

Code on Noise Levels on Board Ships

- Key issues on revision of the Code -

Kunihiko KITABAYASHI



Japan Ship Technology Research Association

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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
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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.

2. Draft revised Code and key issues (3)

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.

2. Draft revised Code and key issues (5)

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



2. Draft revised Code and key issues (6)

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

Designation of rooms and spaces	Draft revised code		Current
	1,600-10,000GT	10,000GT -	
4.2.1 Work spaces			
Machinery spaces (continuously manned)	-	-	90
Machinery spaces (not continuously manned)	-	-	110
Machinery spaces	110	110	-
Machinery control rooms	75	75	75
Workshops	85	85	85
Non-specified work spaces (other work areas)	85	85	90

**10,000GT threshold was introduced
by Japan's proposal at DE54**



2. Draft revised Code and key issues (9)

Chapter 4: Maximum acceptable sound pressure levels

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

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

**Differentiated noise levels for acc. spaces
Introduced by Japan's proposal at DE 54**

2. Draft revised Code and key issues (10)

Chapter 4: Maximum acceptable sound pressure levels

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

Designation of rooms and spaces	Draft revised code		Current
	1,600-10,000GT	10,000GT -	
4.2.4 Service spaces			
Galleys, without food processing equipment operating	75	75	75
Serveries and pantries	75	75	75
4.2.5 Normally unoccupied spaces			
Spaces not specified	90	90	90

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

2. Draft revised Code and key issues (12)

Chapter 5: Noise exposure limits

- ◆ Seafarers should not be exposed to an “Lex,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 muffs required

