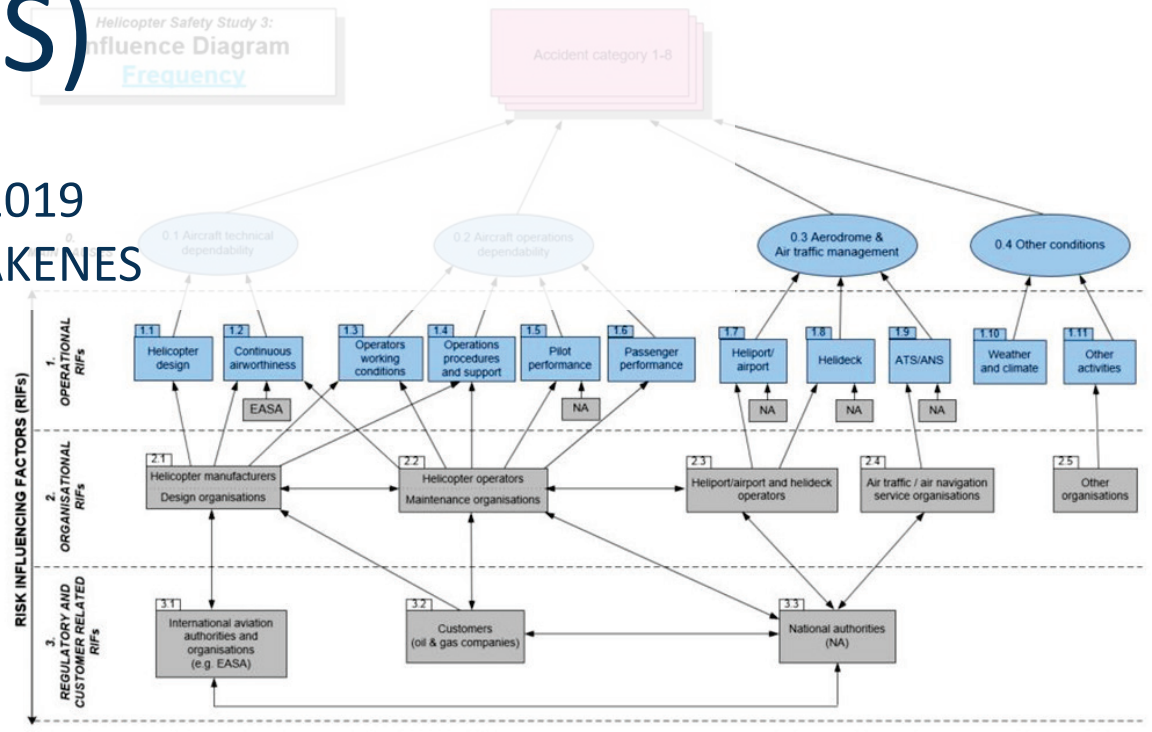
HELICOPTER SAFETY STUDIES (HSS)

25.09.2019

TONY KRÅKENES



Content

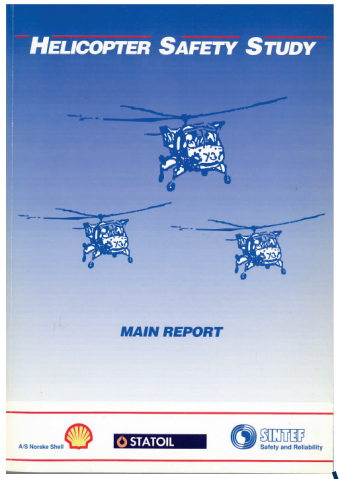
- HSS objective
- HSS history
- HSS relevance
- About HSS-4

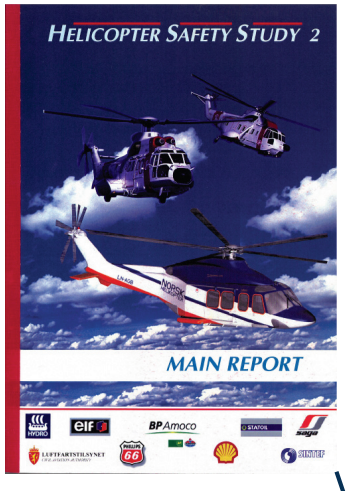
HSS objective

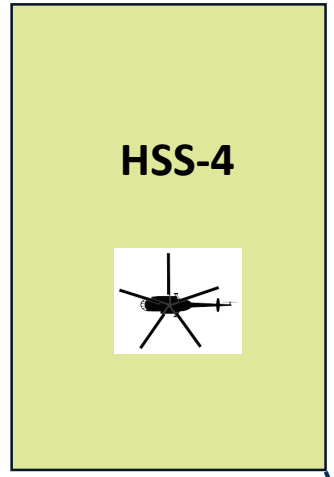
- The overall objective of the HSS studies is to contribute to improved safety in helicopter transport of personnel on the Norwegian Continental Shelf

