A SUMMARY OF THE ENERGY INSTITUTE'S CURRENT WORK ON LOSS PREVENTION PREPARED FOR LOSS PREVENTION ASIA 2019

By Peter Godfrey, Managing Director – APAC, Energy Institute

The following list summarises EI's recent publications and activities relating to Loss Prevention:

PROCESS SAFETY AND HUMAN FACTORS – PUBLISHED SINCE Q2 2019

- Guidance on managing process safety in decommissioning projects (1st edition, July 2019).
- Research report: Enhancing human performance using process safety performance indicators (1st edition, October 2019).
- Guidance on meeting expectations of EI process safety management framework Element 20: Audit, assurance, management review and intervention - Annex G in-line control checks and performance measures for all EI PSM framework elements (1st edition, November 2019).
- Guidance on selection, installation and management of fire resistant sealant materials and system components for secondary containment construction/expansion joints (1st edition, July 2019).
- Research report: Fire resistance testing of sealant materials and system components for secondary containment construction/expansion joints (1st edition, November 2019).
- EI/PLUG Guidance on United Kingdom Continental Shelf (UKCS) subsea pipeline decommissioning including Comparative Assessment (CA) and Interim Pipeline Regime (IPR) (1st edition, October 2019).
- EI/CIEHF/I-CAB Human performance for the energy sector e-learning course (Q2 2019) https://energyinst.org/whats-on/search/events-and-training?meta_eventId=HFPATHWAY
- Guidance on selection and competence assurance of contractors in power plants
- Battery storage guidance note 1: Battery storage planning
- Integrated Offshore Emergency Response – Renewables (IOER-R) guidance
- Model syllabus for the training of technicians involved in the examination, testing, maintenance and repair of petroleum road tankers (3rd edition).

MATERIAL ON "ASSET INTEGRITY" – PUBLISHED SINCE Q2 2019

- Guidelines for the management of structural ALE issues for mono-hull FPSOs (1st edition, October 2019).
- Guidelines to address ageing and life extension issues for offshore structures and structural components (1st edition, October 2019).
- Guidelines for caisson life cycle integrity management (1st edition, October 2019).
- Guidelines for the integrity management of valves for the upstream and downstream industries (1st edition, November 2019).
- Guidelines on fatigue life of ageing pressure vessels (1st edition, November 2019).
- Guidelines for the assessment of corrosion threats in risk-based inspection (1st edition, November 2019).
- Workshop and report Issues associated with aging combined-cycle gas turbine (CCGT) assets
- Guidance on the development and commissioning of new combined cycle gas turbine (CCGT) plant
- Petroleum road tanker design and construction (4th edition).
- Process safety and human factors – new 2020 projects
- Revision of Pipeline and riser loss of containment (PARLOC) database
- Integration and enhancement of Guidelines for the safe and optimum design of hydrocarbon pressure relief and blowdown systems and Guidelines for the design and protection of pressure systems to withstand severe fires
- Safe plant reinstatement
- Revision of EI15: Area classification for installations handling flammable fluids
- Guidance to provide an economic value (or series of values) which can be applied when undertaking a Cost Benefit Analysis (CBA) under COMAH for environmental purposes.
- Managing human factors in cyber security
- Managing human performance through procurement
- Review and update Guidance on control room operator competence
- Task Improvement Process e-learning
- Good practice animation on road tanker loading at petroleum fuel terminals
- Cyber Security Risk Assessment Guidance for the Process Industries

- Investigate the risk and impact associated with alternative fuel engine vehicles, by type, whilst entering or working within the normal hazardous petroleum terminal operation.

- Managing the challenges of minimally manned power stations

- Contractor management web-based resource

- Using second life batteries for energy storage

ASSET INTEGRITY – NEW PROJECTS PLANNED TO BE WORKED ON IN 2020

- Research on the degradation of certified enclosures manufactured from plastics and glass reinforced polyester

- Revision of EI 1540 Design, construction, commissioning, maintenance and testing of aviation fuelling facilities

- Guidance on performance standards for structural safety critical elements (1st edition)

- Workshop on novel and emerging technologies for utilisation of big data analytics in structural integrity monitoring, analysis, modelling and prediction

- Guidance on the Management of Mooring Integrity (1st edition)

- Structural Integrity Management of Decommissioned Offshore Structures in 'Lighthouse Mode' (1st edition)

- Guidance on the Application of Performance based design/assessment for asset life extension (1st edition)

- Workshop on Additive Manufacturing (AM) for Upstream Oil & Gas Applications

- Guidelines for Subsea (including Pipelines) Corrosion Management (1st edition)

- Guidelines on Cost-Benefit Analysis for Asset Integrity (1st edition)

- Update Guidelines for the Management of Coatings for external Corrosion Protection (2nd edition)

HUMAN FACTORS

Human performance is about what people do as part of a system to help manage risk and keep us safe, it's about understanding the human factors involved with how people interact with plant, equipment, processes and each other. All major hazard industries rely on high levels of human performance to improve safety and reliability.
In high hazard industries like the energy sector, good human performance makes the difference between success and failure, an incident-free day and disaster – and even life and death. Everyone has a role to play in managing human performance – and the good news is you don't have to be an expert to make a difference. Being able to recognise

situations that will lead to poor human performance, and then being able to do something about it, is in everyone's power.

- **What is human factors?**
  Human factors is a scientific discipline that puts people at the centre of everything to ensure their capabilities and limitations are taken into account when designing tasks, equipment, environments and the systems that support it all. It includes physical workstation design, fatigue, procedures and error.

- **How does human factors improve human performance?**
  We use human factors to improve human performance by ensuring that people are given jobs and tasks that are satisfying, challenging but achievable. Applying human factors improves safety by ensuring that, as far as reasonably practicable, the potential for error is designed out and any residual risks are minimised. We apply knowledge and principles of human factors so we can set people up for success so they can work together effectively.

- **The Energy Institute is a world leading provider of human factors CPD training and guidance.**
  The EI's training, professional development and resources help to develop capability and provide a comprehensive resource for anyone who applies human factors in their organisation, from safety specialists to engineers and operators.

