

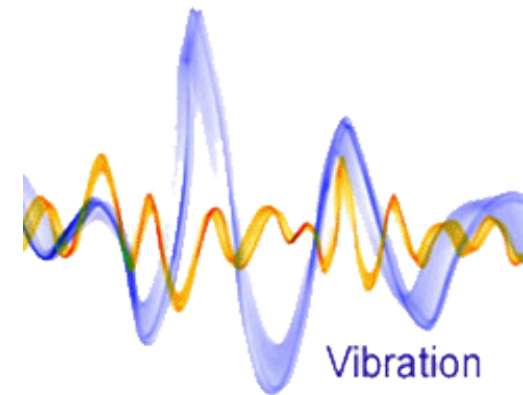


Annual report of *ASEF/TWG/SWG3* on ISO 20283-5 for “*Vibration on Ships*”

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Chairman of *ASEF/TWG/SWG3*

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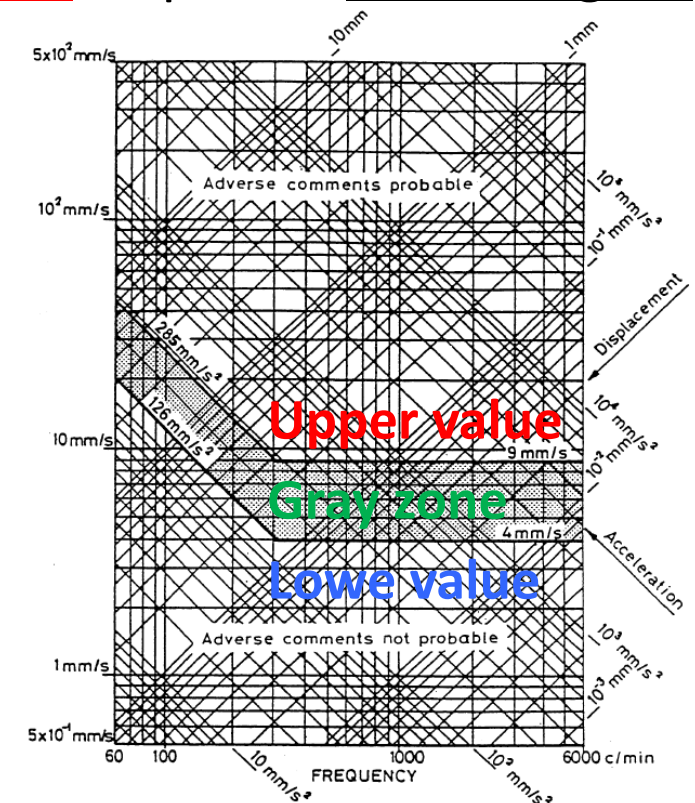


Summary

- **ISO/TC108/SC2** developed ISO/FDIS 20283-5 “*Guidelines for measurement, evaluation and reporting of vibration with regard to habitability on passenger and merchant ships*”.
- ISO/FDIS 20283-5 is under voting and most likely to be finalized and published in due course so as to replace current **ISO 6954:2000** for vibration on passenger and merchant ships.
- **Significant Trouble:** ISO/FDIS 20283-5 specifies **unified** set of **1** vibration limit, which is **easy** for Passenger ships but **probably impracticable** for **numbers of Merchant** ships (e.g., BCs, OTs and CSs).
- **Japan**, at the request of **SAJ** representing **ASEF**, made an **NP** to develop a “**Special ISO Standard for Vibration on **Specific** ships**” (ISO/NP 21984) under **ISO/TC8/SC8**, as a **supplement** to ISO 20283-5, with a view to minimizing undue trouble to the **maritime** Industry.
- Voting on the **NP** is underway, which is to be completed on 2 December 2016.

