

Integrating human factors within MAE control measures: Error and ALARP in offshore petroleum activities

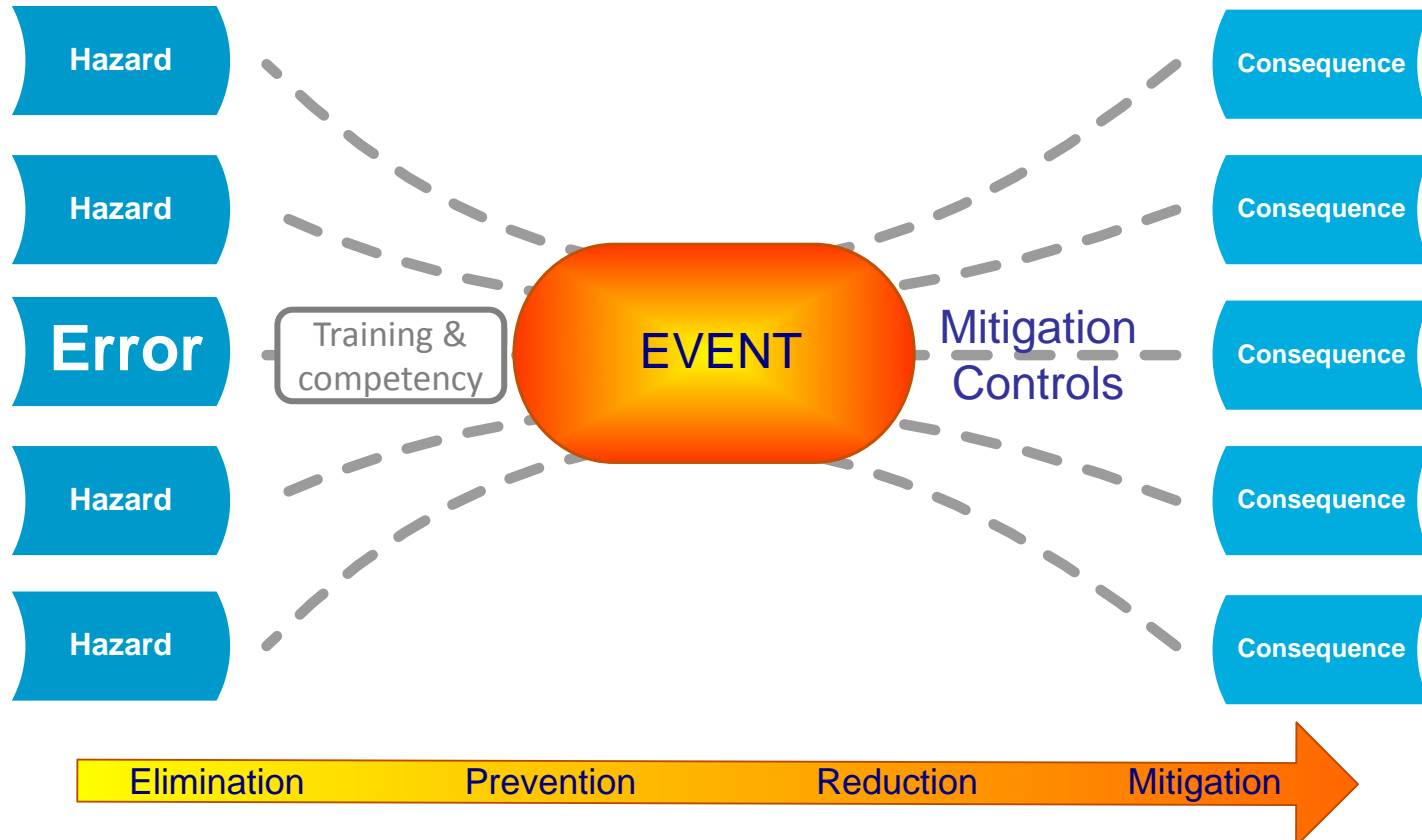
Joelle Mitchell

APPEA HSE Conference, Perth, September 2015