- **The Energy Institute's Human Factors Learning Pathway:**
  The EI provides a unique professional development learning pathway, the first of its kind, which has been developed specifically to address a business need for human factors skills. It includes a free introductory eLearn, and a structured pathway to attain Level 1, Level 2, and Level 3 qualifications.

- **Training:**
  EI expert training in specific human factors topic areas, from culture change through to accident investigation, can help develop your skills to support you on the human performance pathway.

- **Resources:**
  The EI produces guidance on a wide variety of human factors topics and issues. We also regularly use our network of industry leading experts to deliver in-house training for organisations on these topic areas.

GET INVOLVED!

The Energy Institute's Loss Prevention activity is the combined effort of leading energy companies and experts from across the world, who work together to learn from each other and develop industry-led guidance.

Please join us!

International Conference & Exhibition
LOSS PREVENTION ASIA 2019
25-26 November 2019 | Kuala Lumpur
E: LPA2019@utp.edu.my • W: bit.ly/LPA2019 • T: +605 368 7566/7538/7541
Organised by CAPS

Bridging Human Performance with Systems Thinking

Peter Godfrey FEI

Managing Director APAC
Energy Institute

25th November 2019


LOSS PREVENTION SPECTRUM
STRATEGIC
TRANSACATIONAL/TRADING
OPERATIONAL (Systems & Controls)
COMPLIANCE (Regulatory / Markets, Operationall)
LEGAL (Contractual, Litigation, Bribery, Corruption)
ASSET PERFORMANCE & INTEGRITY
INSURANCE
HEALTH, SAFETY, SECURITY
HUMAN RESOIURCES AND PERFORMANCE
ENVIRONMENTAL & SOCIAL
TREASURY
TAXATION
DATA INTEGRITY
CYBER-SECURITY

Role of the EI

That energy is better **understood, managed** and **valued**.

- **Better understood**: by raising standards and good practice
- **Better managed**: by developing skills and competence
- **Better valued**: by advancing knowledge and understanding

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Hearts & Minds

1. Leading the way – the ‘route to the top’ of the HSE culture ladder.

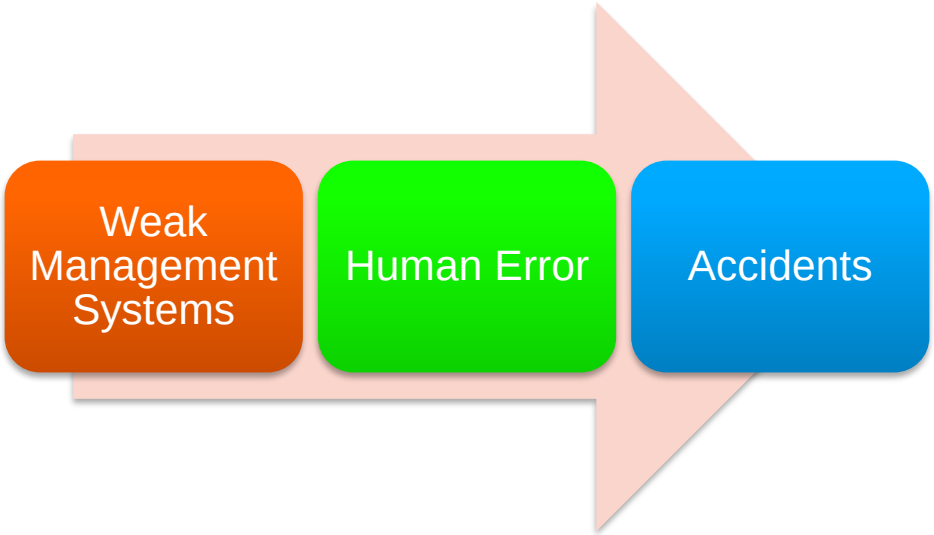
2. Providing the process and tools to get everyone involved and to facilitate behavioural change – the necessary components of a solution.

Toolbox

Putting safety in your hands [toolbox.energyinst.org]

HUMAN FACTORS

99% of accidental losses begin with human error



- Design
- Engineering
- Specifying Components
- Receiving and Installing Equipment
- Commissioning

- Operations
- Predicting and sustaining safeguards to control risks
- Inspection, Maintenance, Repair
- Troubleshooting
- Shut-downs

Managing Change

Types of Human Error

INTENTIONAL
"This is what I meant to do"

OMMISSION

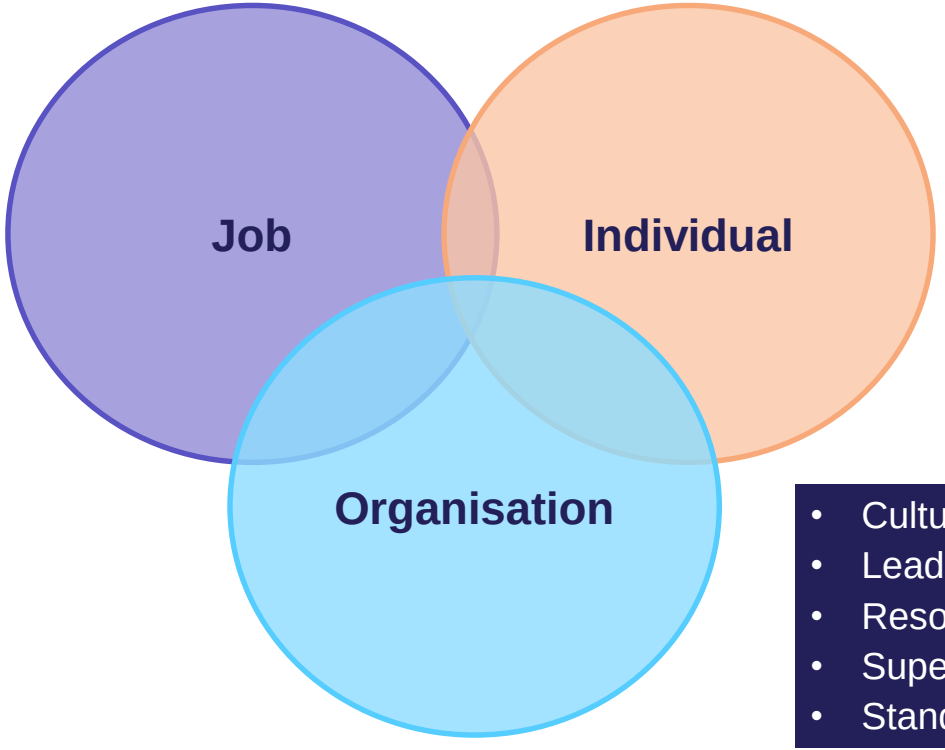
Normally based on insufficient oversight, compliance or checking procedures	*Normally based on a belief that something can be done better*
Normally based on something overlooked.	*Normally based on some part of a process being left out or lack of tools ,equipment or replacement part etc..*

