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Noise Reduction Interventions in the Norwegian Petroleum Industry  

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  - Area noise
  - Self-generated noise
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  - Subsea
HEARING DAMAGES

- Reported hearing damages according to RNNP

<table>
<thead>
<tr>
<th>Period</th>
<th>Registered damages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995 - 2006</td>
<td>150 - 200</td>
</tr>
<tr>
<td>2007</td>
<td>595</td>
</tr>
<tr>
<td>2008</td>
<td>623</td>
</tr>
<tr>
<td>2009</td>
<td>397</td>
</tr>
<tr>
<td>2010</td>
<td>605</td>
</tr>
<tr>
<td>2011</td>
<td>710</td>
</tr>
</tbody>
</table>

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

- Process operator
- Roustabout
- Mechanic - Electrician
- Inst.technichian - automatation technichian
- Surface treatment operator
- Engineer - engine mechanic
- Roughneck
- Derrickman
NOISE EXPOSURE LIMITS

• Norwegian noise exposure limits:
  • $\text{Lex} = 83 \text{ dBA}$ for a 12 hour day
  • $\text{Lex} = 85 \text{ dBA}$ for an 8 hour day
  • Action limit: $80 \text{ dBA} \Rightarrow$ evaluate noise reduction
  • In line with the EU noise directive

• Norwegian peak limit:
  • $L_{\text{peak}} = 130 \text{ dBC}$
  • Somewhat stricter than the EU noise directive
THE ROLE OF 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
AIM FOR 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
OLF & NI

Steering Committee
OLF, NI, KIS, LO, Fellesforbundet, IndustriEnergi, SAFE, Lederne, Ptil(obs.), Atil (obs.)

Project leader

Area Noise
«Self-made» Noise
Helicopter Noise
Barrier Control
SubSea
Vibration
Individual Factors

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)

Make:
Noise and vibration database for methods and tools
Include new technology

Noisy operations

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

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

Less noisy operations

Sand/Water jetting: $L_{PA} = 90$ 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
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
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
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Thank You!

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