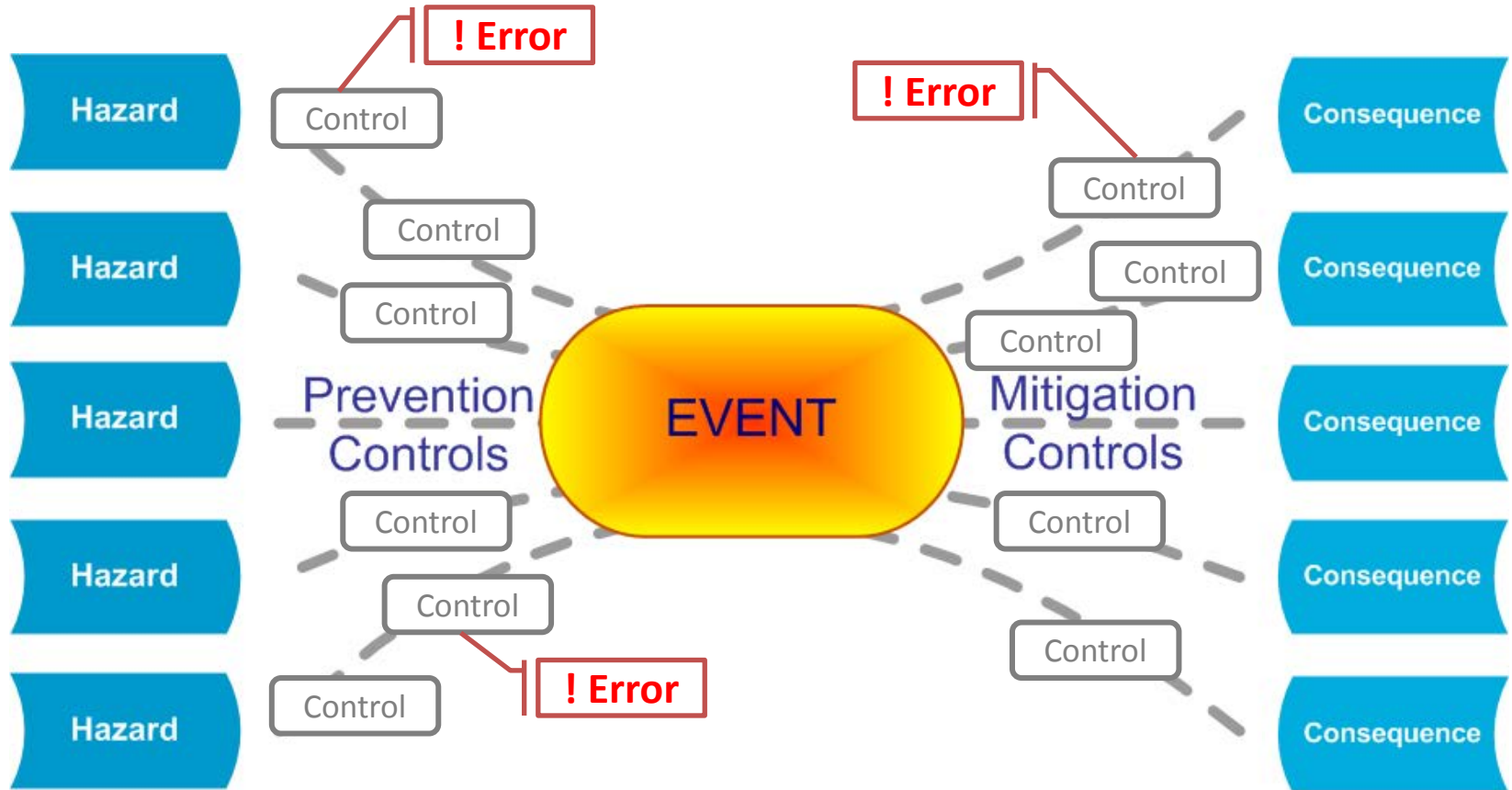
- Humans interact with control measures
- Error can be a barrier-defeating factor
- Error risk can be addressed through adapted traditional risk management approaches