ERROR

UNINTENTIONAL
"This is not what I meant to do"

The EI's focus for development

- Task
- Complexity
- Workload
- Environment
- Display & Controls
- Procedures
- Mismatch between physical and mental capabilities

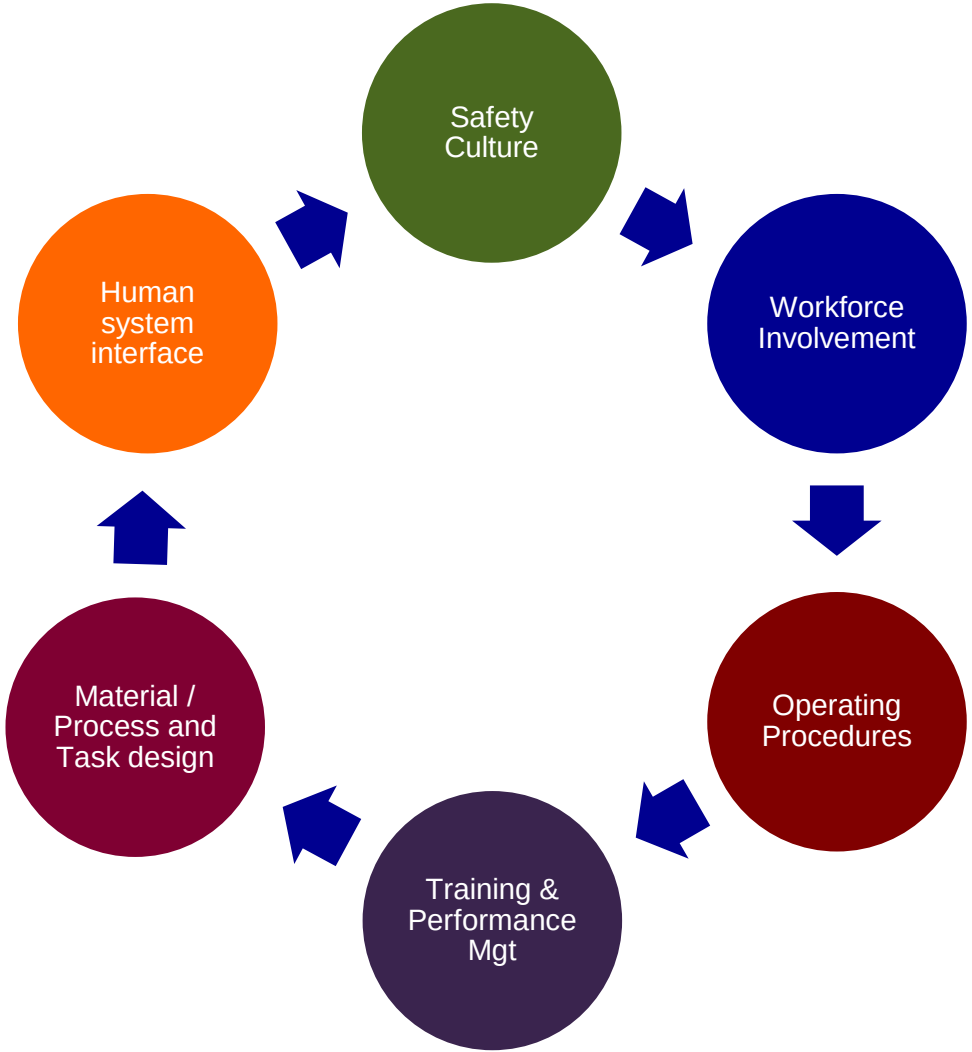


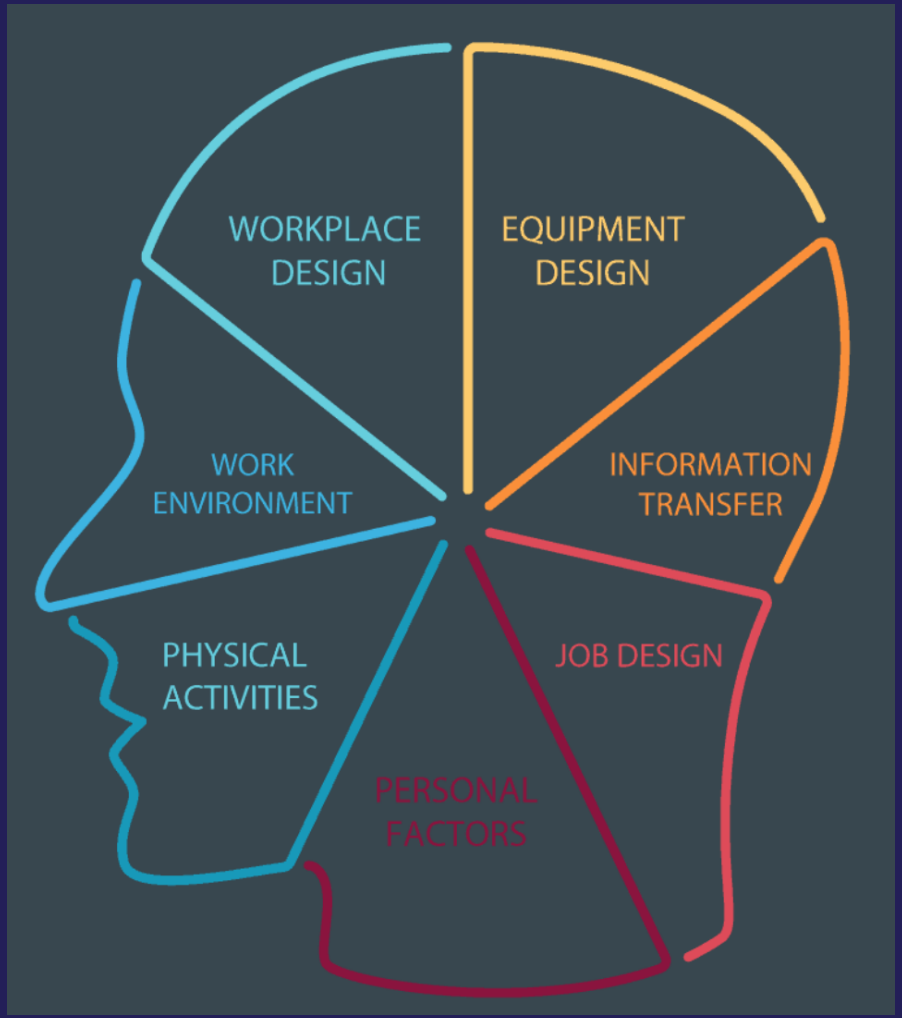
- Competence
- Skills
- Personality
- Attitudes
- Physiology (Height & Weight)
- Risk Perception
- Fatigue