Background: Intl. Standards for Vibration on Ships

- ISO 6954:1984 “*Guidelines for the overall evaluation of vibration in merchant ships*” had been developed by *ISO/TC108/SC2/WG2* (Mechanical vibration & shock as applicable to machines, vehicles and structures).
- ISO 6954:1984 was developed for **normally occupied space** based on habitability, actual vibration measured on Merchant ships and technological level of design for protection against vibration.
- **2 (Upper and Lower) values** were defined like “**ALARP**” concept of *IMO*:
 - Above **9** mm/s (Adverse comments are **probable**)
 - Between **9** mm/s and **4** mm/s (Shipboard vibration environment **commonly experienced and accepted**)
 - Below **4** mm/s (Adverse comments are **not probable**)
- Applicable to each frequency component in each vertical, longitudinal or transverse direction



Background: Intl. Standards for Vibration on Ships

- ISO 6954:2000 “*Guidelines for measurement, reporting and evaluation of vibration with regard to habitability on passenger and merchant ships*” was developed by **ISO/TC108/SC2**, which is still **effective** to date.
- **2** (**Upper** and **Lower**) values are specified for **3** classification spaces following the style of **ISO 6954:1984**.
 - **Passenger** Cabins: “**4** mm/s – **2** mm/s”
 - **Crew** Accommodation Areas: “**6** mm/s – **3** mm/s”
 - **Working** Areas: “**8** mm/s – **4** mm/s”
- Mostly recognized by the **maritime Industry** as an **established** Intl. Standard
- No substantial complaint made by **Owners** and **Crew** of **Merchant** ships
- Applicable to each overall (combined) frequency-weighted **r.m.s.** value in each vertical, longitudinal or transverse direction

Background: Intl. Standards for Vibration on Ships

- IACS Rec. No. 132 “*Human Element Recommendations for structural design of lighting, ventilation, **vibration**, noise, access & egress arrangements*” was developed by **IACS** in December 2013.
- Based on **ISO 6954:2000**, a set of **1 limit** for onboard vibration was specified for **2** classification spaces to mainly aim at conforming to one of the functional requirements of **SOLAS/GBS** of **IMO** for **BCs** & **OTs**.
- With the entry-into-force of **SOLAS/GBS** on 1 July 2016, the set of **1 limit** is deemed mandatory requirements which should not be exceeded.
 - Accommodation Areas: “**5** mm/s”
 - ✓ Above **Upper** value for “**Passenger Cabins**” specified by **ISO 6954:2000**; but
 - ✓ Below **Upper** value for “**Crew Accommodation Areas**”
 - Workspaces: “**6** mm/s”
 - ✓ **Middle** value for “**Working Areas**” specified by **ISO 6954:2000**
- **IACS** states that whole body exposure to the vibration below the set of **1 limit** is generally considered to be **comfortable**.



Background: Intl. Standards for Vibration on Ships

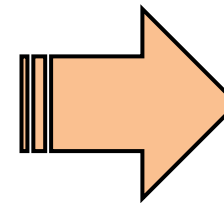
- ISO/FDIS 20283-5 “*Guidelines for measurement, evaluation and reporting of vibration with regard to habitability on passenger and merchant ships*” was developed by **ISO/TC108/SC2** and voting is underway, which is to be completed on 18 Nov. 2016.
- **ISO 20283-5** is most likely to be finalized and published in due course so as to replace current **ISO 6954:2000**.
- **Significant trouble:** ISO/FDIS 20283-5 specifies **unified** set of **1 limit** for **all** ships and for both **Passengers & Crew**, despite the “**Guideline**” status and “**ALARP**” concept of **IMO**, **without** due consideration to technical obstacles to design for protection against vibration on numbers of **Merchant** ships.
- As the result of mixing **Crew on Merchant ships** with Passengers on Passenger ships, **unified** set of **1 limit** specified for **all** ships is **easy** to achieve for Passenger ships, whereas is **probably hard** to achieve for other ships such as numbers of **Merchant** ships.



