Recommendation No.47
"Shipbuilding and Repair Quality Standard"

Part A. Revision History

Version no.	Approval date	Implementation date when applicable
Rev.7 (June 2013)	19 June 2013	
Rev.6 (May 2012)	12 May 2012	
Rev.5 (Oct. 2010)	06 Oct 2010	
Rev.4 (Aug. 2008)	04 Aug 2008	
Rev.3 (Nov. 2006)	01 Nov 2006	
Rev.2 (Dec. 2004)	12 Dec 2004	
Rev.1 (Aug. 1999)	17 Aug 1999	
New (1996)	15 Nov 1996	

- **Rev.7 (June 2013)**

1 Origin for Change:

☑ Suggestion by IACS Members

.2 Main Reason for Change:

During discussion of an outside inquiry regarding the alignment of a t-longitudinal in Table 9.1, the Panel decided to review IACS Rec.47 against other standards currently followed by shipyards and accordingly, if necessary, update IACS Rec.47.

.3 List of non-IACS Member classification societies contributing through the TC Forum and/or participating in IACS Working Group:

None

.4 History of Decisions Made:

A Panel member suggested that Rec 47 should be revised since Rec 47 differs from other shipyard standards with respect to the alignment of a t-longitudinal as shown in Table 9.1. The Panel reviewed the standard practice of different shipyards and agreed to revise the text "grind corners to smooth taper over a distance of 50a" into "release and adjust over a distance of 50a".

A Member suggested that the bending radius given in Table 6.3 for corrugated bulkheads should be amended as per the provision of the CSR Tanker Rules, Sec. 6/4.2.2. The Panel agreed to put this requirement in Rec. 47 for CSR ships only.

The Panel also discussed existing requirements on welding and grinding of cracks in Part B of Section 6.8/6.9. The Panel included introductory text in Section 6.8(Welding

repairs for cracks) to clarify this section and agreed to delete section 6.9 (Grinding of shallow cracks) considering that this section is not relevant for a rapair standard of existing vessels.

.5 Other Resolutions Changes

None

.6 Dates:

Survey Panel Approval: 21 February 2013
GPG Approval: 19 June 2013 (Ref: 13085_IGd)

- **Rev.6 (May 2012)**

.1 Origin of Change:

☑ Other (Based on Other Standard (SSC-443))

.2 Main Reason for Change:

Revise the Recommendation 47 with reference to SSC-443 and in light of experience gained so far for the use of doubling plates for ships in operation.

Also, references and titles of Rec 20, UR W13 and UR W14 were to be updated to current document titles.

.3 List of non-IACS Member classification societies contributing through the TC Forum and/or participating in IACS Working Group:

None

.4 History of Decisions Made:

The Task was triggered by GPG in light of the document SSC-443 by the Ship Structure Committee (U.S.A.) following a bilateral message of 11/1/11 from a Member. The expected benefit of undertaking the work was to have a technical discussion on the use of doublers aboard ship leading to a review of aspects of Recommendation 47 relating to doublers with a view to improving and enhancing current guidance in the Recommendation. Priority was given to discussion of the document SSC-443 vis-à-vis current IACS recommendations regarding doublers.

.5 Other Resolutions Changes

None

.6 Dates:

Original Proposal: *20 January 2012 Made by: Survey Panel*

Panel Approval: *20 April 2012*
GPG Approval: *12 May 2012 (Ref: 11020_IGh)*

- **Rev.5 (Oct 2010)**

.1 Origin of Change:

☑ Other (Query from industry - DAEWOO SHIPBUILDING & MARINE ENGINEERING CO.,LTD.)

.2 Main Reason for Change:

It was agreed in the Panel that the acceptance criteria for minor imperfections is not clear without the definition of influenced area. The existing text is not in line with international standards which are applied by many shipyards and manufacturers. And the definition of limit gap between plates for butt welding is obscure in the relevant Table.