- Culture
- Leadership
- Resources
- Supervision
- Standards & Procedures

THE NEED FOR "FIT FOR PURPOSE" SOLUTIONS

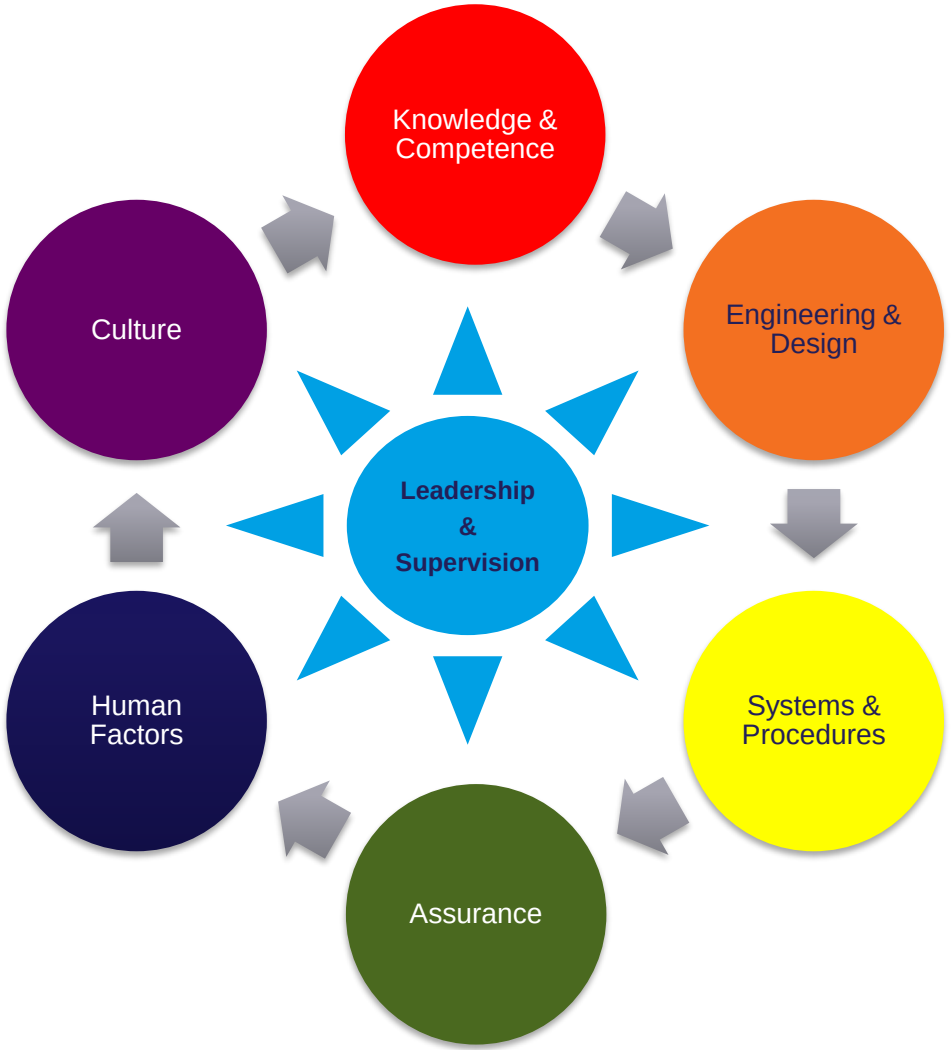
Organisational process linkages for effective HF management





- Staffing / Job Specifications
- Personnel selection
- Training & Development
- Human Factors
- Health & Environmental hazards
- Security
- Systems' safety and Asset Integrity