ISO/FDIS 20283-5: Impracticability

■ ISO/FDIS 20283-5

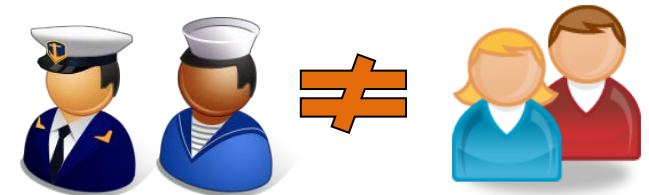
- **Passenger** Cabins, **Passenger** Public Spaces and **Crew** Accommodation:
“3.5 mm/s”
- Open-deck **Passenger** Recreation Spaces and Open-deck **Crew** Recreation Spaces:
“4.5 mm/s”
- Offices:
“4.5 mm/s”
- Navigation Bridge and Engine Control Room:
“5.0 mm/s”
- Other **Work** Spaces:
“6.0 mm/s”



Below the set of
1 limit specified by
IACS Rec. No. 132

■ No distinction between **Passengers** and **Crew** ?

- ISO 6954:2000 has distinguished **Passengers** from **Crew**.
- SOLAS of **IMO** has distinguished **Passengers** from **Crew**.
(Categorization of **Industrial Personnel** is under debate)
- **Class** voluntary rules for vibration (e.g., by **BV**) distinguish **Passengers** from **Crew**.



ISO/FDIS 20283-5: Impracticability

■ Unified vibration limits for **all** ships ?

- Practicability depends on **type** of ships !



- ✓ Owners of **Passenger** ships do invest in **preventive measures against Vibration & Noise** for “**Passengers (customers)**” because of “**Business**”.
- ✓ Owners of **Merchant** ships give priority to minimization of **initial cost** and **F.O.C.** in operation (better **EEDI**) because of harsh shipping competition and **MARPOL** of **IMO** for reduced gas emission.

- **Passenger** ships including cruise ships:

- ✓ Only vertical vibration due to flat, long and wide superstructure
- ✓ **Less** excitation forces because of (e.g.) elastic mounting of **Medium-speed Diesel Engine (& Generator sets)** for **Vibration & Noise isolation**
- ✓ **Easier** avoidance of resonance because of **CPPs**

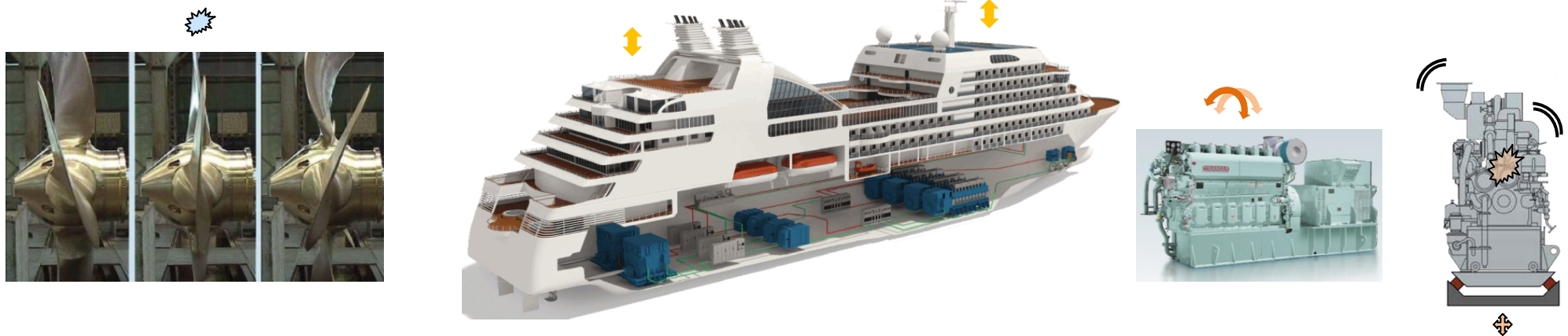
Less obstacles

- Numbers of **Merchant** ships:

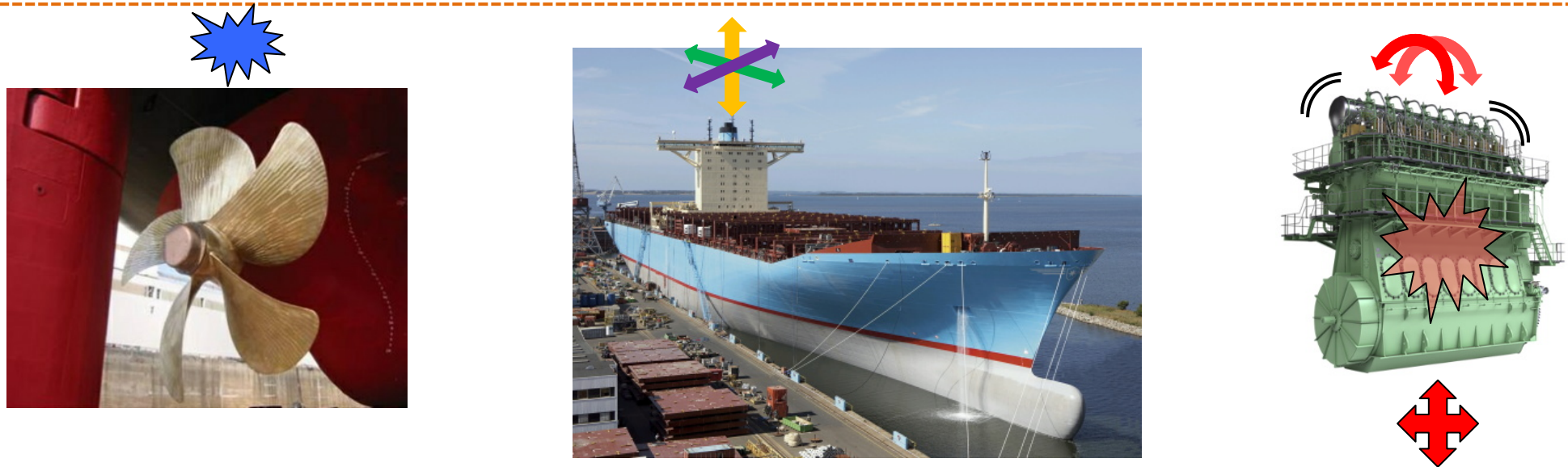
- ✓ Vertical, longitudinal and/or transverse vibrations due to slender deck house
- ✓ **Larger** excitation forces because of direct installation of **Low-speed Diesel Engine**
- ✓ **Harder** avoidance of resonance because of a **FPP** directly coupled to **Diesel Engine**

More obstacles

ISO/FDIS 20283-5: Impracticability



Small changes in Displacement & Mass distribution result in limited changes in Natural Frequencies & Modes

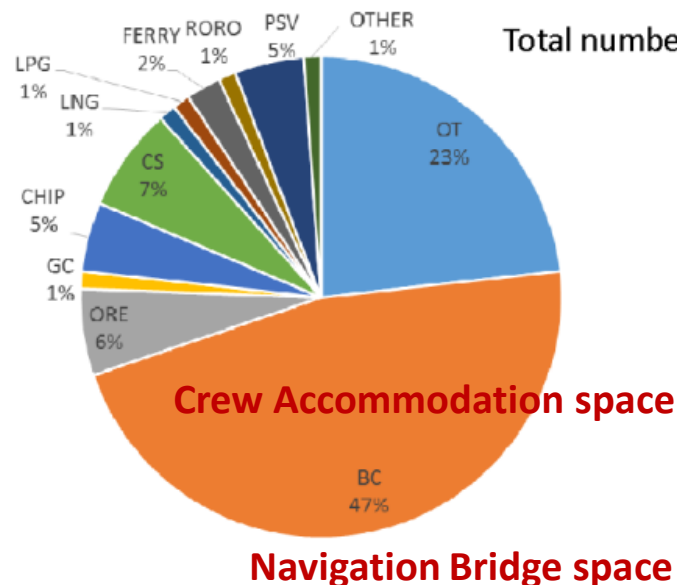


Big changes in Displacement & Mass distribution result in various changes in Natural Frequencies & Modes