- The ambition of the HSS reports is to form a reference standard for helicopter safety wrt. multi-disciplinary approach integrating industry experience and research knowledge

HSS history







1966 1990 1999 2010 2017 2021

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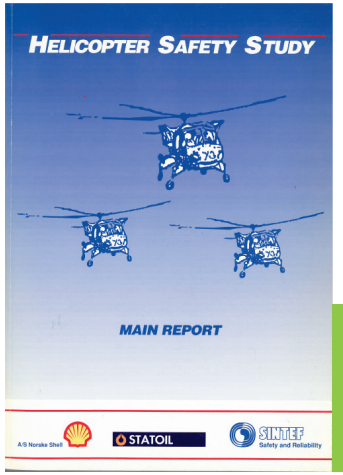
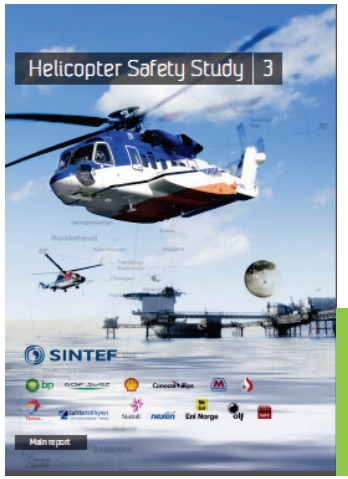
Previous HSS studies – at a glance



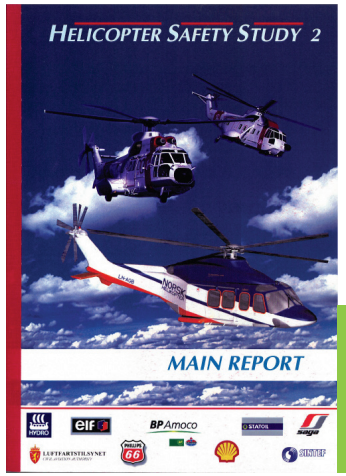
HSS-1

- 1966–1990
- 2 sponsors
- Important topics:
  - Risk modelling
  - Risk contributors



HSS-3

- 1999–2009
- 10 sponsors
- Important topics:
  - Risk level
  - Perceived risk
  - Safety indicators
  - Suggested measures



HSS-2

- 1990–1998
- 8 sponsors
- Important topics:
  - Risk modelling
  - Risk contributors
  - Risk level

HSS-3b

- 2010–2015/16
- 16 sponsors
- Important topics:
  - Recent accidents
  - CAP 1145 assessment
  - HOFO regulations
  - Suggested measures

