GOAL-BASED NEW SHIP CONSTRUCTION STANDARDS

Corrective Action Plans submitted by IACS and its member recognized organizations
(Part 1, in response to the non-conformities identified during GBS verification audit)

Note by the Secretariat

SUMMARY

Executive summary: This document provides the Corrective Action Plans on the six non-conformities raised by the GBS audit teams

Strategic direction: 10
High-level action: 10.0.1
Output: 10.0.1.1
Action to be taken: Paragraph 4
Related documents: MSC 96/5, MSC 96/5/1/Add.1 and MSC 96/5/1/Add.2

Background

1 In accordance with the Guidelines for verification of conformity with goal-based ship construction standards for bulk carriers and oil tankers (resolution MSC.296(87)) (GBS Guidelines), the Secretariat has submitted the GBS verification audit reports provided by the five audit teams, which contain two common reports on the IACS Common Packages (CPs), and the 12 individual reports of IACS member recognized organizations (RO) (MSC 96/5).

Corrective Action Plans submitted by IACS and its member recognized organizations

2 In response to the GBS verification audit reports on IACS CPs 1 and 2 (MSC 96/5, annexes 13 and 14), IACS submitted Corrective Action Plans on five non-conformities and 29 observations. Furthermore, all 12 IACS member ROs submitted Corrective Action Plans in response to their individual GBS verification audit reports (MSC 96/5, annexes 1 to 12).

3 This document provides the Corrective Action Plans on five non-conformities which were submitted by IACS (annexes 1 to 5); and the Corrective Action Plan on one non-conformity which was submitted by Lloyd's Register (annex 6).
**Action requested of the Committee**

4 The Committee is invited to consider the proposed Corrective Action Plans set out in the annexes 1 to 6, in conjunction with the GBS verification audit reports submitted by the audit teams (MSC 96/5, annexes 1 to 14), and take action as appropriate.

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ANNEX 1
CORRECTIVE ACTION PLAN ON IACS/2015/FR1-8/NC/01

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GBS AUDIT FINDINGS (EXTRACT FROM AUDIT REPORT):

Statement of facts

TB Report 03 Pt 1, Ch 4, Sec 2, summarizes: "the technical background of developing the equivalent design wave (EDW) method for extreme design loads using for yielding, buckling and ultimate strength assessments of structural members of bulk carriers and double hull oil tankers in the CSR-H."

"In developing the design loads, the following conditions have been considered as a basis of the CSR-H.

1. A representation of the North Atlantic wave environment. The North Atlantic scatter diagram is given in IACS Rec 34.
2. Pierson-Moskowitz wave spectrum.
3. Angular spreading of the wave energy given by the function \( \cos^2 \).
4. Equal heading probability.
5. 30 degrees step of ship/wave heading.
6. Design life of 25 years (corresponding to the probability level \( Q = 10^{-8} \)).
7. Ship speed equal to 5 knots."

Non-compliance

While the speed 5 knots has been adapted to heavy weather conditions, the heading distribution has obviously not, where head sea can be expected to be dominant. This has also been confirmed in IACS' first reply to the team and is just described as "a simplification that has been used for mobile floating units including merchants ships for many years". No consequence or sensitivity analysis on this effect was provided in the original submitted self-assessment and it was clear that this simplification did not fulfill the GBS audit standard criteria 2.3.4.

In reply to the team's interim report, IACS has submitted a new additional study on the effect of different probability distributions of wave headings on the long-term values of vertical wave bending moment and vertical accelerations. The results are summarized: "The non-uniform probability distribution of incident-wave directions in relation to the ship course, produces slightly higher long-term values (up to 5%) for VBM. For vertical acceleration at bow, the non-uniform heading distribution tends to increase the loads (up to 3%) for smaller ship (\( L < 200 \, \text{m} \)) and to decrease the loads (down to – 10%) for longer ships (\( L > 200 \, \text{m} \))."
Although this additional study is very limited, it clearly confirms the need for assessing important assumptions and including their effect either direct in the analysis or as uncertainties when setting relevant safety margins. Thus evidence was found showing that heading distribution adopted for the assessment of ship motions and loads is not based on the headings expected and, in addition, is non-conservative.