ISO/FDIS 20283-5: Impracticability

■ Dismissal of appeals

- Unified set of **1 limit** specified in **ISO/CD 20283-5** was designated by majority (**2** out of only 3 countries) who attended **TC108/SC2/WG2** meeting in Nov. 2014.
- At the last **TC108/SC2/WG2** meeting in July 2015, **Japan** and **Korea** made presentations of actual vibration levels measured mainly on **various Merchant** ships.
- **Japan** and **Korea** appealed for **re**consideration of **unified** set of **1 limit**, in particular for **2 spaces** on **Merchant** ships, since probability of exceedance of vibration should drastically increase as compared with **upper** values specified in current **ISO 6954:2000**.



Presented by Japan

Measurement location	Sample Number of ship	ISO/CD 20283-5		ISO6954:2000	
		Limit value	Probability of exceedance	Limit value	Probability of exceedance
CA	80	3.5	28.8%	6.0	4.2%
WS	43	6.0	4.7%	8.0	3.6%
OFFICE	44	4.5	3.2%	6.0	0.0%
NB	83	5.0	18.1%	8.0	4.5%
ECR	36	5.0	6.1%	8.0	0.0%

* Values above which adverse comments are probable

ISO/FDIS 20283-5: Impracticability

■ Dismissal of appeals

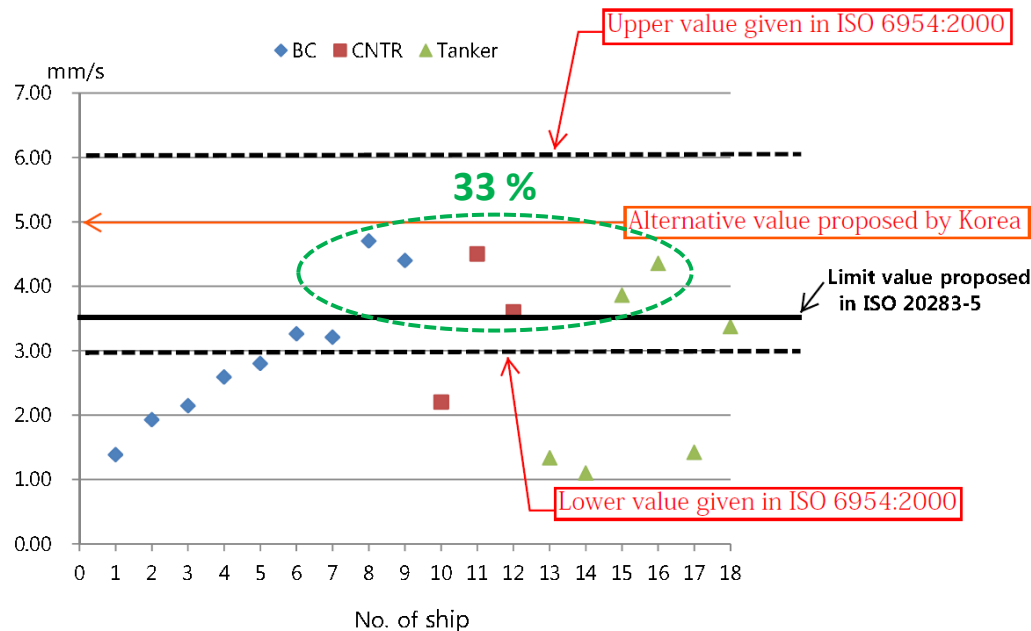


Fig. 1 The maximum vibration levels at crew accommodations of recent successfully delivered 18 ships (BC : 9, CNTR : 3, Tanker : 6)
- The data were given from three Korean shipbuilding companies

