

SUB-COMMITTEE ON SHIP DESIGN AND
CONSTRUCTION
6th session
Agenda item 7

SDC 6/7/Add.1
21 September 2018
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AMENDMENTS TO THE 2011 ESP CODE

Consolidated version of the ESP Code (part 2)

Submitted by IACS and the Secretariat

SUMMARY

Executive summary: This document provides part 2 of the report on the development of a draft consolidated text of the ESP Code, including the draft consolidated text of part B of annex A of the Code

Strategic Direction, if applicable: Other work

Output: OW 2

Action to be taken: Paragraph 6

Related documents: SDC 4/16; SDC 5/15, SDC 5/15/Add.1; MSC 99/22; SDC 6/7, SDC 6/7/Add.2 and SDC 6/7/Add.3

Background

1 The Sub-Committee on Ship Design and Construction (SDC), at its fourth session, authorized the IMO Secretariat and IACS to prepare a draft consolidated text of the ESP Code (in track changes showing all amendments to the 2011 ESP Code) for consideration at SDC 6 (SDC 4/16, paragraph 9.5.2).

2 SDC 5 agreed to proceed with the development of the draft consolidated version of the ESP Code, taking into account:

- .1 corrigenda 1 and 2 to resolution A.1049(27);
- .2 amendments adopted by resolutions MSC.371(93), MSC.381(94) and Corr.1, MSC.405(96) and MSC.412(97);

.3 draft amendments aligning the Code with the latest version of IACS UR Z10, proposing editorial changes to identify all mandatory requirements and improving the format of the tables and forms, expected to be approved at MSC 99; and

.4 the outcome of the intersessional review of the existing footnotes.

3 SDC 5 also agreed that the draft consolidated version of the ESP Code should be finalized for consideration at this session, taking into account the related outcome of MSC 100, with a view to:

.1 preparing a draft Assembly resolution for adoption of the draft consolidated version of the ESP Code, revoking resolutions A.744(18) and A.1049(27); and

.2 subsequent submission to MSC 101, for endorsement, and final adoption at A 31.

4 MSC 99 approved the draft amendments to the 2011 ESP Code, prepared by SDC 5 and requested the Secretary-General to circulate them in accordance with SOLAS article VIII, with a view to adoption at MSC 100.

Proposal

5 This part of the report on the development of a draft consolidated text of the ESP Code provides the draft consolidated text of part B of annex A of the Code.

Action requested of the Sub-Committee

6 The Sub-Committee is invited to consider the enclosed draft consolidated text of part B of annex A of the Code, taking into account the amendments to be adopted by MSC 100, and take action, as appropriate.

ANNEX

DRAFT INTERNATIONAL CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS AND OIL TANKERS, ~~2011~~[2019] (~~2011~~[2019] ESP CODE)*

ANNEX A

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING THE SURVEYS OF BULK CARRIERS

Part B

CODE ON THE ENHANCED PROGRAMME OF INSPECTIONS DURING SURVEYS OF BULK CARRIERS HAVING DOUBLE-SIDE SKIN CONSTRUCTION

1 General

1.1 Application¹¹

1.1.1 The Code ~~should~~ **is to** apply to all self-propelled double-side skin bulk carriers of 500 gross tonnage and above.

1.1.2 The Code ~~should~~ **is to** apply to surveys of hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces, fuel oil tanks within the cargo length area and all ballast tanks.

* Tracked changes are created using "strikeout" for deleted text and:

- .1 "purple shading" to highlight all modifications and new insertions, including deleted text, introduced by corrigenda 1 and 2 to resolution A.1049(27);
- .2 "blue shading" to highlight all modifications and new insertions, including deleted text, introduced by resolution MSC.371(93);
- .3 "green shading" to highlight all modifications and new insertions, including deleted text, introduced by resolution MSC.381(94) and Corr.1;
- .4 "yellow shading" to highlight all modifications and new insertions, including deleted text, introduced by resolution MSC.405(96);
- .5 "red shading" to highlight all modifications and new insertions, including deleted text, introduced by resolution MSC.412(97);
- .6 "pink shading" to highlight all modifications and new insertions, including deleted text, approved by MSC 99 (MSC 99/22/Add.2); and
- .7 "grey shading" to highlight all new modifications and insertions, including deleted text, introduced by the co-sponsors for consideration at this session.

¹¹ ~~The intention of the Code is to ensure that an appropriate level of review of plans and documents is conducted and consistency in application is attained. Such evaluation of survey reports, survey programmes, planning documents, etc., should be carried out at the managerial level of the Administration or organization recognized by the Administration (hereinafter both are referred to as "the Administration").~~

1.1.3 The Code contains the minimum extent of examination, thickness measurements and tank testing. The survey ~~should~~ ~~is to~~ be extended when substantial corrosion and/or structural defects are found and include additional close-up survey when necessary.

1.1.4 For bulk carriers with hybrid cargo hold arrangements, e.g. with some cargo holds of single-side skin and others of double-side skin, the requirements of part A of annex A apply to cargo holds of single-side skin.

1.1.5 The surveys ~~should~~ ~~are to~~ be carried out during the surveys prescribed by regulation I/10 of the Convention.

1.2 Definitions

1.2.1 *Double-side skin bulk carrier* is a ship which is constructed generally with single deck, topside tanks and hopper side tanks in cargo spaces, and is intended primarily to carry dry cargo in bulk including ore carriers and combination carriers, in which all cargo holds are bounded by a double-side skin (regardless of the width of the wing space).⁴²

1.2.2 *Ballast tank* is a tank which is used ~~solely~~ ~~primarily~~ for salt water ballast or, where applicable, a space which is used for both cargo and salt water ballast will be treated as a ballast tank when substantial corrosion has been found in that space. A double-side tank ~~should~~ ~~is to~~ be considered, for survey purposes, as a separate tank even if it is in connection to either the topside tank or the hopper side tank.

1.2.3 *Spaces* are separate compartments including holds, tanks, cofferdams and void spaces bounding cargo holds, decks and the outer hull.

1.2.4 *Overall survey* is a survey intended to report on the overall condition of the hull structure and determine the extent of additional close-up surveys.

1.2.5 *Close-up survey* is a survey where the details of structural components are within the close visual inspection range of the surveyor, i.e. normally within reach of hand.

1.2.6 *Transverse section* is the cross section of the hull perpendicular to the ship's centreline and includes all longitudinal members such as plating, longitudinals and girders at the deck sides, bottom, inner bottom, hopper sides, inner sides, top wing inner sides and longitudinal bulkheads. ~~For transversely framed bulk carriers, a transverse section includes adjacent frames and their end connections in way of transverse sections.~~

1.2.7 *Representative spaces* are those which are expected to reflect the condition of other spaces of similar type and service and with similar corrosion prevention systems. When selecting representative spaces, account ~~should~~ ~~is to~~ be taken of the service and repair history on board and identifiable critical structural areas and/or suspect areas.

1.2.8 *Suspect areas* are locations showing substantial corrosion and/or are considered by the surveyor to be prone to rapid wastage.

1.2.9 *Substantial corrosion* is an extent of corrosion such that assessment of corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits. For ships built under the IACS Common Structural Rules, substantial corrosion is an extent of

⁴² ~~For double-side skin combination carriers, additional requirements are specified in the Guidelines on the enhanced programme of inspections during surveys for oil tankers, set out in part A of annex B.~~

corrosion such that the assessment of the corrosion pattern indicates a gauged (or measured) thickness between $t_{net} + 0.5$ mm and t_{net} , a measured thickness between $t_{ren} + 0.5$ mm and t_{ren} . Renewal thickness (t_{ren}) is the minimum allowable thickness, in mm, below which renewal of structural members is to be carried out.

1.2.10 A *corrosion prevention system* is normally considered a full hard protective coating. Hard protective coating ~~should is~~ usually ~~to~~ be epoxy coating or equivalent. Other coating systems which are neither soft nor semi-hard coatings, may be considered acceptable as alternatives provided that they are applied and maintained in compliance with the manufacturer's specifications.

1.2.11 *Coating condition* is defined as follows:

GOOD condition with only minor spot rusting;

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition;

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

1.2.12 *Critical structural areas* are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships (if applicable) to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

1.2.13 *Cargo length area* is that part of the ship which includes all cargo holds and adjacent areas including fuel tanks, cofferdams, ballast tanks and void spaces.

1.2.14 *Intermediate survey* is a survey carried out either at the second or third annual survey or between these surveys.

1.2.15 A *prompt and thorough repair* is a permanent repair completed at the time of survey to the satisfaction of the surveyor, therein removing the need for the imposition of any associated condition of classification or recommendation.

1.2.16 *Convention* means the International Convention for the Safety of Life at Sea, 1974, as amended.

1.2.17 *Special consideration or specially considered* (in connection with close-up surveys and thickness measurements) means sufficient close-up inspection and thickness measurements are taken to confirm the actual average condition of the structure under the coating.

1.2.18 *Pitting corrosion* is defined as scattered corrosion spots/areas with local material reductions which are greater than the general corrosion in the surrounding area. Pitting intensity is defined in figure 1.

1.2.19 *Edge corrosion* is defined as local corrosion at the free edges of plates, stiffeners, primary support members and around openings. An example of edge corrosion is shown in figure 2.

1.2.20 *Grooving corrosion* is typically local material loss adjacent to weld joints along abutting stiffeners and at stiffener or plate butts or seams. An example of groove corrosion is shown in figure 3.

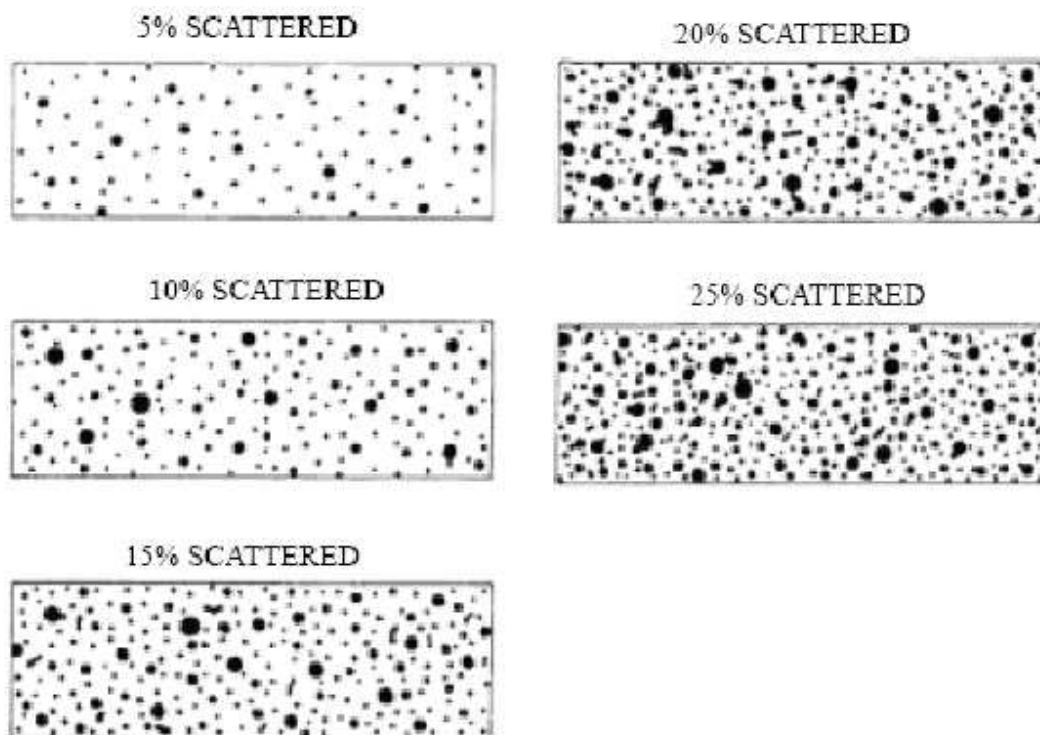


Figure 1: Pitting intensity diagrams

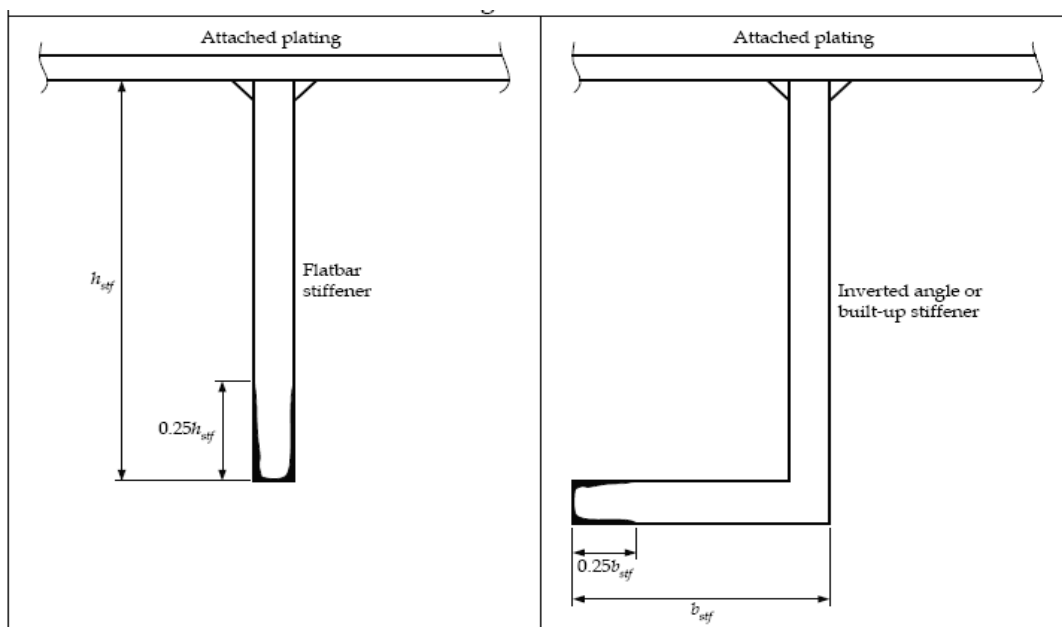


Figure 2: Edge corrosion

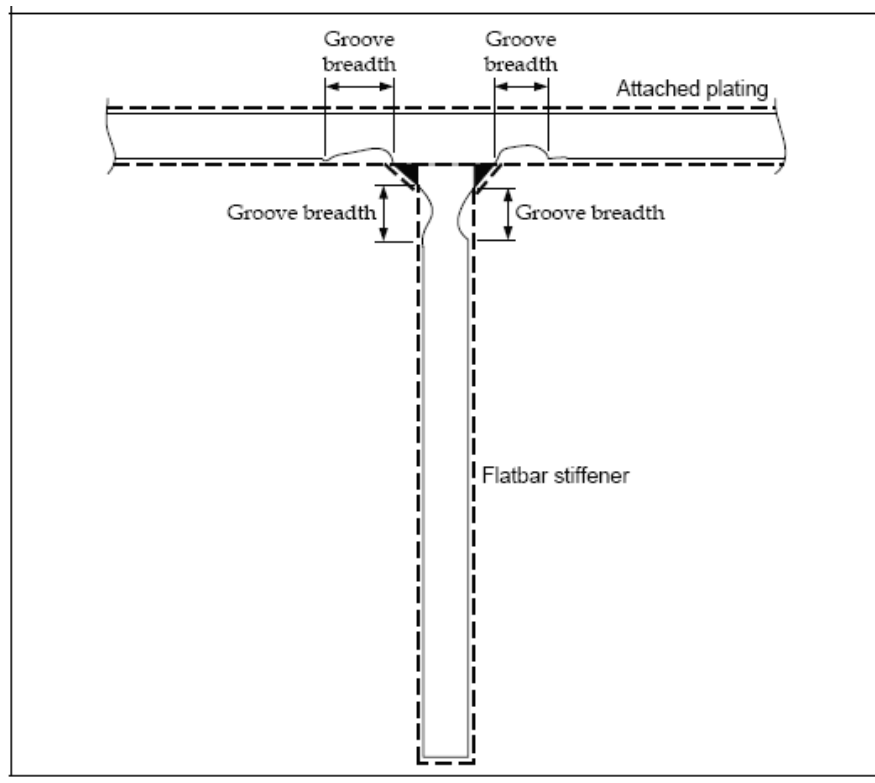


Figure 3: Grooving corrosion

1.3 Repairs

1.3.1 Any damage in association with wastage over the allowable limits (including buckling, grooving, detachment or fracture), or extensive areas of wastage over the allowable limits, which affects or, in the opinion of the Administration, will affect the ship's structural, watertight or weathertight integrity, ~~should~~ **is to** be promptly and thoroughly (see 1.2.15) repaired. Areas which ~~should~~ **are to** be considered include:

- .1 side structure and side plating;
- .2 deck structure and deck plating;
- .3 bottom structure and bottom plating;
- .4 inner bottom structure and inner bottom plating;
- .5 inner side structure and inner side plating;
- .6 watertight or oiltight bulkheads;
- .7 hatch covers or hatch coamings; and
- .8 items in 3.3.10.

For locations where adequate repair facilities are not available, the Administration may allow the ship to proceed directly to a repair facility. This may require discharging the cargo and/or temporary repairs for the intended voyage.

1.3.2 Additionally, when a survey results in the identification of corrosion or structural defects, either of which, in the opinion of the Administration, will impair the ship's fitness for continued service, remedial measures ~~should are to~~ be implemented before the ship continues in service.

~~1.3.3 Where the damage found on the structure mentioned in paragraph 1.3.1 above is isolated and of a localized nature which does not affect the ship's structural integrity (as for example a minor hole in a cross-deck strip), consideration may be given by the surveyor to allow an appropriate temporary repair to restore watertight or weather tight integrity after evaluation of the surrounding structure and impose an associated condition of classification or recommendation with a specific time limit in order to complete the permanent repair and retain classification. Where the damage found on the structure mentioned in paragraph 1.3.1 above is isolated and of a localized nature which does not affect the ship's structural integrity (as for example a minor hole in a cross-deck strip), consideration may be given by the surveyor to allow an appropriate temporary repair to restore watertight or weathertight integrity after evaluation of the surrounding structure and impose an associated condition or recommendation with a specific time limit in order to complete the permanent repair and retain the validity of the relevant statutory certification.~~

1.4 *Surveyors**

~~For bulk carriers of 20,000 tons deadweight and above, two surveyors should jointly carry out the first scheduled renewal survey after the bulk carrier passes 10 years of age (i.e. third renewal survey), and all subsequent renewal surveys and intermediate surveys. If the surveys are carried out by a recognized organization, the surveyors should be exclusively employed by such recognized organizations. 1.4.1 On bulk carriers of 20,000 tonnes deadweight (DWTdwt) and above starting with renewal survey No.3, at renewal and intermediate hull surveys, the survey of hull structure and piping systems to which this Code applies is to be carried out by at least two exclusive surveyors of a recognized organization. On bulk carriers of 100,000 DWTdwt and above of single side skin construction at the intermediate hull survey between 10 and 15 years of age, the survey of hull structure and piping systems to which this Code applies is to be performed by at least two exclusive surveyors.~~

1.4.2 This requires that at least two exclusive surveyors attend on board at the same time to perform the required survey. Though each attending surveyor is not required to perform all aspects of the required survey, they are required to consult with each other and to do joint overall and close-up surveys to the extent necessary to determine the condition of the vessel areas to which this Code applies. The extent of these surveys should be sufficient for the surveyors to agree on actions required to complete the survey with respect to renewals, repairs, and other recommendations or conditions of class. Each surveyor is required to co-sign the survey report or indicate their concurrence in an equivalent manner.