Loss Prevention Leadership = Functional Integration



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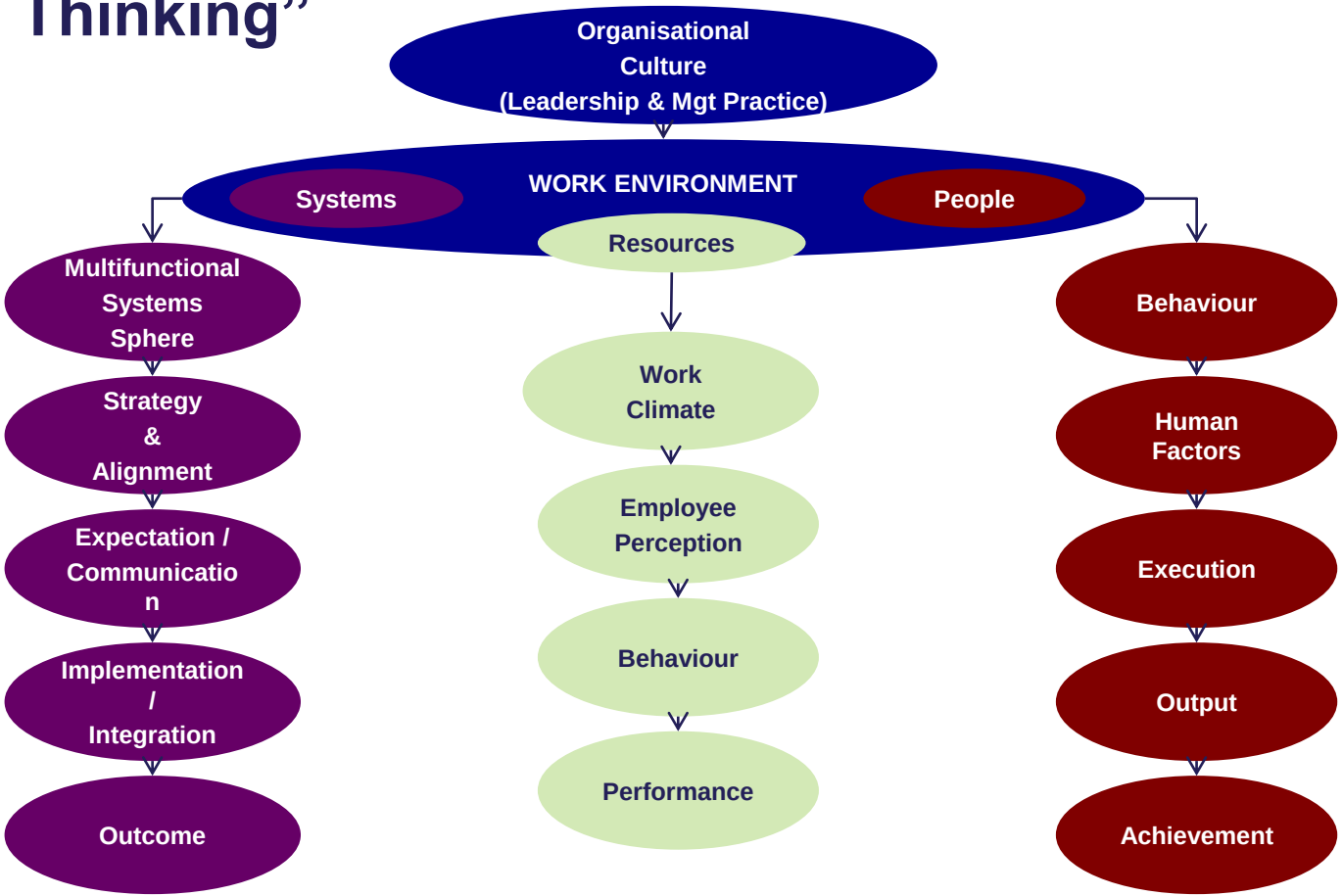
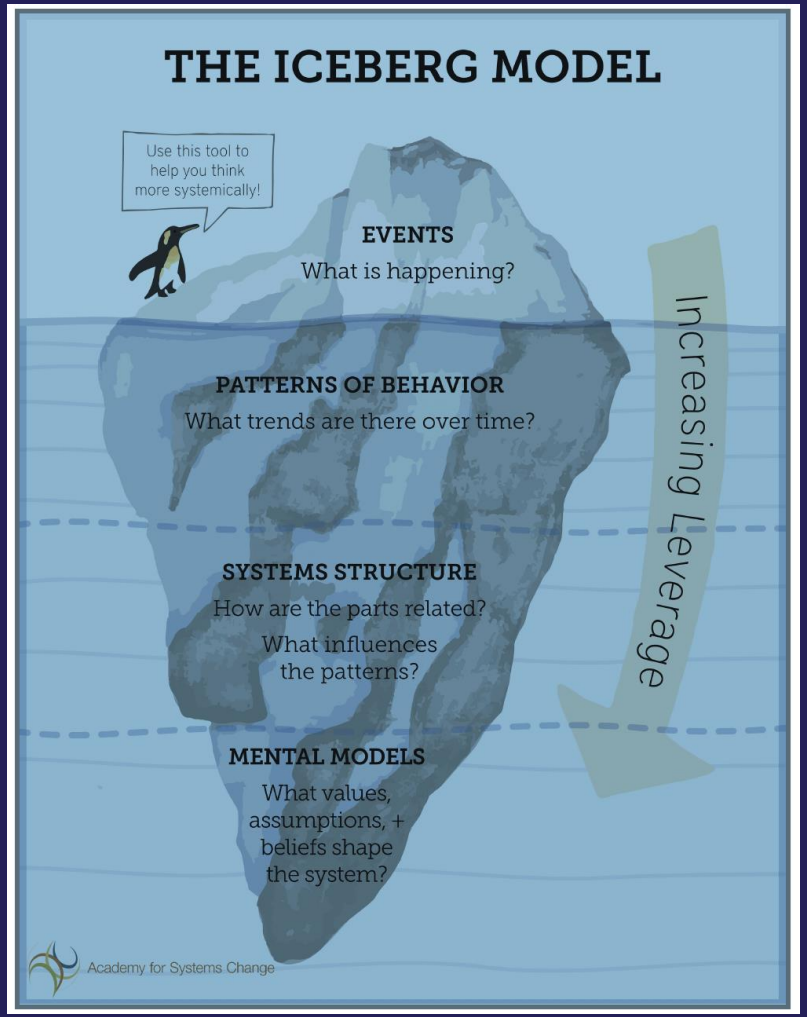
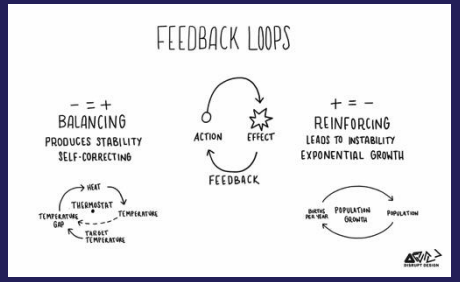
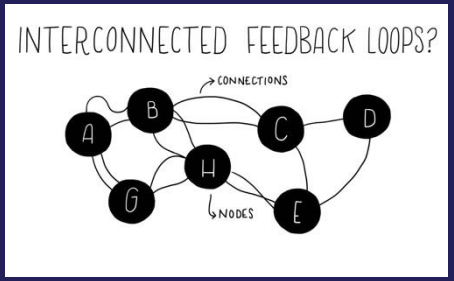
SYSTEMS THINKING