IACS INVESTIGATION AND ACTION PLAN:

In response to this finding, IACS has examined the effect of different probability distributions of wave headings on the long-term values of vertical wave bending moment and vertical accelerations.

In the study of 22 Bulk Carriers and 16 Oil Tankers, seven different distributions have been used: uniform distribution (used to develop the Rules design formulae), two non-uniform distributions and four distributions with different strategies of avoiding the beam or quartering sea in heavy weather. Based on these results, it was concluded that:

1) The non-uniform probability distribution and those based on four strategies of ship headings in relation to wave propagations produce slightly higher long-term values depending on the ship length. In the most conservative scenario investigated, the VWBM increase was about 5% at worst. For vertical acceleration at bow, the scatter is up to 3% for smaller ships (L < 200 m) and decreases to –10% for longer ships (L > 200 m).

2) Mean value of the increase of VWBM when non-uniform distributions are used is about 2% and for vertical acceleration at bow is equal to 1%.

3) It is challenging to define a distribution for beam or quartering sea avoidance in heavy weather, as it depends on many parameters and on the decisions of the ship’s Master that cannot be modelled. Further there should be a limit associated with sound operational decisions in heavy weather scenarios.

4) The results of computations of the long-term values of VWBM at midship cross section and vertical accelerations at the bow show that different assumptions made for modelling the non-uniform heading distributions lead to slightly different results.

To clarify the problem thoroughly, a more comprehensive sensitivity analysis taking into account, among others, non-uniform ship heading distributions, will be carried out.

IACS will investigate/survey the method determining the long-term wave-induced loads, used to develop the design formulae of CSR, in terms of:

- determination of a basis for assumptions;
- description of the uncertainties associated with the assumptions, and
- sensitivity analysis.

The aim of the sensitivity analysis is to examine, among others, how the non-uniform ship heading distribution affects the final results of the method determining the long-term ship responses to waves.
Outline

A sensitivity analysis will be carried out. Depending on the results of the sensitivity analysis, appropriate corrective actions will be undertaken. There are two possibilities.

If the final results of the method used to develop the Rules design formulae are:

- conservative, then, despite the fact that one element of the method – the uniform ship heading distribution, produces itself slightly optimistic results, the corrective action will be a report of the study documented in a Technical Background (TB) document;

- optimistic, then the design formulae determining the required ship motions and loads in CSR will be calibrated according to the results of sensitivity analysis and the consequence assessment of the updated Rules will be carried out.

Corrective Action

The corrective actions will result in either:

1) Demonstration that the method determining the long-term ship responses to waves, used to develop the CSR design formulae for ship motions and loads, produces conservative results despite the fact that the uniform distribution of ship headings is used in this method; or

2) Changing the Rules in the scope of requirements for the ship motions and loads and performing consequence assessment on the Rule Scantlings.

DETAILED PLAN:

Scope

The work items for further investigation of the effect of the heading distribution on the assessment of ship motions and loads are as follows:

1) Description of the state of the art of the method used to determine the long-term ship responses to waves, including determination of a basis for assumptions.

2) Description of the uncertainties associated with the assumptions on the heading distribution.

3) Preparatory works for sensitivity analysis.

4) Sensitivity analysis of how the heading uncertainties affect the long-term ship responses to waves.

5) Sensitivity analysis regarding the other assumptions relevant to the loads.

6) Based on 4 and 5, finding a possible safety margin associated with the investigated assumptions.

7) Modification of the design formulae and preparing a proposal for Rules modification as required.
8) Consequences Assessments on Rule Scantlings as required.

9) Updating the Technical Background Report.

**Deliverables**


2) Updated Technical Background Report.

3) Modified Rules and Consequences Assessments on the Rule Scantlings as found necessary.

**Timescales**

1) The corrective actions will be performed by June 2016.

2) Adoption of any required Rule amendments by end December 2016 for entry into force 1 July 2017.