1.4.3 The following surveys may be witnessed by a single surveyor:

- .1 thickness measurements;
- .2 tank testing; and
- .3 repairs carried out in association with intermediate and renewal hull surveys, the extent of which have been agreed upon by the required two surveyors during the course of the surveys.

* Refer to paragraph 4.2.4 of part 2 of the Code for recognized organizations (RO Code), adopted by resolution MSC.349(92).

1.5 *Thickness measurements and close-up surveys*

In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, thickness measurements of structures in areas where close-up surveys are required should be carried out simultaneously with close-up surveys. In any kind of survey, i.e. renewal, intermediate, annual or other surveys having the scope of the foregoing ones, for structures in areas where close-up surveys are required, thickness measurements, when required by annex 2, should be carried out simultaneously with close-up surveys.

2 **Renewal survey**

2.1 **General**

2.1.1 The renewal survey may be commenced at the fourth annual survey and be progressed during the succeeding year with a view to completion by the fifth anniversary date. When the renewal survey is commenced prior to the fourth annual survey, the entire survey is to be completed within 15 months if such work is to be credited to the renewal survey.

2.1.2 As part of the preparation for the renewal survey, the survey programme should be dealt with in advance of the survey. The thickness measurement should not be held before the fourth annual survey.

2.1.3 The survey should include, in addition to the requirements of the annual survey, examination, tests and checks of sufficient extent to ensure that the hull and related piping, as required in 2.1.5, is in satisfactory condition and is fit for its intended purpose for the new period of validity of the Cargo Ship Safety Construction Certificate, subject to proper maintenance and operation and to periodical surveys being carried out at the due dates.

2.1.4 All cargo holds, ballast tanks, including double-bottom and double-side tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull should be examined, and this examination should be supplemented by thickness measurement and testing, as required by 2.6 and 2.7, to ensure that the structural integrity remains effective. The examination should be sufficient to discover substantial corrosion, significant deformation, fractures, damages or other structural deterioration that may be present.

2.1.5 All piping systems within the above spaces should be examined and operationally tested under working pressure to attending surveyor's satisfaction to ensure that tightness and condition remain satisfactory.

2.1.6 The survey extent of ballast tanks converted to void spaces should be specially considered in relation to the requirements for ballast tanks.

2.1.7 Concurrent crediting to both intermediate survey and renewal survey for surveys and thickness measurements of spaces should not be acceptable.

2.2 **Dry-dock survey**

2.2.1 A survey in dry-dock should be a part of the renewal survey. There should be a minimum of two inspections of the outside of the ship's bottom during the five-year period of the certificate. In all cases, the maximum interval between bottom inspections should not exceed 36 months.

2.2.2 For ships of 15 years of age and over, inspection of the outside of the ship's bottom should be carried out with the ship in dry-dock. For ships of less than 15 years of age,

alternate inspections of the ship's bottom not conducted in conjunction with the renewal survey may be carried out with the ship afloat. Inspection of the ship afloat ~~should is~~ only ~~to~~ be carried out when the conditions are satisfactory and the proper equipment and suitably qualified staff ~~is-are~~ available.

2.2.3 If a survey in dry-dock is not completed in conjunction with the enhanced survey during renewal survey or if the 36-month maximum interval referred to in 2.2.1 is not complied with, the Cargo Ship Safety Construction Certificate ~~should is to~~ cease to be valid until a survey in dry-dock is completed.

2.2.4 The overall and close-up survey and thickness measurements, as applicable, of the lower portions of the cargo holds and ballast tanks ~~should-are to~~ be carried out in accordance with the applicable requirements for renewal survey, if not already performed.

Note: Lower portions of the cargo holds and ballast tanks are considered to be the parts below the light ballast water line.

2.3 *Space protection*

2.3.1 Where provided, the condition of the corrosion prevention system of ballast tanks ~~should is to~~ be examined. For ballast tanks, excluding double-bottom tanks, where a hard protective coating is found in POOR condition as defined in 1.2.11, and it is not renewed, or where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied from the time of constructions, the tanks in question ~~should-are to~~ be examined at annual intervals. Thickness measurements ~~should-are to~~ be carried out as deemed necessary by the surveyor. When such breakdown of hard protective coating is found in water ballast double-bottom tanks and it is not renewed, or where a soft or semi-hard coating has been applied or where a hard protective coating has not been applied from the time of construction, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements ~~should is-are to~~ be carried out.

2.3.2 Where a hard protective coating is provided in cargo holds and is found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

2.3.3 For bulk carriers built under IACS Common Structural Rules (CSR), the identified substantial corrosion areas may be:

- .1 protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition; or alternatively
- .2 required to be measured at annual intervals.

2.4 *Hatch covers and coamings*

The hatch covers and coamings ~~should-are to~~ be surveyed as follows:

2.4.1 A thorough inspection of the items listed in 3.3 ~~should is to~~ be carried out, in addition to all hatch covers and coamings.

2.4.2 Checking of the satisfactory operation of all mechanically operated hatch covers ~~should be~~ made, including:

- .1 stowage and securing in open condition;
- .2 proper fit and efficiency of sealing in closed condition; and
- .3 operational testing of hydraulic and power components, wires, chains and link drives.

2.4.3 The effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent ~~should be~~ checked.

2.4.4 ~~Thickness measurement of the hatch cover and coaming plating and stiffeners should be carried out as given in annex 2. Close up survey and thickness measurement¹³ of the hatch cover and coaming plating and stiffeners should be~~ carried out as given in annexes 1 and 2. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures.

2.5 Extent of overall and close-up surveys

2.5.1 An overall survey of all tanks and spaces ~~should be~~ carried out at the renewal survey. Fuel oil tanks in the cargo length area ~~should be~~ surveyed as follows:

Renewal survey No.1 Age ≤ 5	Renewal survey No.2 5 < Age ≤ 10	Renewal survey No.3 10 < Age ≤ 15	Renewal survey No.4 and subsequent 15 < Age
None	One	Two	Half, minimum two

Notes:

1. These requirements apply to tanks of integral (structural) type.
2. If a selection of tanks is accepted to be examined, then different tanks ~~should be~~ examined at each renewal survey, on a rotational basis.
3. Peak tanks (all uses) ~~should be~~ examined internally at each renewal survey.
4. At renewal survey no.3 and subsequent renewal surveys, one deep tank for fuel oil in the cargo area ~~should be~~ included, if fitted.

2.5.2 The minimum requirements for close-up surveys at renewal surveys are given in annex 1, appendix 1 for double-side skin bulk carriers, excluding ore carriers, and in annex 1, appendix 2 for ore carriers respectively.

2.5.3 The surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the spaces under survey, the condition of the corrosion prevention system and where spaces have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

¹³ ~~For cargo hold hatch covers of approved design which structurally have no access to the internals, close up survey/thickness measurement shall be done of accessible parts of hatch covers' structures.~~

2.5.4 For areas in spaces where hard protective coatings are found to be in a GOOD condition, the extent of close-up surveys according to annex 1 may be specially considered (refer also to 2.3.2).

2.6 Extent of thickness measurements

2.6.1 The minimum requirements for thickness measurements at the renewal survey are given in annex 2.

2.6.2 Representative thickness measurements to determine both general and local levels of corrosion in the transverse web frames in all water ballast tanks ~~should are to~~ be carried out. Thickness measurements ~~should are~~ also ~~to~~ be carried out to determine the corrosion levels on the transverse bulkhead plating. The extent of thickness measurements may be specially considered provided the surveyor is satisfied by the close-up examination that there is no structural diminution, and the hard protective coating where applied remains efficient.

2.6.3 Provisions for extended measurements for areas with substantial corrosion as defined in 1.2.9 are given in annex 10 and may be additionally specified in the survey programme as required by 5.1. These extended thickness measurements ~~should are to~~ be carried out before the survey is credited as completed. Suspect areas identified at previous surveys should be examined. Areas of substantial corrosion identified at previous surveys should have thickness measurements taken.

2.6.4 The surveyor may further extend the thickness measurements as deemed necessary.

2.6.5 For areas in tanks where hard protective coatings are found to be in GOOD condition as defined in 1.2.11, the extent of thickness measurements according to annex 2 may be specially considered by the Administration.

2.6.6 Transverse sections ~~should are to~~ be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

2.7 Extent of tank pressure testing

2.7.1 All boundaries of water ballast tanks, deep tanks and cargo holds used for water ballast within the cargo length area ~~should are to~~ be pressure tested. For fuel tanks, only representative tanks ~~should are to~~ be pressure tested.

2.7.2 The surveyor may extend the tank testing as deemed necessary.

2.7.3 Boundaries of ballast tanks ~~should are to~~ be tested with a head of liquid to the top of air pipes.

2.7.4 Boundaries of ballast holds ~~should are to~~ be tested with a head of liquid to near to the top of hatches.

2.7.5 Boundaries of fuel oil tanks ~~should are to~~ be tested with a head of liquid to the highest point that liquid will rise under service conditions. Tank testing of fuel oil tanks may be specially considered based on a satisfactory external examination of the tank boundaries and a confirmation from the master stating that the pressure testing has been carried out according to the requirements with satisfactory results.

2.7.6 The testing of double-bottom tanks and other spaces not designated for the carriage of liquid may be omitted, provided a satisfactory internal examination together with an examination of the tank top is carried out.

2.8 Additional renewal survey requirements after determining compliance with regulations XII/12 and XII/13 of the Convention

2.8.1 For ships complying with the requirements of regulation XII/12 of the Convention for hold, ballast and dry space water level detectors, the renewal survey ~~should~~ **is to** include an examination and a test of the water ingress detection system and of their alarms.

2.8.2 For ships complying with the requirements of regulation XII/13 of the Convention for the availability of pumping systems, the renewal survey ~~should~~ **is to** include an examination and a test of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

3 Annual survey

3.1 General

Annual surveys are to be held within three months before or after the anniversary date from the date of the initial survey or of the date credited for the last renewal survey. The annual survey ~~should~~ **is to** consist of an examination for the purpose of ensuring, as far as practicable, that the hull weather decks, hatch covers, coamings and piping are maintained in a satisfactory condition and ~~should~~ **is to** take into account the service history, condition and extent of the corrosion prevention system of ballast tanks and areas identified in the survey report file.

3.2 Examination of the hull

3.2.1 Examination of the hull plating and its closing appliances ~~should~~ **is to** be carried out as far as can be seen.

3.2.2 Examination of watertight penetrations ~~should~~ **is to** be carried out as far as practicable.

3.3 Examination of weather decks, hatch covers and coamings

3.3.1 It ~~should~~ **is to** be confirmed that no unapproved changes have been made to the hatch covers, hatch coamings and their securing and sealing devices since the last survey.

3.3.2 A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and ~~should~~ **is to** include verification of proper opening and closing operation. As a result, the hatch cover sets within the forward 25% of the ship's length and at least one additional set, such that all sets on the ship are assessed at least once in every five-year period, ~~should~~ **is to** be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:

- .1 stowage and securing in open condition;
- .2 proper fit and efficiency of sealing in closed condition; and
- .3 operational testing of hydraulic and power components, wires, chains and link drives.

The closing of the covers ~~should is to~~ include the fastening of all peripheral, and cross joint cleats or other securing devices. Particular attention ~~should is to~~ be paid to the condition of hatch covers in the forward 25% of the ship's length, where sea loads are normally greatest.

3.3.3 If there are indications of difficulty in operating and securing hatch covers, additional sets above those required by 3.3.2, at the discretion of the surveyor, ~~should are to~~ be tested in operation.

3.3.4 Where the cargo hatch securing system does not function properly, repairs ~~should are to~~ be carried out under the supervision of the Administration. Where hatch covers or coamings undergo substantial repairs, the strength of securing devices ~~should are to~~ be upgraded to comply with annex 11.

3.3.5 For each cargo hatch cover set, at each annual survey, the following items ~~should are to~~ be surveyed:

- .1 cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, deformation);
- .2 sealing arrangements of perimeter and cross joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non-return valves);
- .3 clamping devices, retaining bars, cleating (for wastage, adjustment, and condition of rubber components);
- .4 closed cover locating devices (for distortion and attachment);
- .5 chain or rope pulleys;
- .6 guides;
- .7 guiderails and track wheels;
- .8 stoppers;
- .9 wires, chains, tensioners and gypsies;
- .10 hydraulic system, electrical safety devices and interlocks; and
- .11 end and interpanel hinges, pins and stools where fitted.

3.3.6 At each hatchway, at each annual survey, the coamings, with plating, stiffeners and brackets ~~should are to~~ be checked for corrosion, cracks and deformation, especially of the coaming tops including close-up survey.

3.3.7 Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

3.3.8 Where portable covers, wooden or steel pontoons are fitted, the satisfactory condition of the following ~~should is to~~ be confirmed:

- .1 wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
- .2 steel pontoons, including close-up survey of hatch cover plating;
- .3 tarpaulins;
- .4 cleats, battens and wedges;
- .5 hatch securing bars and their securing devices;
- .6 loading pads/bars and the side plate edge;
- .7 guide plates and chocks; and
- .8 compression bars, drainage channels and drain pipes (if any).

3.3.9 The flame screens on vents to all bunker tanks ~~should are to~~ be examined.

3.3.10 Bunker and vent piping systems, including ventilators, ~~should are to~~ be examined.

3.4 Examination of cargo holds

3.4.1 For double-side skin bulk carriers of 10 to 15 years of age, the following ~~should is are to~~ be carried out:

- .1 overall survey of two selected cargo holds;
- .2 when considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements ~~should is are to~~ be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements ~~should is to~~ be increased in accordance with annex 10. These extended thickness measurements ~~should are to~~ be carried out before the survey is credited as complete. Suspect areas identified at previous surveys ~~should are to~~ be examined. Areas of substantial corrosion identified at previous surveys ~~should are to~~ have thickness measurements taken. For bulk carriers built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in GOOD condition; and
- .3 all piping and penetrations in cargo holds, including overboard piping, ~~should are to~~ be examined.

3.4.2 For double-side skin bulk carriers over 15 years of age, the following ~~should is are to~~ be carried out:

- .1 overall survey of all cargo holds;

- .2 when considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements ~~should~~ ~~is~~ ~~to~~ be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements ~~should~~ ~~is~~ ~~to~~ be increased in accordance with annex 10. These extended thickness measurements ~~should~~ ~~are~~ ~~to~~ be carried out before the survey is credited as complete. Suspect areas identified at previous surveys ~~should~~ ~~are~~ ~~to~~ be examined. Areas of substantial corrosion identified at previous surveys ~~should~~ ~~are~~ ~~to~~ have thickness measurements taken. For bulk carriers built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in GOOD condition; and
- .3 all piping and penetrations in cargo holds, including overboard piping, ~~should~~ ~~are~~ ~~to~~ be examined.

3.5 Examination of ballast tanks

Examination of ballast tanks ~~should~~ ~~is~~ ~~to~~ be carried out when required as a consequence of the results of the renewal survey and intermediate survey. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements ~~should~~ ~~is~~ ~~to~~ be carried out. If the results of these thickness measurements indicate that substantial corrosion is found, the extent of thickness measurements ~~should~~ ~~is~~ ~~to~~ be increased in accordance with annex 10. These extended thickness measurements ~~should~~ ~~are~~ ~~to~~ be carried out before the survey is credited as complete. Suspect areas identified at previous surveys ~~should~~ ~~are~~ ~~to~~ be examined. Areas of substantial corrosion identified at previous surveys ~~should~~ ~~are~~ ~~to~~ have thickness measurements taken. For bulk carriers built under the IACS Common Structural Rules, the annual thickness gauging may be omitted where a protective coating has been applied in accordance with the coating manufacturer's requirements and is maintained in GOOD condition.

3.6 Additional annual survey requirements after determining compliance with regulations XII/12 and XII/13 of the Convention

3.6.1 For ships complying with the requirements of regulation XII/12 of the Convention for hold, ballast and dry space water level detectors, the annual survey ~~should~~ ~~is~~ ~~to~~ include an examination and a test, at random, of the water ingress detection systems and of their alarms.

3.6.2 For ships complying with the requirements of regulation XII/13 of the Convention for the availability of pumping systems, the annual survey ~~should~~ ~~is~~ ~~to~~ include an examination and a test, of the means for draining and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces any part of which extends forward of the foremost cargo hold, and of their controls.

4 Intermediate survey

4.1 General

4.1.1 Items that are additional to the requirements of the annual survey may be surveyed either at the second or third annual survey or between these surveys.

4.1.2 The extent of survey is dependent upon the age of the ship as specified in 4.2, 4.3 and 4.4.

4.1.3 Concurrent crediting to both intermediate survey and renewal survey for surveys and thickness measurements of spaces ~~should not be~~ are not acceptable.

4.2 Double-side skin bulk carriers 5 to 10 years of age

4.2.1 Ballast tanks

4.2.1.1 For tanks used for water ballast, an overall survey of representative tanks selected by the surveyor ~~should~~ is to be carried out. The selection ~~should~~ is to include fore and aft peak tanks and a number of other tanks, taking into account the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.

4.2.1.2 Where POOR coating condition, corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination ~~should~~ is to be extended to other ballast tanks of the same type.

4.2.1.3 In ballast tanks other than double-bottom tanks, where a hard protective coating is found in POOR condition and it is not renewed, or where soft or semi-hard coating has been applied, or where a hard protective coating was not applied from the time of construction, the tanks in question ~~should~~ are to be examined and thickness measurements carried out as considered necessary at annual intervals. When such breakdown of hard protective coating is found in ballast double-bottom tanks, where a soft or semi-hard coating has been applied, or where a hard protective coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the surveyor, or where extensive corrosion exists, thickness measurements ~~should~~ are to be carried out.

4.2.1.4 In addition to the above requirements, areas found to be suspect areas at ~~the previous renewal survey should~~ previous surveys are to be overall and close-up surveyed.

4.2.2 Cargo holds

4.2.2.1 An overall survey of all cargo holds ~~should~~ is to be carried out.

4.2.2.2 Where considered necessary by the surveyor as a result of the overall survey as described in 4.2.2.1, the survey ~~should~~ is to be extended to include a close-up survey those areas of the structure in the cargo holds selected by the surveyor.

4.2.3 Extent of thickness measurements

4.2.3.1 Thickness measurements ~~should~~ are to be carried out to an extent sufficient to determine both general and local corrosion levels at areas subject to close-up survey where required as per 4.2.2.2 and as provided in 4.2.1.4.

4.2.3.2 The extent of thickness measurements may be specially considered provided the surveyor is satisfied by the close-up survey that there is no structural diminution and the hard protective coatings are found to be in a GOOD condition.

4.2.3.3 Where substantial corrosion is found, the extent of thickness measurements ~~should~~ is to be increased in accordance with the requirements of annex 10. These extended thickness measurements ~~should~~ are to be carried out before the survey is credited as completed. Suspect areas identified at previous surveys ~~should~~ are to be examined. Areas of substantial corrosion identified at previous surveys ~~should~~ are to have thickness measurements taken.