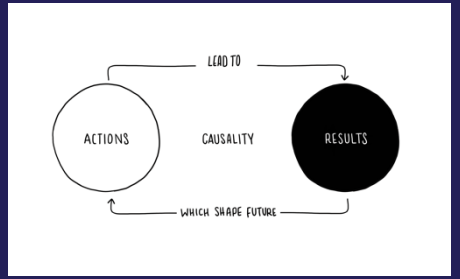
A need to understand the whole work system
“Systems Thinking”

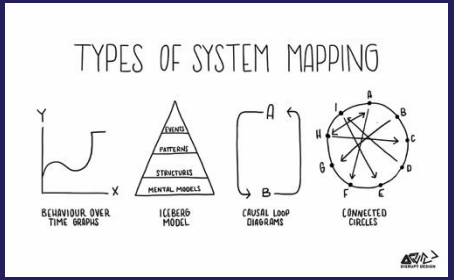



THE ICEBERG MODEL
Use this tool to help you think more systemically!
EVENTS
What is happening?
PATTERNS OF BEHAVIOR
What trends are there over time?
SYSTEMS STRUCTURE
How are the parts related?
What influences the patterns?
MENTAL MODELS
What values, assumptions, + beliefs shape the system?
Increasing Leverage
Academy for Systems Change


FEEDBACK LOOPS
− = +
BALANCING
PRODUCES STABILITY
SELF-CORRECTING
ACTION
EFFECT
FEEDBACK
+ = −
REINFORCING
LEADS TO INSTABILITY
EXPONENTIAL GROWTH


INTERCONNECTED FEEDBACK LOOPS?
CONNECTIONS
A
B
C
D
E
G
H
NODES


LEAD TO
ACTIONS
CAUSALITY
RESULTS
WHICH SHAPE FUTURE


TYPES OF SYSTEM MAPPING
BEHAVIOUR OVER TIME GRAPHS
ICEBERG MODEL
CAUSAL LOOP DIAGRAMS
CONNECTED CIRCLES

“By revealing the root causes of failure, systems-thinking ensures safer designs and fewer disasters.”

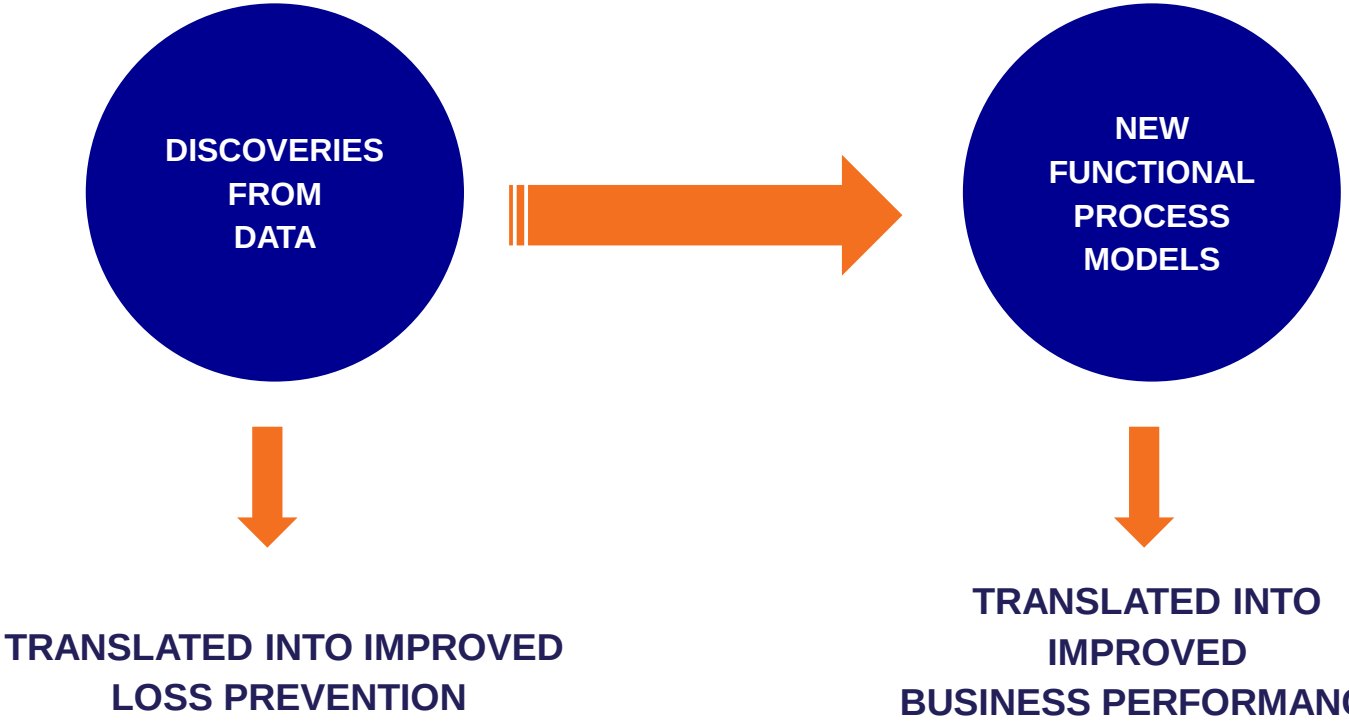
Dr. Simon Bennett Dr Bennett, Director of the Civil Safety and Security Unit, Leicester

