



中国船舶工业行业协会

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What effect would IACS Harmonized CSR have from the viewpoint of the shipbuilding industry?

Wu Jiameng

China Association of the National Shipbuilding Industry
(CANSI)



- Background of CSR-H
- Effect expectation
- Conclusions



Background of CSR-H

- Basic Principles For CSR Harmonization
- Current Status of CSR-H
- CANSI's suggestion in Tripartite 2011



Basic Principles For CSR Harmonization

IACS

INTERNATIONAL ASSOCIATION
OF CLASSIFICATION SOCIETIES

**BASIC PRINCIPLES FOR CSR MAINTENANCE AND
HARMONIZATION**

- Main principles:
 - Harmonization will be based on a consistent methodology at the adoption of the original CSR
 - In compliance with the IMO GBS where GBS Functional Requirement fall within the scope of the CSR-H
 - The level of the harmonized Rule criteria will be equivalent to or higher than the current CSR criteria



Views on Principles (1)

Based on the Principles, it could be found that:

- If rule requirement could be harmonized, the more conservative item will normally be chosen in CSR-H unless it can be proved to be too conservative. In that case, the level of structural safety for CSR-H is not less than CSR-OT or CSR-BC. At the same time, such rule requirement in CSR-H should in compliance with IMO GBS.

- Rule Min. thickness

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Views on Principles (2)

- If rule requirement in corresponding CSR-OT and CSR-BC could not be harmonized, new requirement based on a consistent methodology and approach will be re-developed. At the same time, such new rule requirement in CSR-H should in compliance with IMO GBS.
 - CSR-H loads
 - CSR-H Screening fatigue Assessment
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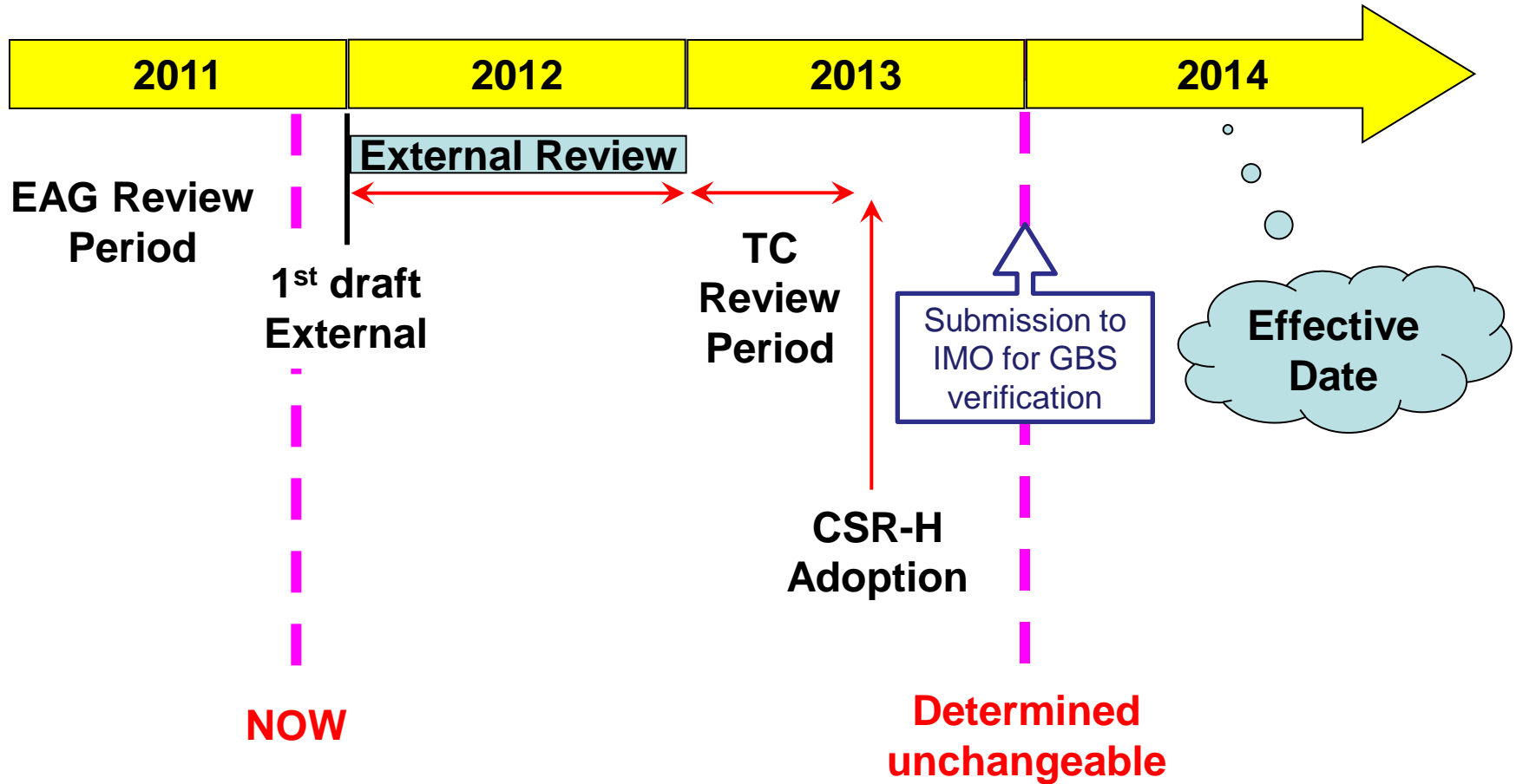