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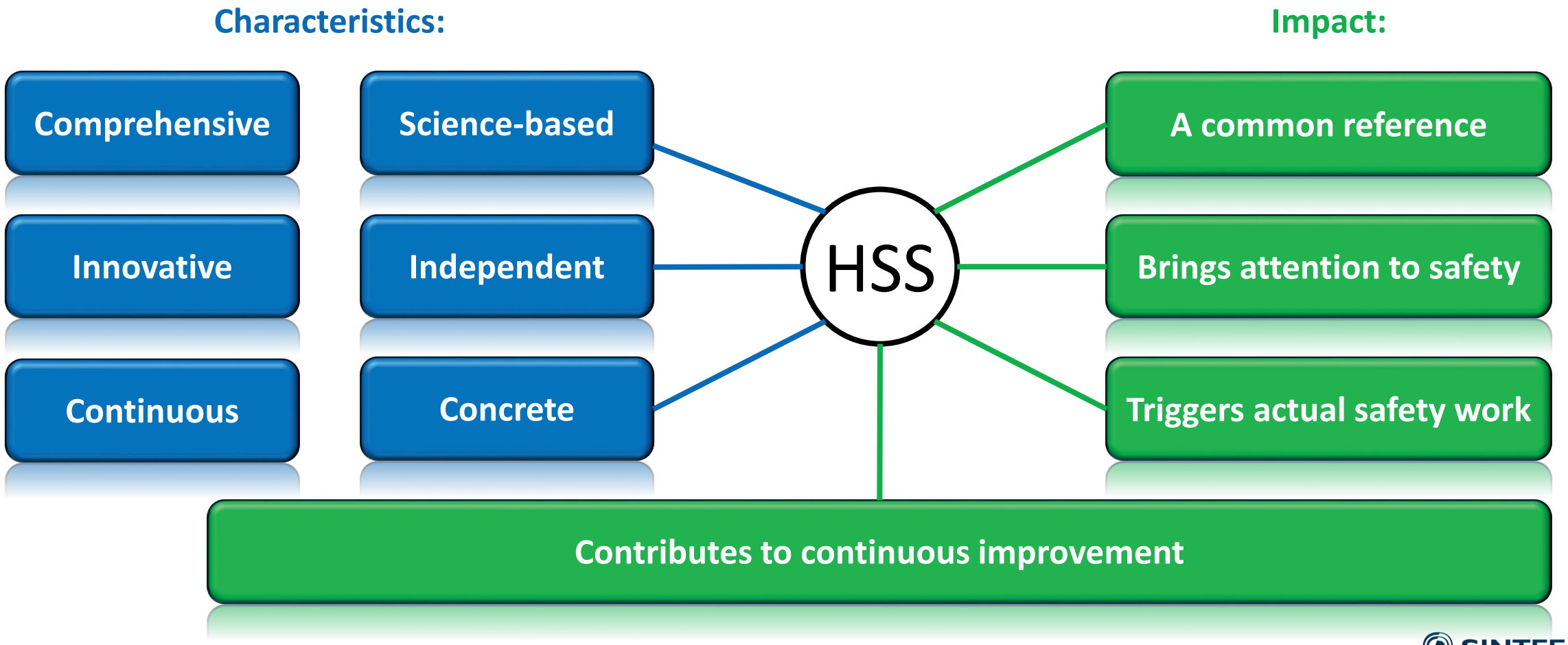
Relevance of the HSS studies



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HSS impact

- Highly anticipated studies in the helicopter community
- Recommended safety measures are followed up by the industry, notably through the *Committee for Helicopter Safety on the Norwegian Continental Shelf* ("Samarbeidsforum")
- HSS methodology and format has been adopted in similar safety work by the global organisation HeliOffshore
- Much media attention after the Turøy accident (29 April 2016)
- Input to Statoil's investigation report on Turøy
- Input to government NOUs (helicopter safety and petroleum HSE)

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HSS-4 in numbers

HSS-4

2 years
March 2019 – March 2021

4 research partners
SINTEF, NTNU, Imperial, Brim

22 sponsors
15 O&G companies
2 national authorities
2 trade unions
2 helicopter companies
1 service provider

4 000 manhours

12 researchers

7 study activities

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Sponsors and supporters

O&G sponsors (15)

AkerBP

Faroe

SPIRIT ENERGY

Cairn

Lundin Norway

NEPTUNE ENERGY

vår energi

ConocoPhillips Norway

OMV

WELLESLEY PETROLEUM

equinor

REPSOL

wintershall dea

Other sponsors (7)

