



Norsk olje&gass

NOISE reduction interventions in the Norwegian petroleum industry

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Hearing damages

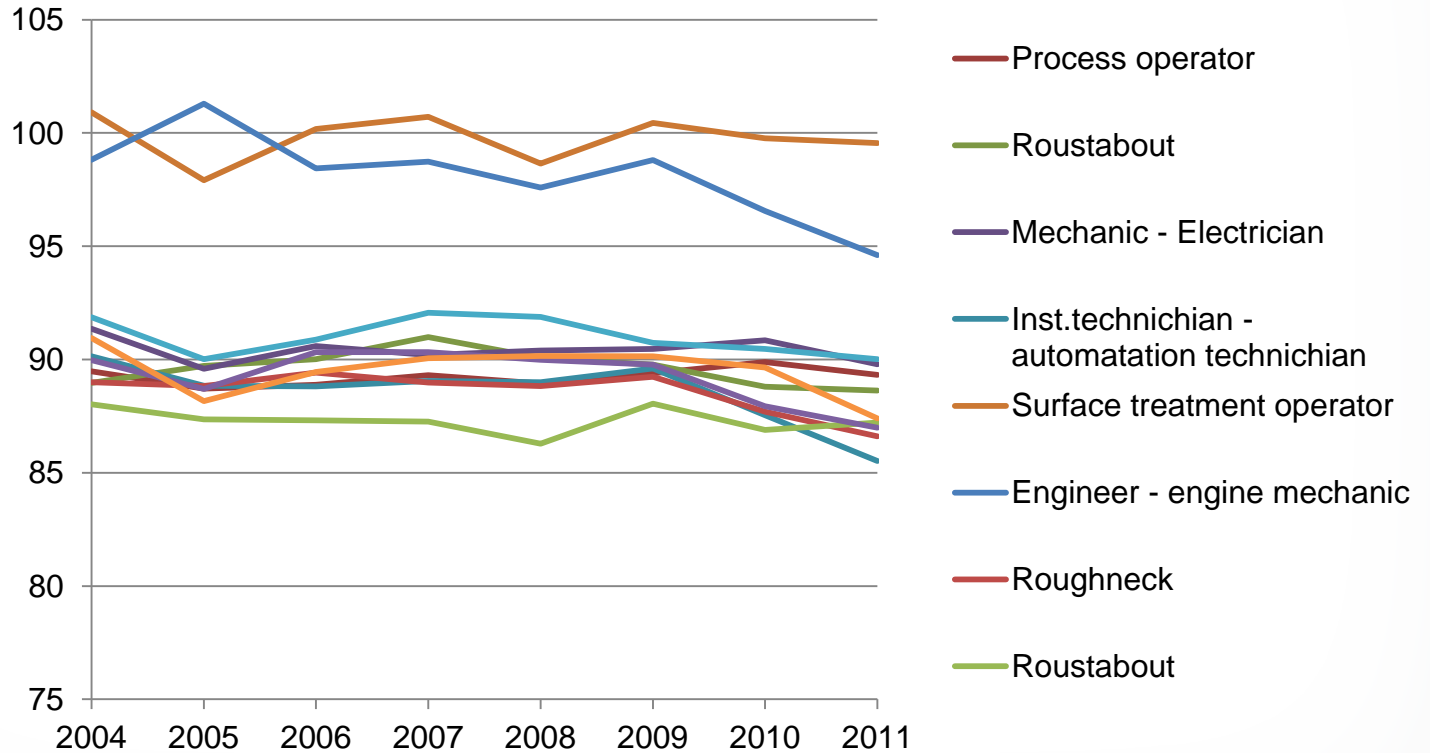
- Reported hearing damages according to RNNP

Period	Registered damages
1995 - 2006	150 - 200
2007	595
2008	623
2009	397
2010	605
2111	710

- Hearing damage is the most common occupational injury reported to the PSA.



PSA Noise Indicator



Noise Exposure Limits

- Norwegian noise exposure limits:
 - $L_{ex} = 83$ dBA for a 12 hour day
 - $L_{ex} = 85$ dBA for an 8 hour day
 - Action limit: 80 dBA => evaluate noise reduction
 - In line with the EU noise directive
- Norwegian peak limit:
 - $L_{peak} = 130$ dBC
 - Somewhat stricter than the EU noise directive



Hearing Protection

- Exposure levels are to be achieved mainly without considering the effect of hearing protection.
- Personal hearing protection not considered a long-term solution
- Only exceptions are activities where hearing protection is the only possible solution.