Views on Principles (3)

- For some requirements not been covered by CSR-OT and CSR-BC but in compliance with IMO GBS, new requirement should be developed and added in CSR-H.
 - Residual strength
 - Structural Redundancy
 - Vibration impact on fatigue
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Harmonised CSR Time Schedule





Current Status of CSR-H (1)

- Information From IACS in the Tripartite 2011:
 - The CSR Harmonization Project has completed an internal draft text of the harmonized rules.
 - Software is being developed in parallel to the rule development, therefore the Consequence Assessment (CA) based on the latest draft version has not been completed yet so further CA is still required.



Current Status of CSR-H (2)

- But, from EAG-4 meeting, it was found that:
 - Some rule contents are not finalized
 - Some need additional investigation and studies
 - Only preliminary results from consequence assessment
 - Less instant supporting software or technical backgrounds



CANSI's suggestion in Tripartite 2011

- 1st draft CSR-H should be released at a right time when the industry can get more complete and qualified Rule text, sufficient results of consequence assessment reviewed by EAG and more transparent technical background.
- Supporting software is to be released as soon as possibly, if the whole package cannot be supplied in time, spreadsheets may also be helpful.
- IACS should give more time for industry for better external review.



Effect expectation of CSR-H

- Adequate coverage for CSR-H?
- CSR-H software in the future
- Estimated impact on newly build tankers and Bulk carriers



Adequate coverage for CSR-H? (1)

- GBS functional requirement:
 - Human element and ergonomic considerations including access, noise and vibration
 - Vibration consideration to prevent damage of structure, equipment or machinery
- Other parts of the existing class rules:
 - ice class requirement
 - tug pushing area reinforcement
 - rudder horn requirement

Adequate coverage for CSR-H? (2)

- Experience or studies from industry
 - Simplified fatigue analysis for upper deck region details, e.g. deck opening, outfitting brackets or pads,