**ANNEXES:**

None

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ANNEX 2

CORRECTIVE ACTION PLAN ON IACS/2015/FR1-8/NC/02

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GSB AUDIT FINDINGS (EXTRACT FROM AUDIT REPORT):

Statement of facts

Design acceptance criteria in Table 3 of Pt1 Ch 1 Sec 2 and Table 4 of TB Pt 1 Ch 1 for yielding and buckling are set to 100% yield stress and usage factor 1, respectively. Since TB Rep. Pt1 Ch 8 Sec 5 shows ratios equal to 1 between ultimate capacity and working stress at 100% load in several CSR ship structures, this means that the rule establishes no explicit safety margin.

Non-compliance

It has been argued that the safety margin is implicit and based on conservative assumptions of uncertainty and "experience". TB Rep Pt 1 Ch 1 noted that safety margins should not be based only on design formulations because the whole picture has to be considered (including load definitions, acceptance criteria, minimum requirements and redundancy). However, no reliability and safety level assessment for structures designed in accordance with CSR-H has been provided.

In reply to this observation on 14 March 2015, IACS's put forward three different arguments:

1) Statistics from application of pre-harmonized CSR: "Based on a direct comparison of the number of reported damages to the number of vessels, the results indicate 3% for oil tankers and 1% for bulk carriers have reported damages. However since the reported damages are isolated localized incidents if one considers the number of plate panels, stiffener spans and connection details on each vessel, the percentage of reported damaged areas compared to the total number of detailed locations that exist, will be extremely small. It is noted that these percentages included damages in welds that may have been due to workmanship, but there is no way to confirm this so they were included in the damages. The review of the damages supports the statement that the safety level required by the CSR is sufficient. Proposed CSR-H increased slightly the safety level in relation to the required by CSR – that has been confirmed by the CA performed."

2) Margin provided by surrounding structure: "The surrounding structure with lower utilization is not considered in the checks, but serve to provide redundancy of the structure and redistribution of stresses."

3) Margin provided by the yield stress adopted: "the minimum specified yield stress is used for the material, which have statistically a large margin compared to the actual value."

The team has considered these arguments and found that:

1) The statistics provided are not so extensive since ships built to CSR-BC and CSR-OT started being delivered in 2008 (as at that time there was a very large order book). Therefore, the service experience referenced by IACS is limited to a
four-year period on a small fleet of ships of an average of two years of age where corrosion is unlikely to have had its effect. There are furthermore neither analysis of the reporting rate nor any acceptance criteria provided for assessing those statistics.

2) TB Rep. Pt 1 Ch 8 Sec 5 shows that in case of stiffener (local member) failure, the panel has structural redundancy. However, this finding points out that whole stiffened panels show ratios equal to 1 between ultimate capacity and working stress at 100% load in several CSR ship structures. Failures in primary members (stiffened panels) can hardly be considered acceptable as a design criterion even though no hull girder collapse occurs.

3) Since CSR-H safety level is not based on the reliability approach, this argument is not possible to evaluate.

Since most of IACS justifications on the structural safety level are based on a general reference to experience, there is no evidence to conclude that the rules include adequate safety factors.

**IACS INVESTIGATION AND ACTION PLAN:**

The following describes the steps taken to investigate this NC and the findings of the investigation.

**Outline**

1) Review prior Auditor/IACS interim communication history.

2) Address the three comments in the section of the Auditor's Findings:

   - Comment 1) mainly addresses service experience and IACS agrees with the Auditor's comment that only limited service history data was originally presented. IACS to provide an overview of how new Rules are compared to existing Rules with regard to rule philosophy and methodology plan.

   - Comment 2) generally addresses the redistribution of stress concentrations into adjacent low-stress structure. IACS to present an overview of the different failure modes that are checked for the same stiffened panel structure, for example yielding of plate and stiffener and buckling

   - Comment 3) addresses the safety margins associated with material properties. IACS to present further statistical data regarding yield stress of materials used in construction.

3) Address the final statement in the section of the Auditor's Findings: "Since most of IACS justifications on the structural safety level are based on a general reference to experience, there is no evidence to conclude that the rules include adequate safety factors". IACS is to explain the safety margin for the following topics:

   - Loads
   - Material yield stress
   - Net scantlings
   - Rule acceptance criteria
Corrective Action

- Create a more comprehensive Technical Background and/or update existing Technical Backgrounds.
- Based on the investigation undertaken, develop a Rule change and/or clarification as considered necessary.