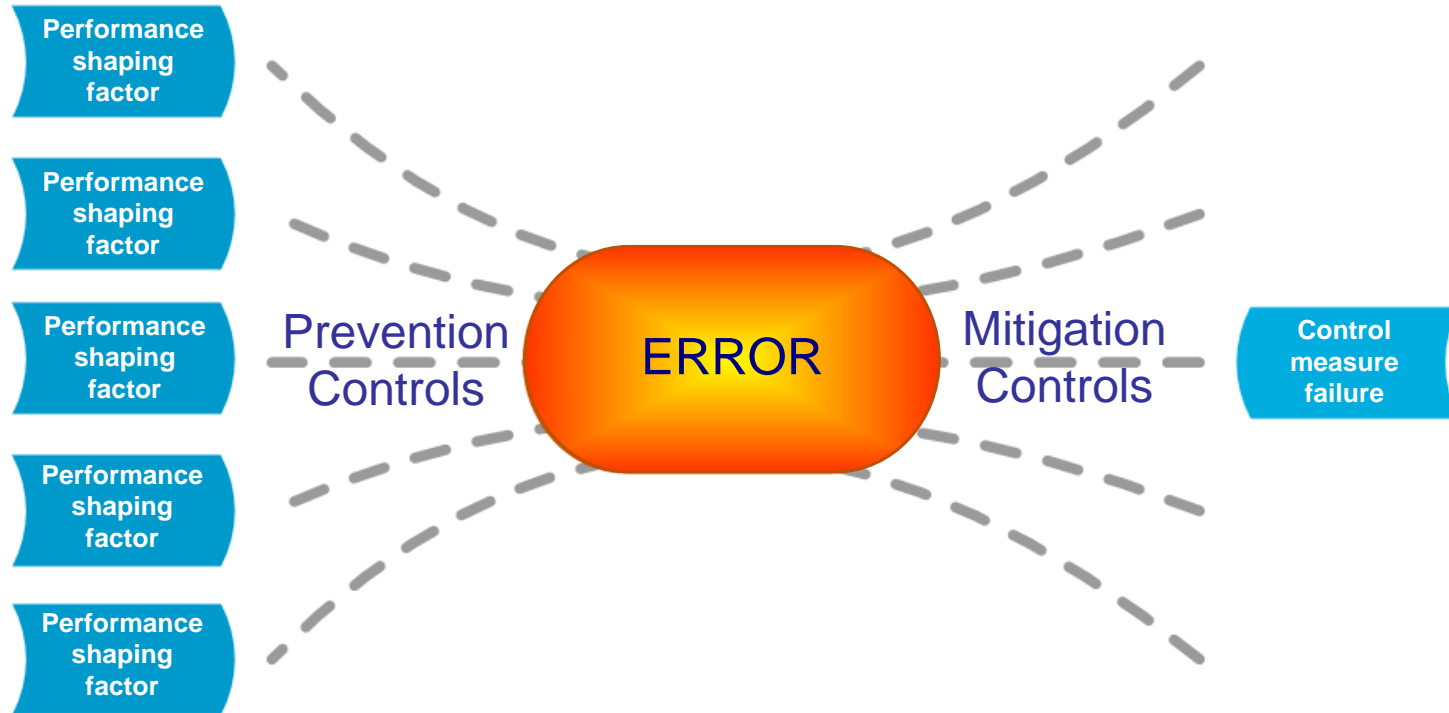
Typical approach



A more accurate approach

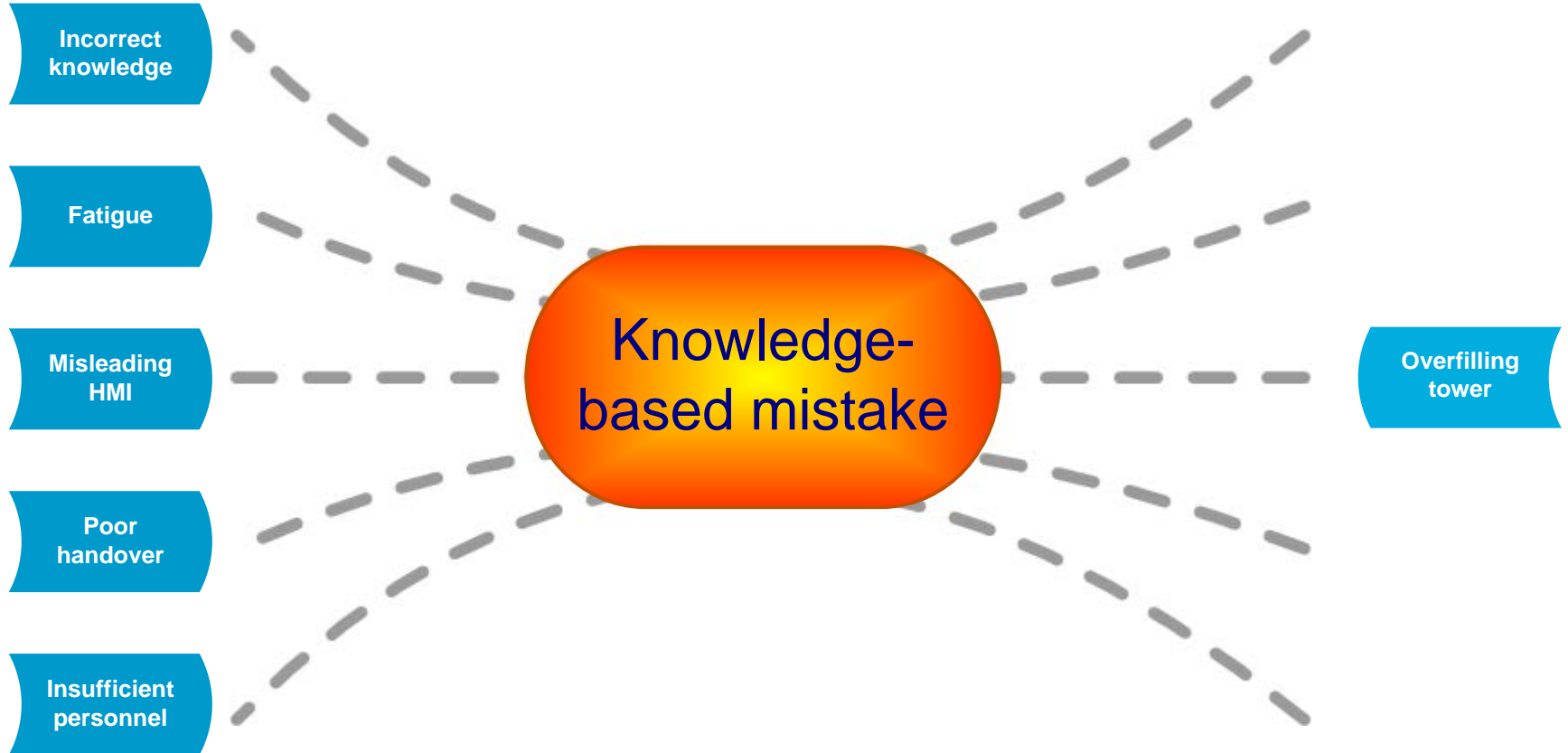


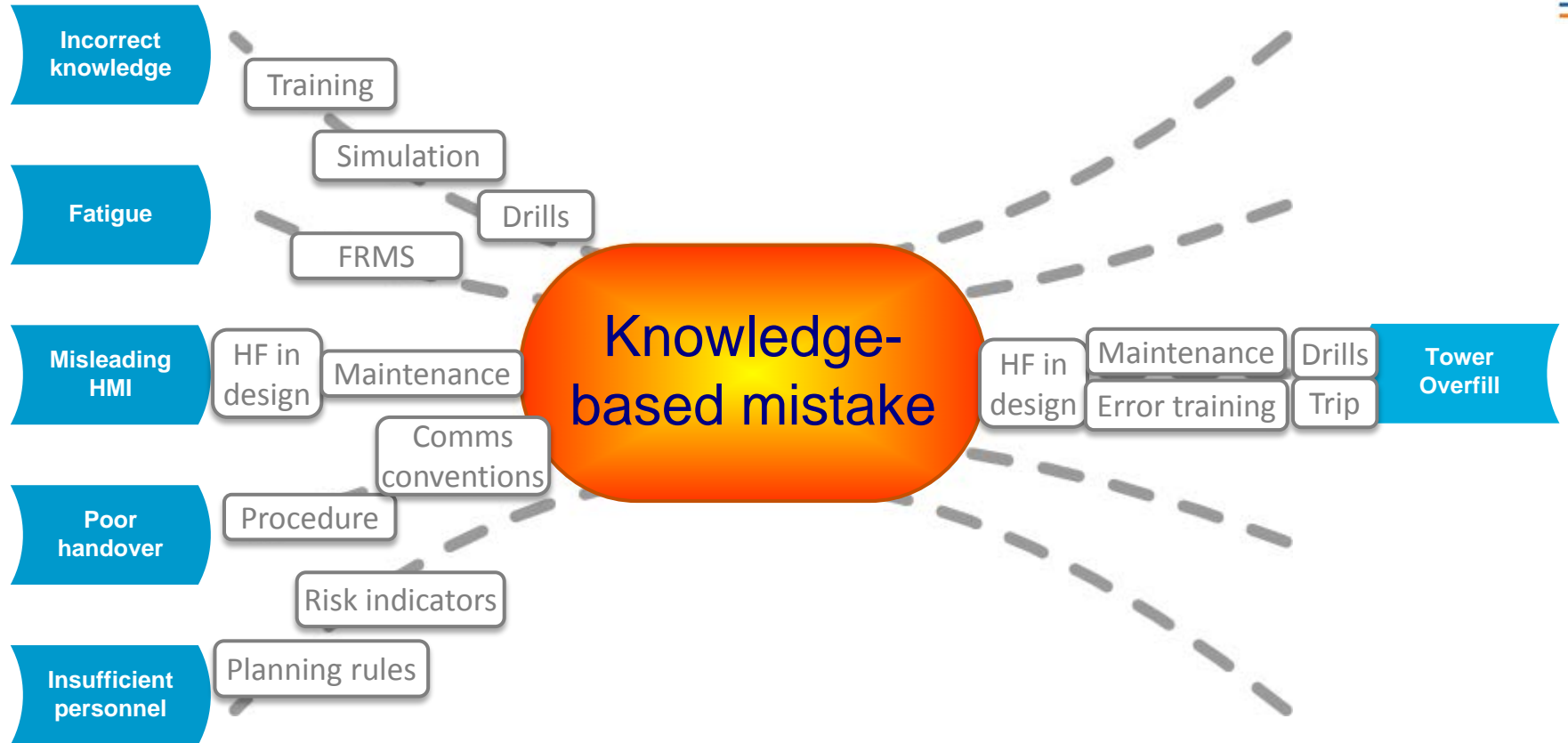
A deeper exploration



- March 23, 2005
 - Isomerization unit start-up
 - Operators overfilled the raffinate splitter tower
 - Pressure relief devices activated
 - Flammable liquid spurting from a blowdown stack
 - No flare installed
 - Ignition, explosion and fire
 - 15 deaths, 180 injuries