.3 List of non-IACS Member classification societies contributing through the TC Forum and/or participating in IACS Working Group:

None

.4 History of Decisions Made:

Lately some shipyards and manufacturers have received steel plates with pits and there has been discussion regarding how to interpret the extent and acceptance criteria for pitting. It was decided by the Survey Panel that the amendments to Rec.47 are necessary in order to improve the clarity of the document. And, there was a query from shipyards on the obscure definition of limit gap between plates for butt welding

.5 Other Resolutions Changes

None
.6 Dates:

Original Proposal: *07 April 2010 Made by: Survey Panel*
Panel Approval: *24 August 2010*
GPG Approval: *06 October 2010 (Ref: 10122_IGb)*

- **Rev.4 (Aug 2008)**

Revision based on Survey Panel Task 44. Ref: 8626_

See TB in Part B

- **Rev.3 (Nov 2006)**

Revision based on comments from SAJ. Ref: 4109a_

No TB document available

- **Rev.2 (Dec 2004)**

Revision proposed by WP/MW to GPG 52 (WP/MW Task 41). Ref: 4109_

No TB document available

- **Rev.1 (Aug 1999)**

Revision based on the revised SARQS (Table 8.7). Ref: 9139_

No TB document available

- **New (1996)**

No TB document available

Part B. Technical Background

List of Technical Background (TB) documents:

Annex 1 **TB for Rev.4 (Aug 2008)**

See separate TB document in Annex 1.

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Annex 2 **TB for Rev.5 (Oct 2010)**

See separate TB document in Annex 2.

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Annex 3 **TB for Rev.6 (May 2012)**

See separate TB document in Annex 3.

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Note: There are no separate Technical Background (TB) documents available for New (1996), Rev.1 (Aug 1999), Rev.2 (Dec 2004), Rev.3 (Nov 2006) and Rev.7 (June 2013).

TECHNICAL BACKGROUND

IACS RECOMMENDATION NO.47 (REV.4, AUG 2008)
"Shipbuilding and Repair Quality Standard"

1. Scope and objective

PT was formed by Survey Panel (Task No.44) to develop a proposal to amend IACS Rec.47, SARQS (Shipbuilding and Repair Quality Standard) in order to align with major national shipbuilding standards.

2. Background

During IACS meeting with JSA (Japan Shipowners Association) and SAJ (Shipbuilders Association of Japan) in Tokyo, September 2005, SAJ made a presentation of areas of concern with IACS Rec.47. IACS agreed to submit the concerns to Survey Panel for action. IACS adopted Rev.3 of Rec.47 in November 2006, which was proposed by PT (Project Team) under the Survey Panel. The amendments in Rev.3 were based on the concern of SAJ that only the construction quality standards should be specified in SARQS and that some impractical recommendations should be revised. Upon the completion of Rev.3, IACS decided to develop a proposal to further amend IACS Rec.47 in order to align it with major national shipbuilding standards.

The Technical Background documents of the previous versions 1 and 2 do not exist.

3. Points of discussions

PT commenced the work through correspondence. After making considerable progress in the work, one meeting was held in Tokyo on 19th and 20th February, 2008 to finalize the amendments. PT members reviewed Rec.47 Rev.3 from the viewpoint of shipbuilding standards in their territories and their own experiences as well.

Initially PM gathered the information and comments from PT members on the results of the comparison of the Rec.47 with major national and certain shipyard standards practiced in China, Germany, India, Japan, Korea and Russia.

PT agreed to amend Rec.47 Rev.3 after the following discussion.

- Rec.47 should not be conflicted with major national shipbuilding standards to the extent possible
- Scope should be defined where Rec.47 applies
- Standard range and limit range should be listed
- Welding procedures should be qualified in accordance with IACS UR W28 or other recognized standard accepted by Classification Society

Upon a comprehensive review of national standards, PT found that there are notable variations among the major national standards in some technical parameters/approaches, maybe due to the differences in their respective technical basis, which would make a complete alignment not feasible. However, PT tried to accommodate the best practices of each of the considered major standards to the extent possible in order to finalize the Rec.47 Rev 4.

To improve the clarity of the recommendations, PT introduced necessary editorial changes.