DETAILED ACTION PLAN:

Scope

IACS will explain and provide values of safety margins that are implicit in the rules to justify that the rules include adequate safety factors.

1) Introduction

- Discuss safety levels associated with the load/capacity components and the assumptions in the rules and indicate how it differs from determining an overall safety level based on a reliability approach.
- The IACS investigation will include the determination of safety margins (SM), where;

\[
SM = \frac{Reference\ Value}{Rule\ Value}
\]

2) Overview of service experience and how it is reflected in the Rules

- Describe general rule philosophy and objectives
- Show rule impacts between various pre-CSR and CSR Rule versions

3) Loads

- North Atlantic trade routes
- Weather routing
- Navigation coefficient
- Stillwater and wave-induced load combination
- Define "reference values" and determine safety margins between expected and rule value for each of the above loads related topics

4) Material yield stress

- Statistics on yield stress of actual shipbuilding materials
- Define "reference value" and determine the safety margins between expected and minimum specified CSR yield stress value
5) Net scantlings

- Summarize new statistics of the expanded corrosion database that included the larger number of tankers and bulk carriers

- Define the "reference value" and determine the safety margins between measured corrosion and the CSR corrosion addition

6) Rule acceptance criteria

- Illustrate the differences between the various acceptance criteria and the associated failure modes (e.g. yielding, buckling, ultimate strength) addressed in the Rules

- Define "reference value", i.e. when a structural failure or a structural damage may occur and CSR acceptance criteria, and show the safety margins between the acceptance criteria and associated failure/damage

7) Findings/Conclusion

- Summarize the various safety margins that are implicit in the Rules

- Explain the individual margins and their sensitivities

- Explain how the usage factor may be indicated as 1.0 or 100% in the Rules, however these usage factors include safety margins and do not represent an actual failure mode

**Deliverables**

1) Updated Technical Background Reports.

2) Rule changes and/or clarifications as considered necessary.

**Timescales**

1) The corrective actions will be performed by June 2016.

2) Adoption of any required Rule amendments by end December 2016 for entry into force 1 July 2017.


**ANNEXES:**

None.
ANNEX 3
CORRECTIVE ACTION PLAN ON IACS/2015/FR1-8/NC/03

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GBS AUDIT FINDINGS (EXTRACT FROM AUDIT REPORT):

Statement of facts
Pt 1, Ch 9, Sec 1, Table 3 defines the design load scenario for fatigue assessment for bulk carriers BC-B and BC-C of L <2 00 m as: 70% of the time in loaded condition, 15% in normal ballast and 15% in heavy ballast condition.

Non-conformity
The assessment of fatigue life is sensitive to the assumed loading conditions. For example, an assumption with a significantly higher portion of heavy ballast is expected to substantially alter the assessment of fatigue. IACS has explained in their reply of 14 March 2015: "The selection of loading conditions to be considered is based on society's experiences, mainly based on global trade pattern. Shipping companies were consulted when determining the representative operational profiles."

Whereas IACS notes that these conditions were selected on the basis of consultations with shipping companies, these assumed loading conditions appear unrepresentative for exclusive North Atlantic trading, especially the assumption of sailing through North Atlantic in normal ballast condition.

IACS explained further in reply to this observation that. "This represents a rule-required distribution that has to be used when evaluating the fatigue details. If an actual design is known to have a different distribution of conditions (e.g. your example where heavy ballast may be used more often), then that distribution would also have to be checked, but the rule-required distribution would still have to be satisfied as a minimum."

However, no rule reference on this has been given and no rule text has been found that substantiate this reply.

The assumptions on design load scenarios seem not have been validated with sensitivity analysis and relevant uncertainties with regard to their adequacy have not been presented to justify the selection.

IACS INVESTIGATION AND ACTION PLAN:
IACS has examined the content of this NC and the corresponding IACS replies, and the content was agreed in principle.

The action plan to rectify this NC was developed as follows:
### Outline

1) Re-evaluation of existing data on loading conditions and endeavour to expand our knowledge by the obtaining of additional information on current operational practices from operators.

2) Perform sensitivity study on influence of different percentages of loading conditions.

### Corrective Action

Rule changes and/or changes in related Technical Background documents as considered necessary.

