Code on Noise Levels on Board Ships

- Key issues on revision of the Code -

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Introduction

✓ Revision of “the IMCO Noise Code” has been discussed at IMO DE Sub-Committee and it would be mandatory under SOLAS.

✓ In this presentation, outline of the draft revised Code with some key issues in which ASEF members might be interested are introduced.
Contents

1. Revision of the Noise Code
2. Draft revised Code & key issues
3. Possible time schedule
4. Conclusion
1. Revision of the Noise Code
1. Revision of the Noise Code (1)

Status of the Code

- “IMCO Code on Noise Levels on Board Ships” (hereinafter “Noise Code”) was adopted in 1981 as IMCO Assembly Resolution A.468(XII)

- The Code is a recommendatory rule and referred at footnote of SOLAS II-1/36 (machinery)
1. Revision of the Noise Code (2)

The aim of the Code

◆ The Code states:

“...Noting that high noise levels on board ships could affect seafarers’ health and impair the safety of the ship,...”
1. Revision of the Noise Code (3)

The current Code mainly stipulates:

◆ Maximum sound pressure levels for each space
◆ Noise exposure limits *
◆ Acoustics insulation b/w accommodation spaces
◆ Ear protection

* Noise exposure represents the equivalent noise exposure level for given time duration. (ex. 24 hours)
1. Revision of the Noise Code (4)

Course of discussion at IMO

◆ **MSC83 (Oct. 2007)**
- decided to revise the Code

◆ **DE53 (Feb. 2010)**
- Proposal of revision to the current Code was submitted
  
  *Enhancement of max. noise level by 5dB for each space*

◆ **Discussed at DE54 (Oct. 2010) , DE55 (Mar. 2011) and CG**
- CG Report has been submitted to DE 56

◆ **DE 56 (Feb. 2012)**
- Revision work would be finalized
2. Draft Revised Code and key issues
2. Draft revised Code and key issues (1)

Basic concepts of revision work:

◆ Keep the basic structure of the current Code
◆ Reflect the latest technology and related ISO/IEC
◆ Distinguish into mandatory/recommendatory parts
◆ Cover design/sea trial stage
2. Draft revised Code and key issues (2)

Structure of the draft revised code

◆ General (Chapter 1)
◆ Measuring equipment (Chapter 2)
◆ Measurement (Chapter 3)
◆ Maximum acceptable sound pressure level (Chapter 4)
◆ Noise exposure limit (Chapter 5)
◆ Acoustic insulation b/w accommodation spaces (Chapter 6)
◆ Hearing protection and warning information (Chapter 7)
◆ Appendices

There are key issues other than maximum noise level which related parties should notice.
Chapter 1: General

◆ Scope: (from 1.1.1 of draft revised Code)

“...The Code is intended to provide the basis for a design standard, with compliance based on the satisfactory conclusion of sea trials that result in issuance of a Noise Survey Report. Ongoing operational compliance is predicted on the crew being trained in the principles of personal protection and maintenance of mitigation measures. These would be enforced under the dynamic processes and practices put in place under SOLAS Chapter IX (ISM Code).”
2. Draft revised Code and key issues (4)

Chapter 1: General

◆ Mandatory in general, some parts recommendatory

◆ Application: new ships of 1,600GT and greater

◆ Exceptions: dynamically supported craft, high-speed craft, MODU, etc.
Chapter 2: Measuring equipment

- Sound level meters should be manufactured to conform to IEC 61672-1 (2005) Type/Class 1 (Former “precision grade sound level meters”)

- Calibration in accordance with IEC 60942-1:2003
Chapter 3: Measurement

◆ Measurement should be conducted on completion of the construction of the ship

◆ Measurement method is based on ISO 2923:1996

◆ A-weighted equivalent continuous sound level $L_{Aeq}(T)$
2. Draft revised Code and key issues (7)

Chapter 3: Measurement

◆ At normal service speed and no less than [80][75]% of the MCR

◆ Noise prediction is a recommendatory method

◆ [Noise exposure level is also to be calculated for expected condition based on ISO 9612:2009] (discussion not completed)
2. Draft revised Code and key issues (8)

Chapter 4: Maximum acceptable sound pressure levels

Noise level limits (dB(A)) for each space

<table>
<thead>
<tr>
<th>Designation of rooms and spaces</th>
<th>Draft revised code</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,600-10,000GT</td>
<td>10,000GT -</td>
</tr>
<tr>
<td>4.2.1 Work spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery spaces (continuously manned)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Machinery spaces (not continuously manned)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Machinery spaces</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Machinery control rooms</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Workshops</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Non-specified work spaces (other work areas)</td>
<td>85</td>
<td>85</td>
</tr>
</tbody>
</table>

10,000GT threshold was introduced by Japan’s proposal at DE54
### Chapter 4: Maximum acceptable sound pressure levels

Noise level limits (dB(A)) for each space (continued)

<table>
<thead>
<tr>
<th>Designation of rooms and spaces</th>
<th>Draft revised code</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,600-10,000GT</td>
<td>10,000GT -</td>
</tr>
<tr>
<td>4.2.2 Navigation spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation bridge and chartrooms</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>Listening post, incl. navigating bridge wings and windows</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Radio rooms (with radio equipment operating but not producing audio signals)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Radar rooms</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>4.2.3 Accommodation spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabin and hospitals</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td>Mess rooms</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Recreation rooms</td>
<td>65</td>
<td>60</td>
</tr>
<tr>
<td>Open recreation areas (external recreation areas)</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Offices</td>
<td>65</td>
<td>60</td>
</tr>
</tbody>
</table>

Differentiated noise levels for acc. spaces

Introduced by Japan’s proposal at DE 54
## Chapter 4: Maximum acceptable sound pressure levels

Noise level limits (dB(A)) for each space (continued)

<table>
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<th>Draft revised code</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,600-10,000GT</td>
<td>10,000GT -</td>
</tr>
<tr>
<td><strong>4.2.4 Service spaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galleys, without food processing equipment operating</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Serveries and pantries</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td><strong>4.2.5 Normally unoccupied spaces</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spaces not specified</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>
2. Draft revised Code and key issues (11)

Chapter 4: Maximum acceptable sound pressure levels

◆ A noise survey report should be made for each ship

◆ The format for the noise survey report is provided in appendix 1

◆ The noise survey report should always be carried on board ship
Chapter 5: Noise exposure limits

◆ Seafarers should not be exposed to an “Lex,\text{24h}” exceeding 80dB(A)
  “Lex,24h” represents the equivalent noise exposure level for a period of 24 hrs.