Recognizing the importance of short bead welding in remedial work, PT introduced a new Table 9.14 according to JSQS.

Table 6.4 was amended to include the ovality of cylindrical structure according to FS (Production standard of the German Shipbuilding Industry).

In revision 2, in Table 9.4 and Table 9.5 (Typical Butt Weld Edge Preparation Remedial (Manual Welding and Semi-automatic welding)), the gap value, based on which the remedial standard is decided, was a function of the plate thickness. But in Revision 3 the gap value was modified to absolute value considering the comments from SAJ. During the PT meeting on 19 and 20 Feb 2008, it was agreed that the gap value is to be related to the thickness values, considering the comments from shipyards in Korea and elsewhere, to deal with thinner plates.

To avoid duplications and contradictions with other IACS technical requirements, some parts of the Rec.47 are modified.

4. Source and derivation of proposed standards
IACS Recommendation No.47 Rev.3 and Rev.4

5. Appendix
N.A.

Submitted by Project Team Manager
March 2008

Permanent Secretariat note:
PT's proposed amendments to Rec.47 were unanimously agreed by the Survey Panel and draft Rec.47 Rev.4 was submitted to GPG on 17 July 2008.
GPG approved Rec.47 Rev.4 on 4 August 2008 (ref. 8626_IGb).

Technical Background for Recommendation No.47 Rev.5, Oct 2010

1. Scope and objectives

To revise the Recommendation 47, Par.4.2.1 and 4.2.2 with the aim to eliminate uncertainties related to determining the imperfection surface area ratio and subsequently the acceptance criteria for minor imperfections which do not need to be repaired. And, to clarify the meaning of gap between edges of plates for Butt welding.

2. Engineering background for technical basis and rationale

While preparing a reply to the query from Daewoo Shipbuilding & Marine Engineering Co. Ltd. it was noticed that different societies have different interpretation of the acceptance criteria for minor imperfections without remedies. It was felt that including the definition of influenced area would improve the clarity of Recommendation 47 in this respect.

3. Source / derivation of the proposed IACS Resolution

The definition of the influenced area was adopted from European Standard EN 10163-1.

4. Summary of Changes intended for the revised Resolution:

New text defining the influenced area was added to Par.4.2.2.
A clear description on welding the gap with Butt weld plate was added to Table 9.5

5. Points of discussions or possible discussions

None

6. Attachments if any

None

Technical Background for Recommendation No.47 Rev.6, May 2012

1. Scope and objectives

Review of Recommendation 47 with reference to SSC-443 and in light of experience gained so far, update the Recommendation or identify needs to develop a set of requirements for the use of doubling plates for ships in operation, by Survey Panel.

2. Engineering background for technical basis and rationale

Technical discussion on the use of doublers aboard ship with reference to SSC-443 led to review and improvement of the current guidance in the Recommendation 47 relating to doublers.

3. Source / derivation of the proposed IACS Resolution

SSC-443 by the Ship Structure Committee (U.S.A.)

4. Summary of Changes intended for the revised Resolution:

Para 6.6 (Termination of straps) of Rec. 47 has been renamed and revised with following wordings:

6.6 Application of Doubling Straps

In certain instances, doubling straps are used as a means to strengthen and reinforce primary structure. Where this has been agreed and approved, particular attention should be paid to:

- the end termination points of the straps, so that toe support is such that no isolated hard point occurs.
- In the case of application of symmetrical or asymmetrical-ended straps, the corners at the end of the tapering should be properly rounded.
- any butts between lengths of doubling straps, so that there is adequate separation of the butt weld from the primary structure below during welding, and so that a high quality root run under controlled circumstances is completed prior to completing the remainder of the weld. Ultrasonic testing should be carried out on completion to verify full penetration.

Moreover, the corners are to be rounded for the symmetrical arrangement shown in Fig.6.6.

Also, references and titles of Rec 20, UR W13 and UR W14 were updated to current document titles.

5. Points of discussions or possible discussions

None

6. Attachments if any

None