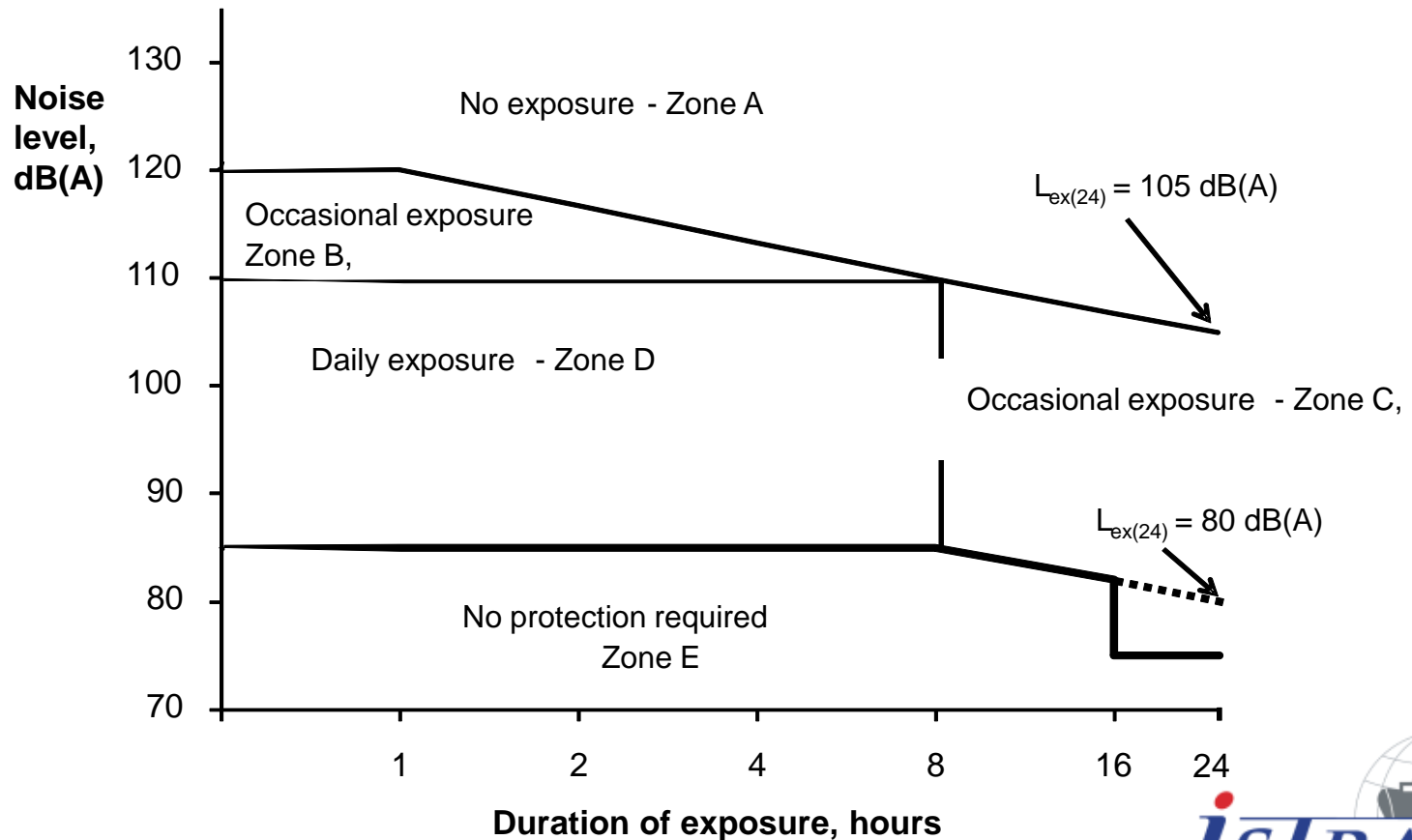


At construction stage, the actual noise exposure level cannot be determined. Only estimation can be done.

After delivery, compliance with the noise exposure limits attributes to actual operation.

2. Draft revised Code and key issues (13)

Chapter 5: Noise exposure limits

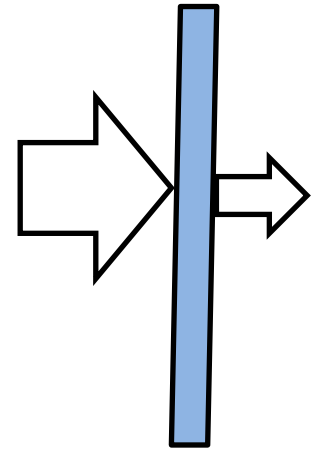


2. Draft revised Code and key issues (14)

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)

	Draft revision	Current
Cabin to cabin	Rw=35	Rw=30
Messrooms, recreation rooms, <u>public spaces and entertainment areas</u> to cabins and hospitals	Rw=45	Rw=45
Corridor to cabin	Rw=30	-
Cabin to cabin communicating door	Rw=30	-

2. Draft revised Code and key issues (16)

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
- ◆ $|R'w - R_w|$ 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

2. Draft revised Code and key issues (17)

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 ??

2. Draft revised Code and key issues (19)

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.

2. Draft revised Code and key issues (20)

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

2. Draft revised Code and key issues (21)

Appendix 3: Suggested methods of attenuating noise

- ◆ Informative appendix for ship design, including noise prediction at design stage

2. Draft revised Code and key issues (22)

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

2. Draft revised Code and key issues (23)

List of relevant ISO/IEC standards (not exhaustive)-1

- ✓ ISO 2923:1996 Acoustics – Measurement of noise on board vessels
- ✓ ISO 1999:1990 Acoustics – Determination of occupational noise exposure and estimation of noise-induced hearing impairment
- ✓ ISO 9612:2009 Acoustics – Determination of occupational noise exposure –Engineering method
- ✓ ISO/IEC 17025:2005 General requirements for the competence of testing an 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

- ✓ ISO 717-1:1996 Acoustics – Rating of sound insulation in buildings and of building elements – Part 1: Airborne sound insulation
- ✓ ISO 140-3:1995 Acoustics – Measurement of sound insulation in buildings and building elements – Part 3: Laboratory measurement of airborne sound insulation of building elements
- ✓ ISO 140-4:1998 Acoustics – Measurement of sound insulation in buildings and building elements – Part 4: Field measurements of airborne sound insulation between rooms
- ✓ ISO 10140-2:2010 Acoustics – Laboratory measurement of sound insulation of building elements – Part 2: Measurement of airborne sound insulation

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

ASEF

Asian Shipbuilding Experts' Forum
for International Maritime Technical Initiative



Thank you for your attention !

kitabayashi@jstra.jp



Japan Ship Technology Research Association