◆ In spaces with sound pressure levels exceeding 85dB(A), suitable hearing protection such as ear muff required

At construction stage, the actual noise exposure level cannot be determined. Only estimation can be done. After delivery, compliance with the noise exposure limits attributes to actual operation.
Chapter 5: Noise exposure limits

<table>
<thead>
<tr>
<th>Noise level, dB(A)</th>
<th>Duration of exposure, hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>130</td>
<td>No exposure - Zone A</td>
</tr>
<tr>
<td>120</td>
<td>Occasional exposure - Zone B,</td>
</tr>
<tr>
<td>110</td>
<td>Daily exposure - Zone D</td>
</tr>
<tr>
<td>100</td>
<td>No protection required - Zone E</td>
</tr>
</tbody>
</table>

- \( L_{\text{ex}(24)} = 105 \text{ dB(A)} \) for occasional exposure - Zone C,
- \( L_{\text{ex}(24)} = 80 \text{ dB(A)} \) for occasional exposure - Zone C,
Chapter 6: Acoustic insulation between accommodation spaces

◆ Objective:
In order to make rest and recreation possible even if activities are going on in adjacent spaces
2. Draft revised Code and key issues (15)

Chapter 6: Acoustic insulation between accommodation spaces

Sound insulation index (Rw) according to ISO 717-1(1996) and ISO 10140-2(2010)

<table>
<thead>
<tr>
<th></th>
<th>Draft revision</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabin to cabin</td>
<td>Rw=35</td>
<td>Rw=30</td>
</tr>
<tr>
<td>Messrooms, recreation rooms, public spaces and entertainment areas to cabins and hospitals</td>
<td>Rw=45</td>
<td>Rw=45</td>
</tr>
<tr>
<td>Corridor to cabin</td>
<td>Rw=30</td>
<td>-</td>
</tr>
<tr>
<td>Cabin to cabin communicating door</td>
<td>Rw=30</td>
<td>-</td>
</tr>
</tbody>
</table>
Chapter 6: Acoustic insulation between accommodation spaces

◆ The requirement for apparent weighted sound insulation index \((R'w)\) in accordance with ISO 140-4 is also described in the draft revised Code

◆ \(|R'w - Rw|\) to be with tolerance of up to 3dB

◆ It has not been decided whether \(R'w\) should be mandatory or recommendatory

• • • It is not easy to apply ISO 140-4 to ship structure
Chapter 7: Hearing protection and warning information

◆ Hearing protectors needed if sound pressure level is above 85 dB(A)

◆ In that case, C-weighted peak sound level should also be measured in order to determine the suitable hearing protectors

◆ Instruction for seafarers...may be recommendatory
2. Draft revised Code and key issues (18)

Chapter 7: Hearing protection and warning information

◆ Selection of suitable hearing protectors should be in accordance with “HML Method” in ISO 4869-2:1994 (Details in appendix 2)
  ...The opinions were split whether it should be mandatory or recommendatory

◆ Warning notices for high level noise area (>85dB(A))
  ...Symbols to be developed ??
Appendix 1: Format for noise survey report

- Ship particulars, machinery particulars, measurement conditions, measured data, etc. should be recorded in the designated format and be kept on board.
Appendix 2: Guidance on inclusion of noise issues in Safety Management Systems (SMS)

◆ Instruction to /Responsibility of seafarers

◆ Responsibility of ship operators

◆ Selection of hearing protectors
  ...HML method based on ISO 4869-2

◆ This appendix may be recommendatory
Appendix 3: Suggested methods of attenuating noise

Informative appendix for ship design, including noise prediction at design stage
Appendix 4: Simplified procedure for determining noise exposure

- Based on ISO 9612, a simplified method of calculation of expected noise exposure level after delivery is provided.

- Obviously, actual noise exposure level fully depends on the actual operation.

- Whether this appendix to be mandatory or recommendatory not discussed yet.
List of relevant ISO/IEC standards (not exhaustive)-1

- ISO 2923:1996 Acoustics – Measurement of noise on board vessels


- ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories

- IEC 61672-1:2002 Electroacoustics – Sound level meters
2. Draft revised Code and key issues (24)

List of relevant ISO/IEC standards (not exhaustive)-2


3. Possible time schedule
3. Possible time schedule

- IMO/DE56 (Feb. 2012) is expected to finalize the work on revision of the Code

- In the earliest case, MSC 91 (Nov. 2012) may adopt the relevant resolution(s) and new rule would be entered into force from July 2014

- It depends on the discussion at DE and MSC
4. Conclusion
4. Conclusion

◆ IMCO Noise Code revision work is in the final stage

◆ There are other key issues than maximum noise level in the Code (ex. noise exposure, sound insulation...)

◆ The Code contains regulations relevant to not only shipbuilders but also operators/seafarers

◆ It is important for ASEF members to be familiar with relevant ISO/IEC, and follow the discussion at IMO
Thank you for your attention!

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