

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



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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 and 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:

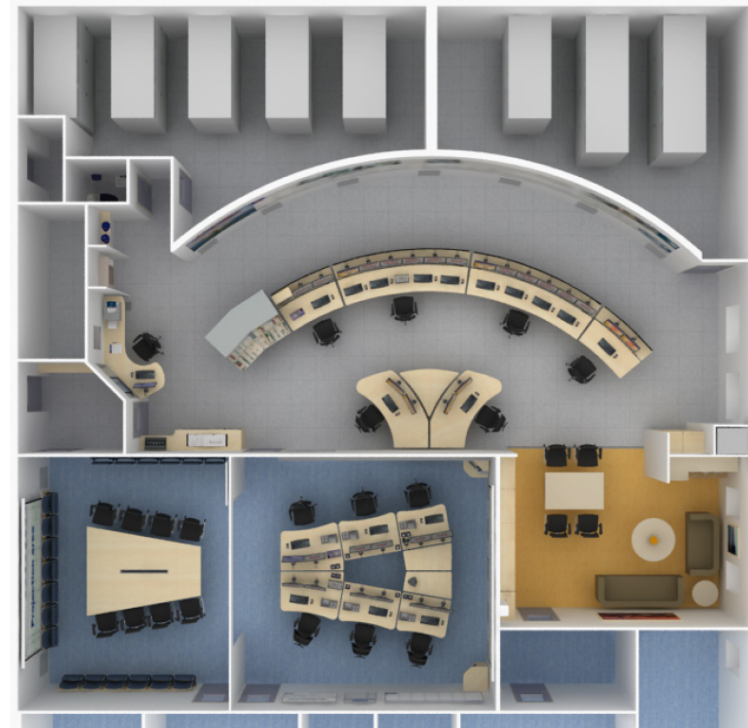
- **Organizational factors (communication, teamwork, CRM...)**
- **Cognitive factors (perceptions, information processing, HMI...)**
- **Physical ergonomics (Layout, Working Environment,)**

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)