CAA Norway

PETROLEUM SAFETY AUTHORITY NORWAY

AVINOR

INDUSTRI ENERGI

NHF

Bristow

CHC Helikopter Service

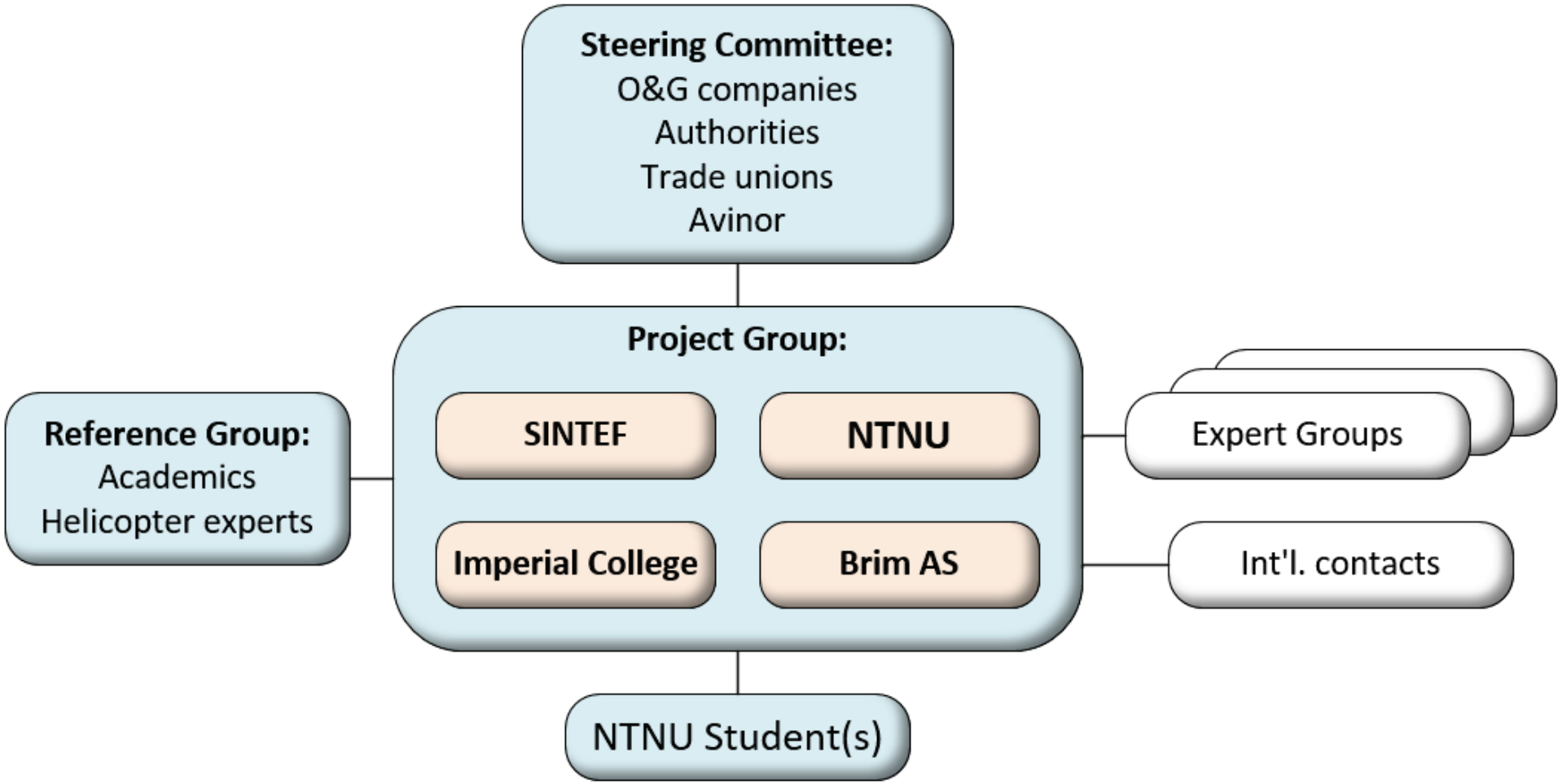
Supporters (3)

Norsk olje&gass

SAFE

Norsk Flygerforbund

Project organisation



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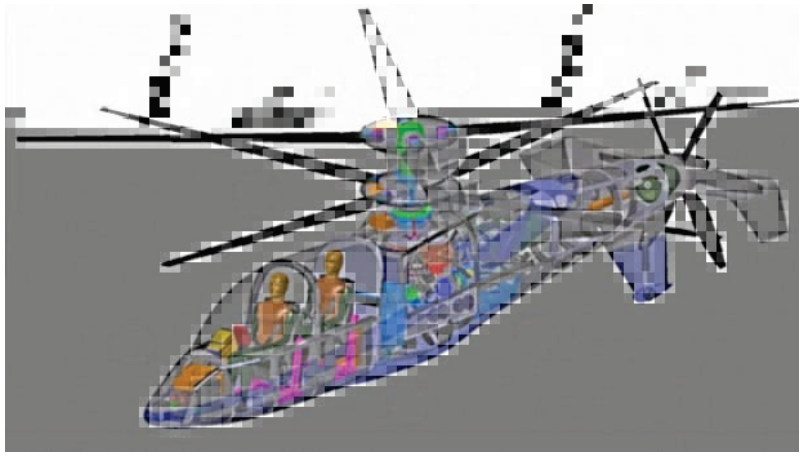
Study activities

1. Industry developments in the period 2010–2020 (and ahead)
2. Statistics, accidents and risk level
3. HSS model development
4. Comparison of helicopter safety in the NO and UK sector
5. Resilience in practice
6. Identification and prioritisation of safety measures
7. "Living HSS"

Activity 1:

Industry developments



- Technological, operative, ATM, organisational, regulatory, emergency preparedness
- Specific challenges ahead: High north, digitalisation, drones, etc.
- Approach:
  - Document study
  - Interviews with key stakeholders
  - Analysis using safety theoretical perspectives
- Output: A comprehensive description of main developments in the last 10 years and ahead