Crew Accommodation space

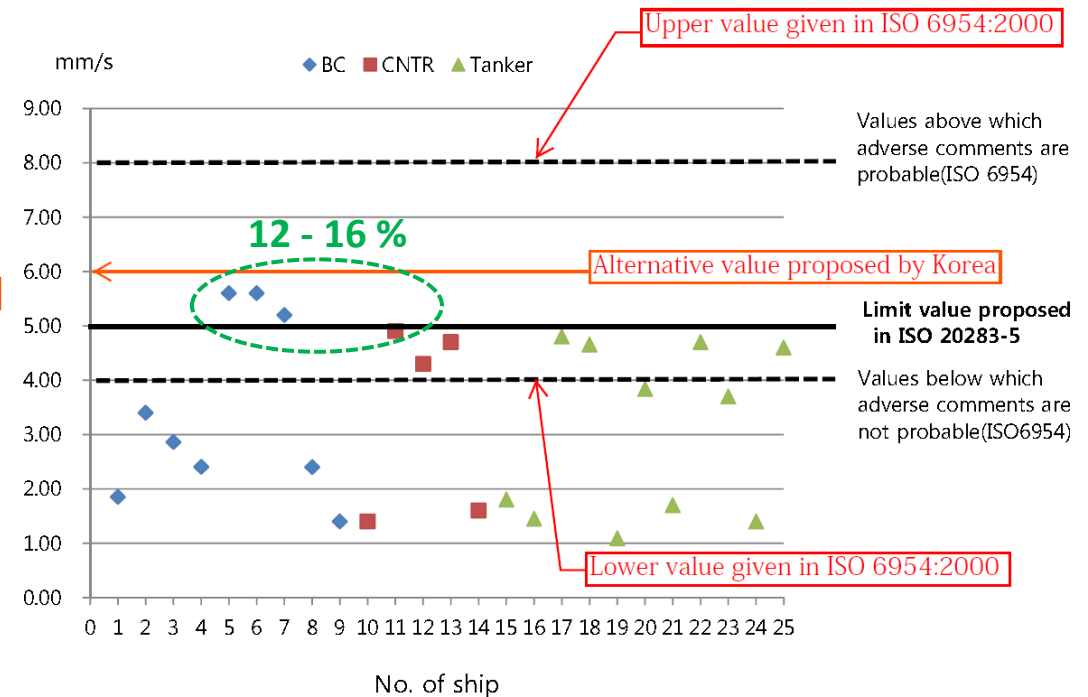


Fig. 2 The maximum vibration levels at navigation bridge of recent successfully delivered 25 ships (BC : 9, CNTR : 5, Tanker : 11)
- The data were given from three Korean shipbuilding companies.

Navigation Bridge space

All ships have been delivered to the Shipowners *successfully without complaint* against the vibration.

ISO/FDIS 20283-5: Impracticability

■ Dismissal of appeals

- At **TC108/SC2/WG2** meeting in July 2015, **France (BV)** made counter presentation.
- **Most** of the measured vibration on board ships were around **0.4 mm/s** on the average.
- “Average” – “**1***SD” = **0.0 mm/s** to **0.1 mm/s**
- “Average” + “**1***SD” = **0.7 mm/s** to **0.9 mm/s**
- “Average” + “**2***SD” = **1.0 mm/s** to **1.2 mm/s**
- It is to be noted that the data presented were dominated by measurements on board Passenger ships built from 2012 to 2015, which were issued with “**Comfort Class**” by **BV**: Additional/Voluntary Notation for “happier **Passengers** and more efficient **Crew**”

Incredibly low ?