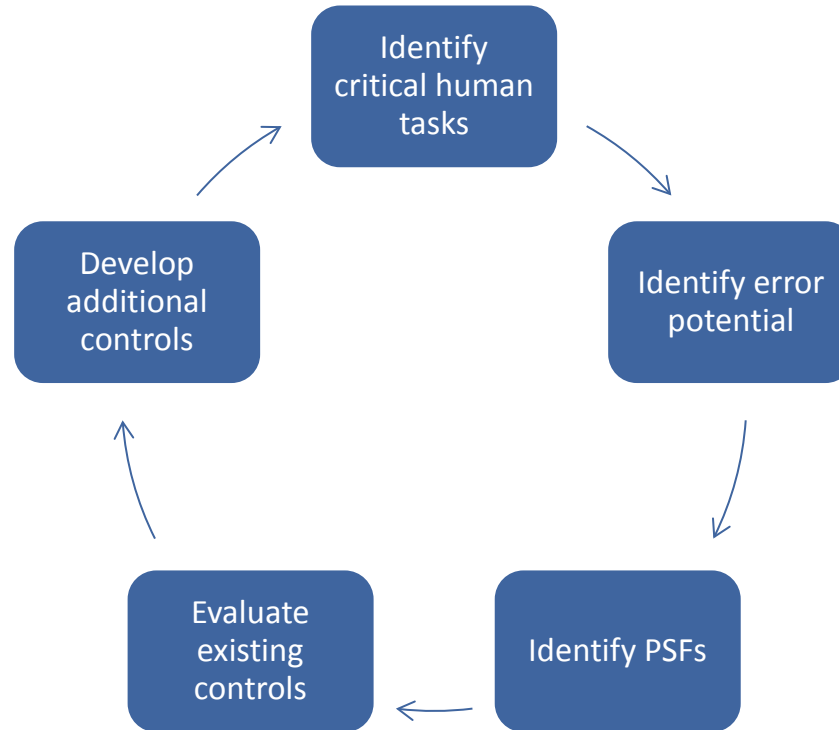




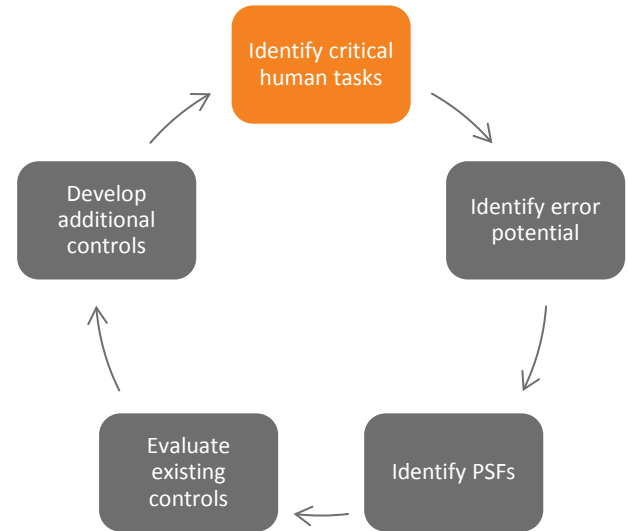
- Classify potential high-risk errors
- Identify critical PSFs
- Develop targeted control measures
- Focus on prevention and mitigation
- Facilitate risk reduction to ALARP

- “Critical human tasks”
- Activities people are expected to perform:
 - as barriers against an incident
 - to prevent incident escalation
 - to support or maintain barriers during an incident
- OGP (2011). *Human factors engineering in projects*.

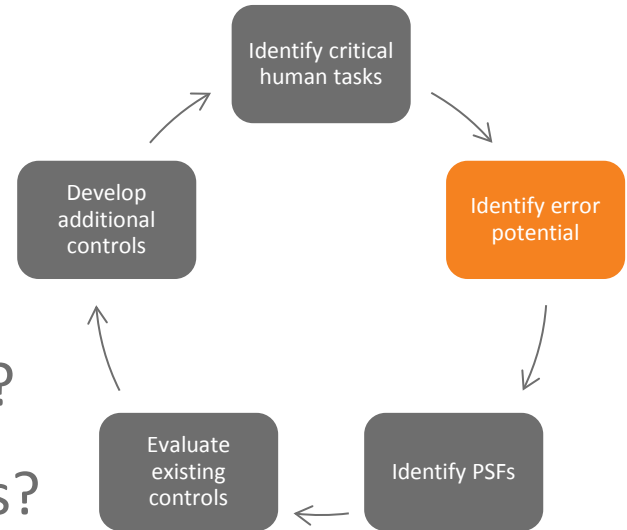
A suggested process



- Tasks where:
 - a procedure is a single point failure
 - people interact with control measures
 - error can lead to barrier failure
 - barrier failure can lead to MAE