For bulk carriers built under IACS Common Structural Rules, the identified substantial corrosion areas may be:

- .1 protected by coating applied in accordance with the coating manufacturer's requirements and examined at annual intervals to confirm the coating in way is still in good condition; or alternatively
- .2 required to be measured at annual intervals.

Explanatory note:

For existing bulk carriers, where owners may elect to coat or recoat cargo holds as noted above, consideration may be given to the extent of the close-up surveys and thickness measurement. Prior to the coating of cargo holds of existing ships, scantlings ~~should are to~~ be ascertained in the presence of a surveyor.

4.2.3.4 Where the hard protective coating in cargo holds is found to be in GOOD condition, the extent of close-up surveys and thickness measurements may be specially considered.

4.3 Double-side skin bulk carriers 10 to 15 years of age

4.3.1 The requirements of the intermediate survey ~~should are to~~ be the same extent as the previous renewal survey as required in 2 and 5.1. However, internal examination of fuel oil tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.

4.3.2 In application of 4.3.1, the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of the application of 2.1.1.

4.3.3 In application of 4.3.1, an underwater survey may be considered in lieu of the requirements of 2.2.

4.4 Double-side skin bulk carriers exceeding 15 years of age

4.4.1 The requirements of the intermediate survey ~~should are to~~ be to the same extent as the previous renewal survey required in 2 and 5.1. However, internal examination of fuel tanks and pressure testing of all tanks are not required unless deemed necessary by the attending surveyor.

4.4.2 In application of 4.4.1, the intermediate survey may be commenced at the second annual survey and be progressed during the succeeding year with a view to completion at the third annual survey in lieu of the application of 2.1.1.

4.4.3 In application of 4.4.1, a survey in dry-dock ~~should is to~~ be part of the intermediate survey. The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo holds and water ballast tanks ~~should are to~~ be carried out in accordance with the applicable requirements for intermediate surveys, if not already performed.

Note: Lower portions of the cargo holds and ballast tanks are considered to be the parts below ~~the~~ light ballast water line.

5 Preparations for survey

5.1 Survey programme

5.1.1 ~~The owner in cooperation with the Administration should work out a specific survey programme prior to the commencement of any part of:~~

~~.1 the renewal survey; and~~

~~.2 the intermediate survey for double-side skin bulk carriers over 10 years of age.~~

~~The survey programme should be in a written format based on the information in annex 4A. The survey should not commence until the survey programme has been agreed. The owner in cooperation with the Administration is to work out a specific survey programme prior to the commencement of any part of the renewal survey and, for double-side skin bulk carriers over 10 years of age, the intermediate survey. The survey programme is to be in a written format based on the information in annex 4A. The survey is not to commence until the survey programme has been agreed.~~

5.1.1.1 Prior to the development of the survey programme, the survey planning questionnaire ~~should is to~~ be completed by the owner based on the information set out in annex 4B, and forwarded to the Administration.

5.1.1.2 The survey programme at intermediate survey may consist of the survey programme at the previous renewal survey supplemented by the condition evaluation report (executive hull summary report) of that renewal survey and later relevant survey reports.

5.1.1.3 The survey programme ~~should is to~~ be worked out taking into account any amendments to the survey requirements after the last renewal survey carried out.

5.1.2 In developing the survey programme, the following documentation ~~should is to~~ be collected and consulted with a view to selecting tanks, holds, areas and structural elements to be examined:

- .1 survey status and basic ship information;
- .2 documentation on board, as described in 6.2 and 6.3;
- .3 main structural plans (scantlings drawings), including information regarding use of high-tensile steels (HTS);
- .4 relevant previous survey and inspection reports from both the ~~classification society-recognized organization~~ and the owner;
- .5 information regarding the use of ship's holds and tanks, typical cargoes and other relevant data;
- .6 information regarding corrosion prevention level on the new building; and
- .7 information regarding the relevant maintenance level during operation.

5.1.3 The submitted survey programme ~~should~~ **is to** account for, and comply, as a minimum, with the provisions of annexes 1 and 2 and 2.7 for close-up survey, thickness measurement and tank testing, respectively, and ~~should~~ **is to** include relevant information, including at least:

- .1 basic ship information and particulars;
- .2 main structural plans (scantling drawings), including information regarding use of high-tensile steels (HTS);
- .3 plan of holds and tanks;
- .4 list of holds and tanks with information on use, protection and condition of coating;
- .5 conditions for survey (e.g. information regarding hold and tank cleaning, gas-freeing, ventilation, lighting, etc.);
- .6 provisions and methods for access to structures;
- .7 equipment for surveys;
- .8 nomination of holds and tanks and areas for close-up survey (see 2.5);
- .9 nomination of sections for thickness measurement (see 2.6);
- .10 nomination of tanks for testing (see 2.7); and
- .11 damage experience related to the ship in question.

5.1.4 The Administration ~~should~~ **is to** advise the owner of the maximum acceptable structural corrosion diminution levels applicable to the ship.

5.1.5 Use may also be made of the Guidelines for technical assessment in conjunction with the planning of enhanced surveys for double-side skin bulk carriers, contained in annex 9. These Guidelines are a recommended tool which may be invoked at the discretion of the Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

5.2 Conditions for survey

5.2.1 The owner ~~should~~ **is to** provide the necessary facilities for a safe execution of the survey.

5.2.2 ~~In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access, should be agreed between the owner and the Administration. In order to enable the attending surveyors to carry out the survey, provisions for proper and safe access should be to be agreed between the owner and the Administration, based on recommendations developed by the Organization.~~^{*44}

^{*44} Refer to the *Revised recommendations for entering enclosed spaces aboard ships*, adopted by the Organization by resolution A.1050(27).

5.2.3 Details of the means of access ~~should are to~~ be provided in the survey planning questionnaire.

5.2.4 In cases where the provisions of safety and required access are judged by the attending surveyors not to be adequate, the survey of the spaces involved ~~should not-is not to~~ proceed.

5.2.5 Cargo holds, tanks and spaces ~~should are to~~ be safe for access. Cargo holds, tanks and spaces ~~should are to~~ be gas free and properly ventilated. Prior to entering a tank, void or enclosed space, it ~~should-is to~~ be verified that the atmosphere in the tank is free from hazardous gas and contains sufficient oxygen.

5.2.6 In preparation for survey and thickness measurements and to allow for a thorough examination, all spaces ~~should are to~~ be cleaned including removal from surfaces of all loose accumulated corrosion scale. Spaces ~~should are to~~ be sufficiently clean and free from water, scale, dirt, oil residues, etc., to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating. However, those areas of structure whose renewal has already been decided by the owner need only be cleaned and descaled to the extent necessary to determine the limits of the areas to be renewed.

5.2.7 Sufficient illumination ~~should-is to~~ be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration as well as the condition of the coating.

5.2.8 Where soft or semi-hard coatings have been applied, safe access ~~should-is to~~ be provided for the surveyor to verify the effectiveness of the coating and to carry out an assessment of the conditions of internal structures which may include spot removal of the coating. When safe access cannot be provided, the soft or semi-hard coating ~~should-is to~~ be removed.

5.2.9 ~~The surveyor(s) should always be accompanied by, at least, one responsible person, assigned by the owner, experienced in tank and enclosed spaces inspection. In addition, a back-up team of at least two experienced persons should be stationed at the hatch opening of the tank or space that is being surveyed. The back-up team should continuously observe the work in the tank or space and should keep life-saving and evacuation equipment ready for use.~~ The surveyor(s) ~~should always-is(are) always to~~ be accompanied by, at least, one responsible person, assigned by the owner, experienced in tank and enclosed space inspection.

5.2.10 ~~A communication system should be arranged between the survey party in the cargo hold, tank or space being examined, the responsible officer on deck and, as the case may be, the navigation bridge. The communication arrangements should be maintained throughout the survey.~~

5.3 Access to structures^{*45}

5.3.1 For overall survey, means ~~should are to~~ be provided to enable the surveyor to examine the structure in a safe and practical way.

^{*45} Refer to the Guidelines on the means of access to structures for inspection and maintenance of oil tankers and bulk carriers (MSC/Circ.686).

5.3.2 For close-up survey, one or more of the following means for access, acceptable to the surveyor, ~~should is to~~ be provided:

- .1 permanent staging and passages through structures;
- .2 temporary staging and passages through structures;
- .3 ~~lifts and moveable platformshydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms;~~
- .4 portable ladders;
- .5 boats or rafts; and
- .6 other equivalent means.

5.4 *Equipment for survey*

5.4.1 Thickness measurements ~~should are~~ normally ~~to~~ be carried out by means of ultrasonic test equipment. The accuracy of the equipment ~~should is to~~ be proven to the surveyor as required.

5.4.2 One or more of the following fracture detection procedures may be required if deemed necessary by the surveyor:

- .1 radiographic equipment;
- .2 ultrasonic equipment;
- .3 magnetic particle equipment; and
- .4 dye penetrant.

5.4.3 Explosimeter, oxygen-meter, breathing apparatus, lifelines, riding belts with rope and hook and whistles together with instructions and guidance on their use ~~should are to~~ be made available during the survey. A safety checklist ~~should is to~~ be provided.

5.4.4 Adequate and safe lighting ~~should is to~~ be provided for the safe and efficient conduct of the survey.

5.4.5 Adequate protective clothing ~~should is to~~ be made available and used (e.g. safety helmet, gloves, safety shoes, etc.) during the survey.

5.5 *Rescue and emergency response equipment*

~~If breathing apparatus and/or other equipment is used as "Rescue and emergency response equipment", then the equipment should is to be suitable for the configuration of the space being surveyed.~~

5.56 *Surveys at sea or at anchorage*

5.56.1 Surveys at sea or at anchorage may be accepted provided the surveyor is given the necessary assistance from the personnel on board. Necessary precautions and procedures for carrying out the survey ~~should are to~~ be in accordance with 5.1, 5.2, 5.3 and 5.4.

5.56.2 A communication system ~~should are is to~~ be arranged between the survey party in the spaces under examination and the responsible officer on deck. This system ~~should also is also to~~ include the personnel in charge of ballast pump handling if boats or rafts are used.

5.56.3 Surveys of tanks or applicable holds by means of boats or rafts may only be undertaken with the agreement of the surveyor, who ~~should is to~~ take into account the safety arrangements provided, including weather forecasting and ship response under foreseeable conditions and provided the expected rise of water within the tank does not exceed 0.25 m.

5.56.4 When rafts or boats will be used for close-up survey, the following conditions ~~should are to~~ be observed:

- .1 only rough duty, inflatable rafts or boats, having satisfactory residual buoyancy and stability even if one chamber is ruptured, ~~should are to~~ be used;
- .2 the boat or raft ~~should is to~~ be tethered to the access ladder and an additional person ~~should is to~~ be stationed down the access ladder with a clear view of the boat or raft;
- .3 appropriate lifejackets ~~should are to~~ be available for all participants;
- .4 the surface of water in the tank or hold ~~should is to~~ be calm (under all foreseeable conditions the expected rise of water within the tank ~~should not is not to~~ exceed 0.25 m) and the water level stationary. On no account ~~should the level of the water is the level of the water to~~ be rising while the boat or raft is in use;
- .5 the tank, hold or space ~~should is to~~ contain clean ballast water only. Even a thin sheen of oil on the water is not acceptable; and
- .6 at no time ~~should the level of the water is the level of the water to~~ be allowed to be within 1 m of the deepest under deck web face flat so that the survey team is not isolated from a direct escape route to the tank hatch. Filling to levels above the deck transverses ~~should only is only to~~ be contemplated if a deck access manhole is fitted and open in the bay being examined, so that an escape route for the survey party is available at all times. Other effective means of escape to the deck may be considered.

5.56.5 Rafts or boats alone may be allowed for inspection of the under deck areas for tanks or spaces, if the depth of the webs is 1.5 m or less.

5.56.6 If the depth of the webs is more than 1.5 m, rafts or boats alone may be allowed only:

- .1 when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage; or
- .2 if a permanent means of access is provided in each bay to allow safe entry and exit. This means:
 - .1 access direct from the deck via a vertical ladder and a small platform fitted approximately 2 m below the deck in each bay; or

- .2 access to deck from a longitudinal permanent platform having ladders to deck in each end of the tank. The platform ~~should~~shall, for the full length of the tank, be arranged in level with, or above, the maximum water level needed for rafting of under deck structure. For this purpose, the ullage corresponding to the maximum water level ~~should is to~~be assumed not more than 3 m from the deck plate measured at the midspan of deck transverses and in the middle length of the tank.

If neither of the above conditions are met, then staging or other equivalent means ~~should are is~~to be provided for the survey of the under-deck areas.

5.56.7 The use of rafts or boats alone in 5.56.5 and 5.56.6 does not preclude the use of boats or rafts to move about within a tank during a survey.

5.67 Survey planning meeting

5.67.1 The establishment of proper preparation and the close cooperation between the attending surveyor(s) and the owner's representatives on board prior to and during the survey are an essential part in the safe and efficient conduct of the survey. During the survey onboard safety meetings ~~should are to~~be held regularly.

5.67.2 Prior to commencement of any part of the renewal and intermediate survey, a survey planning meeting ~~should is to~~be held between the attending surveyor(s), the owner's representative in attendance, the thickness measurement ~~company operator (as applicable)~~firm representative, where involved, and the master of the ship or an appropriately qualified representative appointed by the master or company for the purpose to ascertain that all the arrangements envisaged in the survey programme are in place, so as to ensure the safe and efficient conduct of the survey work to be carried out (see also 7.1.2).

5.67.3 The following is an indicative list of items that ~~should is are to~~be addressed in the meeting:

- .1 schedule of the ship (i.e. the voyage, docking and undocking manoeuvres, periods alongside, cargo and ballast operations, etc.);
- .2 provisions and arrangements for thickness measurements (i.e. access, cleaning/descaling, illumination, ventilation, personal safety);
- .3 extent of the thickness measurements;
- .4 acceptance criteria (refer to the list of minimum thicknesses);
- .5 extent of close-up survey and thickness measurement considering the coating condition and suspect areas/areas of substantial corrosion;
- .6 execution of thickness measurements;
- .7 taking representative readings in general and where uneven corrosion/pitting is found;
- .8 mapping of areas of substantial corrosion; and
- .9 communication between attending surveyor(s) the thickness measurement ~~company~~firm operator(s) and owner's representative(s) concerning findings.

6 Documentation on board

6.1 General

6.1.1 The owner ~~should~~ is to obtain, supply and maintain on board documentation as specified in 6.2 and 6.3, which ~~should~~ is to be readily available for the surveyor. The condition evaluation report (executive hull summary report) referred to in 6.2 ~~should~~ is to include a translation into English.

6.1.2 The documentation ~~should~~ is to be kept on board for the lifetime of the ship.

6.1.3 For bulk carriers subject to SOLAS regulation II-1/3-10, the owner ~~should~~ is to arrange the updating of the Ship Construction File (SCF) throughout the ship's life whenever a modification of the documentation included in the SCF has taken place. Documented procedures for updating the SCF ~~should~~ are to be included within the Safety Management System.

6.1.4 For bulk carriers with coatings of dedicated seawater ballast tanks and double-side skin spaces subject to PSPC standards (MSC.215(82)), the owner is to arrange the updating of the Coating Technical File (CTF) throughout the ship's life whenever a maintenance, repair, or recoating activity to these coatings has taken place. Documented procedures for updating the CTF are to be included within the Safety Management System.

6.2 Survey report file

6.2.1 A survey report file ~~should~~ is to be a part of the documentation on board consisting of:

- .1 reports of structural surveys (annex 6);
- .2 condition evaluation report (executive hull summary report) (annex 7); and
- .3 thickness measurement reports (annex 8A/annex 8B).

6.2.2 The survey report file ~~should~~ is to be available also in the owner's and the Administration offices or in the office of the organization recognized by the Administration.

6.3 Supporting documents

6.3.1 The following additional documentation ~~should~~ is to be available on board:

- .1 survey programme, as required under 5.1 until such time as the renewal survey or intermediate survey, as applicable, has been completed;
- .2 main structural plans of cargo holds and ballast tanks (for CSR bulk carriers, these plans are to include for each structural element both the as-built and renewal thickness. Any thickness for voluntary addition is also to be clearly indicated on the plans. The midship section plan to be supplied on board the ship is to include the minimum allowable hull girder sectional properties for hold transverse section in all cargo holds);
- .3 previous repair history;
- .4 cargo and ballast history;

- .5 inspections by ship's personnel with reference to:
 - .1 structural deterioration in general;
 - .2 leakages in bulkheads and piping; and
 - .3 condition of ~~coating or~~ corrosion prevention system, if any. Guidance for reporting is shown in annex 3; and
- .6 any other information that would help to identify critical structural areas and/or suspect areas requiring inspection.

6.3.2 For bulk carriers subject to SOLAS regulation II-1/3-10, the Ship Construction File (SCF), limited to the items to be retained on board, ~~should~~ is to be available on board.

6.3.3 For bulk carriers with coatings of dedicated seawater ballast tanks and double-side skin spaces subject to PSPC standards (MSC.215(82)), the Coating Technical File (CTF) is to be available on board.

6.4 *Review of documentation on board*

6.4.1 Prior to survey, the surveyor ~~should~~ is to examine the completeness of the documentation on board, and its contents as a basis for the survey.

6.4.2 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor ~~should~~ is to verify that the update of the Ship Construction File (SCF) has been done whenever a modification of the documentation included in the SCF has taken place.

6.4.2.1 For the SCF stored on board ship, the surveyor is to examine the information on board ship. In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is kept on board the ship. If the updating of the SCF on board is not completed at the time of survey, the surveyor records it and requires confirmation at the next periodical survey.

6.4.2.2 For the SCF stored in the onshore archive, the surveyor is to examine the list of information included in the onshore archive. In cases where any major event, including, but not limited to, substantial repair and conversion, or any modification to the ship structures, the surveyor is to also verify that the updated information is stored in the onshore archive by examining the list of information included in the onshore archive or kept on board the ship. In addition, the surveyor is to confirm that the service contract with of the archive centre is valid. If the updating of the SCF Supplement ashore is not completed at the time of survey, the surveyor records it and requires confirmation at the next periodical survey.

6.4.3 For bulk carriers subject to SOLAS regulation II-1/3-10, on completion of the survey, the surveyor ~~should~~ is to verify any addition and/or renewal of materials used for the construction of the hull structure are documented within the Ship Construction File list of materials.

6.4.4 For bulk carriers with coatings of dedicated seawater ballast tanks and double-side skin spaces subject to PSPC standards (MSC.215(82)), on completion of the survey, the surveyor is to verify any maintenance, repair, or recoating activities to these coatings are documented within the Coating Technical File (CTF).

7 Procedures for thickness measurements

7.1 General

7.1.1 The required thickness measurements, if not carried out by the recognized organization acting on behalf of the Administration itself, ~~should~~ ~~are to~~ be witnessed by a surveyor of the recognized organization. The surveyor ~~should~~ ~~is to~~ be on board to the extent necessary to control the process.

