

Human Factors in Future Operations of Floating Production Vessels

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Floating production, storage, and offloading (FPSO) in Equinor

Operational



Major Development Projects



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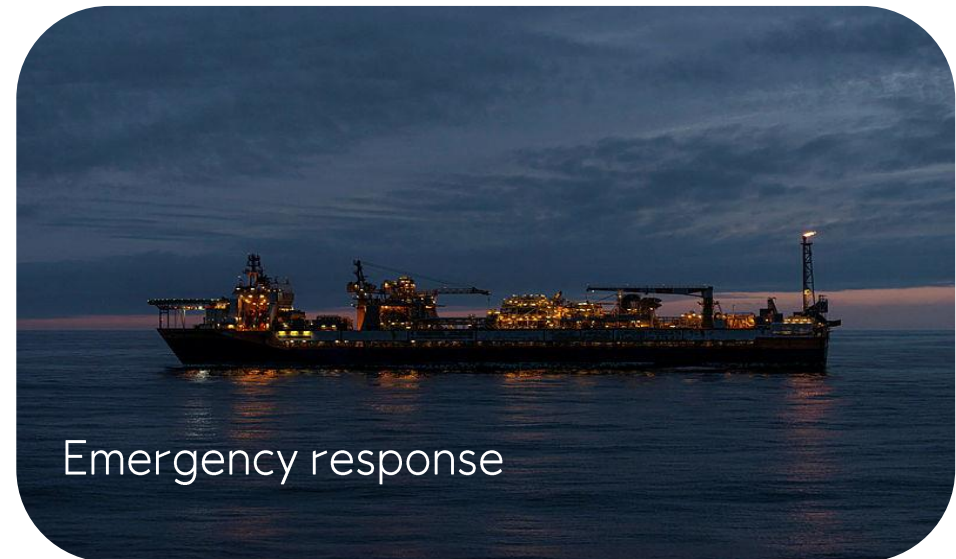
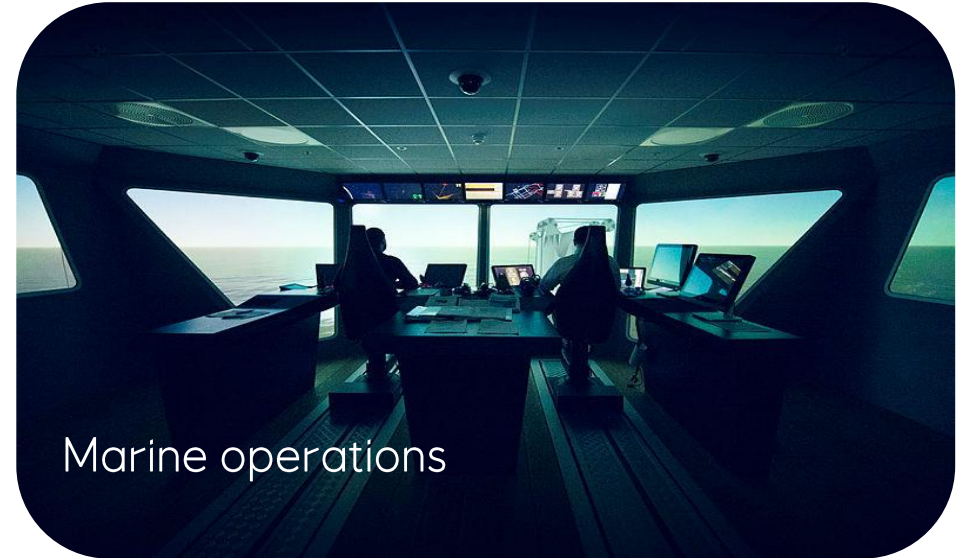
Future onshore marine control?