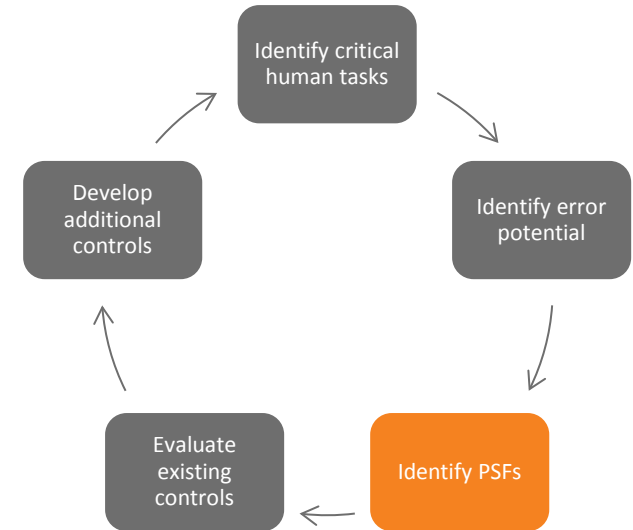


- Task analysis can help
 - What errors are possible?
 - Classify errors by a taxonomy
 - What are the potential consequences?
 - What are the high-risk potential errors?



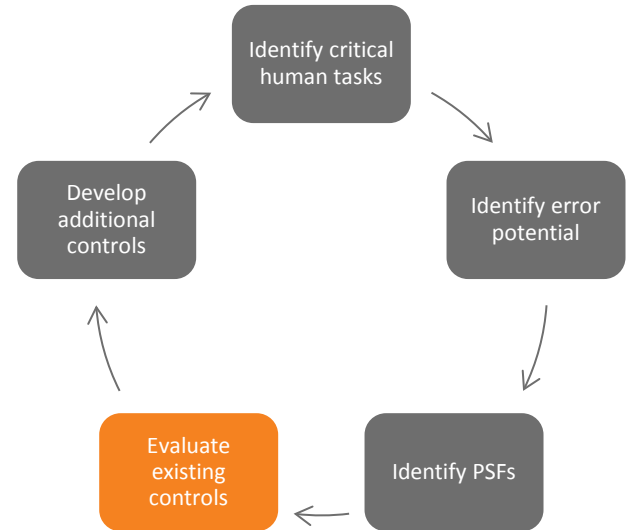
- People-level
 - Knowledge, skills, experiences
 - Health
- Job-level
 - Procedures
 - Equipment
 - Supervision
- Organisation-level
 - Culture & climate
 - Corporate strategy

Identify PSFs

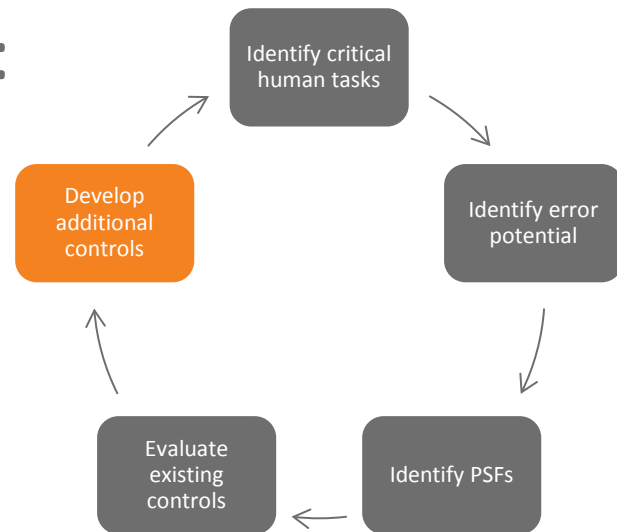


Evaluate existing controls

- Prevention controls?
- Mitigation controls?
- Is error risk ALARP?

