HFC workshop Energy – Renewables

Workshop at the HFC meeting 19-20 October 2021.

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Starting point:

- Har vi kunnskap, prinsipper, metoder, standarder og krav for å håndtere utfordringene vi står ovenfor; nye teknologier, energiformer og «den grønne skiftet» på en god måte?
- Hvis nei på en eller flere av punktene over:
    - Hva/ hvor er det største gapet?
    - Hva bør vi gjøre?
        - Utvikle designprinsipper?
        - Metodeutvikling?
        - Standarder eller krav? I så fall hvem og hvordan?

Main considerations from the group:

- O&G has a lot of requirements and standards, maybe more than others?
    - Do we have the best standards and requirements and can apply them directly on new areas?
        - Many of the standards utilized in the discipline typically reflect best practice, there needs to be an assessment to identify relevant application.
    - People from the wind industry sometimes ask: are the strict requirements needed? What can we relax?
        - Where knowledge of HF integration is limited by others, having support through the regulations/standards is beneficial (experience from oil & gas). Important to ensure HF integration/user centered design principles is included the regulations and standards.
    - DSB as regulator does not have the strong history as Ptil
- Autonomy: E.g., offshore wind is unmanned. Those principles and standards are lacking (also for relaxing).
    - Not only unmanned, but the level of autonomy/automation. What is the role of humans in autonomous processes?
    - Def of automation vs autonomy. The understanding of this is very different in various groups. Overtrust and under-reliance are important factors.
    - Contractual issues: Design specification. Automation systems need a complete specification, while autonomous systems may use learning systems. What is the level of detail that has to be documented?
    - Sometimes the goal of the system is not clear.
    - What do people need to know? Another opportunity for human error, must address programmers of autonomous systems as users? Early into design?
    - Robots on the drill floor
        - Conflict between different autonomous systems working together? E.g., emergency system with operational system.

    - HF in autonomy vs automation: Drilling automation: different systems serving different functions and even the same function. Operator is kind of system integrator (on-line). Can different autonomous systems work it out alone? SA is central.
        - Depends on the integration in the project: is the function allocation completed at which stage in the design? Work for the HF. Competence is also important.
    - Pull-back from full autonomy now. So HF will have a central role in the "teaming" aspects.
- These points reinforce the importance of Human Factors integration. The discipline can bring a holistic, systematic approach to understanding the potential risks/challenges/opportunities to optimize either human or system performance in safety critical and complex operations. In successful cases, HF and systems engineering goes hand in hand.
- **Which method to use when?** We should be able to use a different set of methods for different criticality.
- Defs of major accidents: Wind does maybe not have this? Maybe the major accident in wind is lack of supply of power?
- Regulations: In a technology driven environment, some disciplines could view HF as a potential limiting factor. Developers may think how machines can do the job. However, HF should be and often is a facilitator/enabler to support innovation development and solutions that can be best utilized by end-users.
- Major accidents: HF is not only applicable to that, it is also for designs of new systems. E.g., improved efficiency of human-machine teaming need to be a goal.
    - E.g. carbon-capture has climate and efficiency goals that must be fulfilled.
    - This is an opportunity, how best to apply these methods. Optimize performance!
    - O&G has then been too prescriptive, we could be more adaptable for other types of goals.
    - Details of task allocation may be a key.
- Hydrogen will require risk assessment of major accidents, while other renewable areas have other issues. In general, there is a need to understand the similarities but also the potential differences in the risk picture that can influence the design and operations.