*Investment decision postponed
 **Investment decision approx. 2024

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Example functions influenced by onshore marine system control



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Human Factors integration and common dilemmas

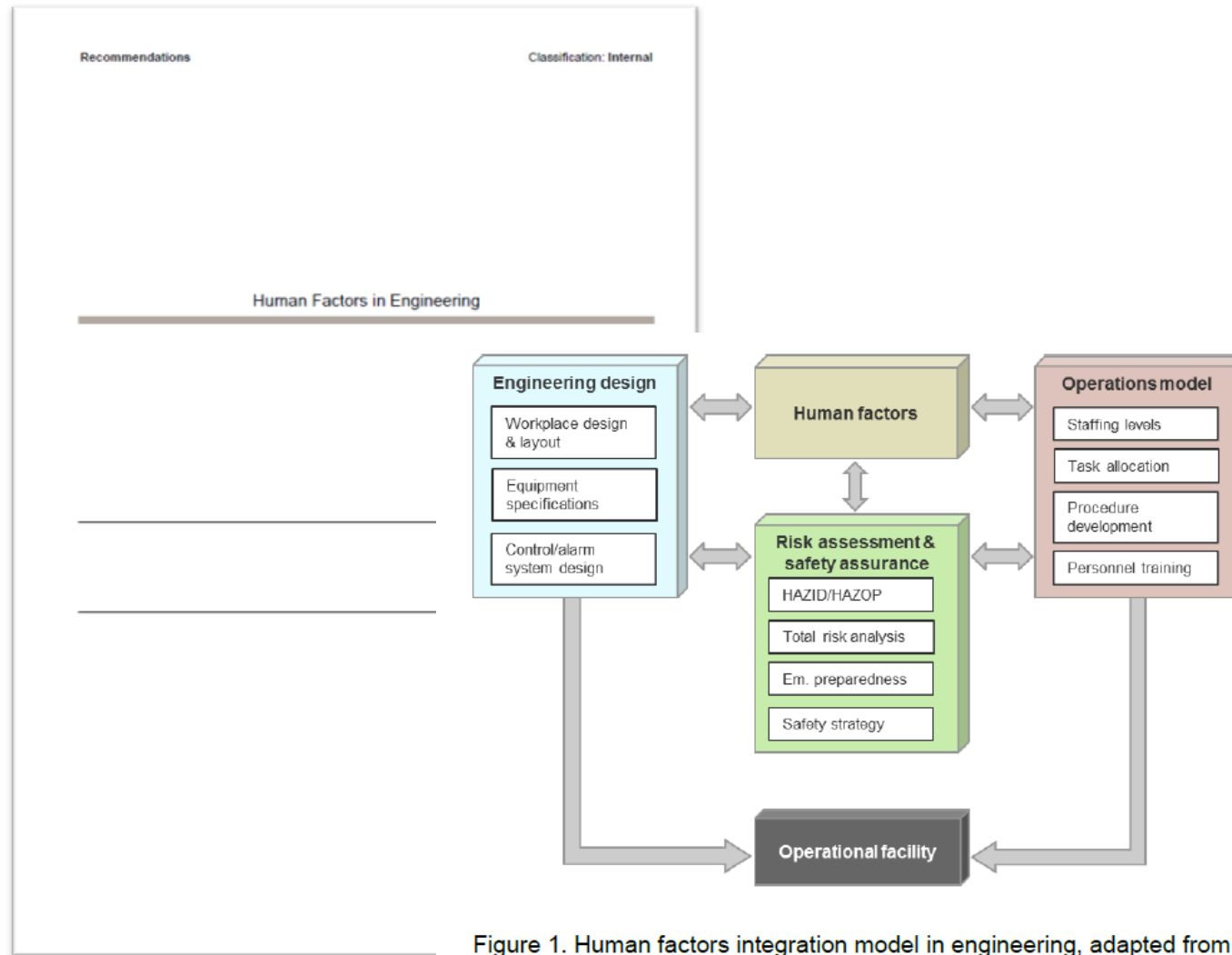
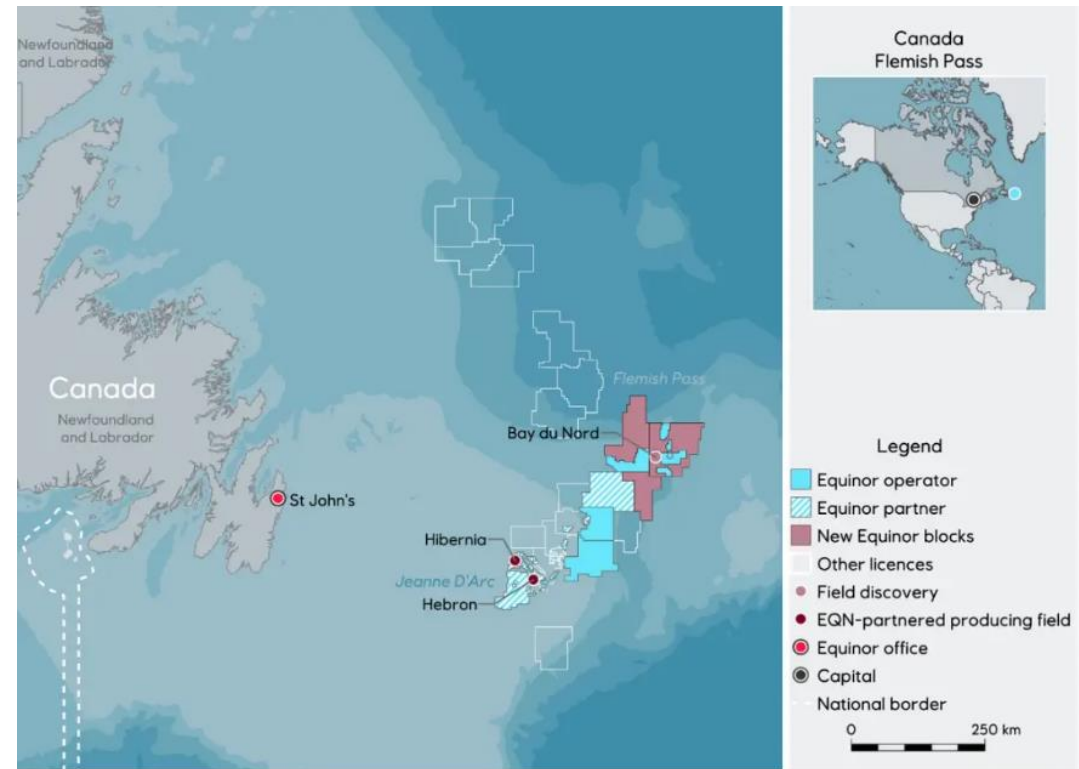