**A natural extension of the generally accepted safety philosophy:
There should always be more than one single barrier to prevent an unwanted incident.**

→ the attention is on low-noise design and administrative measures



Ambitions / Goals

- The petroleum industry shall be leading within HSE
- Occupational noise exposure shall be under control and within authority limits offshore and onshore
- The aim should be verified by objective criteria's



Deliveries

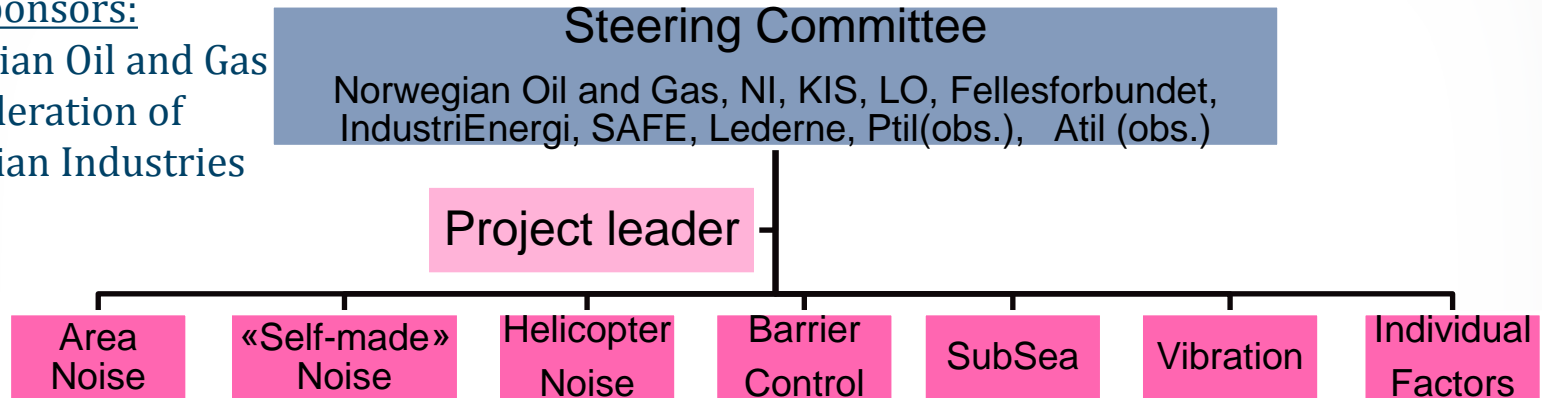
- Collect, create and spread knowledge about noise and effective measures.
- Create best practice documents
- Make useful tools such as:
 - Noise calculator
 - Engineering procedures
 - Database on noise and vibration sources
 - Helicopter handling procedures
 - Table of accepted field values for hearing protection
 - Other agreed and/or recommended noise occupational factors



Project Structure

Sponsors:

- * Norwegian Oil and Gas
- * Federation of Norwegian Industries



Activities
across
subject areas

- Best Practice
- Work Processes
- R&D
- Work Practices
- Benchmarking
- Analysis
- Dissemination of Knowledge
- Develop / Improve Standards
- Health Monitoring



Area Noise (1)

Describes problems connected to noise from the installations such as from the process, generators, compressors etc.

Aim:

Propose improvements to the systematic work on noise control, with special focus on the engineering phase.



Area Noise (2)

- Examples of focus in the engineering phase
- Vendor requirements and objectives
- Acoustic competence in project organisations
- Improvements of Standard NORSOK S-002 and others



Area Noise (3)

Examples of noise risk design



DRA – Compressor noise



Mud cube as alternative
Shaker technology



Self-Generated Noise (1)

“Self-made” / Self generated noise
radiates from handheld tools
in connection with maintenance work, surface treatment etc.

Aim:

- Reduce noise level to meet legal requirements
- Stimulate the industry to choose less noisy alternatives
- Encourage development of new technologies
- Clarify responsibilities regarding:
Equipment vendor/Service comp./Oil comp.



Self-Generated Noise (2)

Introduce:

- Noise and vibration data base for methods and tools
- Include new technology

Noisy operations



Water jetting: $L_{pA} = 100-110$ dB

Less noisy operations



Sand/Water jetting: $L_{pA} = 90$ dB



Sand blasting: $L_{pA} = 105-115$ dB



Vacuum Blasting: $L_{pA} = 80-90$ dB



Self-Generated Noise (3)

New technology continued:
Remote controlled operations



Vibrations

Hand-arm vibrations covers mechanical vibrations from handheld tools to hand or arm

Aim

- Increase focus in industry
- Increase personnel knowledge
- Improve risk management
- Common data base with noise

Hand-arm VIBRATIONS and NOISE



Barrier Control

The barrier shall ensure that noise exposure is under control and below legal requirements. Includes:

- Physical barriers
- Time limitations
- Personal barriers – hearing protection

Aim

- Evaluate existing barriers
- Present recommendations on ear muffs and plugs
- Improve existing specification
- Evaluate new technology



Helicopter Noise

Evaluations concerning noise exposure for passengers and helicopter handling personnel mainly

Aim

Evaluate risk connected to – such as:

- Passengers during boarding/disembarking
- Noise exposure inside cabin during flight
- Work performed at helideck



Individual Factors

Individual sensibility affects the risk of hearing damage

Aim

- Identify sensibility factors
- Start early identification of hearing damage to enable necessary protection
- Increase knowledge in order to avoid hearing damage both at workplaces and among workers



Subsea

Noise exposure connected to subsea operations

Aim

Document noise levels in subsea operations

- Evaluate underwater noise levels with respect to risk of hearing damage
- Compare levels with legal requirements
- Propose actions to reduce risk of hearing damage



Thank You !

Project information: www.norog.no/stoy