STANDARDS ON HUMAN FACTORS AND TRAINING

Impact on Safety

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Objective & Discussion Topics

Objective: to present an overview on human factors and training as input to the discussion on standardization

Definition
Physical Ergonomics
Cognitive Ergonomics
Competency Management
Safety Culture
Concluding remarks
Human Factors Engineering: A multidisciplinary science that focuses on the interaction between the human and the work system in order to design human-machine interactions that optimise human and system performance.

From: ISO 6385 “Ergonomic principles in the design of work systems”
PHYSICAL ERGONOMICS
EXAMPLE: MOUNTING VALVES W. HORIZONTAL STEMS

Min. 610 mm (24 in) between any obstruction and hand wheel/valve stem

Preferred

Acceptable

Unacceptable

455 mm (18 in)

230 mm (9 in)

610 mm (24 in)

1830 mm (72 in)

Max. horizontal distance from obstruction, or operator’s front
PHYSICAL ERGONOMICS

- Relatively easy to standardize:
  - Based on statistics of human physiology or anthropometrics:
    - Length, strength, reach, etc.
  - Often linked to local regulations e.g. OSHA 1910 for USA
  - International standards: see ISO 26800 Ergonomics – general approach
  - Many companies (including Shell) have internal standards
  - Few international standards specific to the oil & gas industry:
    - API Human Factors 2005 & 2006 for new resp. existing facilities
    - Initiatives by OGP* Health Committee
    - Shell supports the drive for international standards in this field

*OGP: International Oil and Gas Producers Association
COGNITIVE ERGONOMICS

- Mental workload
- Decision making
- Skilled performance

The “human” as part of the system:
- How to sustain/improve reliability?
- How to avoid errors?

Example: Alarm Management

Standardization efforts:
- ISA 18.2: Management of alarm systems for the process industries
- EEMUA 191: Alarm systems
- IEC/TC65/SC65A: Industrial process measurement, control and automation - System aspects:
  - IEC 62682 Management of Alarm Systems – based on ISA 18.2 (ongoing)
  - IEC 62879 Human factors and functional safety (ongoing)
Now consider a business (or a project) rather than a control room and look at the human(s) as part of the safety system…

Some challenges:
- What does the control panel look like?
- Impossible to program or hard-wire human behaviour

Suggestion: the management system or control framework needs to:
- Cover data collection/feedback: this was part of Session 2 today
- Establish norms (set standards!) for expected behaviour
We aim to achieve this by three Golden Rules:

- We comply with the law, standards and procedures
- We intervene in unsafe or non-compliant situations
- We respect our neighbours

Goal Zero: Zero Harm & Zero Leakage – this is our mindset

“Our House”

Goal Zero

Commit

Act

Care

Respect

Intervene

Comply

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To put the Golden Rules into practice requires:

- Staff to have the right competencies e.g.
  - Know the rules, know how to observe & intervene
- A strong safety culture
  - Permanent awareness or “chronic unease” at all levels
  - Receptive to “weak signals”
- Leadership commitment
  - Support interventions
  - Allow for resources
Competency Management:
- Shell has implemented Competence Management System that is standardized across all businesses, locations and disciplines
- Increasingly, the assessments are externally certified
Standardization to support a strong safety culture:

- Use of Personal Safety standards to drive Process Safety
  - Helps to keep Safety at the top of the mind
  - Simple example implemented in Shell: Hold the handrail
  - Also: Life Saving Rules – see also OGP Report 459
Standardization to support a strong safety culture:

- Discussion around Prescriptive versus Performance based standards:
  - Performance-based standards and ALARP concept stimulate “chronic unease”

- Use of standards to keep lessons from the past “alive”

- Shell DEM2 manual containing Process Safety Basic Requirements that are all directly and explicitly connected to disasters in the industry – so that we not forget
SUMMARY

- Human factors covers a wide variety aspects from physical to cognitive
- Standardisation activities in physical and cognitive ergonomics for the oil and gas industry were identified.
- Expanding the reach of cognitive ergonomics from a control room to a business, the role of standardization in managing competencies and supporting the safety culture in Shell was explained.

References:
OGP Report No. 459 OGP Life-saving rules, April 2013
Thank You