Session 6: Group Work

Task: Is there, based on the presentations in the workshop, a common ground for risk-informed decision-making for structures and how can that be described?

a) List the main principles that should be followed when assessing risk acceptance.

b) What should be avoided? What are the main sources of inconsistencies?

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Results of the different group discussions

RISK-BASED DECISION-MAKING

WORKING GROUP 1

» Principles that should be followed

- ↳ Pragmatism
- ↳ Similar cases to be treated similar
- ↳ Proportionality
- ↳ System definition – important to point out what is not included in the analysis; could neverthelss be relevant for decision making
- ↳ Risk evaluation as a process, with different stakeholders involved and a broader background to be considered – on top of life safety
- ↳ (relative comparison)
- ↳ (ALARP principle)

» What should be avoided

- ↳ Including risk aversion as a factor
- ↳ Estimates should not account for non-accountable aspects (like political aspects)
- ↳ Replace probability by “possibility” thus focussing on consequences, then the decision becomes irrational
- ↳ “0-risk attitude” - which s completely unrealistic (we will do whatever is needed to save every single life) – importance of adequate risk communication & education

Group 2

➢Main principles

- Qualitative risk analysis is fundamental
  - Should include all possible scenarios
  - Need for different domain knowledges in order to identify scenarios
  - Expert knowledge and the availability of different data sources
- If possible, risk should be quantified explicitly
  - Especially if uncertainties and/or consequences are large
  - Should be to best possible extent unbiased
  - Risk analysis depends on the state of information – can change over time
  - Consider duly the epistemic uncertainties
- Risk acceptance criteria
  - Optimisation principles should be followed to identify maximum utility
  - Should account for both economic and sustainability principles
  - Life safety risks should be assessed with regard to the SWTP for investments into life safety
  - SWTP should be contrasted/validated through available data
  - Reality checks can be done based on e.g. individual risk criteria
- Risk aversion
  - We should be aware that it exists
  - We agree that F-N curves are not an appropiate way to represent this
  - But: Acknowledge that large accidents can have comparatively larger societal costs/societal disruptions (with respect to the sum of smaller accidents)
  - Maybe the SWTP is comparatively larger in such cases – possible way to accommodate it in the risk analysis procedure
- Clear communication
  - Clearly document all the assumptions involved and their effects
  - Insist that is is a knowledge-based procedure, not insist on subjectivity

Group 2

➢What should be avoided?

- Biased and unidirectional assessment of risks
- Unclear communication of the assumptions behind an analysis
- Unnecessary risk analysis to demonstrate satisfying a criterion if you already know that you are far above – no need of wasting resources!

JCSS workshop

Group 3

List of principles and common ground

- Knowledge-based
- Holistic perspective - aim to capture
  - all negative outcomes (including indirect consequences)
  - all possible mitigation actions
- Decisions on RAC need to be taken (implicitly or explicitly)
- Attitude and values of the personnel are critical to the assessment
- To differentiate between life-safety and financial risk
  - Life-safety: we focus not on satisfying a risk level, but on potential mitigation actions and their effectiveness
  - Financial risk: Although inherently a decision problem, one can also do with target safety level

Open

What should be avoided?

- Check-box ticking analyses
- Lack of resolution
- Lack of resources for QA
- Underestimate risk based on
  - Experience-based design
  - Mainstream solution
- Overestimate risk with consequent impact on environment and budget for safety
- Oversimplification

Inconsistencies

- F-N curves
- Doing the usual
- Focus on what we know best (say FEM) as opposed to on what is important
- Urge for easy application

Open

Group 4


Group 4
Ton Vrouwenvelder
Gerhard Ersdal
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Principles to be followed

- A proper description of risk should be agreed upon
  - Expected value of consequences, given the available knowledge*
- It is essential to identify which mitigation measures / decision alternatives are relevant – including the 0-alternative
- Multi-attribute fatalities, cost, environment, reputation….

- Acceptable, preferable, optimal, adequate, reasonable → ALARP
- We may need an upper bound for fatalities (in spec. situations other attributes), as a reference or backstop

- The goal is to give transparent* recommendations to the decision-maker, for risk-informed DM
- The decision-maker can be the standard- or code-writer, which result in some kind of loss of optimality

What to be avoided

- Decisions where disadvantages are externalised to 3rd parties (without compensation and further risk reduction)
- Underestimation of the time needed
- FN-criteria
- Risk tool to achieve a hindsight justification of predetermined preferences
- Neglecting uncertainties

Group 5

Main principles

- we always accept risk, implicitly and explicitly
- risk acceptance is an attribute for a decision for when to stop risk mitigation
- Acceptance criteria is a minimum criteria, from an economic or rationality aspect you may need to do more
- Always consider to effectively reduce the uncertainties, stop when we can have acceptable levels
- Always consider to effectively reduce the consequences,
- Can we even use risk acceptance criteria for releasing resources risk mitigation when we are under the limit?

Main principles

- risk acceptance is dependent on the relative comparison of risks within the ALARP region
- societal perspective is importance for risk acceptance
- risk metric: expected value of consequences
- perscriptive safety restrictions contain implicit risk acceptance
- risk acceptance should be standardised so that the responsibility is taken away for individual engineer

Should be avoided

- Misuse of F-N curves
- Oversimplification (risk matrix etc.)
- Discouragement from standardisation bodies
- Lack of clarity in commuication