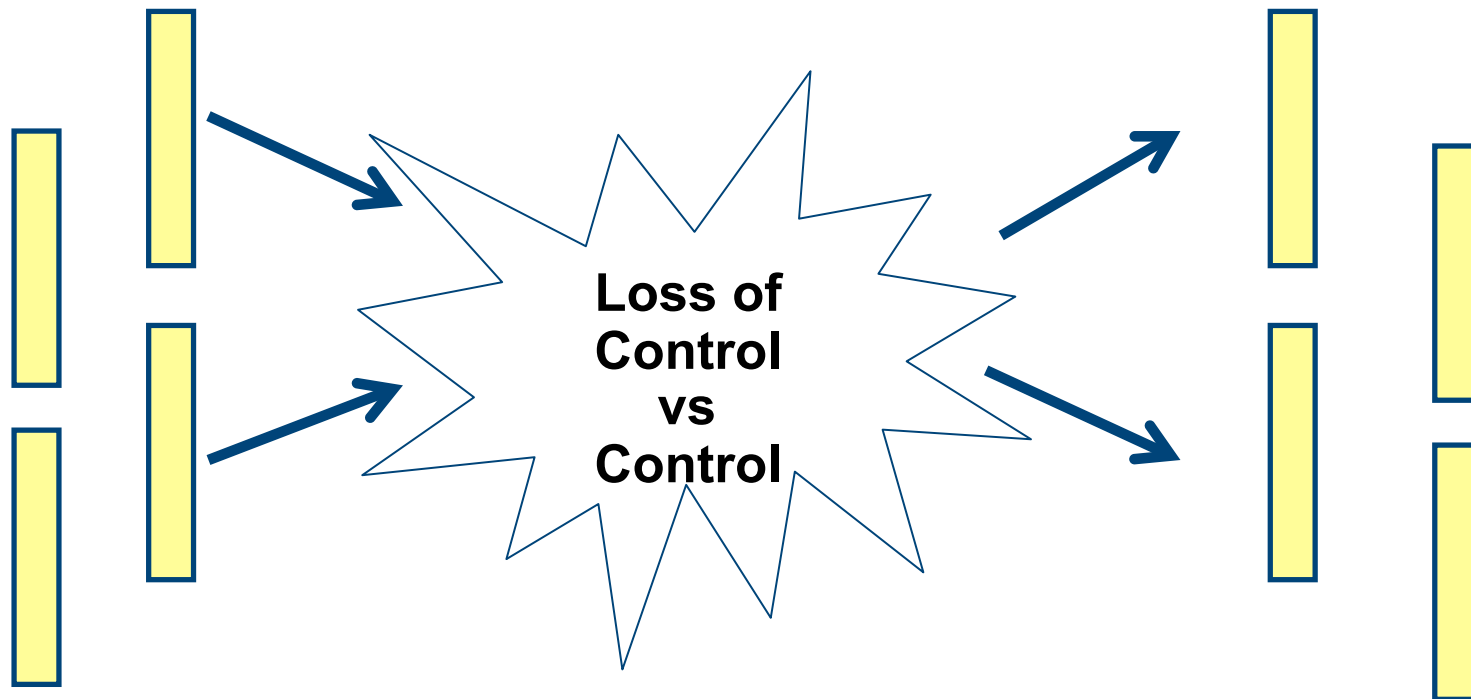
HF focus – Safety and efficiency

Proactive barriers

- Organisational HF
- Cognitive HF
- Phys. ergonomics

Reactive barriers

- Organisational HF
- Cognitive HF
- Phys. ergonomics



Poor HF - Deepwater Horizon

Blowout April 20, 2010

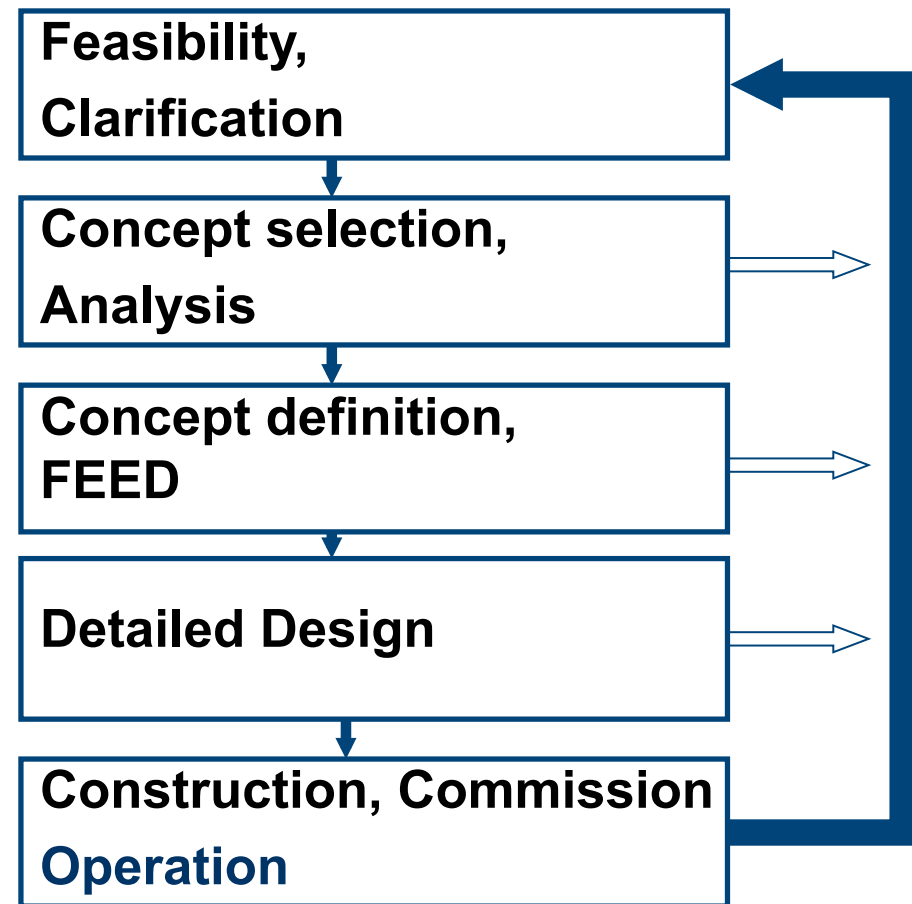
- Loss of 11 lives
- Almost 5 million barrels of oil spill
- Financial loss BP: 40 Billion \$,
- Loss shareholders: 105 Billion \$

Industry association OGP, after DH,
one of four key issues:

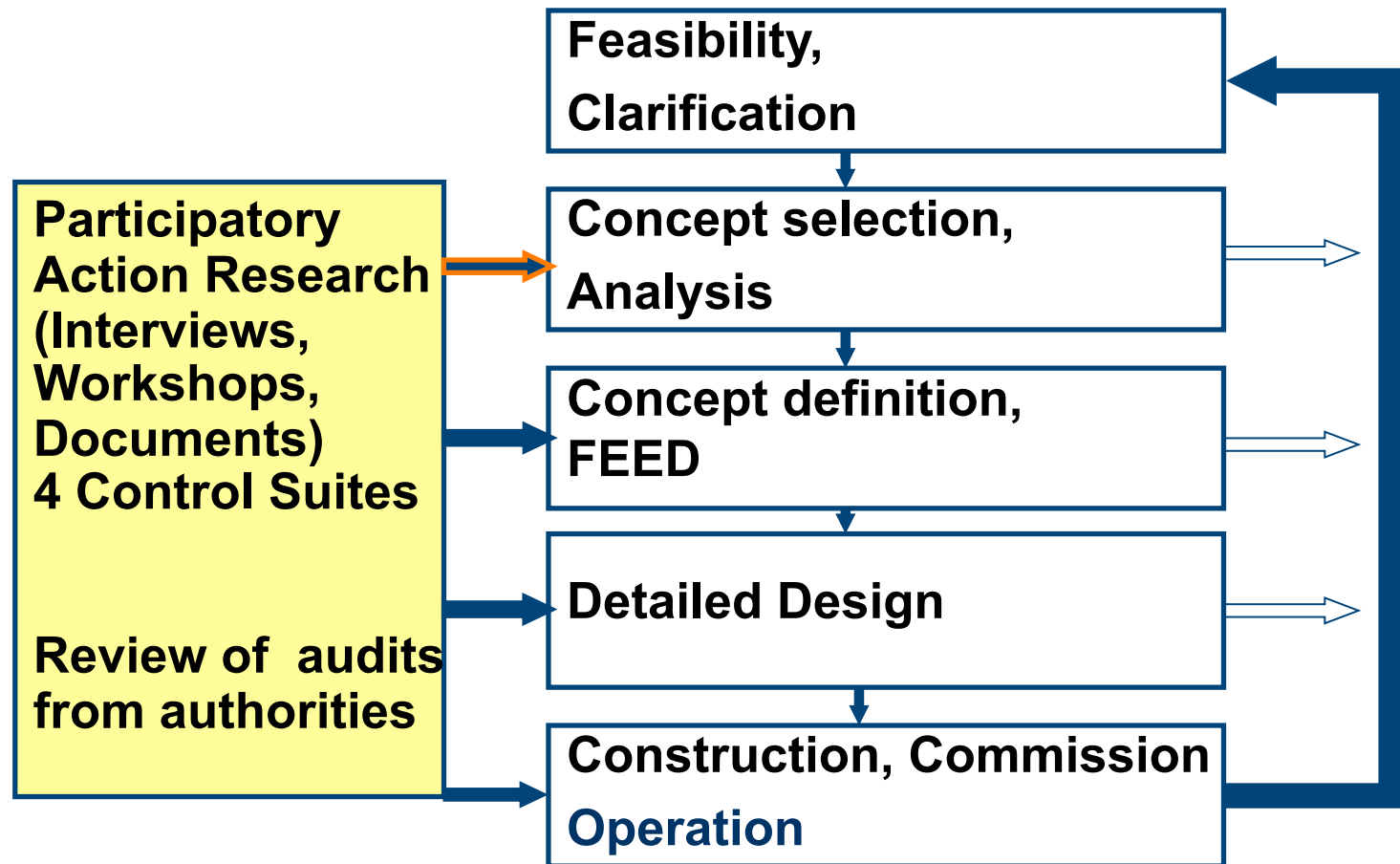
- More attention paid to HF



HF in development process



2-Performed Review of HF in development



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**
 - **Ned 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 ?

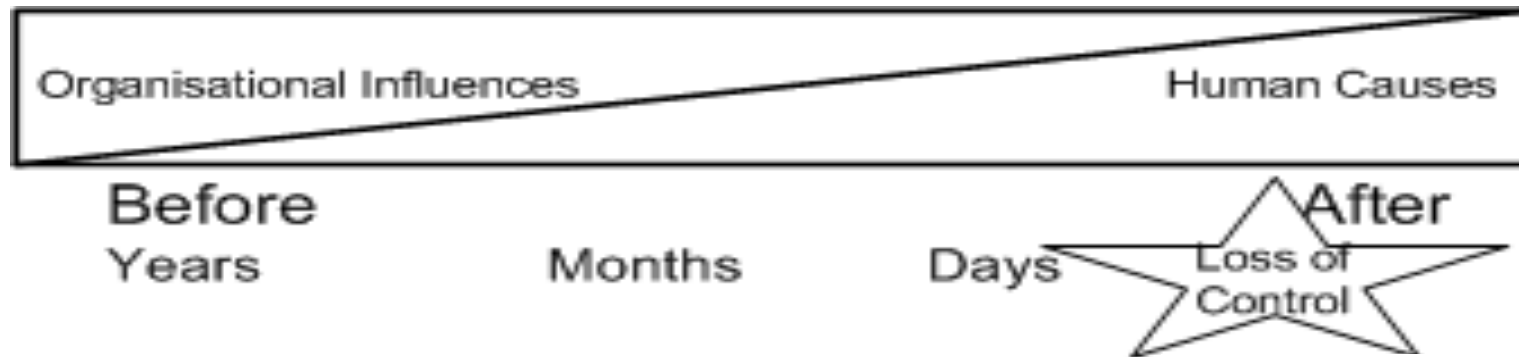
Dekker (2002): Human error is seen as a symptom of problems with the system, being an effect rather than a cause.



