Is human factors missing in the blunt end in the oil and gas industry?

Stig.O.Johnsen@sintef.no
Main message

Yes - Human Factors (HF) is missing in the blunt end - in early phases of projects and where decisions are made

Why
- HF is simplified as layout issues or to avoid “human error”
  - 99% boredom and 1% panic
- Technology driven – missing competence of HF in organizations
- Poor focus of HF in early phases – holes in barriers

What to do
- Re-conceptualize HF to support resilience, organisational and cognitive issues – i.e. layout and human errors are results
- Increase power of the HF perspective - safety and efficiency
- HF as a natural part of concepts and project definitions
Agenda

1. Introduction an presentation of scope
2. Performed research/review
3. Discussion and conclusion
1 - Human Factors - concepts

Human Factors – (in short) is a discipline focusing on the nature of interactions between humans, technology and organizations – (ref definition from IEA - International Ergonomics Association)

Human Factors domains:

- Organizational factors (communication, teamwork, CRM…)
- Cognitive factors (perceptions, information processing, HMI…)
- Physical ergonomics (Layout, Working Environment, ….)
Scope: Control Suites

Control suites:
- Central Control Room
- Collaboration Room
- Emergency Control Centre
- Drillers cabin

New challenges:
- Remote operation and support
- Experts collaborating in distributed teams
- Increased complexity (organisational and technological)
HF focus – Safety and efficiency

Proactive barriers
- Organisational HF
- Cognitive HF
- Phys. ergonomics

Reactive barriers
- Organisational HF
- Cognitive HF
- Phys. ergonomics

Loss of Control vs Control
Poor HF - Deepwater Horizon

Blowout  April 20, 2010
- Loss of 11 lives
- Almost 5 million barrels of oil spill
- Financial loss BP: 40 Billion $,
- Loss shareholders: 105 Billion $

Industry association OGP, after DH, one of four key issues:
- More attention paid to HF
HF in development process

- Feasibility, Clarification
- Concept selection, Analysis
- Concept definition, FEED
- Detailed Design
- Construction, Commission, Operation
2-Performed Review of HF in development

Participatory Action Research (Interviews, Workshops, Documents) 4 Control Suites

- Feasibility, Clarification
- Concept selection, Analysis
- Concept definition, FEED
- Detailed Design
- Construction, Commission Operation

Review of audits from authorities
HF focus – research/ early phases?

- Poor research focus
  - Looking at 10 years of research in the petroleum industry (2004-2014) – Norwegian PETROMAX program, 4 of 447 projects awarded grants focusing on HF i.e. – 1%

- Industry HF focus – variable (poor in early phases)

- Regulatory focus in later phases
  - HF is mentioned – in focus usually from detailed design, related to layout, and working environment
Results – Action Research – four centres

Concept/ design phase

- Usually no HF experts a part of organisation (+ at one operator)
- Insufficient focus on HF in design – especially HMI design
- CCTV implemented without HF guidelines (one case: 170 CCTV)

- Responsibility, work procedures and information between distributed actors have not been explored sufficiently
- Poor focus on team training based on non technical skill such as Crew Resource Management (CRM discussed in an extended review of 10 projects)

- Poor focus on humans as proactive safety barriers to detect and mitigate unwanted events
Results – Review of HF in drilling

- Concept phase - review
  - Insufficient focus on HF in design (and operation)
  - Different (HF/HMI) solutions from different vendors – no common HMI

- Design phase – review
  - HMI in general is poor
  - Need for improved systems to present safety critical information
  - Need for improved alarms and and improved layout

- Review of operations
  - Many unnecessary alarms (reported from 50% of drillers)
  - Alarms gives no support during critical situation (20%)
  - Too much information on screens (50%)
3 – Conclusions

- Major shortcomings in integrating HF in early project phases

  - Cognitive human and organisational factors are not prioritized in the early phases – seldom coordinated

  - “Non technical skills” of teams – such as CRM – is not prioritized

  - Drilling cases – poor alarm design, poor HMI, poor procedures..
Suggested causes

- Missing HF stakeholders in organizations
  - Insufficient involvement of HF in concept, design (and operation)

- Poor knowledge and awareness of HF, poor certification of HF experts (in Norway one certified expert);

- Too much focus on technology, HF is poorly involved

- More focus on human factor errors than human factors resilience
Human error – cause or symptom

Accidents are caused by human mistakes/ human errors?
- Program humans, make new and strict procedures?
- Remove Humans - Automate?

Dekker (2002): Human error is seen as a symptom of problems with the system, being an effect rather than a cause.

Build HF based barriers
- Establish possibilities for human resilience, support recoveries
- Automation support of human resilience
Improve influence of HF from blunt end

Build ability to be resilient:

- HF position in organisation (Airbus went from 1 to 20 HF experts)

- HF evaluated from start i.e. feasibility phase, through standards
HF based barriers in all phases

Organisational Influences

Before

- Years

- Months

Human Causes

After

- Days

- Loss of Control

HF in all phases
- Organization
- Cognitive
- Phys. Erg.

supporting resilience and distributed sense making

CRM training based on
- accidents
- successes

Stress test to build resilience

Internal and external audits

Human in Control
- improvisation

Reduce consequences through control
Repetition of the main message

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