7.1.2 The thickness measurement ~~company should~~ ~~firm is to~~ be part of the survey planning meeting to be held prior to commencing the survey.

7.1.3 Thickness measurements of structures in areas where close-up surveys are required ~~should~~ ~~are to~~ be carried out simultaneously with close-up surveys.

7.1.4 In all cases the extent of the thickness measurements ~~should~~ ~~is to~~ be sufficient as to represent the actual average condition.

7.1.5 Procedural requirements for thickness measurements are set out in annex 12.

7.2 Certification of thickness measurement ~~company~~ ~~firm~~

The thickness measurements ~~should~~ ~~are to~~ be carried out by a qualified ~~company~~ ~~firm~~ certified by an organization recognized by the Administration according to principles stated in annex 5.

7.3 Number and locations of measurements

7.3.1 Application

This section only applies to ships built under the IACS Common Structural Rules^{42*} (CSR). For ships not built under IACS CSR, the requirements for number and locations of measurements are according to the Rules of the individual classification society and/or specific IACS URs depending on ship's age and structural elements concerned.

7.3.2 Number of measurements

Considering the extent of thickness measurements according to the different structural elements of the ship and surveys (renewal, intermediate and annual), the locations of the points to be measured are given for the most important items of the structure.

7.3.3 Locations of measurements

7.3.3.1 Table 1 provides explanations and/or interpretations for the application of those requirements indicated in the IACS CSR, which refer to both systematic thickness measurements related to the calculation of global hull girder strength and specific measurements connected to close-up surveys.

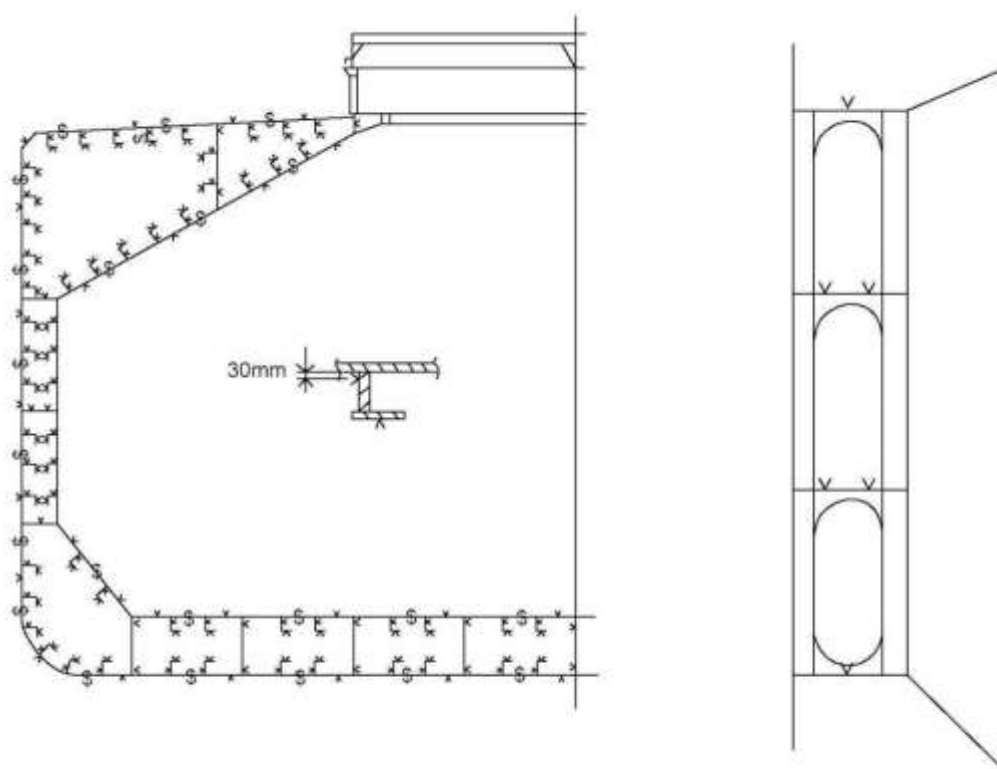
7.3.3.2 Figures 4 to 9 are provided to facilitate the explanations and/or interpretations given in table 1, to show typical arrangements of double-~~side~~ skin bulk carriers.

* 42 IACS Common Structural Rules mean IACS Common Structural Rules for Bulk Carriers (IACS CSR for Bulk carriers) or IACS Common Structural Rules for Bulk Carriers and Oil Tankers (IACS CSR BC& OT)

Table 1 – Interpretations of rule requirements for the locations and number of points to be measured for CSR bulk carriers (double skin)

Item	Interpretation	Figure reference
Selected plates on deck, tank top, bottom, double bottom and wind-and-water area	"Selected" means at least a single point on one out of three plates, to be chosen on representative areas of average corrosion	
All deck, tank top and bottom plates and wind-and-water strakes	At least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion	
Transverse section	A transverse section includes all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom, hopper sides, inner sides and top wing inner sides	Figure 4
All cargo hold hatch covers and coamings	Including plates and stiffeners	Locations of points are given in figure 5
Transverse section of deck plating outside line of cargo hatch openings	Two single points on each deck plate (to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion) between the ship sides and hatch coamings in the transverse section concerned	
All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches	<p>"All deck plating" means at least two points on each plate to be taken either at each 1/4 extremity of plate or at representative areas of average corrosion</p> <p>"Under deck structure": at each short longitudinal girder: three points for web plating (fwd/middle/aft), single point for face plate, one point for web plating and one point for face plating of transverse beam in way. At each ends of transverse beams, one point for web plating and one point for face plating</p>	<p>Extent of areas is shown in appendix 3 to annex 8B</p> <p>Locations of points are given in figure 9</p>
Transverse frame in double-sideskin tank		Figure 4
Transverse bulkheads in cargo holds	Includes bulkhead plating, stiffeners and girders, including internal structure of upper and lower stools, where fitted. Two selected bulkheads: one is to be the bulkhead between the two foremost cargo holds and the second may be chosen in other positions	<p>Areas of measurements are shown in appendix 3 to annex 8B</p> <p>Locations of points are given in figure 7</p>

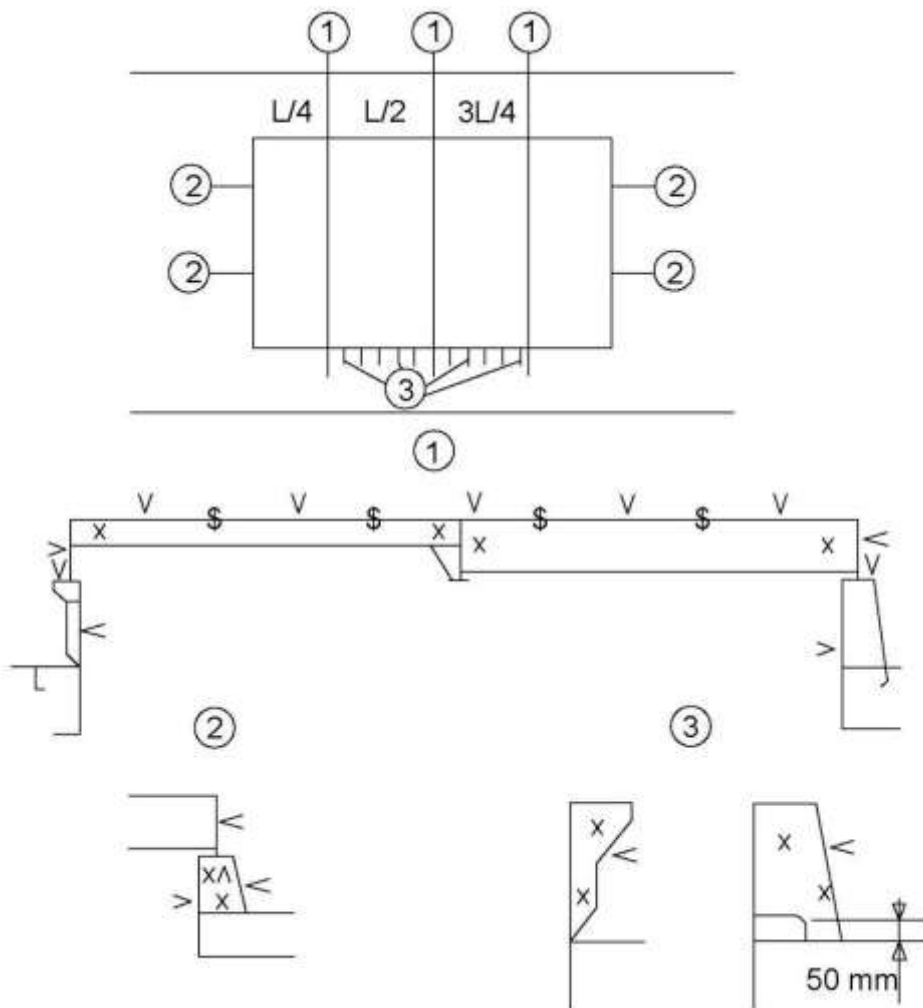
Item	Interpretation	Figure reference
One transverse bulkhead in each cargo hold	This means that the close-up survey and related thickness measurements are to be performed on one side of the bulkhead; the side is to be chosen based on the outcome of the overall survey of both sides. In the event of doubt, the surveyor may also require (possibly partial) close-up survey on the other side	Areas of measurements are shown in appendix 3 to annex 8B Locations of points are given in figure 7
Transverse bulkheads in one topside, hopper and double bottom ballast tank	Includes bulkhead and stiffening systems The ballast tank is to be chosen based on the history of ballasting among those prone to have the most severe conditions	Locations of points are given in figure 8
Transverse webs in ballast tanks	Includes web plating, face plates, stiffeners and associated plating and longitudinals One of the representative tanks of each type (i.e. topside or hopper or side tank) is to be chosen in the forward part	Areas of measurements are shown in appendix 3 to annex 8B Locations of points are given in figure 6



Double Skin Bulk Carrier

Note: Measurements are to be taken on both port and starboard sides of the selected transverse section.

Figure 4: Transverse section of a double-side skin bulk carrier



Notes:

- 1 Three sections at $L/4$, $L/2$, $3L/4$ of hatch cover length, including:
 - .1 one measurement of each hatch cover plate and skirt plate,
 - .2 measurements of adjacent beams and stiffeners; and
 - .3 one measurement of coaming plates and coaming flange, each side.
- 2 Measurements of both ends of hatch cover skirt plate, coaming plate and coaming flange.
- 3 One measurement (two points for web plate and one point for face plate) of one out of three hatch coaming brackets and bars, on both sides and both ends.

Figure 5: Locations of measurements on hatch covers and coamings

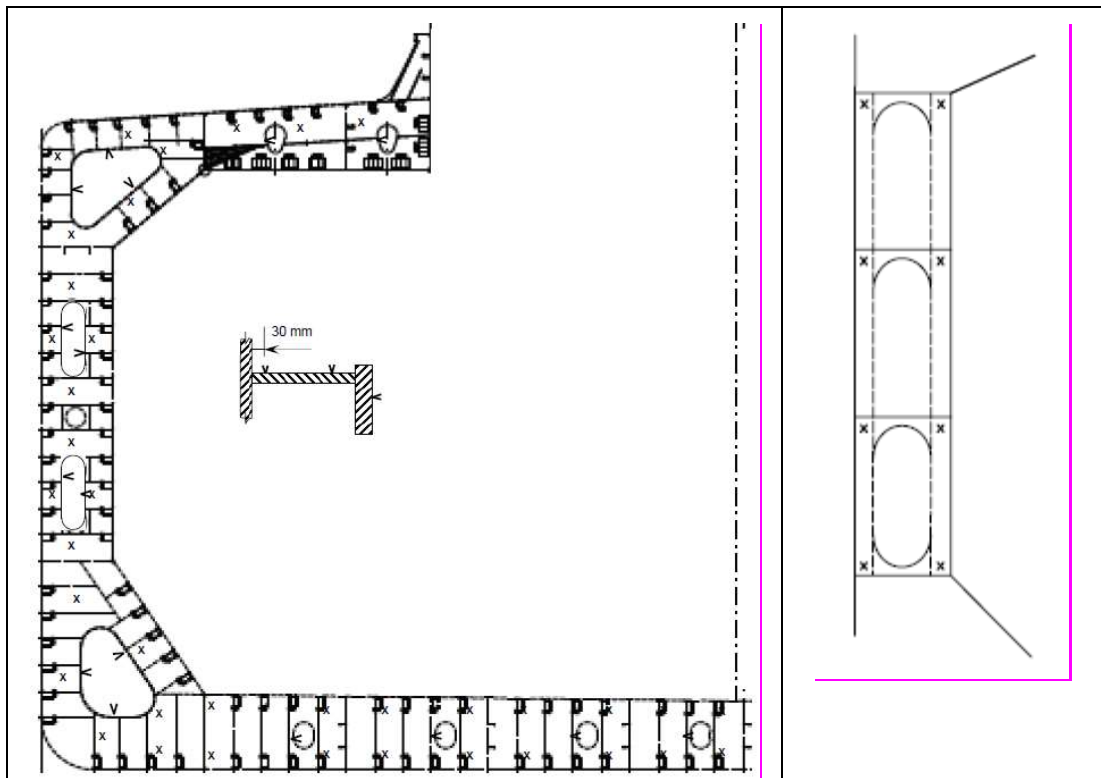
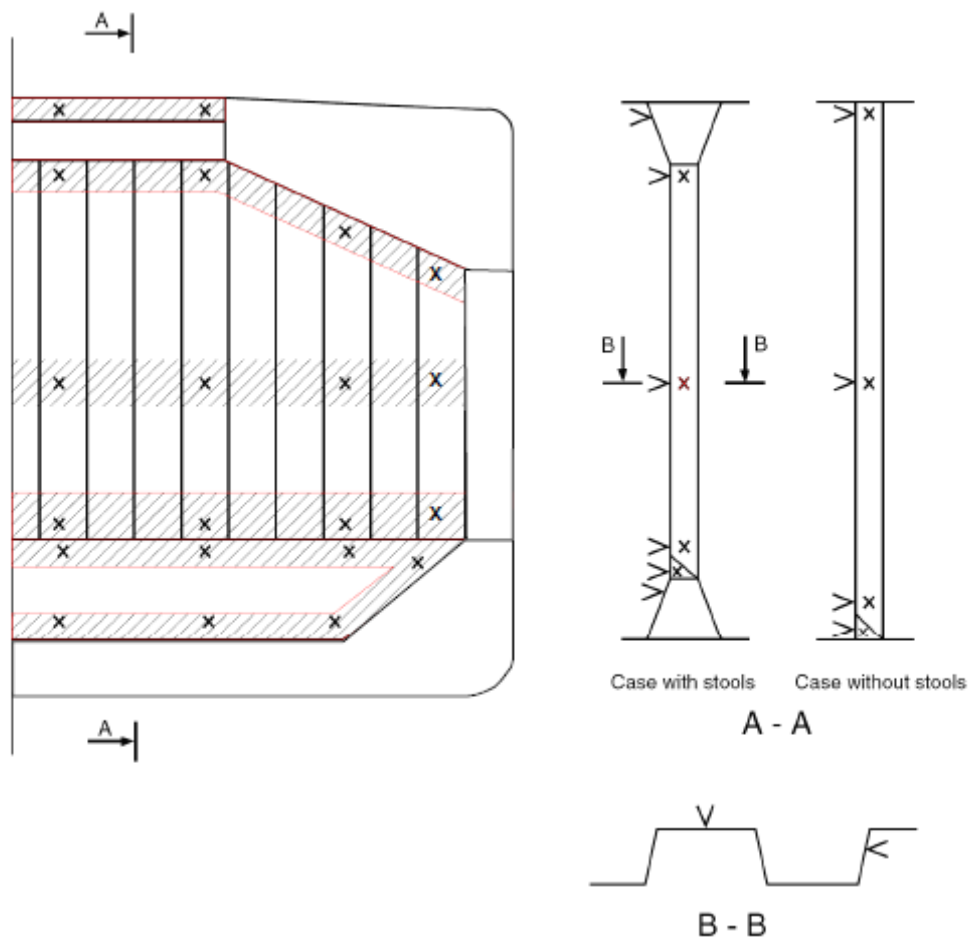
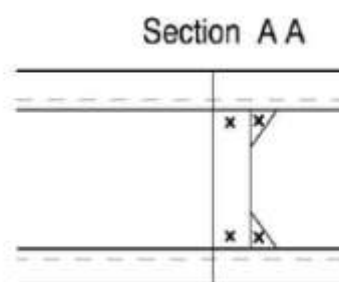
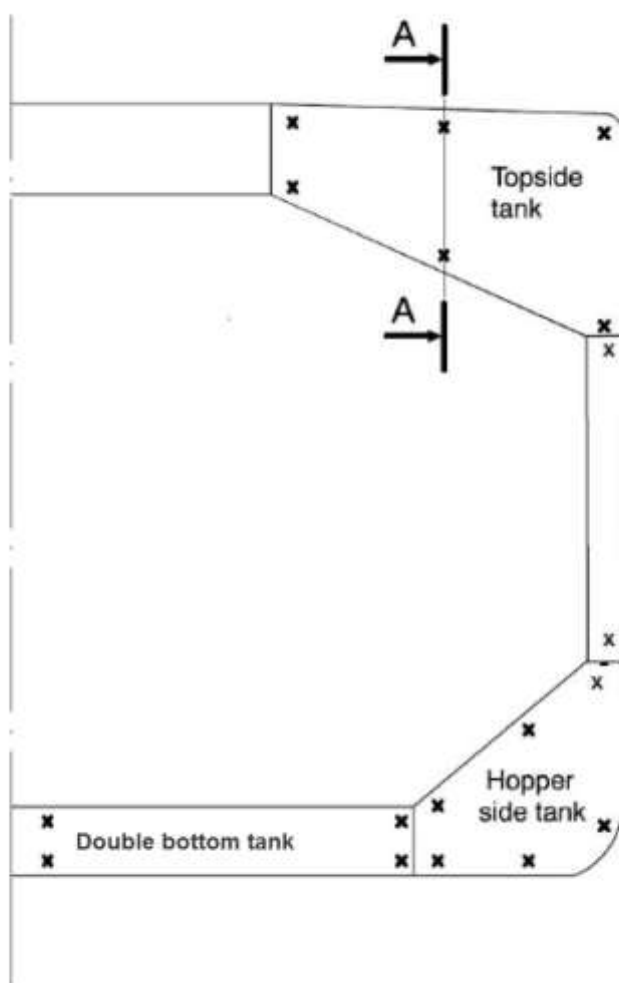


Figure 6: Locations of measurements on structural members in ballast tanks of double-side skin bulk carriers (topside or hopper or side tank)



Note: Measurements to be taken in each shaded area as per views A-A and B-B.

Figure 7: Locations of measurements on cargo hold transverse bulkheads (additional measurements to internal structure of upper and lower stools to be added, e.g. two points in the upper and two points in the lower stools to be indicated in section A-A)



Note: Measurements to be taken in each vertical section as per view A-A.