### DETAILED PLAN:

#### Scope

1) The percentage of time spent in heavy ballast currently adopted in the Rule was primarily based on a survey of owners and operators at the time of the CSR-BC Rules. Questionnaires will be prepared for the ship size and type identified and IACS will invite the relevant ship owners and operators to participate so as to update and expand the data sample.

2) Review and survey of the loading conditions for BC-B/C with L < 200 m.
   - Review of Rule text and existing TB report
   - Investigate the actual operating condition for this type and size of ship with respect to the percentage of time spent in loaded and ballast conditions (Normal ballast condition/Heavy ballast condition).

3) Perform sensitivity study on influence of different percentages of time spent in various loading conditions.
   - Select the vessels to be used in the study.
   - Calculate the fatigue strength for selected vessels taking into consideration the findings of the study.
   - Develop the Technical Background report.

4) Draft Rule Change proposal and/or revised Technical Background document as considered necessary.

#### Deliverables

1) Technical Background document which includes the results of the investigation on the actual loading conditions in operation.

2) Rule change proposal as considered necessary.
Timescales

1) The corrective actions will be performed by June 2016.

2) Adoption of any required Rule amendments by end December 2016 for entry into force on 1 July 2017.


ANNEXES:

None
ANNEX 4

CORRECTIVE ACTION PLAN ON IACS/2015/FR1-8/NC/04

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GBS AUDIT FINDINGS (EXTRACT FROM AUDIT REPORT):

Statement of facts

In the fatigue assessment the local condition is to be assumed at net scantling plus 50% corrosion addition, which according to the TB Report 02 Pt.1, Ch.3, Sec.3 is described as follows: "A simplified approach utilizing the average diminution over the ship’s design life could, therefore, be applied to account for the corrosion effect in fatigue analysis. The thickness diminution is assumed zero at the start of service of a vessel and is assumed to reach the full corrosion addition at the end of the ship’s design life. The average diminution through the ship’s design life can simply be considered to be half of the full corrosion addition ...

CSR-H Pt 1 Ch 9 Sec 3 [5.1.1] specifies the assumptions for the S-N curves to be applied for fatigue life assessment: 'It is assumed that the corrosion protection (i.e. coating system) is only effective for a limited number of years during which the structural details are protected, i.e. in-air environment. During the remaining part of the design life as specified in Table 5, the structural details are unprotected i.e. exposed to corrosive environment.'

In [5.3], Table 5 specifies that the corrosive environment is to be assumed only 2-5 years of the ship design life and thus protected environment should be assumed 20-23 years.

Non-conformity

There is a large difference in cumulative fatigue damage depending on the choice of S-N curve. The assumption of protected environment during 80-90% of the lifetime seems not realistic. In the first place, there is no requirement for coatings in void spaces, nor any formal standard for coatings in bulk cargo holds. For water ballast tanks and oil cargo tanks there are mandatory SOLAS requirements for coating systems with a target useful life of 15 years in "good" condition (where the definition of "good" allows a certain percentage of coating failure, even in the first 15 years of a ship's life). Coatings may fail before they reach their target useful life, especially in way of welds and areas of high stress, all of which tend to be areas where fatigue life is critical. It is impractical to expect that coatings will be maintained in good condition in service, and for this reason there is no such requirement by SOLAS or by classification, and therefore there can be no reliance on continuous protection, as is implied in Pt 1, Ch 9, Sec 3, Table 5.

Furthermore, the assumption on protective environment for fatigue damage seems not be in line with the assumption of 50% average diminution.

IACS replied to the teams interim report with the following statement:

_The corrosion effect is considered twice, on the load side as well as on the resistance side._
On the load side stresses are calculated for partly corroded structures resulting in increased stresses. This follows the t-net approach. These increased stresses are used for the whole life time, i.e. also for the time in protected environment. This is a conservative assumption.

On the resistance side the more stringent S-N curve for time in corrosive environment is to be used resulting in a damage which is 2 times the damage in comparison to in-air environment.

Some societies assume 100% of life time in protected condition, i.e. no thickness reduction for fatigue assessment and no more stringent S-N curve for time in corrosion environment is assumed. In comparison to that the CSR net-scantling approach is conservative.