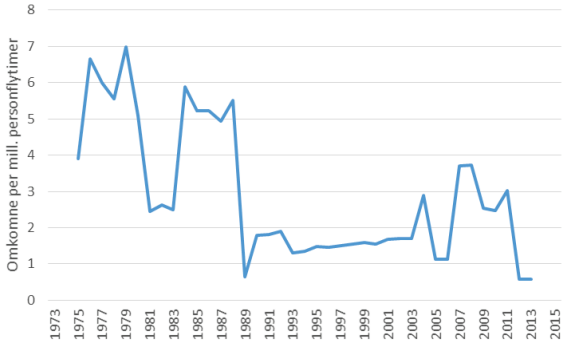
Activity 2:

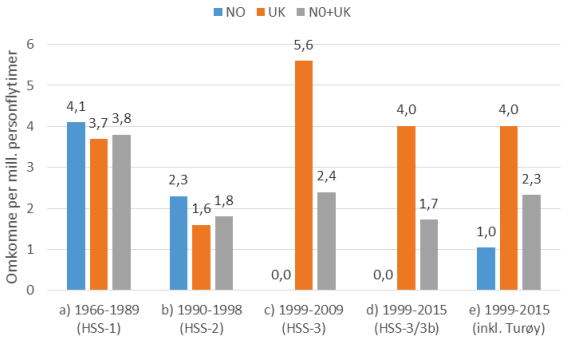
Statistics, accidents and risk level

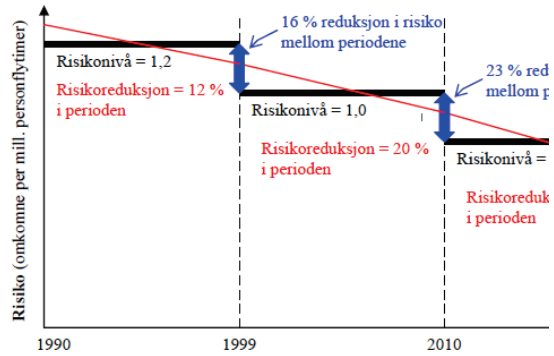
- Content:
  a) Statistics on accidents, incidents and traffic
  b) Analysis of recent accidents
  c) Quantification of risk

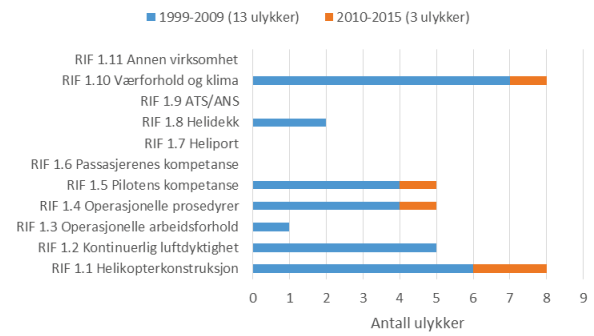
- Output: Quantitative descriptions and analyses based on the HSS model