6 Principles of Systems Thinking

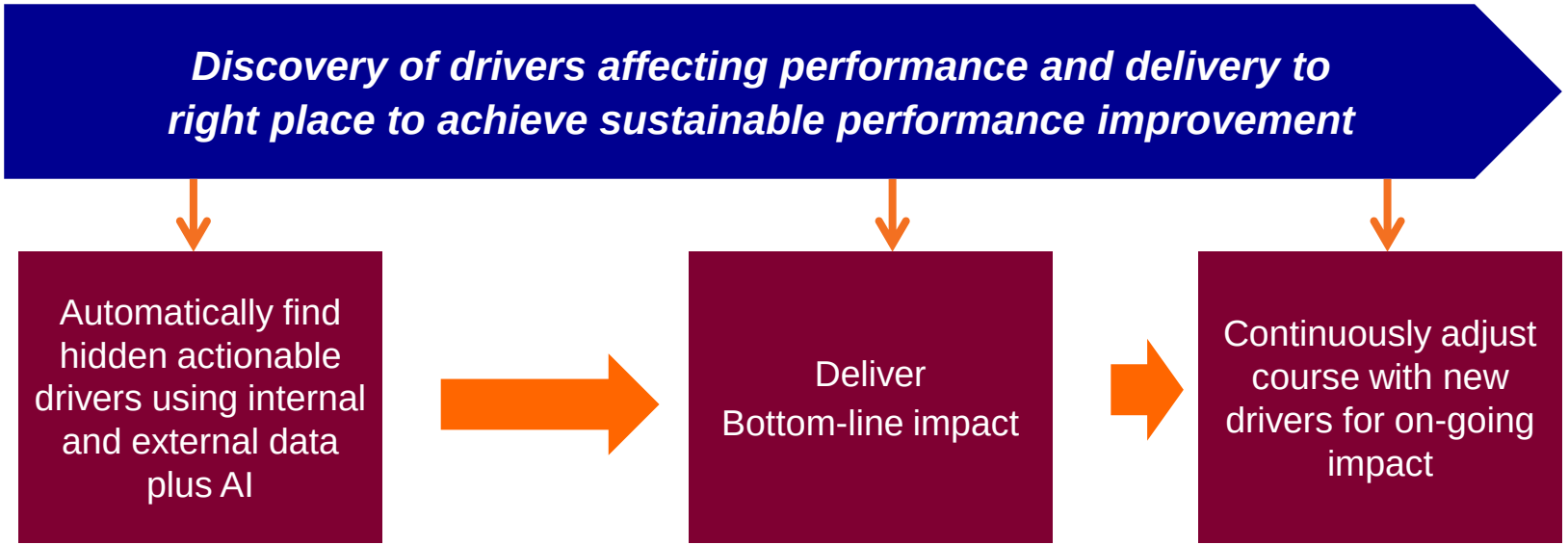
1. Interconnectedness
2. Synthesis
3. Emergence
4. Feedback Loops
5. Causality
6. Systems Mapping / Architecture

ENTER AI

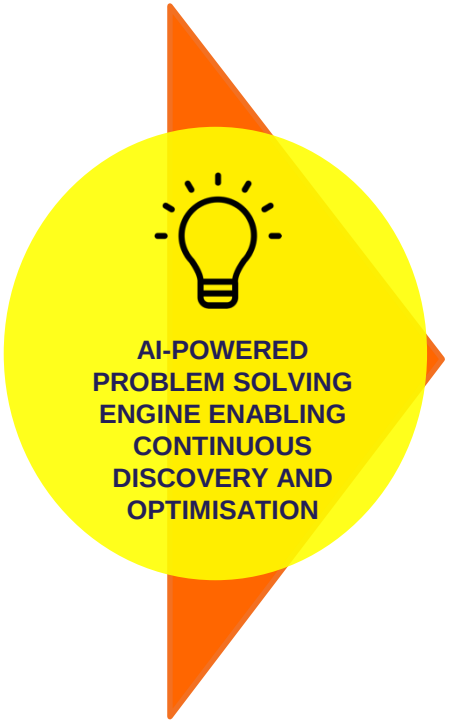
Two fundamental areas of value creation



Creating a problem-solving platform utilising AI



Potential business impact of AI

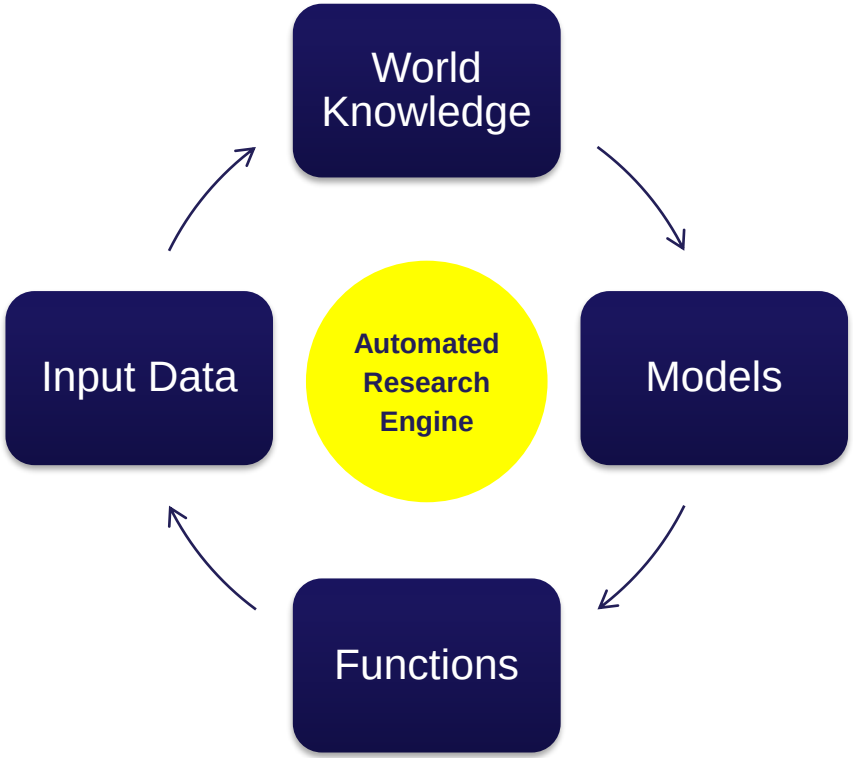


What if a machine was…

Cognitive Bottleneck	❑ Humans have a limited ability to recognise patterns in complex high dimensional data ❑ Limited cognitive bias	***…capable of asking millions of questions and ..***
Exogenous Drivers	❑ Internal data tells only a part of the story ❑ Much useful data available in open-source data	***…could augment internal data by connecting dots to the world around us and…***
The dynamic world	❑ Business drivers are in continuous flux ❑ No capacity to run 24/7 deep research on all KPI's across all disciplines	***…could continue discovering drivers; never sleeping / never slowing down.***