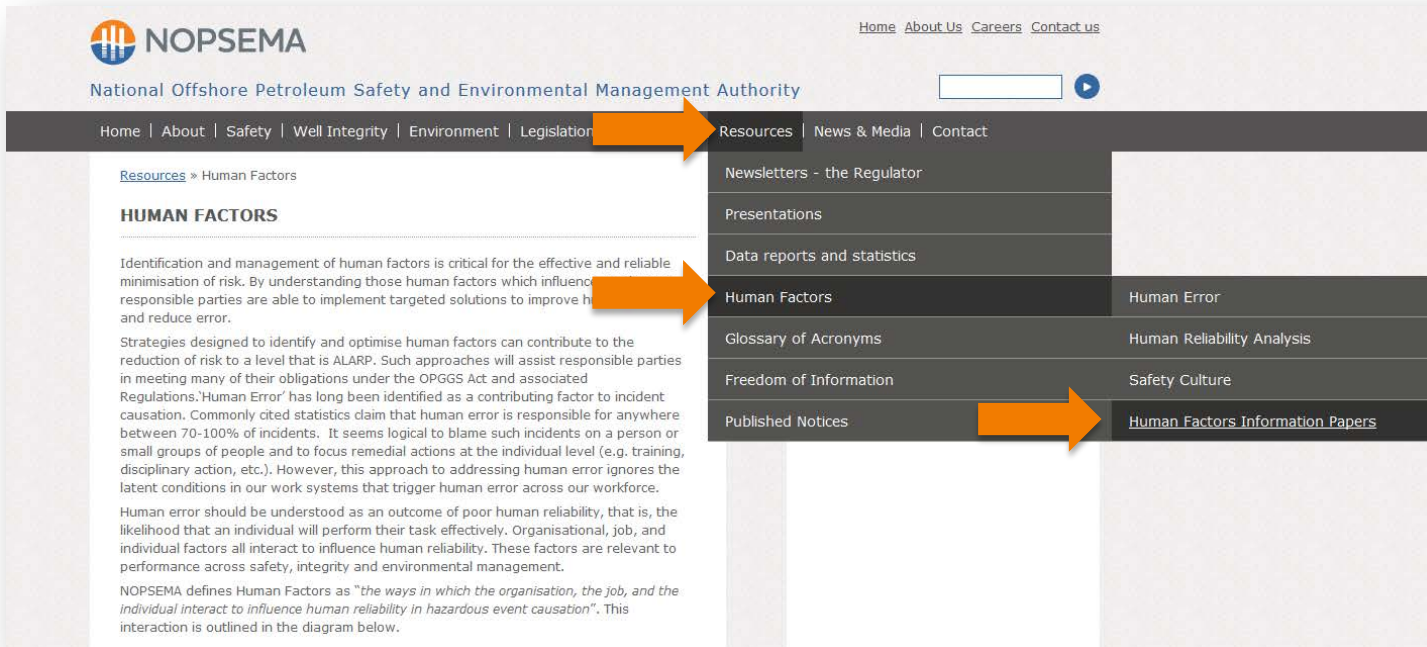


- Layered defences targeting error:
 - **Eliminate** the opportunity
 - **Prevent** the error
 - **Reduce** the impact – error identification and recovery
 - **Mitigate** the consequences



- Evidence of uncontrolled error:
 - Events and dangerous occurrences
 - Existing controls have failed to mitigate error risk
- Performance-shaping factors:
 - Latent conditions
 - Broader implications

- Human error can facilitate barrier failure
- Error is most significant within critical human tasks
- Layered defences can reduce error risk
- Effective risk reduction includes:
 - error prevention
 - error mitigation



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HUMAN FACTORS

Identification and management of human factors is critical for the effective and reliable minimisation of risk. By understanding those human factors which influence the actions of responsible parties are able to implement targeted solutions to improve human performance and reduce error.

Strategies designed to identify and optimise human factors can contribute to the reduction of risk to a level that is ALARP. Such approaches will assist responsible parties in meeting many of their obligations under the OPGGS Act and associated Regulations. 'Human Error' has long been identified as a contributing factor to incident causation. Commonly cited statistics claim that human error is responsible for anywhere between 70-100% of incidents. It seems logical to blame such incidents on a person or small groups of people and to focus remedial actions at the individual level (e.g. training, disciplinary action, etc.). However, this approach to addressing human error ignores the latent conditions in our work systems that trigger human error across our workforce.

Human error should be understood as an outcome of poor human reliability, that is, the likelihood that an individual will perform their task effectively. Organisational, job, and individual factors all interact to influence human reliability. These factors are relevant to performance across safety, integrity and environmental management.

NOPSEMA defines Human Factors as "the ways in which the organisation, the job, and the individual interact to influence human reliability in hazardous event causation". This interaction is outlined in the diagram below.

- Newsletters - the Regulator
- Presentations
- Data reports and statistics
- Human Factors**
 - Human Error
 - Human Reliability Analysis
 - Safety Culture
 - Human Factors Information Papers**
- Glossary of Acronyms
- Freedom of Information
- Published Notices

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Questions