Finally, it should be emphasized that the corrosion degradation depends on individual maintenance by the ship owner.

The in-air S-N curve is used in general and no credit for coating is given. To account for possible time in corrosive environment the more stringent corrosion S-N curve for that time is to be used."

However, this explanation does not provide additional evidence and is not a proper justification as described in the Guidelines for verification of conformity with GBS, paragraph 33.

The audit concludes that justification has not been provided for the fatigue life assessment with regard to rule assumptions for protective environment as requested by evaluation criterion 4.3.1 and the degradation of coating performance has not been considered as requested by evaluation criterion 4.3.10. Instead the rule assumptions appear highly non-conservative in this respect.

### IACS INVESTIGATION AND ACTION PLAN:

IACS has examined the content of this NC and the corresponding IACS replies, and agrees to the content in principle.

**Outline**

See Corrective Action below.

**Corrective Action**

Rule change and/or change in related TB documents as considered necessary.

**DETAILED PLAN:**

**Scope**

1) In rectifying this non-conformity take into consideration other related audit findings.

2) Review of current Rule text and Technical Background documents to investigate the basis of using between 2 and 5 years in a corrosive environment for the fatigue calculation.

3) Carry out literature review on corrosion models and validate current Rule requirement to ensure that the time in a corrosive environment is justified.
4) For selected details, validate the current procedure.

5) Consider the introduction of additional requirements into the Rules to emphasize the importance of the following:
   - owner responsibility for maintenance
   - class responsibility for inspection

6) Prepare a Rule Change Proposal and/or revised Technical Background document as considered necessary.

**Deliverables**

1) Updated Technical Background Reports.

2) Rule changes and/or clarifications as considered necessary.

**Timescales**

1) The corrective actions will be performed by June 2016.

2) Adoption of any required Rule amendments by end December 2016 for entry into force 1 July 2017.


**ANNEXES:**

None
ANNEX 5

CORRECTIVE ACTION PLAN ON IACS/2015/FR9-15/NC/01

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GBS AUDIT FINDINGS (EXTRACT FROM AUDIT REPORT):

Statement of facts

As per the Rule linkage summary Table (RLS Table) for CP1, the evaluation criteria under 10.3.3 and 12.3.4 of the Guidelines are met through IACS Procedures Requirements PR03 (IACS PR 03). However, it is observed that the evaluation criteria mentioned under 10.3.3 and 12.3.4 are not fully covered by IACS PR 03, thereby not fully meeting the functional requirements of 'Design Transparency' (FR 10) and "Survey during construction" (FR 12), as detailed below.

(a) IACS PR03 states that "Approved Drawings" will be available to the Owner only when so accepted by Shipyard, whereas the Standards (10.3.3) require that 'the rules should establish procedures to provide all relevant design and construction information to be made available to the owners and flag State'.

(b) In addition, no provisions are included in IACS PR 03 to make available documents such as " Formal Approval Letters" and "Certificates of Important Equipment" to the flag State.

(c) Further, IACS PR 03 does not include provisions to make available survey related correspondence between shipyard and recognized organization relating to ship design and construction, as required under 12.3.4. (While appreciating the fact that a part of the design information may be subject to intellectual property rights, the IACS PR 03 procedure do not adequately address the sharing of other information mentioned under the Evaluation criteria at 10.3.3 and 12.3.4, towards achieving the intent of the FR).

IACS has acknowledged this finding and informed in their reply dated 27 April 2015 that amendment to the relevant IACS Procedural Requirement (PR 03) will be considered.

Non-compliance

The measures adopted to achieve design transparency (as documented in the RLS Table and CP1) do not fully meet the evaluation criteria under FR-10 and FR-12 (i.e. appropriate procedures are not included in the rules submitted for evaluation, to provide all relevant design and construction information as per FR-10, with due consideration to intellectual property rights, to the Owner and Flag State during the construction process).