Figure 8: Locations of measurements on transverse bulkheads of topside, hopper and double bottom tanks (two additional measurements to internal structure of double bottom tank to be added at midspan)

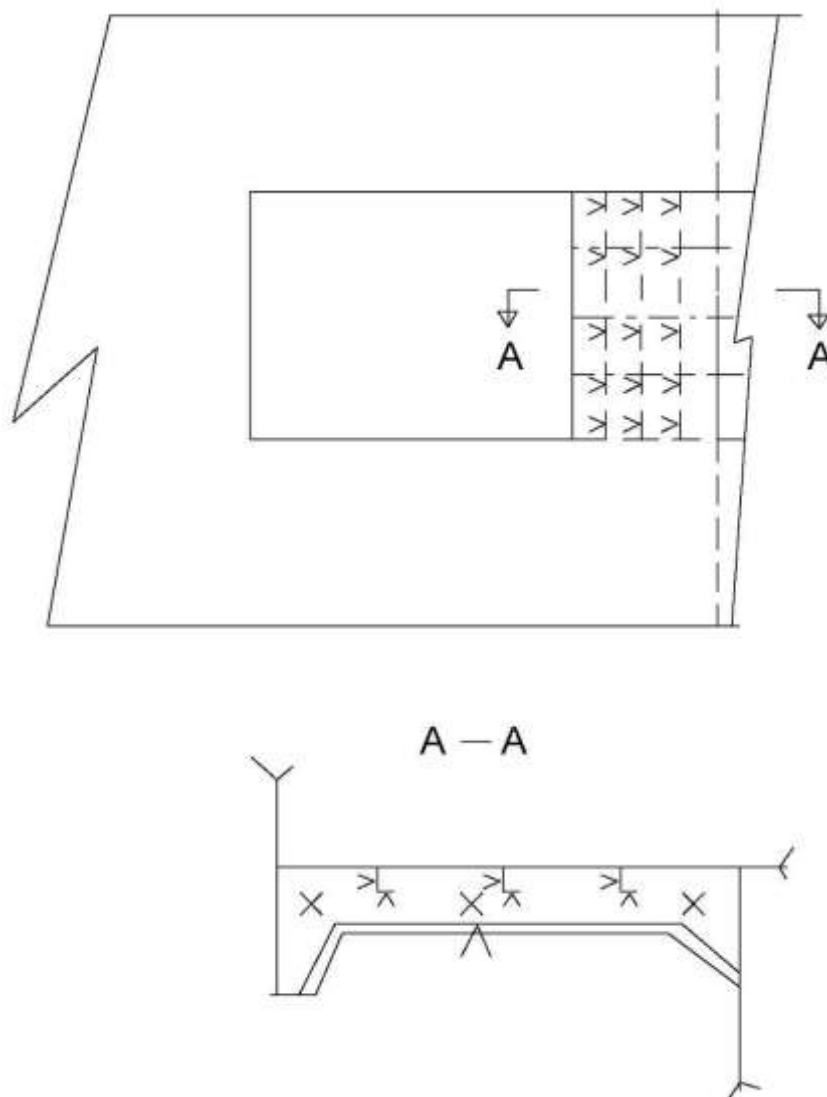


Figure 9: Locations of measurements on underdeck structure

7.34 Reporting

7.34.1 A thickness measurement report ~~should~~ **is to** be prepared and submitted to the Administration. The report ~~should~~ **is to** give the location of measurements, the thickness measured as well as corresponding original thickness. Furthermore, the report ~~should~~ **is to** give the date when the measurements were carried out, type of measuring equipment, names of personnel and their qualifications and be signed by the operator. The thickness measurement report ~~should~~ **is to** follow the principles as specified in the recommended procedures for thickness measurements set out in annex 8A/annex 8B.

7.34.2 The surveyor ~~should~~ **is to** review the final thickness measurement reports and countersign the cover page.

8 Acceptance Criteria

8.1 General

8.1.1 For ships built under IACS CSR, the acceptance criteria are according to IACS Common Structural Rules*, as applicable, and as specified in sections 8.2, 8.3 and 8.4.

8.1.2 For ships not built under IACS CSR, the acceptance criteria are according to the Rules of the individual classification society and/or specific IACS URs depending on ship's age and structural elements concerned, e.g. UR S18 for corrugated transverse watertight bulkheads, UR S19 for the transverse watertight corrugated bulkhead between cargo holds Nos. 1 and 2, and UR S21 for all cargo hatch covers and hatch forward and side coamings on exposed decks in position 1 (as defined in the International Convention on Load Lines, 1966), as applicable.

8.2 Acceptance criteria for pitting corrosion for ships built under IACS CSR

8.2.1 Side structures

8.2.1.1 If pitting intensity in an area where coating is required, according to IACS CSR,⁺⁴³ is higher than 15% (see figure 1), thickness measurements are to be performed to check the extent of pitting corrosion. The 15% is based on pitting or grooving on only one side of a plate.

8.2.1.2 In cases where pitting is exceeding 15%, as defined above, an area of 300 mm or more, at the most pitted part of the plate, is to be cleaned to bare metal and the thickness is to be measured in way of the five deepest pits within the cleaned area. The least thickness measured in way of any of these pits is to be taken as the thickness to be recorded.

8.2.1.3 The minimum remaining thickness in pits, grooves or other local areas is to be greater than 70% of the as-built thickness, in the side shell, hopper tank and topside tank plating attached to the each side frame, over a width up to 30 mm from each side of it, without being greater than the renewal thickness (t_{ren}).

8.2.2 Other structures

For plates with pitting intensity less than 20%, see figure 1, the measured thickness, t_m , of any individual measurement is to meet the lesser of the following criteria:

$$t_m \geq 0.7 (t_{as-built} - t_{vol add}) \text{ (mm); and}$$

$$t_m \geq t_{ren} - 1 \text{ (mm),}$$

where:

$t_{as-built}$ as-built thickness of the member, in mm;

$t_{vol add}$ voluntary thickness addition; thickness, in mm, voluntarily added as the owner's extra margin for corrosion wastage in addition to t_c ;

* Chapter 13 of IACS CSR for Bulk Carriers or Chapter 13 of Part 1 of IACS CSR BC & OT

⁺⁴³ Section 5 of Chapter 3 of IACS CSR for Bulk Carriers or Section 4 of Chapter 3 of Part 1 of IACS CSR BC&OT

t_{ren} renewal thickness; minimum allowable thickness, in mm, below which renewal of structural members is to be carried out;

t_c total corrosion addition, in mm, defined in IACS CSR^{+14*} and

t_m measured thickness, in mm, on one item, i.e. average thickness on one item using the various measurements taken on this same item during periodical surveys of ships in service ~~periodical ship's in service surveys.~~

The average thickness across any cross section in the plating is not to be less than the renewal criteria for general corrosion given in IACS CSR⁺, as applicable.

8.3 Acceptance criteria for edge corrosion for ships built under IACS CSR

8.3.1 Provided that the overall corroded height of the edge corrosion of the flange, or web in the case of flat bar stiffeners, is less than 25%, see figure 2, of the stiffener flange breadth or web height, as applicable, the measured thickness, t_m , is to meet the lesser of the following criteria:

$$t_m \geq 0.7 (t_{as-built} - t_{vol add}) \text{ (mm); and}$$

$$t_m \geq t_{ren} - 1 \text{ (mm).}$$

8.3.2 The average measured thickness across the breadth or height of the stiffener is not to be less than that defined in IACS CSR⁺¹⁵, as applicable.

8.3.3 Plate edges at openings for manholes, lightening holes, etc. may be below the minimum thickness given in IACS CSR⁺, as applicable, provided that:

.1 the maximum extent of the reduced plate thickness, from the opening edge, below the minimum, is not more than 20% of the smallest dimension of the opening and does not exceed 100 mm; and

.2 rough or uneven edges may be cropped-back provided that the maximum dimension of the opening is not increased by more than 10% and the remaining thickness of the new edge is not less than $t_{ren} - 1$ mm.

8.4 Acceptance criteria for grooving corrosion for ships built under IACS CSR

8.4.1 Where the groove breadth is a maximum of 15% of the web height, but not more than 30 mm, see figure 3, the measured thickness, t_m , in the grooved area is to meet the lesser of the following criteria:

$$t_m \geq 0.75 (t_{as-built} - t_{vol add}) \text{ (mm);}$$

$$t_m \geq t_{ren} - 0.5 \text{ (mm) and}$$

$$t_m \geq 6 \text{ mm.}$$

* ¹⁴ Section 3 of Chapter 3 of IACS CSR for Bulk Carriers or Section 3 of Chapter 3 Chapter 13 of Part 1 of IACS CSR BC&OT.

¹⁵ Chapter 13 of IACS CSR for Bulk Carriers or Chapter 13 of Part 1 of IACS CSR BC&OT.

8.4.2 Structural members with areas of grooving greater than those in paragraph 8.4.1 above are to be assessed based on the criteria for general corrosion as defined in IACS CSR¹, as applicable, using the average measured thickness across the plating/stiffener.

89 Reporting and evaluation of survey

89.1 Evaluation of survey report

89.1.1 The data and information on the structural condition of the ship collected during the survey ~~should are to~~ be evaluated for acceptability and continued structural integrity of the ship.

9.1.1.1 For bulk carriers built under IACS CSR, the ship's longitudinal strength is to be evaluated by using the thickness of structural members measured, renewed and reinforced, as appropriate, during the renewal surveys carried out after the ship reached 15 years of age (or during the renewal survey No. 3, if this is carried out before the ship reaches 15 years) in accordance with the criteria for longitudinal strength of the ship's hull girder for bulk carriers, specified in IACS CSR.

9.1.1.2 The final result of evaluation of the ship's longitudinal strength required in paragraph 9.1.1.1, after renewal or reinforcement work of structural members, if carried out as a result of initial evaluation, is to be reported as a part of the condition evaluation report (executive hull summary report).

89.1.2 The analysis of data ~~should is to~~ be carried out and endorsed by the Administration or recognized organization authorized by the Administration and the conclusions of the analysis ~~should are to~~ form a part of the condition evaluation report (executive hull summary report).

89.2 Reporting

89.2.1 Principles for survey reporting are shown in annex 6.

89.2.2 When a survey is split between different survey stations, a report ~~should is to~~ be made for each portion of the survey. A list of items examined and/or tested (pressure testing, thickness measurements, etc.) and an indication of whether the item has been credited, ~~should is to~~ be made available to the next attending surveyor(s), prior to continuing or completing the survey.

89.2.3 A condition evaluation report (executive hull summary report) of the survey and results ~~should are to~~ be issued to the owner as shown in annex 7 and placed on board the ship for reference at future surveys. The condition evaluation report (executive hull summary report) ~~should is to~~ be endorsed by the Administration or by the recognized organization on behalf of the Administration.

ANNEX 1

REQUIREMENTS FOR CLOSE-UP SURVEY AT RENEWAL SURVEYS

Appendix 1 – Minimum requirements for close-up survey at renewal survey of double-side skin bulk carriers excluding ore carriers

Age ≤ 5 years Renewal Survey No.1	5 < Age ≤ 10 years Renewal Survey No.2	10 < Age ≤ 15 years Renewal Survey No.3	Age > 15 years Renewal Survey No.4 and subsequent
<p>One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type. This is to include the foremost topside and double-side water ballast tanks on either side. (A)</p> <p>Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p> <p>All cargo hold hatch covers and coaming (plating and stiffeners). (D)</p>	<p>One transverse web with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>Forward and aft transverse bulkheads including stiffening system in a transverse section including topside, hopper side and double-side ballast tanks on one side of the ship (i.e. port or starboard). (A)</p> <p>25% of ordinary transverse web frames in the foremost double-side tanks. (B)</p> <p>25% of ordinary transverse frames for transverse framing systems or 25% of longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in the foremost double-side tanks. (B)</p> <p>One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)</p>	<p>All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>All transverse bulkheads including stiffening system in each water ballast tank. (A)</p> <p>25% of ordinary transverse web frames in all double-side tanks. (B)</p> <p>25% of ordinary transverse frames for transverse framing systems or 25% of longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in all double-side tanks. (B)</p> <p>All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. (C)</p> <p>All cargo hold hatch covers and coamings (plating and stiffeners). (D)</p> <p>All deck plating and under-deck structure inside line of hatch openings between all cargo hold hatches. (E)</p>	<p>All transverse webs with associated plating and longitudinals as applicable in each water ballast tank. (A)</p> <p>All transverse bulkheads including stiffening system in each water ballast tank. (A)</p> <p>All ordinary transverse frames in all double-side tanks. (B)</p> <p>All ordinary transverse frames for transverse framing systems or all longitudinals for longitudinal framing systems on side shell and inner side plating at forward, middle and aft parts in all double-side tanks. (B)</p> <p>Areas (C)–(E) as for column renewal survey No.3</p>

Age ≤ 5 years Renewal Survey No.1	5 < Age ≤ 10 years Renewal Survey No.2	10 < Age ≤ 15 years Renewal Survey No.3	Age > 15 years Renewal Survey No.4 and subsequent
	All cargo hold hatch covers and coamings (plating and stiffeners). (D) All deck plating and under-deck structure inside line of hatch openings between all cargo hold hatches. (E)		

(A), (B), (C), (D) and (E) are areas to be subjected to close-up surveys and thickness measurements (see sketches in appendix 3 to annex 8A/annex 8B).

- (A) Transverse web frame or watertight transverse bulkhead in topside, hopper side and double-side ballast tanks. In fore and aft peak tanks transverse web frame means a complete transverse web frame ring including adjacent structural members.
- (B) Ordinary transverse frame in double-side tanks.
- (C) Cargo hold transverse bulkhead, plating, stiffeners and girders.
- (D) Cargo hold hatch covers and coamings. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures.
- (E) Deck plating and under-deck structure inside line of hatch openings between cargo hold hatches.

Note: Close-up survey of transverse bulkheads should be carried out at four levels:

- Level (a) Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool.
- Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.
- Level (c) About mid-height of the bulkhead.
- Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.

Appendix 2

Minimum requirements for close-up survey at renewal survey for ore carriers

Age < 5 years	5 < Age ≤ 10 years	age > 10
Renewal Survey No.1	Renewal Survey No.2	Renewal Survey No.3 and subsequent
<p>One web frame ring complete including adjacent structural members in a ballast wing tank. (A)</p> <p>One transverse bulkhead lower part – including girder system and adjacent structural members – in a ballast tank. (A)</p>	<p>All web frame rings complete including adjacent structural members in a ballast wing tank. (A)</p> <p>One deck transverse including adjacent deck structural members in each remaining ballast tank. (A)</p> <p>Forward and aft transverse bulkheads complete – including girder system and adjacent structural members – in a ballast wing tank.</p> <p>One transverse bulkhead lower part – including girder system and adjacent structural members – in each remaining ballast tank. (A)</p>	<p>All web frame rings complete including adjacent structural members in each ballast tank. (A)</p> <p>All transverse bulkheads complete – including girder system and adjacent structural members – in each ballast tank. (A)</p> <p>One web frame ring complete including adjacent structural members in each wing void space. (A)</p> <p>Additional web frame rings in void spaces as deemed necessary by the Administration or organization recognized by the Administration. (A)</p>
<p>Two selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p>	<p>One transverse bulkhead in each cargo hold, including internal structure of upper and lower stools, where fitted. (C)</p>	<p>All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. (C)</p>
<p>All cargo hold hatch covers and coamings (plating and stiffeners). (D)</p>	<p>All cargo hold hatch covers and coamings (plating and stiffeners). (D)</p>	<p>All cargo hold hatch covers and coamings (plating and stiffeners). (D)</p>
	<p>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)</p>	<p>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches. (E)</p>

(A), (C), (D) and (E) are areas to be subjected to close-up surveys and thickness measurements (see sketches in appendix 3 to annex 8A/annex 8B).

(A) Transverse web frame or watertight transverse bulkhead in ballast wing tanks and void spaces. In fore and aft peak tanks transverse web frame means a complete transverse web frame ring including adjacent structural members.

(C) Cargo hold transverse bulkhead plating, stiffeners and girders.

(D) Cargo hold hatch covers and coamings. For cargo hold hatch covers of approved design which structurally have no access to the internals, close-up survey/thickness measurement shall be done of accessible parts of hatch covers' structures.

- (E) Deck plating and under deck structure inside line of hatch openings between cargo hold hatches.

Note: Close-up survey of transverse bulkheads ~~should~~ **is to** be carried out at four levels:

- Level (a) Immediately above the inner bottom and immediately above the line of gussets (if fitted) and shedders for ships without lower stool.
- Level (b) Immediately above and below the lower stool shelf plate (for those ships fitted with lower stools), and immediately above the line of the shedder plates.
- Level (c) About mid-height of the bulkhead.
- Level (d) Immediately below the upper deck plating and immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools, or immediately below the topside tanks.

ANNEX 2

MINIMUM REQUIREMENTS FOR THICKNESS MEASUREMENTS AT RENEWAL HULL SURVEY OF DOUBLE-SIDE SKIN BULK CARRIERS

Age ≤ 5 years	5 < Age ≤ 10 years	10 < Age ≤ 15 years	Age > 15 years
Renewal Survey No.1	Renewal Survey No.2	Renewal Survey No.3	Renewal Survey No.4 and subsequent
<p>1— Suspect areas</p>	<p>1— Suspect areas</p> <p>2— Within the cargo length area: two transverse sections of deck plating outside line of cargo hatch openings</p> <p>3— Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1/ appendix 1 or annex 1/ appendix 2 as applicable</p> <p>4— Wind and water strakes in way of the two transverse sections considered under point 2 above</p> <p>5— Selected wind and water strakes outside the cargo length area</p>	<p>1— Suspect areas</p> <p>2— Within the cargo length area: .1— each deck plate outside line of cargo hatch openings .2— two transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings</p> <p>3— Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to annex 1/appendix 1 or annex 1/ appendix 2 as applicable</p> <p>4— All wind and water strakes within the cargo length area</p> <p>5— Selected wind and water strakes outside the cargo length area</p>	<p>1— Suspect areas</p> <p>2— Within the cargo length area: .1— each deck plate outside line of cargo hatch openings .2— three transverse sections, one of which should be in the amidship area, outside line of cargo hatch openings .3— each bottom plate</p> <p>3— Point 3 referred to in column 3</p> <p>4— All wind and water strakes, full length</p>

Age ≤ 5 years	5 < Age ≤ 10 years	10 < Age ≤ 15 years	Age > 15 years
Renewal survey No.1	Renewal survey No.2	Renewal survey No.3	Renewal survey No.4 and subsequent
<p>1 Suspect areas</p>	<p>1 Suspect areas</p> <p>2 Within the cargo length area: two transverse sections of deck plating outside line of cargo hatch openings</p> <p>3 Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to appendices 1 or 2 to annex 1 as applicable</p> <p>4 Wind and water strakes in way of the two transverse sections considered under point 2 above</p> <p>5 Selected wind and water strakes outside the cargo length area</p>	<p>1 Suspect areas</p> <p>2 Within the cargo length area: .1 each deck plate outside line of cargo hatch openings .2 two transverse sections, one of which is to be in the amidship area, outside line of cargo hatch openings .3 All wind and water strakes within the cargo length area</p> <p>3 Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to appendices 1 or 2 to annex 1 as applicable</p> <p>4 Selected wind and water strakes outside the cargo length area</p>	<p>1 Suspect areas</p> <p>2 Within the cargo length area: .1 each deck plate outside line of cargo hatch openings .2 three transverse sections, one of which is to be in the amidship area, outside line of cargo hatch openings .3 each bottom plate</p> <p>3 Point 3 referred to in column 3</p> <p>4 All wind and water strakes, full length</p>

ANNEX 3

OWNER'S INSPECTION REPORT

Structural condition

Ship's name:

Owner's inspection report — Structural condition

For tank/hold No:

Grade of steel: deck: side:
bottom: longitudinal bulkhead:

Elements	Cracks	Buckles	Corrosion	Coating condition	Pitting	Modification/repair	Other
Deck:							
Bottom:							
Side:							
Side framing:							
Longitudinal bulkheads:							
Transverse bulkheads:							

Repairs carried out due to:

Thickness measurements carried out (dates):

Results in general:

Overdue surveys:

Outstanding conditions of class:

Comments:

Date of inspection:

Inspected by:

Signature:

Name of ship:

IMO number:

Port of registry:

Owner:

TANK/HOLD	Grade of steel	Cracks	Corrosion	Buckles	Coating condition	Pitting	Modification/repair	Other
TANK/HOLD No.								
Deck								
Bottom								
Side								
Side framing								
Longitudinal bulkheads								
Transverse bulkheads								

Repairs carried out due to:

Thickness measurements carried out (dates):

Results in general:

Overdue surveys:

Outstanding conditions of class:

Comments:

Inspected by			
	Name	Date of inspection	Signature

ANNEX 4A

SURVEY PROGRAMME

Basic information and particulars

Name of ship/Ship's name:
IMO number:
Flag State:
Port of registry:
Gross tonnage:
Deadweight (metric tonnes):
Length between perpendiculars (m):
Shipbuilder:
Hull number:
Recognized organization (RO):
RO ship identity:
Date of build of the ship:
Owner:
Thickness measurement company/firm:

1 Preamble

1.1 Scope

1.1.1 The present survey programme covers the minimum extent of overall surveys, close-up surveys, thickness measurements and pressure testing within the cargo length area, cargo holds, ballast tanks, including fore and aft peak tanks, required by the Code.

