reasoning (style of thinking)	Interaction (style of relating to others)	Coping (self-attitude and coping style)
Critical Thinking	Self Directed	Resilient
Conscientiousness	Cooperative	Self directed
Investigative		Adaptive
Vigilance		

Sensitivity to operations

Focus on failure

Reluctance to simplify

Deference to Expertise

Commitment to resilience

Critical thinker

Conscientious

Investigative

Vigilant

Reasoning

Self-directed

Cooperative

Cooperative

Interacting

Resilient

Decisive

Adaptive

Coping

Ethnographic assessment

- Using Ethnography
 - Empirical, data driven sociological approach
 - Looks at how work is done in real-time in the real-world
 - Provides descriptions of social practices of work
 - Study informs how people make sense of their working environment
 - HCI, Air Traffic Control, Police work

Organisational audit

When something unexpected happens, we will work out why our expectations were not met

1 2 3

People in this organization will report significant mistakes even if others do not notice that a mistake is made

1 2 3

We regard near misses as failures that reveal potential dangers rather than as successes that show our capability to avoid disaster

1 2 3

We regard near misses - successes that s...

1 2 3

Mindfulness to change an organisation's culture



What are the benefits of this approach?

- Gives baseline measure of an organisation's current HRO/mindfulness potential
- Data comes from own organisation
 - Encourages engagement
- Data can be analysed
- Identifies areas for improvement
- Develop strategy for HRO/mindfulness performance

Next steps

- Next-stage psychometric tool now ready for pilot
- We need to engage with participants/ organisations
- Comparison against other nuclear competency frameworks
- Ethnographic studies ongoing

Thank you



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