IACS INVESTIGATION AND ACTION PLAN:

In order to address IACS/2015/FR9-15/NC/01, IACS has considered how to amend the relevant IACS Procedural Requirement (PR 03), taking into account of the correspondence with the audit team.
Outline

- Review IACS/2015/FR9-15/NC/01 with reference to Evaluation Criteria 10.3.3 and 12.3.4 of IMO Resolution MSC 296(87)
- Identify items to be modified in IACS PR 03
- Draft the revision of PR 03
- Apply the revised PR 03 by all IACS members

Corrective Action

Revise IACS PR 03 and apply it by all IACS members with uniform application date of 1 July 2016.

DETAILED PLAN:

Scope

In addressing IACS/2015/FR9-15/NC/01 regarding the non-fulfillment of GBS Functional Requirement 10 and 12 (refer to Evaluation Criteria 10.3.3 and 12.3.4 of IMO Resolution MSC 296(87), IACS considered how to modify the PR 03 so that for Tankers and Bulk Carriers subject to SOLAS Chapter II-1 Part A-1 Regulation 3-10, the procedural requirement will include provisions to make available to the shipowner and/or flag Administration all relevant design and construction information, including:

- the Ship Construction File (SCF)
- the formal review letter in relation with the SCF
- the correspondence exchanged between shipyard and society
- The updated modifications to SCF

Accordingly, modifications to the PR 03 were agreed.

Deliverables

PR 03 (Rev.1, October 2015): "Transparency of Classification and Statutory Information" (available on IACS web site).

Timescales

1) The corrective actions have been completed.

2) Adoption of amendment to Procedural Requirement completed in October 2015 for entry into force 1 July 2016.

3) Available for submission with next GBS self-assessment.

ANNEXES:

None

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#### ANNEX 6

**CORRECTIVE ACTION PLAN ON LR/2015/NC/01**

<table>
<thead>
<tr>
<th>Submitted to:</th>
<th>MSC 96</th>
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<tbody>
<tr>
<td>Date:</td>
<td>17 December 2015</td>
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</table>

| Functional requirement: | 12 Survey during construction |

<table>
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<tr>
<th>Non-conformity No.:</th>
<th>LR/2015/NC/01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observation No.:</td>
<td></td>
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</table>

**GBS AUDIT FINDINGS:**

**Statement of facts**

Qualifications to be achieved by the surveyors to inspect oil tankers and bulk carriers (in general and in particular subject to CSR) were not identified in the documentation submitted.

It was declared that Qualifications for different roles in LR are provided on the appropriate role profile and that for surveyors the requirements of Resolution A.789(19) –will need update- are applicable (i.e. Module 2A: Hull structure…The RO should have the appropriate competence, capability and capacity to perform the following technical evaluations and/or calculations pertaining to: longitudinal strength; local scantlings such as plates and stiffeners; structural stress, fatigue and buckling analyses; materials, welding and other pertinent methods of material-joining, for compliance with relevant rules and convention requirements pertaining to design, construction and safety) but this aspect doesn´t refer to the qualification of surveyors.

It was later indicated that LR qualifies surveyors using H01 (Hull New Construction – Baseline), H12 (Bulk Carriers) and H13 (Tankers) authorization processes, which is in accordance with PR06 and PR07.

**Non-compliance**

However, the rules or procedures submitted do not provide to assign an adequate number of qualified surveyors to carry out proposed surveys in accordance with the size of the project.

**LR INVESTIGATION:**

LR has reviewed the non-conformity. LR has also raised the matter with IACS with a view to obtaining a consistent requirement throughout all IACS members. Some IACS members have provided LR with the text they have used for this subject and which has been accepted by their Audit teams.

A number of proposed changes to the LR rules were put to the team auditing LR, but these were not accepted as meeting the requirements.

**Outline**

Write a procedure for assessing the number of qualified surveyors needed for each project, taking into consideration the text already used by other IACS members.
Corrective Action
Develop a procedure which reflects current LR practice and meets the requirements of the audit team.

DETAILED PLAN:

Scope
1. Review the texts from other IACS members and the current LR practice.
2. Develop an LR procedure and circulate to appropriate managers.
3. Publish new LR procedure.

Deliverables
1. New LR procedure for assessing the number of adequately qualified surveyors.

Timescales
1. Draft procedure ready by end December 2015.
2. Final Procedure published by end May 2016.

ANNEXES*:
1 Draft procedure for project manning review

* Annexes will be presented to the next audit team.