Build HF based barriers

- Establish possibilities for human resilience, support recoveries
- Automation support of human resilience

Improve influence of HF from blunt end

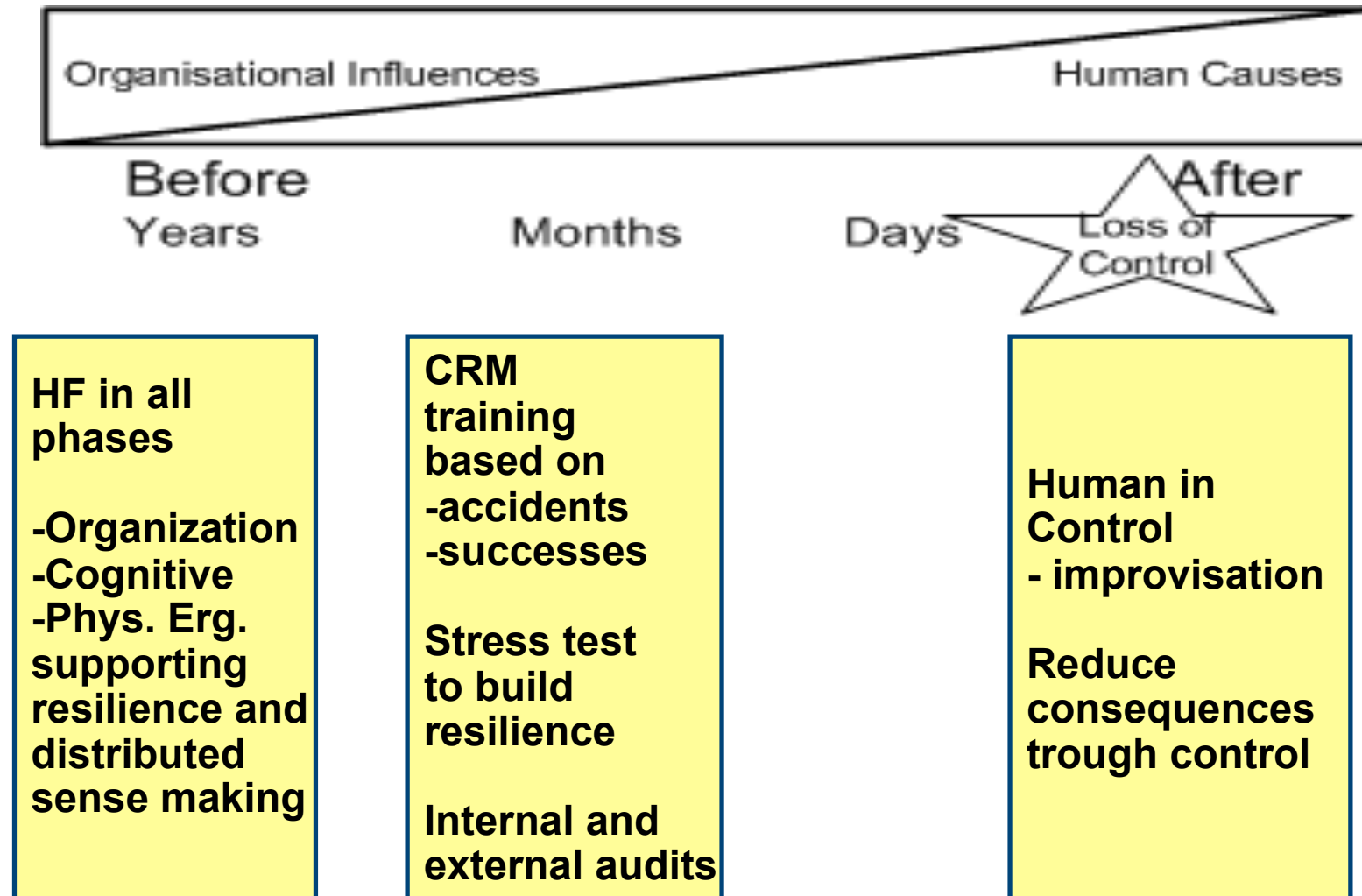


Build ability to be resilient:

- 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



Repetition of the main message

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