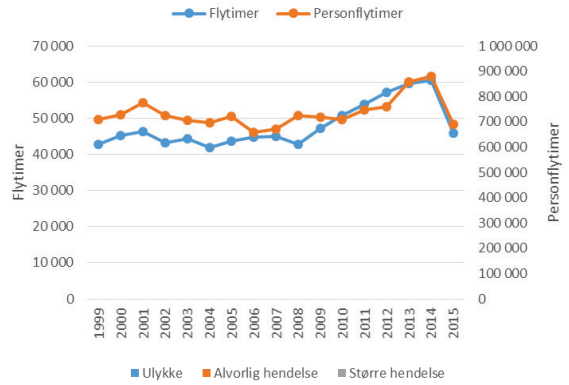
Example diagrams from HSS-3/3b

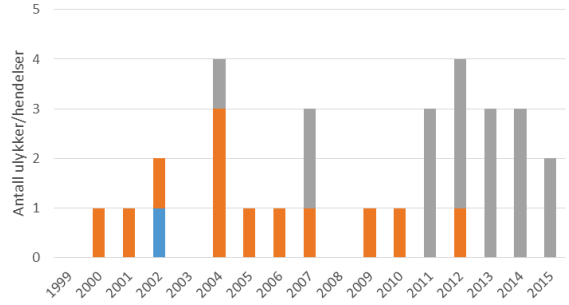


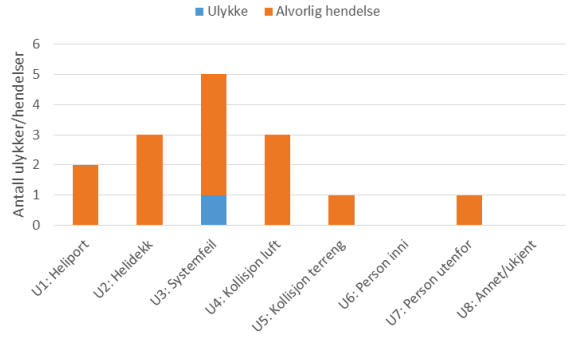


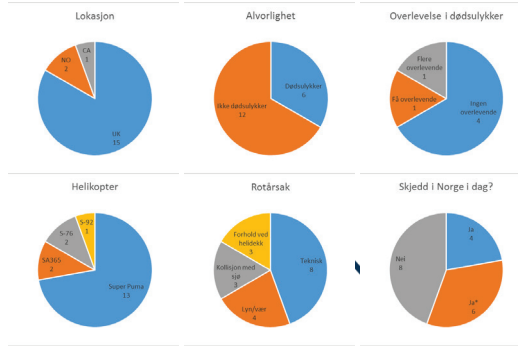










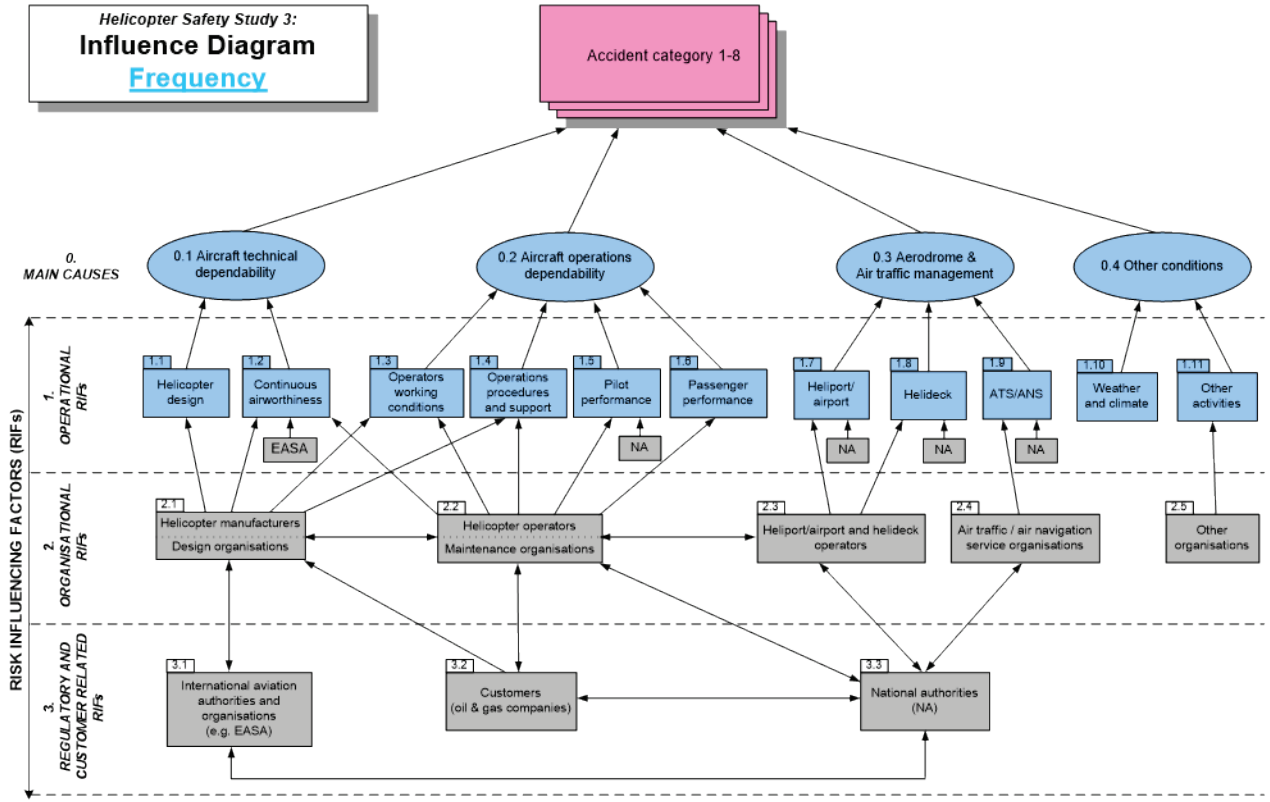


Activity 3:

HSS model development

The HSS model features a set of risk influencing factors (RIFs) and is used to:

- Identify important **risk contributors**
- **Quantify risk** and risk change
- Assess the **effect of safety measures** and prioritise between measures
- Structure data/information collection
- Structure results