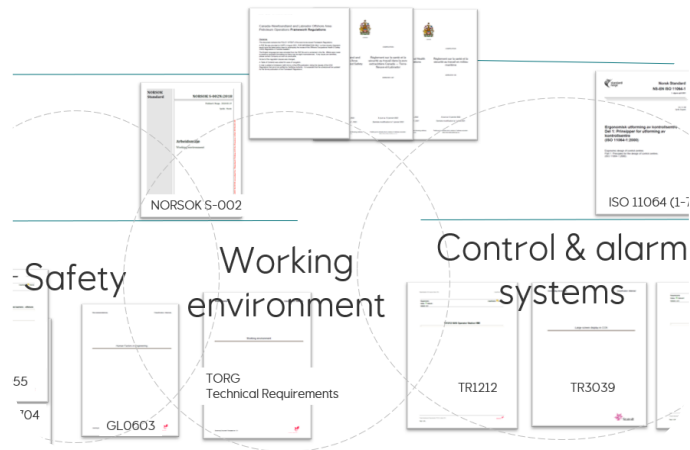
Figure 1. Human factors integration model in engineering, adapted from Cullen (2007).

Example: Bay du Nord project

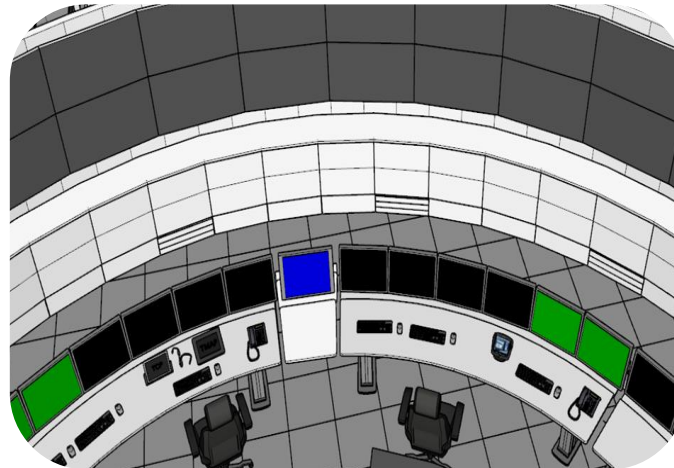
- Shipshape FPSO w/ disconnectable turret
- 475 km northeast of St. John's, NL
- 1170 m water depth
- 200 000 bl/day during peak production
- Optimized offshore staffing
 - Marine minimum manning to meet Transport Canada requirements
- Onshore support and control center via subsea fiber optic cable