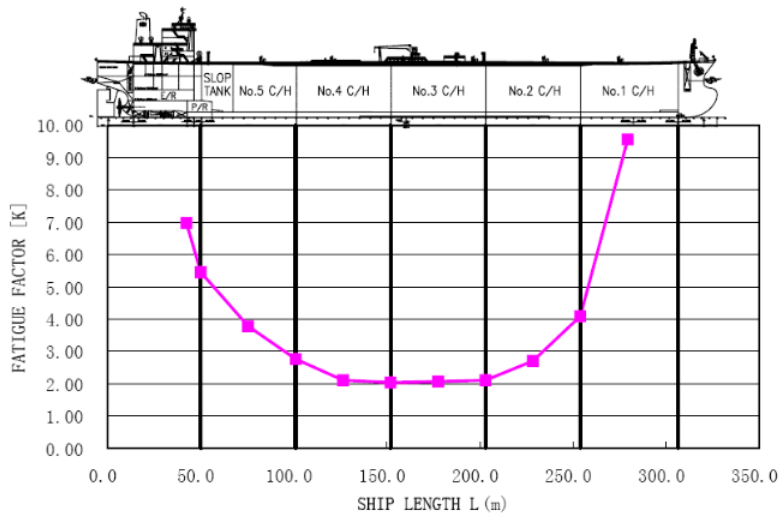


Fig.1 Typical diagram of fatigue factor [K] for deck region in C.L. section

Source: TSCF 2010

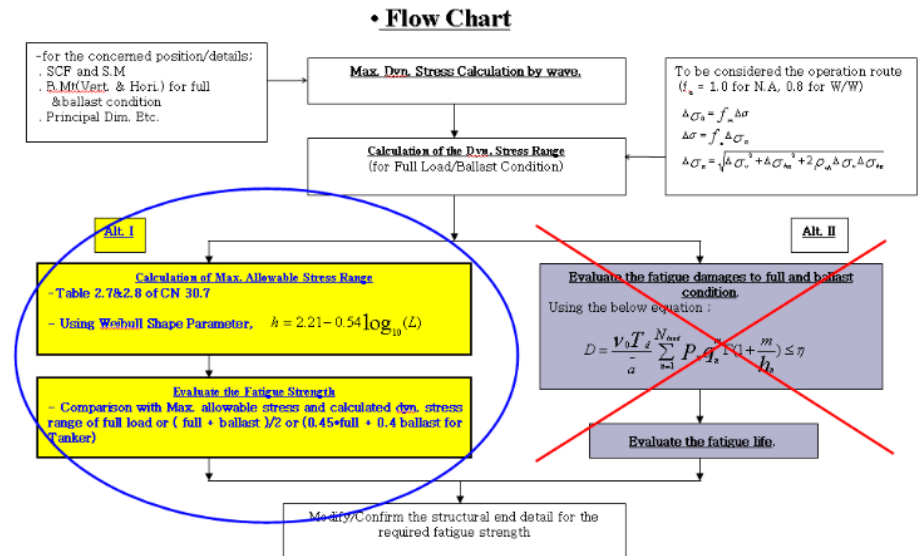


Figure 1 Flow Chart for the Simplified Fatigue Strength Evaluation

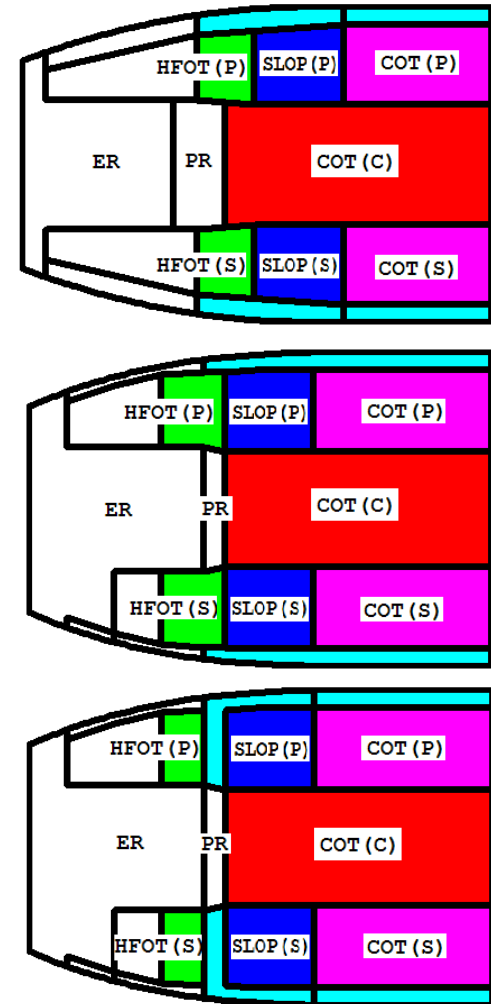


Views on the FE analysis (1)

- Is it necessary to do the FE analysis for the foremost cargo hold?
 - Local scantling determined by large local pressure
 - Bottom structures determined by slamming
 - Shell structures determined by bow impact
 - Deck structures determined by green sea load
 - Review by consequence assessment

Views on the FE analysis (2)

- For aftermost cargo hold, different design concept determine the different arrangement.
 - It's difficult to unify the standard loading conditions.
 - Besides the standard loading conditions, it is suggested to provide the guideline on how to choose the critical loading condition.





CSR-H software in the future

- More Friendly Interface:
 - Exchange of calculation models
- Ease of use:
 - Reduce time spent on verification
 - Fast modeling on fore/aft cargo region and foremost/aft most cargo hold
 - Fast fine mesh modeling with 50X50 or very fine mesh modeling with tXt or 10X10



CSR-H Impact expectation (1)

- May enhance the level of structural safety
 - Based on Harmonization Principles

Scantlings will be used as a proxy for level of structural safety. Therefore, CSR-H **may increase steel weight.**



CSR-H Impact expectation (2)

- Promote the development of optimized design
 - Steel weight increase will influence EEDI
 - Optimized design:
 - ✓ Lines and loading condition
 - ✓ Structural Arrangement, incl. cargo division, hopper knuckle, spacing,
 - ✓ Scantling optimization, especially in Fore/Aft cargo hold, using FE method required by CSR-H
 - ✓ Detail optimization, especially for anti-fatigue
 - ✓ Higher tensile steel of HT32 or HT36 used more
 - ✓ Workmanship, e.g. post welding



CSR-H Impact expectation (3)

- Increase design threshold and design costs
 - Due to lots of optimization
 - Due to better understanding of complicated CSR-H rule text and technical background
 - Due to lots of direct analysis, not only for mid cargo area, but for Fore/Aft cargo area and Foremost/Aft most cargo hold
 - Design period may be double at least due to FE analysis