Model from HSS-3/3b

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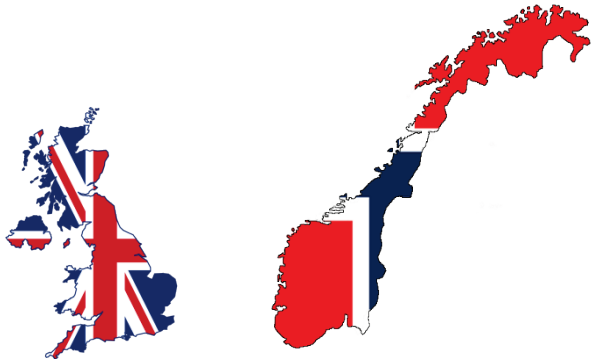
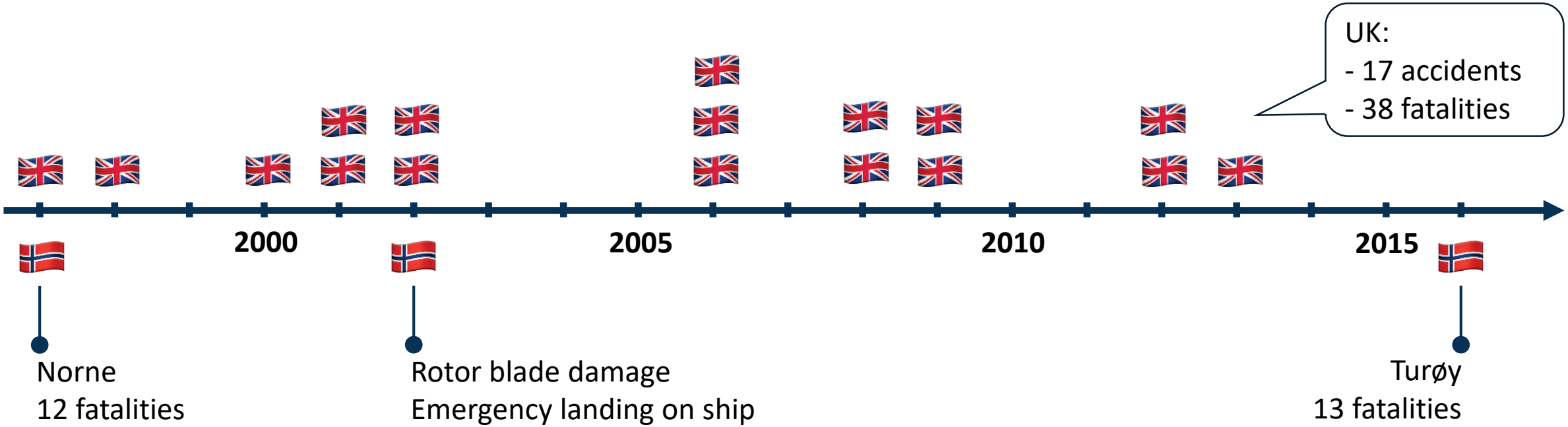
Activity 4:

Comparison NO–UK (1)



Comparative study of helicopter safety in the NO and UK sectors



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Activity 4:

Comparison NO–UK (2)

Background:

- A comparison study was recommended in both HSS-3 and HSS-3b
- Many apparent similarities – and many anecdotes of differences
- Not documented in previous studies

Ambition:

- Identify and describe similarities and differences
- Identify points of learning between the sectors

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Activity 4:

Comparison NO–UK (3)

Study themes:

- Comparable **statistics** related to accident/incident data, traffic volume/patterns and operational conditions (e.g. weather)
- European and national **regulations**, i.e. the formal framework conditions impacting safety
- **Industry structure and roles** of organisations: helicopter operators, O&G companies, unions, authorities, training and maintenance organisations
- **Technology** in use: helicopter types and age, types of usage, available equipment, maintenance routines
- Industry **working conditions** (contracts, workload, pay, environmental factors, etc.)
- The role of **culture** and **work as done**, including safety culture and reporting practices
- How the sectors **work to handle safety** – e.g. safety forums, follow-up of safety recommendations

Activity 5:

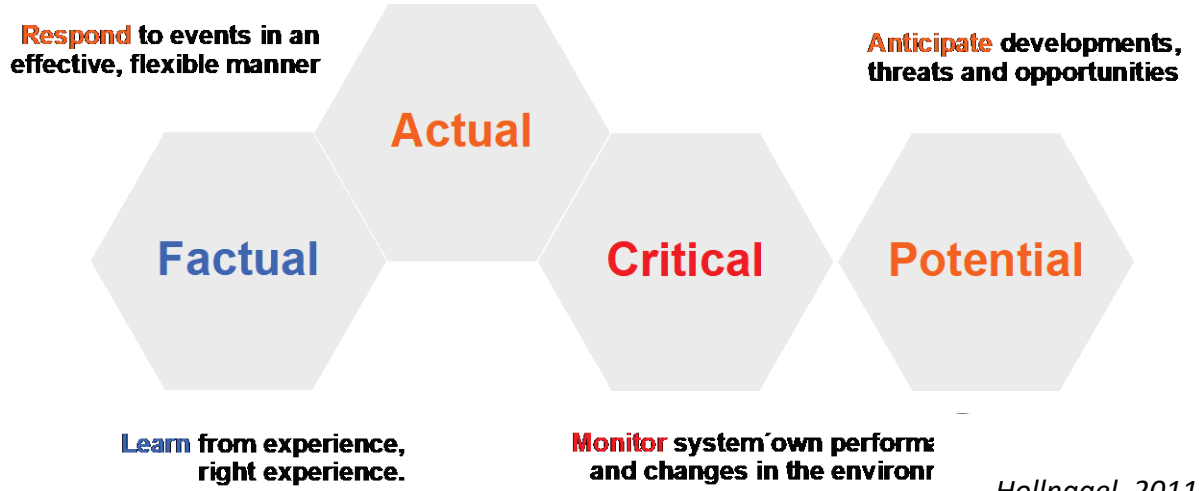
Resilience in practice

- Increased complexity, uncertainty and limitation of resources calls for *resilience*
- **Resilience** is the ability of systems and organizations to continue operations both under expected and unexpected conditions (changes, disturbances, opportunities)
- Case studies to reveal sources of resilience and gaps between "work as imagined" vs. "work as done"

Procedures
Guidelines
Regulations

Practices
Strategies
"Tacit knowledge"

- Output: Practices, strategies and recommendations to enhance resilient performance



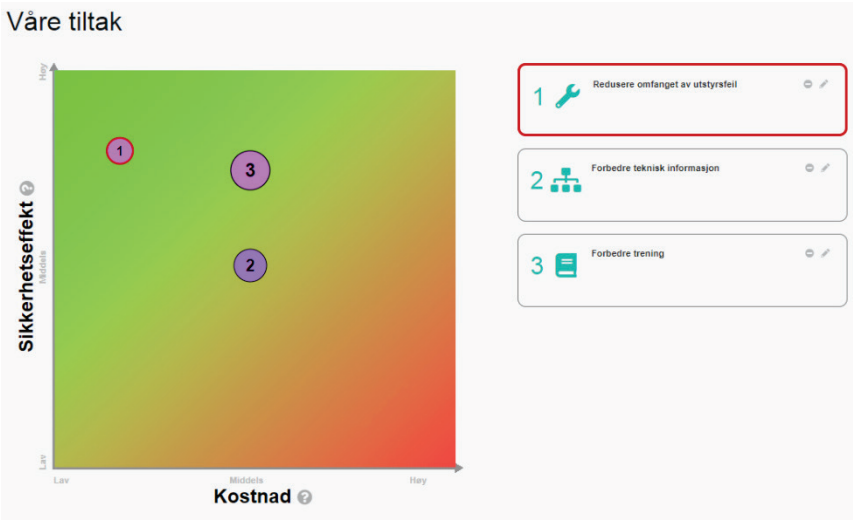
Hollnagel, 2011

Activity 6:

Identification/prioritisation of safety measures

- The study activities give input to the identification and analysis of possible safety measures (risk-reducing or safety-promoting)

- Cost-benefit assessment of safety measures
  - The HSS model is used to quantify "benefit" (i.e. risk reduction)
  - A digital tool for analysis and visualisation of cost-benefit of safety measures is developed and used in expert meetings
  - The tool can also be used during follow-up of safety measures (post study)



Activity 6:

Example of safety measures (HSS-3b)

- AIS in helicopters, integrated in navigational displays
- ADS-B, ATC services and communication coverage in the Barents Sea
- Stronger focus on communication to improve learning from incidents
- Unified practice concerning contracts and the use of penalties
- Improved training of technical personnel
- Stricter competency requirements for leaders in the helicopter companies
- Strengthening of capacity and competence in the Norwegian CAA

Activity 7:

"Living HSS"

- The final report is also delivered as a web resource
- Assessment of the potential of further development and use of such a digital solution
  - Continuous updating of e.g. developments, incidents, statistics, risk level, work with safety measures, etc.
  - Digitized, interactive HSS model
  - Visualisation of risk contribution and effect of safety measures
- Possible to learn and draw inspiration from fixed-wing and other domains

Questions?

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