Human Factors and Operational considerations with onshore marine control



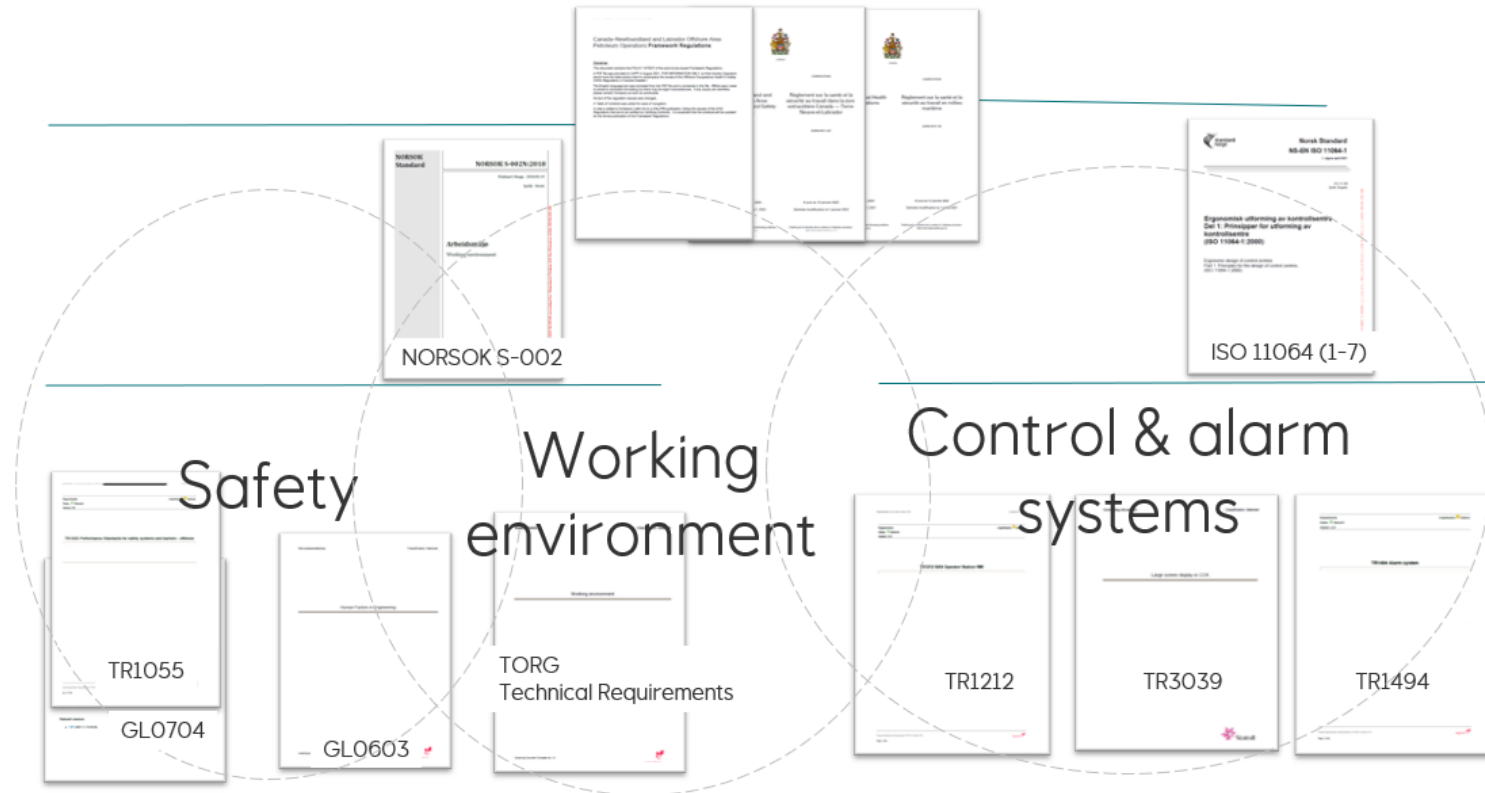
Regulatory



Design

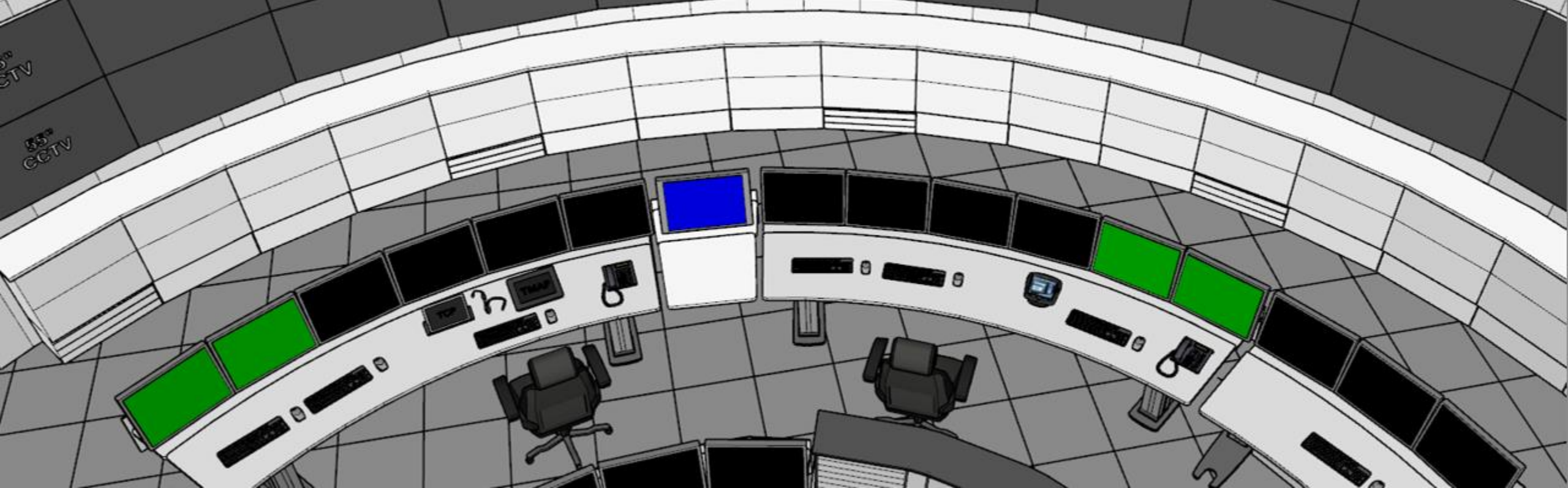


Competency
and experience



Regulatory

- No existing regulations, under evaluation
- Application of new/novel technology
- Engagement with Regulatory bodies



Design

- Understanding the risk, identifying 'error traps'
- Distribution of tasks between onshore and offshore
- Designing for situation awareness and human performance with automation and digitalisation shifts
- Seeking to learn from 'normal work' for new operational paradigm