Platform combining internal inputs with thousands of extra data sources and functions

- Tabular/ Rational
- Text
- Time-Series
- Geo-spatial
- Graphic



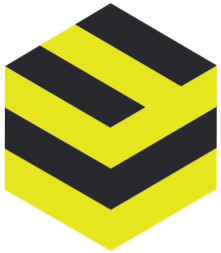
- Discoveries
- Features
- Predictive Models
- Prescriptive Optimisers

Functions | Curated Libraries | Extended Functions

Toolbox

“Putting safety in your hands”

https://toolbox.energyinst.org/



toolbox

PUTTING SAFETY IN YOUR HANDS

toolbox.energyinst.org

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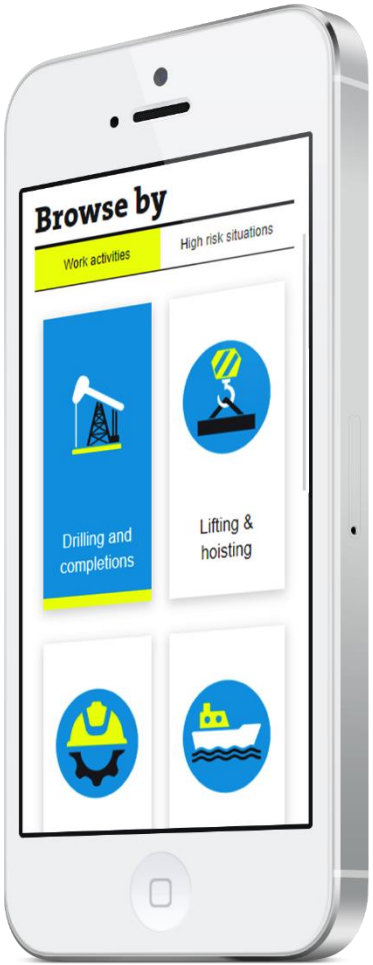
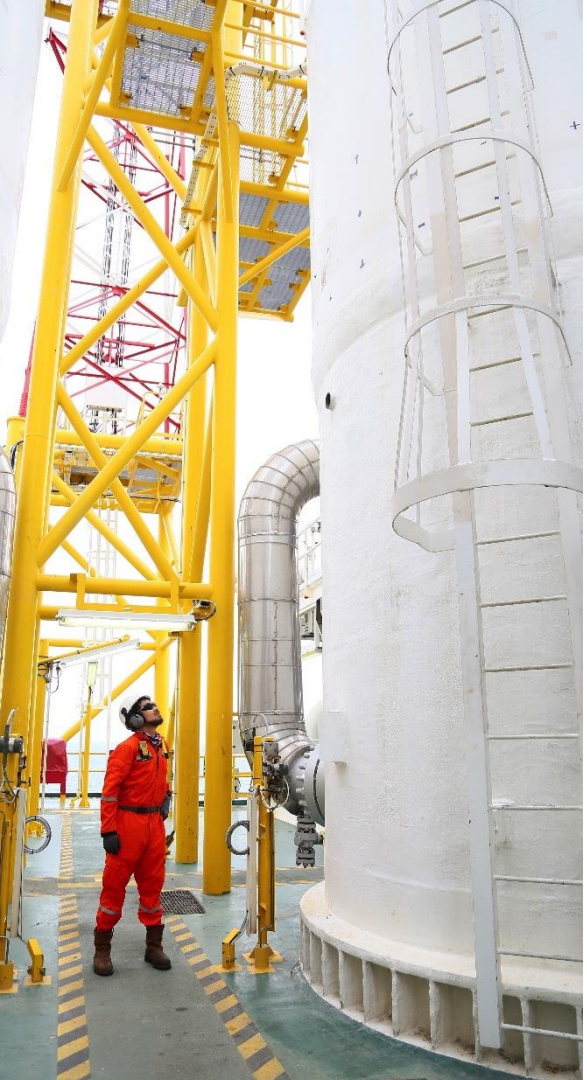


How will Toolbox help you?

- Provides safety information that is:
  - **What you need**
  - **When you need it**
  - **Right for you**
- Gives you control by **putting safety in your hands**
- Its focus is on **lifesaving, fatality prevention** and **high risk activities**
- Provides **short, useful safety insights** that will **help you and your team work safely**
- Provides content that **you can relate to**



Who is Toolbox for?

Front line workers:

- The tool holder
- The planner of work
- The supervisor of execution of work
- The overseer of work

Two types of user:

- The person using the content for their own work in the field
- The person (e.g. supervisor/lead person) sharing content with their team

What's next? (Phase 2)

- Phase 2 beginning to be planned now.
- Open up project to wider members (including other sectors).
- Source more partners and funding (likely as JIP cont).
- Create world class content for Toolbox:
  - Translations of existing content
  - New videos
  - Adapting EI guidance for Toolbox

The NEW Guide

The second edition of the EI's '**Guidance for corrosion management in oil and gas production and processing**' has been fully updated and significantly expanded with annexes detailing corrosion mechanisms and illustrative case studies to help practitioners apply agreed good practice in their corrosion management systems and procedures.

is available here: https://publishing.energyinst.org/topics/asset-integrity/corrosion/guidance-for-corrosion-management-in-oil-and-gas-production-and-processing

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Guidance for corrosion management in oil and gas production and processing

Second edition

HSE

energy institute

“Corrosion never sleeps”

- Reducing the number of corrosion-related hydrocarbon releases and other safety related and other environmentally damaging outcomes
- Identifying good practices for setting up an optimal corrosion management schemes
- Providing an overview of the top corrosion threats to production and processing facilities
- Improving the safety profile of hydrocarbon installation
- Improving equipment availability & reliability
- Value / profitability improving strategies

Thank you

Questions?

www.energyinst.org

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