Locations	BV Rules 2014 grade 3	ISO 20283-5	Actual measurements	
	mm/s	mm/s	average	standard deviation
Wheelhouse / radio rooms	3.2	5	0.4	0.3
Cabins	3.2	3.5	0.4	0.4
Offices	4	4.5	0.4	0.4
Public spaces, mess rooms	4	3.5	0.5	0.4
Hospital	3.2	3.5	0.4	0.3
ECR	6	5	0.7	0.6
Open recreation areas	-	4.5	1.1	0.4
Galleys	6	6	0.5	0.4
Workspaces	6	6	0.6	0.63
Staircase and corridor	6	-	0.36	0.4

ISO/FDIS 20283-5: Impracticability

■ Dismissal of appeals

- When the appeals made by **Japan** and **Korea** were dismissed illogically based on the simple balance between **Japan & Korea** and **France**, Convener of **ISO/TC108/SC2/WG2** from **DNV GL** stated “*The guideline values given in ISO 20283-5 aim at the protection of the people on board. However, the final binding values are contractually to be agreed on between the shipbuilder and shipowner.*”
- The fact is that current **ISO 6954:2000** has usually been referred to in building specifications as an **established IS**, and likely trouble is that most of the stakeholders consider “so is **ISO 20283-5**” although which specifies inflexible & impracticable set of **1 limit** for numbers of **Merchant** ships.
- **ISO/DIS 20283-5** was already approved and **ISO/FDIS 20283-5** is under voting despite the joint comments made by **China, Korea, Japan** and **Sri Lanka** (based on the information provided by relevant **ASEF** members).



ISO/NP 21984 under Voting at ISO/TC8/SC8

■ Scope & Schedule of ISO/NP 21984

- Under the circumstances, there was no choice but to make an **NP** to **ISO/TC8/SC8 (Ship design)** to develop a “**Special ISO Standard (ISO 21984) for vibration on Specific ships**” with a view to minimizing confusion and undue trouble to the **maritime** Industry.
- The **NP** had been presented by **Japan** preliminarily at **ISO/TC8/SC8** meeting held on 7 July 2016 in Shanghai, and **ISO/TC8/SC8** agreed to initiate the **NP** (Res. 31/2016).
- **Japan**, at the request of **SAJ** representing **ASEF**, already made the official **NP** to **ISO/TC8/SC8** with **initial** draft **ISO 21984**, on which voting is underway and to be completed on 2 December 2016.
- The **NP** was presented by **Japan** at **ISO/TC8** meeting held on 28 Sept. 2016 in Beijing, too.



ISO

Form 4: New Work Item Proposal

Circulation date: 2016-09-08	Reference number: ISO/NP 21984 (to be given by Central Secretariat)
Closing date for voting: 2016-12-02	ISO/TC 8/SC 8 N 344
Proposer (e.g. ISO member body or A liaison organization) ISO/TC 8/SC 8	
Secretariat KATS	

A proposal for a new work item within the scope of an existing committee shall be submitted to the secretariat of that committee with a copy to the Central Secretariat and, in the case of a subcommittee, a copy to the secretariat of the parent technical committee. Proposals not within the scope of an existing committee shall be submitted to the secretariat of the ISO Technical Management Board.

The proposer of a new work item may be a member body of ISO, the secretariat itself, another technical committee or subcommittee, an organization in liaison, the Technical Management Board or one of the advisory groups, or the Secretary-General.

The proposal will be circulated to the P-members of the technical committee or subcommittee for voting, and to the Q-members for information.

☐ The proposer has considered the guidance given in the Annex C during the preparation of the NWIP.

Proposal (to be completed by the proposer)