1.1.2 The arrangements and safety aspects of the survey ~~should~~ are to be acceptable to the attending surveyor(s).

1.2 Documentation

All documents used in the development of the survey programme ~~should~~ are to be available on board during the survey as required by section 6.

2 Arrangement of cargo holds, tanks and spaces

This section of the survey programme ~~should~~ is to provide information (either in the form of plans or text) on the arrangement of cargo holds, tanks and spaces that fall within the scope of the survey.

3 List of cargo holds, tanks and spaces with information on their use, extent of coatings and corrosion prevention system

This section of the survey programme ~~should~~ is to indicate any changes relating to (and ~~should~~ is to update) the information on the use of the holds and tanks of the ship, the extent of coatings and the corrosion prevention system provided in the survey planning questionnaire.

4 Conditions for survey

This section of the survey programme ~~should~~ **is to** provide information on the conditions for survey, e.g. information regarding cargo hold and tank cleaning, gas freeing, ventilation, lighting, etc.

5 Provisions and method of access to structures

This section of the survey programme ~~should~~ **is to** indicate any changes relating to (and ~~should~~ **is to** update) the information on the provisions and methods of access to structures provided in the survey planning questionnaire.

6 List of equipment for survey

This section of the survey programme ~~should~~ **is to** identify and list the equipment that will be made available for carrying out the survey and the required thickness measurements.

7 Survey requirements

7.1 Overall survey

This section of the survey programme ~~should~~ **is to** identify and list the spaces that ~~should~~ **is are to** undergo an overall survey for this ship in accordance with 2.5.1.

7.2 Close-up survey

This section of the survey programme ~~should~~ **is to** identify and list the hull structures that ~~should~~ **is are to** undergo a close-up survey for this ship in accordance with 2.5.2.

8 Identification of tanks for tank testing

This section of the survey programme ~~should~~ **is to** identify and list the cargo holds and tanks that ~~should~~ **is are to** undergo tank testing for this ship in accordance with 2.7.

9 Identification of areas and sections for thickness measurements

This section of the survey programme ~~should~~ **is to** identify and list the areas and sections where thickness measurements ~~should~~ **is are to** be taken in accordance with 2.6.1.

10 Minimum thickness of hull structures

This section of the survey programme ~~should~~ **is to** specify the minimum thickness for hull structures of this ship that are subject to survey, ~~according to .1 or .2~~ (indicate either (a) or preferably (b), if such information is available):

~~.1~~ **(a)** Determined from the attached wastage allowance table and the original thickness ~~from~~ the hull structure plans of the ship;

~~.2~~ **(b)** Given in the following table(s):

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Deck			
Plating			
Longitudinals			
Longitudinal girders			
Cross deck plating			
Cross deck stiffeners			
Bottom			
Plating			
Longitudinals			
Longitudinal girders			
Inner bottom			
Plating			
Longitudinals			
Longitudinal girders			
Floors			
Ship side in way of topside tanks			
Plating			
Longitudinals			
Ship side in way of hopper side tanks			
Plating			
Longitudinals			
Ship side in way of double-hull tanks (if applicable)			
Plating			
Longitudinals or ordinary transverse frames			
Longitudinal stringers			
Longitudinal bulkhead inner side (if applicable)			
Plating			
Longitudinals (if applicable)			
Longitudinals or ordinary transverse frames			
Longitudinal girders (if applicable)			
Transverse bulkheads			
Plating			
Stiffeners (if applicable)			
Upper stool plating			
Upper stool stiffeners			
Lower stool plating			
Lower stool stiffeners			
Transverse web frames in topside tanks			
Plating			
Flanges			
Stiffeners			

Area or location	Original as-built thickness (mm)	Minimum thickness (mm)	Substantial corrosion thickness (mm)
Transverse web frames in hopper tanks			
Plating			
Flanges			
Stiffeners			
Transverse web frames in double-side tanks			
Plating			
Flanges			
Stiffeners			
Hatch covers			
Plating			
Stiffeners			
Hatch coamings			
Plating			
Stiffeners			

Note: The wastage allowance tables ~~should~~ **is to** be attached to the survey programme. For ships built under IACS CSR, the renewal thickness of the hull structure elements is indicated in the appropriate drawings.

11 Thickness measurement ~~company~~ firm

This section of the survey programme ~~should~~ **is to** identify changes, if any, relating to the information on the thickness measurement ~~company~~ firm provided in the survey planning questionnaire.

12 Damage experience related to the ship

This section of the survey programme ~~should~~ **is to**, using the tables provided below, provide details of the hull damages for at least the last three years in way of the cargo holds, ballast tanks and void spaces within the cargo length area, using the tables provided below. These damages are subject to survey.

Hull damages sorted by location for this ship

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

Hull damages for sister or similar ships (if available) in the case of design-related damage

Cargo hold, tank or space number or area	Possible cause, if known	Description of the damages	Location	Repair	Date of repair

13 Areas identified with substantial corrosion from previous surveys

This section of the survey programme ~~should is to~~ identify and list the areas of substantial corrosion from previous surveys.

14 Critical structural areas and suspect areas

This section of the survey programme ~~should is to~~ identify and list the critical structural areas and the suspect areas, when such information is available.

15 Other relevant comments and information

This section of the survey programme ~~should is to~~ provide any other comments and information relevant to the survey.

Appendices

Appendix 1 – List of plans

The provisions of 5.1.3.2 require that the main structural plans of cargo holds and ballast tanks (scantling drawings), including information regarding the use of high-tensile steel (HTS), ~~should is to~~ be available. This appendix of the survey programme ~~should is to~~ identify and list the main structural plans which form part of the survey programme.

Appendix 2 – Survey planning questionnaire

The survey planning questionnaire (annex 4B), which has been submitted by the owner, ~~should is to~~ be appended to the survey programme.

Appendix 3 – Other documentation

This part of the survey programme ~~should is to~~ identify and list any other documentation that forms part of the plan.

Prepared by the owner in cooperation with the Administration for compliance with 5.1.3.

Date:

(name and signature of authorized owner's representative)

Date:

(name and signature of authorized representative of the Administration)

ANNEX 4B

SURVEY PLANNING QUESTIONNAIRE

~~1~~ The following information will enable the owner, in cooperation with the Administration, to develop a survey programme complying with the requirements of the Code. It is essential that the owner provides, when completing the present questionnaire, up-to-date information. The present questionnaire, when completed, ~~should~~ **is to** provide all information and material required by the Code.

1 Particulars

Ship's name:
IMO number:
Flag State:
Port of registry:
Owner:
Recognized organization:
RO Ship identity:
Gross tonnage:
Deadweight (metric tonnes):
Date of build:

2 Information on access provision for close-up surveys and thickness measurement

~~2~~ The owner ~~should~~ **is to** indicate, in the table below, the means of access to the structures subject to close-up survey and thickness measurement. A close-up survey is an examination where the details of structural components are within the close visual inspection range of the attending surveyor, i.e. normally within reach of hand.

Hold/Tank No.	Structure	Permanent means of access	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
F.P.	Fore peak						
A.P.	Aft peak						
Cargo holds	Hatch side coamings						
	Topside sloping plate						
	Upper stool plating						
	Cross deck						
	Double-side tank plating						
	Transverse bulkhead						
	Hopper tank plating						
	Lower stool plating						
	Tank top						
Topside tanks	Under-deck structure						
	Side shell and structure						
	Sloping plate and structure						
	Webs and bulkheads						
Hopper tanks	Hopper sloping plate and structure						
	Side shell and structure						
	Bottom structure						
	Webs and bulkheads						
Double-side tanks	Side shell and structure						
	Inner skin and structure						
	Webs and bulkheads						
	Double-bottom structure						
	Upper stool internal structure						
	Lower stool internal structure						

Hold/Tank No.	Structure	Permanent means of access	Temporary staging	Rafts	Ladders	Direct access	Other means (please specify)
Wing tanks of ore carriers	Underdeck and structure						
	Side shell and structure						
	Side shell vertical web and structure						
	Longitudinal bulkhead and structure						
	Longitudinal bulkhead web and structure						
	Bottom plating and structure						
	Cross ties/stringers						

History of bulk cargoes of a corrosive nature (e.g. high-sulphur content)

3 Owner's inspections

3 Using a format similar to that of the table below (which is given as an example), the owner should provide details of the results of their inspections, for the last three years in accordance with the Code on all CARGO holds and BALLAST tanks and VOID spaces within the cargo area.

Tank/Hold No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo holds					
Topside tanks					
Hopper tanks					
Double-side skin-tanks					
Double-bottom tanks					
Upper stools					
Lower stools					
Wing tanks (ore tankers)					
Fore peak					
Aft peak					
Miscellaneous other spaces:					

Note:

Indicate tanks which are used for oil/ballast.

- 1) HC = hard coating; SC = soft coating;
SH = semi-hard coating; NP = no protection
- 2) U = upper part; M = middle part;
L = lower part; C = complete
- 3) G = good; F = fair; P = poor;
RC = recoated (during the last three years)
- 4) N = no findings recorded; Y = findings recorded,
description of findings should be attached to this questionnaire
- 5) DR = damage & repair; L = leakages;
CV = conversion (description to be attached to this questionnaire)

Name of owner's representative:
Signature:
Date:

Reports of port State control inspections

List the reports of port State control inspections containing hull structural related deficiencies, and relevant information on rectification of the deficiencies:

Safety management system

List non-conformities related to hull maintenance, including the associated corrective actions:

Name and address of the approved thickness measurement companyfirm

ANNEX 5

PROCEDURES FOR APPROVAL AND CERTIFICATION OF A COMPANYFIRM ENGAGED IN THICKNESS MEASUREMENT OF HULL STRUCTURES

1 Application

This guidance applies for certification of the companyfirm which intends to engage in the thickness measurement of hull structures of ships.

2 Procedures for approval and certification

Submission of documents

2.1 The following documents ~~should are to~~ be submitted to an organization recognized by the Administration for approval:

- .1 outline of the companyfirm, e.g. organization and management structure;
- .2 experience of the companyfirm on thickness measurement of hull structures of ships;
- .3 technicians' careers, i.e. experience of technicians as thickness measurement operators, technical knowledge and experience of hull structure, etc. Operators ~~should are to~~ be qualified according to a recognized industrial NDT Standard;
- .4 equipment used for thickness measurement such as ultrasonic testing machines and their maintenance/calibration procedures;
- .5 a guide for thickness measurement operators;
- .6 training programmes for technicians for thickness measurement;
- .7 measurement record format in accordance with recommended procedures for thickness measurements (see annex 8A/annex 8B).

Auditing of the companyfirm

2.2 Upon reviewing the documents submitted with satisfactory results, the companyfirm ~~should is to~~ be audited in order to ascertain that the companyfirm is duly organized and managed in accordance with the documents submitted, and eventually is capable of conducting thickness measurement of the hull structure of ships.

2.3 Certification is conditional upon an onboard demonstration of thickness measurement as well as satisfactory reporting.

3 Certification

3.1 Upon satisfactory results of both the audit of the companyfirm referred to in 2.2 and the demonstration tests referred to in 2.3, the Administration or organization recognized by the Administration ~~should is to~~ issue a certificate of approval as well as a notice to the effect that the thickness measurement operation system of the companyfirm has been certified.

3.2 Renewal/endorsement of the certificate ~~should~~ **is to** be made at intervals not exceeding three years by verification that original conditions are maintained.

4 ~~Report of Information about~~ any alteration to the certified thickness measurement operation system

In cases where any alteration to the certified thickness measurement operation system of the ~~company~~ **firm** is made, such an alteration ~~should~~ **is to** be immediately ~~reported~~ **informed** to the organization recognized by the Administration. Re-audit ~~should~~ **is to** be made where deemed necessary by the organization recognized by the Administration.

5 ~~Withdrawal of the certification~~ **Cancellation of approval**

~~The certification may be~~ **Approval may be cancelled and the certification** withdrawn in the following cases:

- .1 where the measurements were improperly carried out or the results were improperly reported;
- .2 where the surveyor found any deficiencies in the approved thickness measurement operation systems of the ~~company~~ **firm**; and
- .3 where the ~~company~~ **firm** failed to ~~report~~ **informed** of any alteration referred to in 4 to the organization recognized by the Administration as required.

ANNEX 6

SURVEY REPORTING PRINCIPLES

As a principle, for oil tankers subject to the Code, the surveyor should include the following contents in his report for survey of hull structure and piping systems, as relevant for the survey. As a principle, for bulk carriers subject to this Code, the surveyor(s) are to include the following contents in the report for survey of hull structure and piping systems, as relevant for the survey. The structure of the reporting content may be different, depending on the reporting system of the Administration or by the recognized organization acting on behalf of the Administration.

1 General

1.1 A survey report ~~should~~ **is to** be generated in the following cases:

- .1 in connection with commencement, continuation and/or completion of periodical hull surveys, i.e. annual, intermediate and renewal surveys, as relevant;
- .2 when structural damages/defects have been found;
- .3 when repairs, renewals or modifications have been carried out; and
- .4 when condition of class (recommendation) has been imposed or has been deleted.

1.2 The reporting ~~should~~ **is to** provide:

- .1 evidence that prescribed surveys have been carried out in accordance with applicable requirements;
- .2 documentation of surveys carried out with findings, repairs carried out and condition of class (recommendation) imposed or deleted;
- .3 survey records, including actions taken, which ~~should~~ **are to** form an auditable documentary trail. Survey reports ~~should~~ **are to** be kept in the survey report file required to be on board;
- .4 information for planning of future surveys; and
- .5 information which may be used as input for maintenance of classification rules and instructions.

1.3 When a survey is split between different survey stations, a report ~~should~~ **is to** be made for each portion of the survey. A list of items surveyed, relevant findings and an indication of whether the item has been credited, ~~should~~ **are to** be made available to the next attending surveyor, prior to continuing or completing the survey. Thickness measurement and tank testing carried out ~~should~~ **are** also **to** be listed for the next surveyor.

2 Extent of the survey

2.1 Identification of compartments where an overall survey has been carried out.

2.2 Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where a close-up survey has been carried out, together with information on the means of access used.

2.3 Identification of locations, in each ballast tank and cargo hold including hatch covers and coamings, where thickness measurement has been carried out.

Note: As a minimum, the identification of location of close-up survey and thickness measurement ~~should is to~~ include a confirmation with description of individual structural members corresponding to the extent of requirements stipulated in part B of annex A based on type of periodical survey and the ship's age.

Where only partial survey is required, e.g. one transverse web, two selected cargo hold transverse bulkheads, the identification ~~should is to~~ include location within each ballast tank and cargo hold by reference to frame numbers.

2.4 For areas in ballast tanks and cargo holds where protective coating is found to be in good condition and the extent of close-up survey and/or thickness measurement has been specially considered, structures subject to special consideration ~~should are to~~ be identified.

2.5 Identification of tanks subject to tank testing.

2.6 Identification of piping systems on deck and within cargo holds, ballast tanks, pipe tunnels, cofferdams and void spaces where:

- .1 examination including internal examination of piping with valves and fittings and thickness measurement, as relevant, has been carried out; and
- .2 operational test to working pressure has been carried out.

3 Result of the survey

3.1 Type, extent and condition of protective coating in each tank, as relevant (rated GOOD, FAIR or POOR).

3.2 Structural condition of each compartment with information on the following, as relevant:

- .1 identification of findings, such as:
 - .1 corrosion with description of location, type and extent;
 - .2 areas with substantial corrosion;
 - .3 cracks/fractures with description of location and extent;
 - .4 buckling with description of location and extent; and
 - .5 indents with description of location and extent;
- .2 identification of compartments where no structural damages/defects are found. The report may be supplemented by sketches/photos; and

- .3 thickness measurement report ~~should~~ ~~is to~~ be verified and signed by the surveyor controlling the measurements on board.

4 Actions taken with respect to findings

4.1 Whenever the attending surveyor is of the opinion that repairs are required, each item to be repaired ~~should~~ ~~is to~~ be identified in a ~~numbered list~~ survey report. Whenever repairs are carried out, details of the repairs effected ~~should~~ ~~are to~~ be reported by making specific reference to relevant items in the ~~numbered list~~ survey report.

4.2 Repairs carried out ~~should~~ ~~are to~~ be reported with identification of:

- .1 compartment;
- .2 structural member;
- .3 repair method (i.e. renewal or modification), including:
 - .1 steel grades and scantlings (if different from the original); and
 - .2 sketches/photos, as appropriate;
- .4 repair extent; and
- .5 non-destructive test (NDT)/tests.

4.3 For repairs not completed at the time of survey, condition of class/recommendation ~~should~~ ~~is to~~ be imposed with a specific time limit for the repairs. In order to provide correct and proper information to the surveyor attending for survey of the repairs, condition of class/recommendation ~~should~~ ~~is to~~ be sufficiently detailed with identification of each item to be repaired. For identification of extensive repairs, reference may be ~~made~~ ~~given~~ to the survey report.