Conclusions

- For CSR-H Schedule:

- 1st external draft CSR-H be released at a right time
- Supporting software be released as soon as possibly
- More time for industry for better external

- For CSR-H coverage:

- GBS functional requirements
- Common requirements of existing Rules
- Experience or studies from industry

- For CSR-H effect expectation:

- May enhance the level of structural safety
- Promote the development of optimized design
- Increase design threshold and design costs

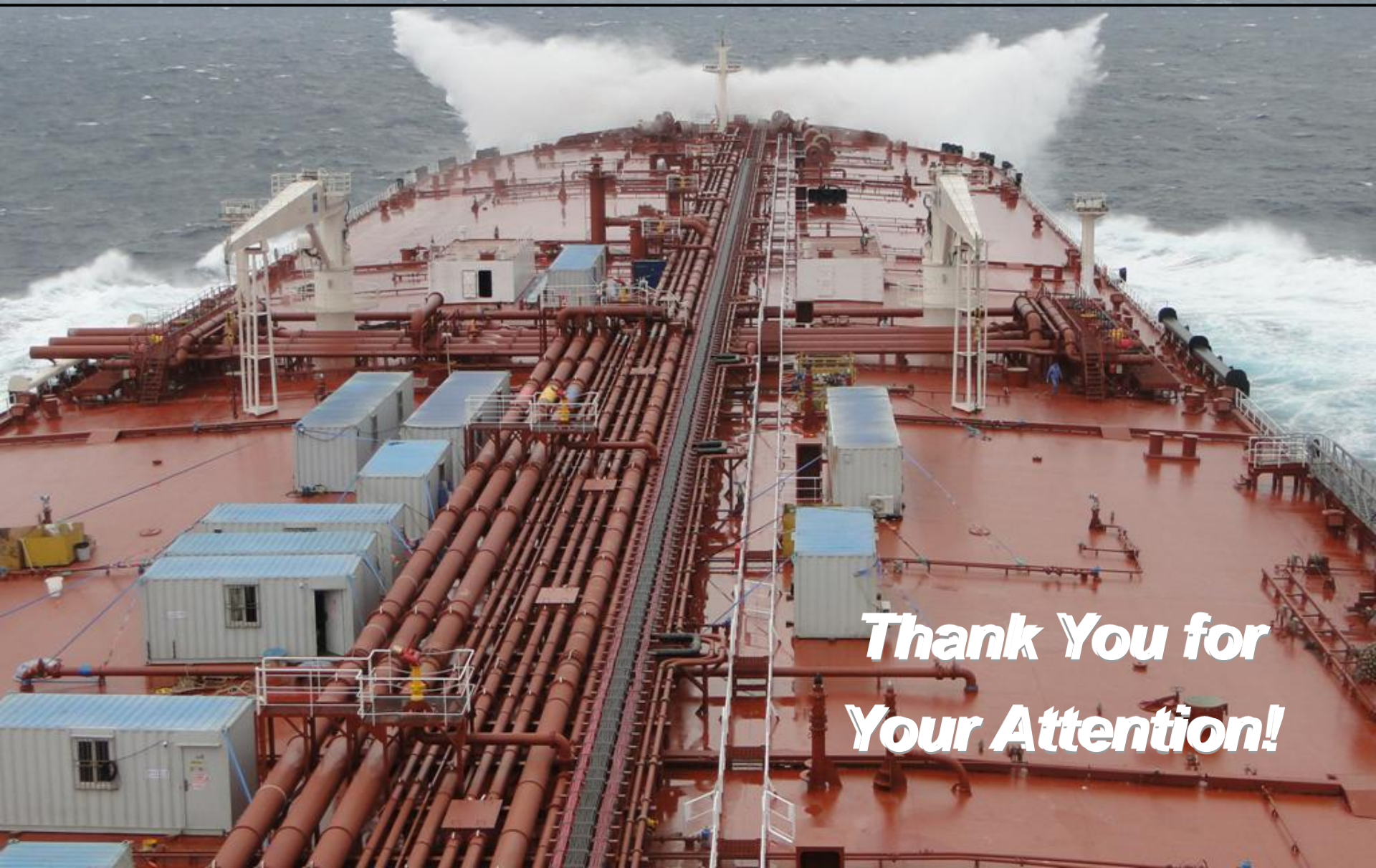


Conclusions

- We hope the Asian shipbuilders would promote more international cooperation to get the better understanding and use with harmonized Rules.
- Asian shipbuilders would give more contribution to external review for better CSR-H.



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***Thank You for
Your Attention!***