Competency and experience

- Understanding Operators role in normal, safety critical and emergency situations
- Re/up-skilling across project into operations
 - Technical and non-technical skills for onshore marine control

Summary

- Pioneering projects for Equinor and industry
- Regulations and requirements evolving throughout project development
- Utilising internal and external learnings to advance developments in onshore marine control
- Understanding and mitigating risk in new operational models and design
- Early integration of Human Factors and human performance principles in projects and operations

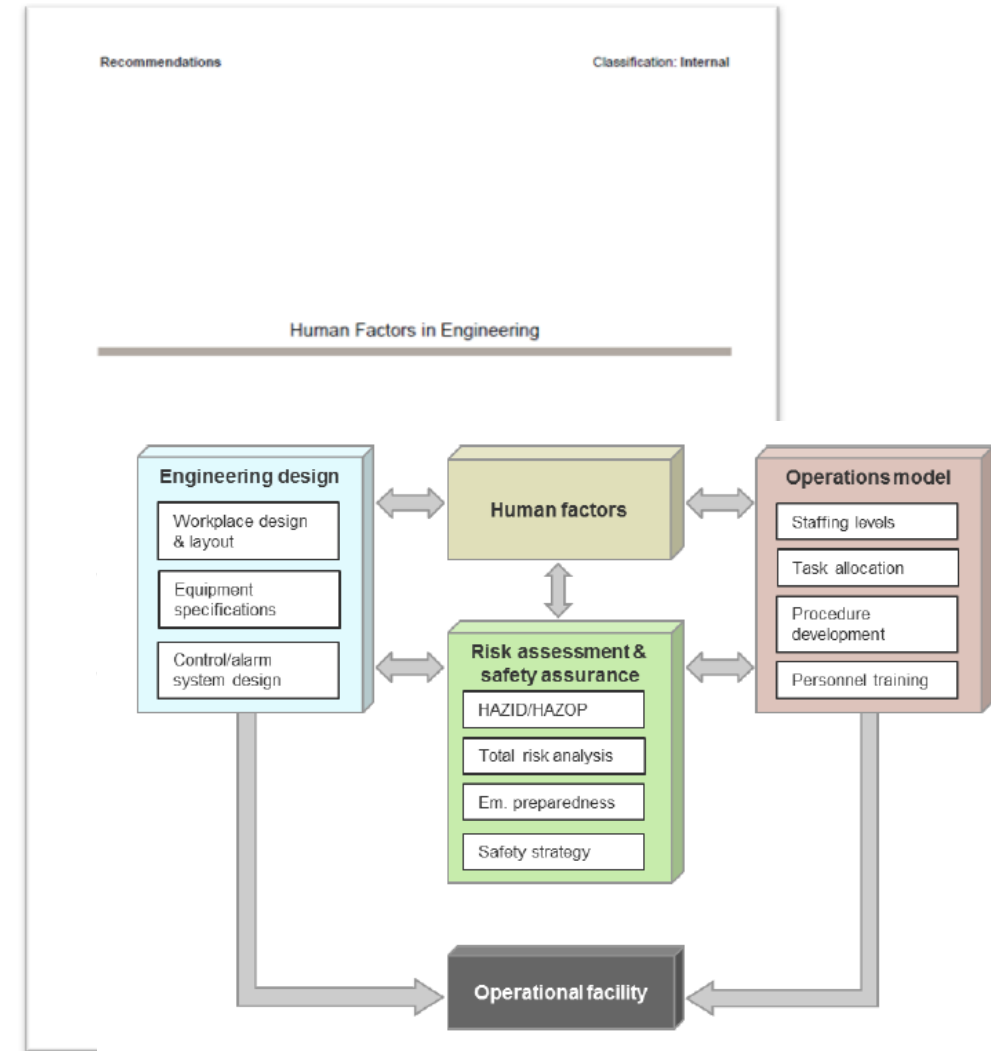


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