ISO/NP 21984 under Voting at ISO/TC8/SC8

■ Scope & Schedule of ISO/NP 21984

- ISO 20283-5 is generally applicable to **all** ships including **Merchant** ships.
- The **Special ISO 21984** may also be applicable to **Specific** ships where **2-cycle, long-stroke, low-speed Diesel engine directly coupled to the fixed-pitch propulsion propeller** is installed, and/or **Specific** ships with **high deck house** of around 1.0 in slenderness ratio of “Height” to “Length” and above (e.g., numbers of **Merchant** ships).
- The **Special ISO 21984** is neither complementary nor additional but supplementary to ISO 20283-5.
- Major modifications may be limited to **Vibration Limits** for **2** spaces.
 - ✓ **Crew Accommodation:** “3.5 mm/s ➔ 5.0 mm/s”
 - ✓ **Wheel House excluding Bridge Wings:** “5.0 mm/s ➔ 6.0 mm/s”
- Proposed **Limits** are consistent with both **IACS Rec. No. 132** and **what** proposed by **China, Korea, Japan** and **Sri Lanka**, which are also supported by **all** members of **ASEF** who build over 90 % of **Merchant** ships.
- Unlike **ISO/FDIS 20283-5** but like **ISO 6954:2000**, no allowance for excess of **Vibration Limits** is granted to any location within the same type of occupied space on a deck.

ISO/NP 21984 under Voting at ISO/TC8/SC8

■ Possible mediation undertaken by ISO Central Secretariat

- Technical Program Managers of **ISO/TC108** and **ISO/TC8** have been studying the gaps between **ISO 20283-5** and **ISO 21984**, and solution of potential conflict.
- When the gaps are found limited and require no discussion,
 - ✓ Stop vote on **ISO/FDIS 20283-5**, incorporate amendments and revote
- When the gaps are found limited and require discussion,
 - ✓ Complete vote on **ISO/FDIS 20283-5**, publish **ISO 20283-5** and discuss amendments
- When the gaps are found substantial,
 - ✓ Bring up for decision of **ISO Technical Management Board (ISO/TMB)**
 - ✓ **ISO/TMB** deals with matters of monitoring of Technical Committee activities.
 - ✓ **ISO** member bodies in **China, Japan, Korea** and **Malaysia** are **ISO/TMB** members (15 in total).



Activities of ASEF/TWG/SWG3

- **TWG/SWG3** had been organized with the establishment of **ASEF** on 26 Nov. 2015 to tackle **ISO/DIS 20283-5**, which was put to vote from 4 Jan. 2016 to 4 Apr. 2016.
- **11 Experts** have been registered with **TWG/SWG3** by **4 ASEF** members.
- Joint actions have been requested of not only **TWG/SWG3** members but also other **ASEF** members.
 - **7 ASEF** members are from the countries of which **ISO** member bodies are P-members of **ISO/TC8/SC8** (14 in total).
 - **6 ASEF** members are from the countries of which **ISO** member bodies are P-members of **ISO/TC108/SC2** (25 in total).
 - ✓ P-members can cast vote on **NP** and **CD** in addition to **DIS** and **FDIS**
- **TWG/SWG3** Chairman has been communicating with **ISO/TC8** Chairman (Director of **SICC**) and **ISO/TC8/SC8** Chairman (former Vice President of **KR**) & Secretary (the 2nd Secretary General of **ASEF** from **KOSHIPA**).
- **TWG/SWG3** continues to be active until **ISO 21984** is finalized and published.

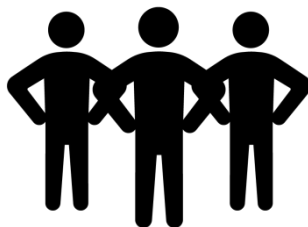
Request for Understanding and Support

■ Understanding

- Any **ISO Standard** should not be merely ideal.
- Any **ISO Standard** should be technically reasonable, practicably achievable and widely implementable.
- Well-balanced approach is essential since there are various aspects of potential improvements for **Crew**, as specified by **ILO MLC 2006**, etc.
 - ✓ Vibration is one element of onboard habitability, which is one aspect of the potential improvements for **Crew**.
 - ✓ Priority and practicability need to be considered.

■ Support

- The 10th **ASEF Forum** participants are invited to share the information provided, and support the **ISO/NP 21984** under voting, which was proposed by **Japan** to **ISO/TC8/SC8** at the request of **SAJ** representing **ASEF**.





Thank you for your attention.

ASEF/TWG/SWG3