ANNEX 7

CONDITION EVALUATION REPORT (EXECUTIVE HULL SUMMARY REPORT)

Issued upon completion of renewal survey

General particulars

Ship's name: Class/Administration identity number: Administration/
recognized organization identity number:
Previous class/Administration identity number(s): Previous
Administration/recognized organization identity number(s):
IMO number:

Port of registry: National flag:
Previous national flag(s):

Deadweight (metric tonnes): Gross tonnage:
National:
ITC (1969):

Date of build: Classification notation:

Date of major conversion:

Type of conversion: Owner:
Previous owner(s):

1 The survey reports and documents listed below have been reviewed by the undersigned and found to be satisfactory.

2 A summary of the survey is attached herewith on sheet 2.

3 The renewal survey has been completed in accordance with the present Code on (date)

Condition evaluation report (executive hull summary report) completed by	Name Signature	Title
Office	Date	
Condition evaluation report (executive hull summary report) verified by	Name Signature	Title
Office	Date	

Attached reports and documents:

- 1)
- 2)
- 3)
- 4)
- 5)
- 6)

Contents of condition evaluation report (executive hull summary report)

- Part 1 – General particulars: - See front page
- Part 2 – Report review: - Where and how survey was done
- Part 3 – Close-up survey: - Extent (which tanks/holds)
- Part 4 – Thickness measurements: - Reference to thickness measurement report
 - Summary of where measured
 - Separate form indicating the spaces/areas with substantial corrosion, and corresponding:
 - thickness diminution
 - corrosion pattern
- Part 5 – Tank/hold corrosion prevention system: - Separate form indicating:
 - location of coating
 - condition of coating (if applicable)
- Part 6 – Repairs: - Identification of spaces/areas
- Part 7 – Condition of class (recommendations)/flag
State requirements:
- Part 8 – Memoranda:
 - Acceptable defects
 - Any points of attention for future surveys, e.g. for suspect areas
 - Extended annual/intermediate survey due to coating breakdown
- Part 9 – Conclusion: - Statement on evaluation/verification of survey report

Extract of thickness measurements for ships not built under IACS CSR

Reference is made to the thickness measurement report:

Position of substantially corroded tanks/areas ¹ or areas with deep pitting ³	Thickness diminution [%]	Corrosion pattern ²	Remarks: (e.g. reference to attached sketches)

Notes:

- ¹ Substantial corrosion, i.e. 75 to 100% of acceptable margins wasted.
- ² P = Pitting
C = Corrosion in general
- ³ Any bottom plating with a pitting intensity of 20% or more, with wastage in the substantial corrosion range or having an average depth of pitting of 1/3 or more of actual plate thickness ~~should~~ **is to** be noted.

Extract of thickness measurements for ships built under IACS CSR

Reference is made to the thickness measurements report:

Position of substantially corroded tanks/areas ¹ or areas with deep pitting	$t_m - t_{ren}$ (mm)	Corrosion pattern ²	Remarks (e.g. reference to attached sketches)

Notes:

- 1 Substantial corrosion, an extent of corrosion such that the assessment of the corrosion pattern indicates a measured thickness between $t_{ren} + 0.5$ mm and t_{ren} .
- 2 P = Pitting
C = Corrosion in general
Areas with deep pitting assessed according to section 8.2 are to be recorded in this column.

Tank/hold corrosion prevention system protection

Tank/hold Nos. ¹	Tank/hold corrosion prevention protection system ²	Coating condition ³	Remarks

Notes:

- 1 All ballast tanks and cargo holds ~~should~~ are to be listed.
- 2 C = Coating NP = No protection
- 3 Coating condition according to the following standard:

GOOD condition with only minor spot rusting.

FAIR condition with local breakdown of coating at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.

POOR condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.

If coating condition POOR is given, extended annual surveys ~~should~~ are to be introduced. This ~~should~~ is to be noted in part 8 of the contents of condition evaluation report (executive hull summary report).

ANNEX 8A

**RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS OF
DOUBLE-SIDE SKIN BULK CARRIERS NOT BUILT UNDER IACS CSR***

1 This annex should be used for recording thickness measurements as required by part B of annex A.

2 Thickness measurement sheet forms TM1-DSBC, TM2-DSBC(i), TM2-DSBC(ii), TM3-DSBC, TM4-DSBC, TM5-DSBC and TM6-DSBC (appendix 2) should be used, as appropriate, for recording thickness measurements. The maximum allowable diminution should be stated. The maximum allowable diminution could be stated in an attached document.

3 Appendix 3 contains guidance diagrams and notes relating to the reporting forms and the procedure for the thickness measurements.

4 The reporting forms should, where appropriate, be supplemented by data presented on structural sketches.

* This annex is recommendatory.

Appendix 1

THICKNESS MEASUREMENT REPORT-GENERAL PARTICULARS

Ship's name:
IMO number:
Class/Administration identity number:
Port of registry:
Gross tonnage:
Deadweight:
Date of build:
Classification society:

Name of **companyfirm** performing thickness measurement:
.....
Thickness measurement **companyfirm** certified by:
Certificate number:
Certificate valid from: to
Place of measurement:
First date of measurement:
Last date of measurement:
Renewal survey/intermediate survey* due:
Details of measurement equipment:
Qualification of operator:

Report number:	consisting of pages
Name of operator:	Name of surveyor:
Signature of operator:	Signature of surveyor:
CompanyFirm official stamp:	Administration:

Official stamp

* Delete as appropriate.

Appendix 2

REPORTS ON THICKNESS MEASUREMENT

Report on thickness measurement of all deck plating, bottom shell plating and side shell plating* (TM1-DSBC)

Ship's name..... Class Identity No..... Report No..... IMO number.....

STRAKE POSITION	PLATE POSITION	No. of letter	Orig. thk. (mm)	Forward reading						Aft reading						Mean diminution		
				Gauged		Diminution P		Diminution S		Gauged		Diminution P		Diminution S		%		
				P	S	mm	%	mm	%	P	S	mm	%	mm	%	P	S	mm
	12th forward																	
	11th																	
	10th																	
	9th																	
	8th																	
	7th																	
	6th																	
	5th																	
	4th																	
	3rd																	
	2nd																	
	1st																	
	Amidships																	
	1st aft																	
	2nd																	
	3rd																	
	4th																	
	5th																	
	6th																	
	7th																	
	8th																	
	9th																	
	10th																	
	11th																	
	12th																	

Operator's signature..... Notes — see following page

* Delete as appropriate.

TM1-DSBC

Report on thickness measurement of all deck plating, bottom shell plating and side shell plating

Ship's name..... IMO number..... Class identity No..... Report No.....

STRAKE POSITION																	
	PLATE POSITION	No. or letter	Org. thk. mm	Forward reading				Aft reading				Mean diminution mm		Maximum allowable diminution mm			
				Gauged		Diminution P		Diminution S		Gauged		Diminution P			Diminution S		
				P	S	mm	%	mm	%	P	S	mm	%		mm	%	P
12th forward																	
11th																	
10th																	
9th																	
8th																	
7th																	
6th																	
5th																	
4th																	
3rd																	
2nd																	
1st																	
Amidships																	
1st aft																	
2nd																	
3rd																	
4th																	
5th																	
6th																	
7th																	
8th																	
9th																	
10th																	
11th																	
12th																	

Operator's signature.....

Notes – see following page

* Delete as appropriate.

Notes to report TM1-DSBC:

- 1 This report should be used for recording the thickness measurement of:
 - .1 all strength deck plating within cargo length area;
 - .2 all keel, bottom shell plating and bilge plating within the cargo length area;
 - .3 side shell plating including selected wind and water strakes outside cargo length area; and
 - .4 all wind and water strakes within cargo length area.
- 2 The strake position should be cleared as follows:
 - .1 for strength deck indicate the number of the strake of plating inboard from the stringer plate;
 - .2 for bottom plating indicate the number of the strake of plating outboard from the keel plate; and
 - .3 for side shell plating give number of the strake of plating below sheerstrake and letter as shown on shell expansion.
- 3 Only the deck plating strakes outside line of openings are to be recorded.
- 4 Measurements should be taken at the forward and aft areas of all plates and where plates cross ballast/cargo tank boundaries separate measurements for the area of plating in way of each type of tank should be recorded.
- 5 The single measurements recorded should represent the average of multiple measurements.
- 6 The maximum allowable diminution could be stated in an attached document.

**Report on thickness measurement of shell and deck plating at transverse sections (one, two or three transverse sections)
(TM2-DSBC(ii))**

Ship's name..... Class Identity No..... Report No..... IMO number.....

STRENGTH DECK AND SHEERSTRAKE PLATING																											
		FIRST TRANSVERSE SECTION AT FRAME NUMBER.....								SECOND TRANSVERSE SECTION AT FRAME NUMBER.....								THIRD TRANSVERSE SECTION AT FRAME NUMBER.....									
STRAKE POSITION	No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S	
				P	S	mm	%	mm	%				P	S	mm	%	mm	%				P	S	mm	%	mm	%
Stringer plate																											
1st strake inboard																											
2nd																											
3rd																											
4th																											
5th																											
6th																											
7th																											
8th																											
9th																											
10th																											
11th																											
12th																											
13th																											
14th																											
centre strake																											
sheerstrake																											
TOPSIDE																											
TOTAL																											

Operator's signature..... Notes — see following page

TM2-DSBC(i)

**Report on thickness measurement of shell and deck plating at transverse sections
(one, two or three transverse sections)**

Ship's name..... IMO number..... Class identity No..... Report No.....

STRENGTH DECK AND SHEERSTRAKE PLATING																											
		FIRST TRANSVERSE SECTION AT FRAME NUMBER....								SECOND TRANSVERSE SECTION AT FRAME NUMBER....								THIRD TRANSVERSE SECTION AT FRAME NUMBER....									
STRAKE POSITION	No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S	
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%
Stringer plate																											
1st strake inboard																											
2nd																											
3rd																											
4th																											
5th																											
6th																											
7th																											
8th																											
9th																											
10th																											
11th																											
12th																											
13th																											
14th																											
centre strake																											
sheerstrake																											
TOPSIDE																											
TOTAL																											

Operator's signature.....

Notes – see following page

Notes to report TM2-DSBC(i):

- 1 This report should be used for recording the thickness measurement of:

Strength deck plating and sheerstrake plating transverse sections:

One, two or three sections within the cargo length area, comprising of the structural items (1), (2) and (3) as shown on the diagrams of typical transverse sections (appendix 3).
- 2 Only the deck plating strakes outside line of hatch openings should be recorded.
- 3 The top side area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).
- 4 The exact frame station of measurement should be stated.
- 5 The single measurements recorded should represent the average of multiple measurements.
- 6 The maximum allowable diminution could be stated in an attached document.

**Report on thickness measurement of shell and deck plating at transverse sections (one, two or three transverse sections)
(TM2-DSBC(ii))**

Ship's name..... Class Identity No..... Report No..... IMO number.....

SHELL PLATING																												
		FIRST TRANSVERSE SECTION AT FRAME NUMBER....								SECOND TRANSVERSE SECTION AT FRAME NUMBER....								THIRD TRANSVERSE SECTION AT FRAME NUMBER....										
STRAKE POSITION	No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		No. of letter	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		
				P	S	mm	%	mm	%				P	S	mm	%	mm	%				P	S	mm	%	mm	%	
1st below sheerstrake																												
2nd																												
3rd																												
4th																												
5th																												
6th																												
7th																												
8th																												
9th																												
10th																												
11th																												
12th																												
13th																												
14th																												
15th																												
16th																												
17th																												
18th																												
19th																												
20th																												
keel strake																												
BOTTOM TOTAL																												

Operator's signature..... Notes — see following page

TM2-DSBC(ii)

**Report on thickness measurement of shell and deck plating at transverse sections
(one, two or three transverse sections)**

Ship's name..... IMO number..... Class identity No..... Report No.....

SHELL PLATING																												
FIRST TRANSVERSE SECTION AT FRAME NUMBER....							SECOND TRANSVERSE SECTION AT FRAME NUMBER....							THIRD TRANSVERSE SECTION AT FRAME NUMBER....														
STRAKE POSITION	No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		No. or letter	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%	
1st below sheerstrake																												
2nd																												
3rd																												
4th																												
5th																												
6th																												
7th																												
8th																												
9th																												
10th																												
11th																												
12th																												
13th																												
14th																												
15th																												
16th																												
17th																												
18th																												
19th																												
20th																												
keel strake																												
BOTTOM TOTAL																												

Operator's signature.....

Notes – see following page

Notes to report TM2-DSBC(ii):

- 1 This report should be used for recording the thickness measurement of:

Shell plating at transverse sections:

One, two or three sections within the cargo length area, comprising of the structural items (3), (4), (5) and (6) as shown on the diagrams of typical transverse sections in appendices 3 and 4.
- 2 The bottom area comprises keel, bottom and bilge plating.
- 3 The exact frame station of measurement should be stated.
- 4 The single measurements recorded should represent the average of multiple measurements.
- 5 The maximum allowable diminution could be stated in an attached document.

**Report on thickness measurement of longitudinal members at transverse sections (one, two or three transverse sections)
(TM3-DSBC)**

Ship's name..... Class Identity No..... Report No..... IMO number.....

STRUCTURAL MEMBER	FIRST TRANSVERSE SECTION AT FRAME NUMBER....								SECOND TRANSVERSE SECTION AT FRAME NUMBER....								THIRD TRANSVERSE SECTION AT FRAME NUMBER....										
	Item no.	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		Item no.	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S		Item no.	Orig. thk (mm)	Max allow. dimin. (mm)	Gauged		Diminution P		Diminution S	
				P	S	mm	%	mm	%				P	S	mm	%	mm	%				P	S	mm	%	mm	%

Operator's signature..... Notes — see following page

TM3-DSBC

**Report on thickness measurement of longitudinal members at transverse sections
(one, two or three transverse sections)**

Ship's name..... IMO number..... Class identity No..... Report No.....

STRUCTURAL MEMBER	FIRST TRANSVERSE SECTION AT FRAME NUMBER.....						SECOND TRANSVERSE SECTION AT FRAME NUMBER.....						THIRD TRANSVERSE SECTION AT FRAME NUMBER.....															
	Item No.	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		Item No.	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		Item No.	Orig. thk	Max allow. dimin.	Gauged		Diminution P		Diminution S		
		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%		mm	mm	P	S	mm	%	mm	%	

Operator's signature..... Notes – see following page

Notes to report TM3-DSBC:

- 1 This report should be used for recording the thickness measurement of:

Longitudinal members at transverse sections:

Two, or three sections within the cargo length area comprising of the appropriate structural items (10) to (25) as shown on diagrams of typical transverse sections in appendices 3 and 4.
- 2 The exact frame station of measurement should be stated.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.

Report on thickness measurement of transverse structural members in the double-bottom, hopper side and topside water ballast tanks (TM4-DSBC)

Ship's name..... Class Identity No..... Report No..... IMO number.....

TANK DESCRIPTION:

LOCATION OF STRUCTURE:

STRUCTURAL MEMBER	ITEM	Original thickness (mm)	Max. allow. dimin. (mm)	Gauged		Diminution P		Diminution S	
				Port	Starboard	mm	%	mm	%

Operator's signature..... Notes — see following page

TM4-DSBC

**Report on thickness measurement of transverse structural members in the double-bottom,
 hopper side and topside water ballast tanks**

Ship's name..... IMO number..... Class identity No..... Report No.....

TANK DESCRIPTION:									
LOCATION OF STRUCTURE:									
STRUCTURAL MEMBER	ITEM	Original thickness mm	Max. allow. dimin. mm	Gauged		Diminution P		Diminution S	
				Port	Starboard	mm	%	mm	%

Operator's signature.....

Notes – see following page

Notes to report TM4-DSBC:

- 1 This report should be used for recording the thickness measurement of:

Transverse structural members, comprising of the appropriate structural items (30) to (34) as shown on diagrams of typical transverse sections illustrated in appendices 3 and 4.
- 2 Guidance for areas of measurements is indicated in appendix 53.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.

Report on thickness measurement of watertight transverse bulkheads in cargo holds (TM5-DSBC)

Ship's name..... Class Identity No..... Report No..... IMO number.....

LOCATION OF STRUCTURE:

FRAME NO:

STRUCTURAL COMPONENT (PLATING/STIFFENER)

	Original thickness	Max. allow. dimin.	Gauged		Diminution		Diminution	
	(mm)	(mm)	P	S	mm	%	mm	%

Operator's signature.....

Notes see following page

TM5-DSBC

Report on thickness measurement of watertight transverse bulkheads in cargo holds

Ship's name..... IMO number..... Class identity No..... Report No.....

LOCATION OF STRUCTURE:				FRAME NO:				
STRUCTURAL COMPONENT (PLATING/STIFFENER)								
	Original thickness	Max. allow. dimin.	Gauged		Diminution P		Diminution S	
	mm	mm	P	S	mm	%	mm	%

Operator's signature.....

Notes – see following page

Notes to report TM5-DSBC:

- 1 This report should be used for recording the thickness measurement of:
Watertight transverse bulkheads in cargo holds.
- 2 Guidance for areas of measurements is indicated in appendix 3.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.

Report on thickness measurement of miscellaneous structural members (TM6-DSBC)

Ship's name..... Class Identity No..... Report No..... IMO number.....

STRUCTURAL MEMBER: LOCATION OF STRUCTURE:									SKETCH
DESCRIPTION	Orig. thk.	Max. allow. dimin.	Gauged		Diminution P		Diminution S		
	mm	mm	P	Q	mm	%	mm	%	

Operator's signature..... Notes — see following page

TM6-DSBC

Report on thickness measurement of miscellaneous structural members

Ship's name..... IMO number..... Class identity No..... Report No.....

STRUCTURAL MEMBER:										SKETCH
LOCATION OF STRUCTURE:										
DESCRIPTION	Orig. thk.	Max. allow. dimin.	Gauged		Diminution P		Diminution S			
	mm	mm	P	S	mm	%	mm	%		

Operator's signature.....

Notes – see following page".

Notes to report TM6-DSBC:

- 1 This report should be used for recording the thickness measurement of:

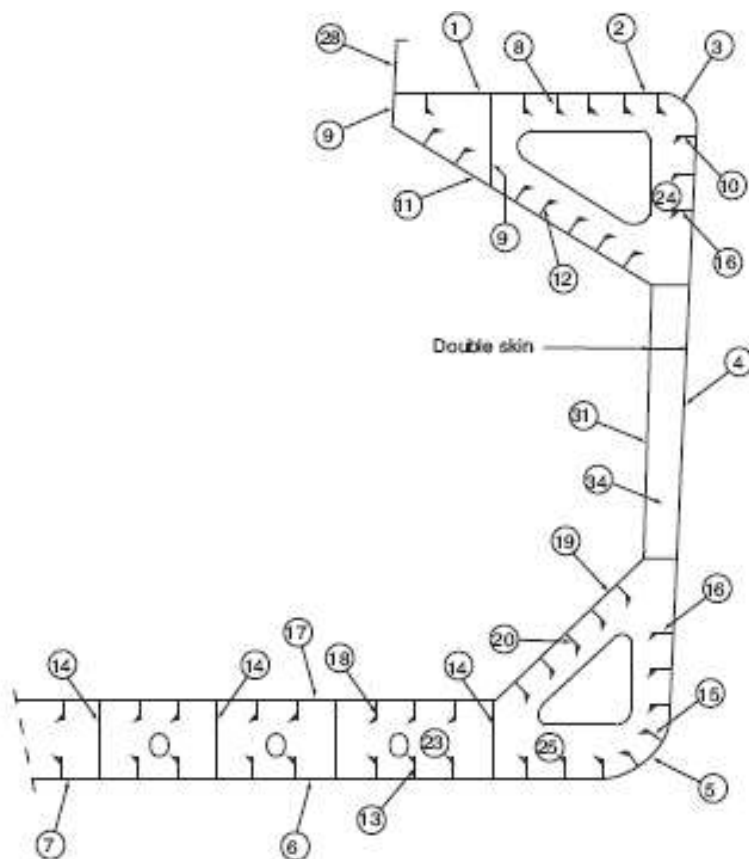
Miscellaneous structural members including structural items (28) and others for instance deck plating between hatches, hatch covers as shown on diagrams of typical transverse sections illustrated in appendix 3.
- 2 Guidance for areas of measurements is indicated in appendix 53.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The maximum allowable diminution could be stated in an attached document.

Appendix 3

GUIDANCE ON THICKNESS MEASUREMENT – DOUBLE-SIDE SKIN CONSTRUCTION SHIPS NOT BUILT UNDER IACS CSR

THICKNESS MEASUREMENT – Double-side skin bulk carriers

Typical transverse section of a double-side skin bulk carrier with indication of longitudinal and transverse members.



REPORT ON TM2-DSBC(i) and (ii)	
①	Strength deck plating
②	Stringer plate
③	Sheerstrake
④	Side shell plating
⑤	Bilge plating
⑥	Bottom shell plating
⑦	Keel plate

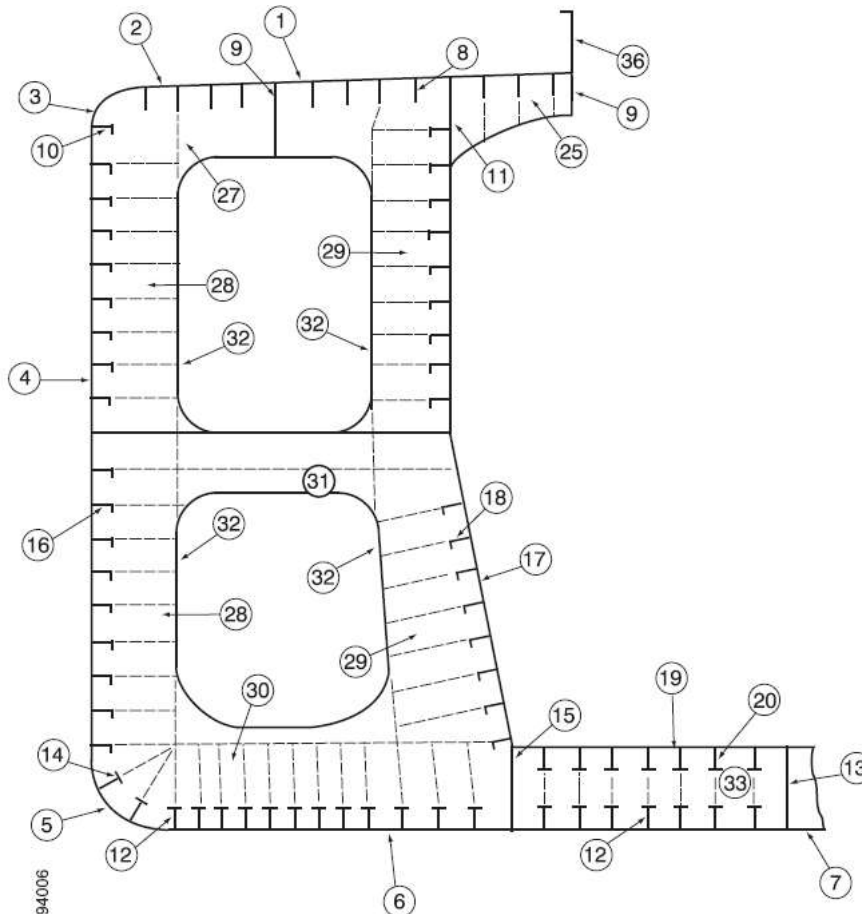
REPORT ON TM3-DSBC			
⑧	Deck longitudinals	⑩	Side shell longitudinal, if any
⑨	Deck girders	⑪	Inner bottom plating
⑩	Sheerstrake longitudinal	⑫	Inner bottom longitudinal
⑪	Topside tank sloping plating	⑬	Hopper plating
⑫	Topside tank sloping plating longitudinal	⑭	Hopper longitudinal
⑬	Bottom longitudinal	⑮	Inner side plating – Inner side longitudinal, if any – Horizontal girders in wing ballast tanks
⑭	Bottom girders		
⑮	Bilge longitudinal		

REPORT ON TM4-DSBC	
⑯	Double-bottom tank floors
⑰	Hopper side tank transverses
⑱	Transverse web frame – Topside tank transverses

REPORT ON TM6-DSBC	
⑳	Hatch coamings – Deck plating between hatches – Hatch covers

THICKNESS MEASUREMENT — Ore carriers

Typical transverse section of an ore carrier with indication of longitudinal and transverse members.



REPORT ON TM2-DSBC (i) and (ii)	
1	Strength deck plating
2	Stringer plate
3	Sheerstrake
4	Side shell plating
5	Bilge plating
6	Bottom shell plating
7	Keel plate

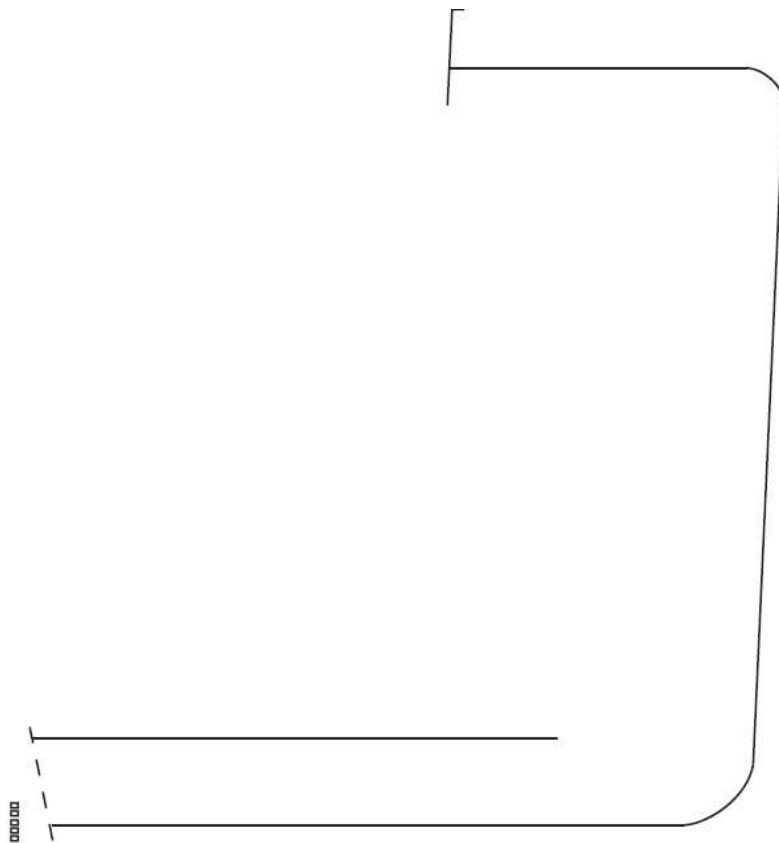
REPORT ON TM6-DSBC	
36	Hatch coamings
37	Deck plating between hatches
38	Hatch covers
39	
40	

REPORT ON TM3-DSBC	
8	Deck longitudinals
9	Deck girders
10	Sheerstrake longitudinals
11	Longitudinal bulkhead top strake
12	Bottom longitudinals
13	Bottom girders
14	Bilge longitudinals
15	Longitudinal bulkhead lower strake
16	Side shell longitudinals
17	Longitudinal bulkhead plating (remainder)
18	Longitudinal bulkhead longitudinals
19	Inner bottom plating
20	Inner bottom longitudinals
21	
22	
23	
24	

REPORT ON TM4-DSBC	
25	Deck transverse centre tank
26	Bottom transverse centre tank
27	Deck transverse wing tank
28	Side shell vertical web
29	Longitudinal bulkhead vertical web
30	Bottom transverse wing tank
31	Struts
32	Transverse web face plate
33	Double bottom floors
34	
35	

THICKNESS MEASUREMENT – Double-side skin bulk carriers

Transverse section outline: the diagram may be used for those ships where the typical transverse sections are not suitable.



REPORT ON TM2-DSBC(i) and (ii)	
①	Strength deck plating
②	Stringer plate
③	Sheerstrake
④	Side shell plating
⑤	Bilge plating
⑥	Bottom shell plating
⑦	Keel plate

REPORT ON TM3-DSBC			
⑧	Deck longitudinals	⑩	Side shell longitudinals, if any
⑨	Deck girders	⑪	Inner bottom plating
⑩	Sheerstrake longitudinals	⑫	Inner bottom longitudinals
⑪	Topside tank sloping plating	⑬	Hopper plating
⑫	Topside tank sloping plating longitudinals	⑭	Hopper longitudinals
⑬	Bottom longitudinals	⑮	Inner side plating
⑭	Bottom girders	⑯	– Inner side longitudinals, if any
⑮	Bilge longitudinals	⑰	– Horizontal girders in wing ballast tanks

REPORT ON TM4-DSBC	
⑳	Double-bottom tank floors
㉑	Hopper side tank transverses
㉒	Transverse web frame
	– Topside tank transverses

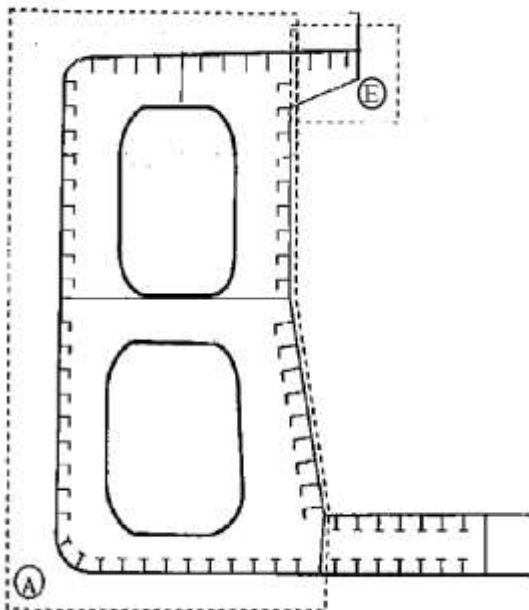
REPORT ON TM6-DSBC	
㉓	Hatch coamings
	– Deck plating between hatches
	– Hatch covers

**THICKNESS MEASUREMENT –
Close-up survey and thickness measurements areas**

Ore carriers

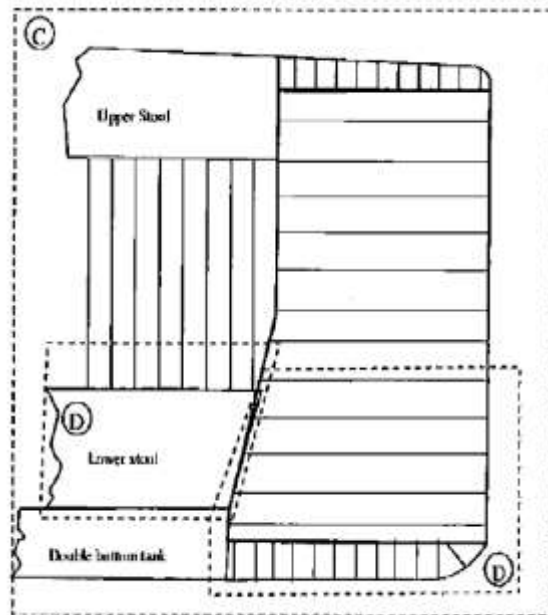
Areas subject to close-up survey and thickness measurements – areas (A), (C), (D) and (E) as defined in annex 1 of part B – Thickness to be reported on TM3-DSBC, TM4-DSBC, TM5-DSBC and TM6-DSBC as appropriate

Typical transverse section close-up survey

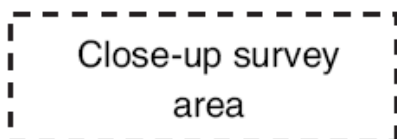


Thickness to be reported on TM3-DSBC and TM4-DSBC as appropriate

Typical transverse bulkhead



Thickness to be reported on TM5-DSBC

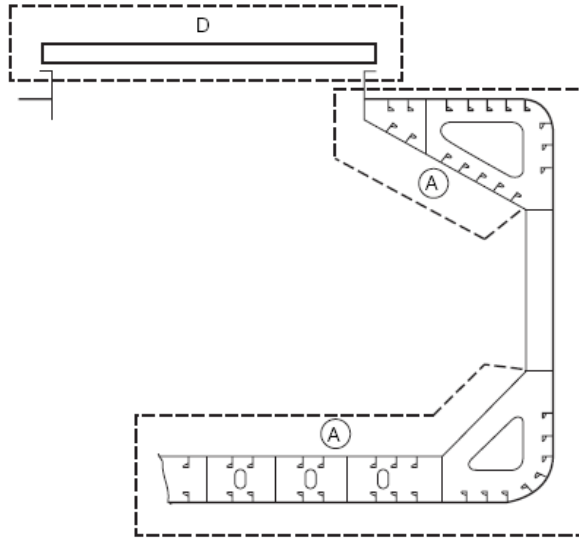


THICKNESS MEASUREMENTS – Double-side skin bulk carriers

Areas subject to close-up survey and thickness measurements – areas (A) to (E) as defined in annex 1 of part B – Thickness to be reported on TM3-DSBC, TM4-DSBC, TM5-DSBC and TM6-DSBC as appropriate.

Typical transverse section

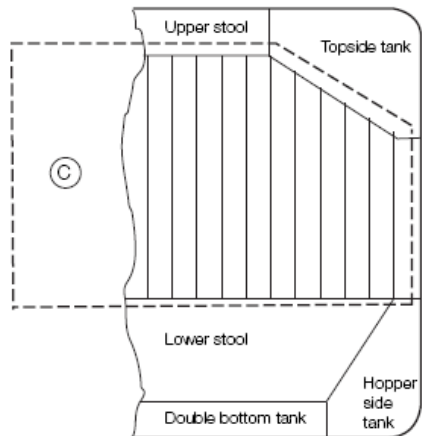
Areas (A) and (D)



Thickness to be reported on TM3-DSBC, TM4-DSBC, and TM6-DSBC, as appropriate

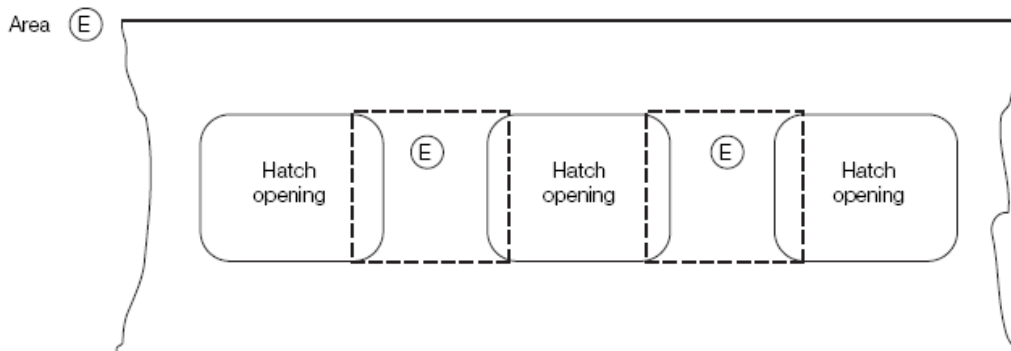
A cargo hold, transverse bulkhead

Area (C)



Thickness to be reported on TM5-DSBC

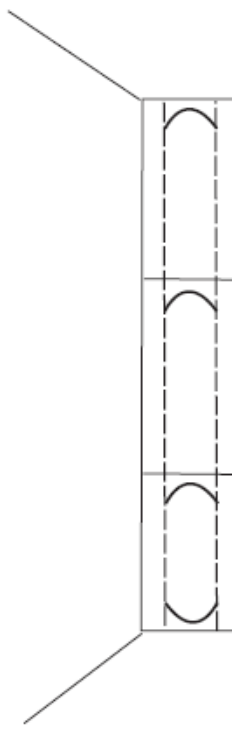
**Typical areas of deck plating and underdeck structure inside line
of hatch openings between cargo hold hatches**



Thickness to be reported on TM1-DSBC

Ordinary transverse frame in double-side skin tank

Area (B)



Thickness to be reported on TM4-DSBC

Framing in double-side tanks

Area (B)

<p>Ordinary transverse frame in double-side tank</p>	<p>Ordinary longitudinal structure in double-side tank</p>

Thickness to be reported on TM4-DSBC

ANNEX 8B

**RECOMMENDED PROCEDURES FOR THICKNESS MEASUREMENTS OF
DOUBLE-SIDE SKIN BULK CARRIERS BUILT UNDER IACS CSR***

General

1 This document should be used for recording thickness measurements of bulk carriers built under IACS CSR.

2 Reporting forms TM1-DSBC(CSR), TM2-DSBC(CSR)(i), TM2-DSBC(CSR)(ii), TM3-DSBC(CSR), TM4-DSBC(CSR), TM5-DSBC(CSR) and TM6-DSBC(CSR) (see appendix 2) should be used for recording thickness measurements. The as-built thickness and the voluntary thickness addition and renewal thickness (minimum allowable thickness) should be stated in the aforementioned forms.

3 Appendix 3 contains guidance diagrams and notes clarifying the areas for thickness measurement and the respective reporting forms.

4 The reporting forms should, where appropriate, be supplemented by data presented on structural sketches.

* This annex is recommendatory.

Appendix 1

GENERAL PARTICULARS

Ship's name:
IMO number:
Class/Administration identity number:
Port of registry:
Gross tons:
Deadweight:
Date of build:
Classification Society:

Name of Firm performing thickness measurement:
Thickness measurement firm certified by:
Certificate No:
Certificate valid from.....to.....
Place of measurement:
First date of measurement:
Last date of measurement:
Renewal survey/intermediate* survey due:
Details of measurement equipment:
Qualification of operators:

Report number:	consisting of.....pages
Name of operator:	Name of surveyor:
Signature of operator:	Signature of surveyor:
Firm official stamp:	Administration:

Official Stamp

* Delete as appropriate.

Appendix 2

REPORTS ON THICKNESS MEASUREMENT

TM1-DSBC(CSR)

Report on thickness measurement of all deck plating, all bottom plating or side shell plating*

Ship's name..... IMO number..... Class identity No..... Report No.....

STRAKE POSITION PLATE POSITION	No. or letter	As-built thk. mm	Voluntary thickness addition mm	Renewal thickness mm (a)	Forward reading				Aft reading				Mean remaining corr. addition, mm	
					Gauged thk. mm (b1)		Remaining corr. addition, mm (c1)=(b1)-(a)		Gauged thk. mm (b2)		Remaining corr. addition, mm (c2)=(b2)-(a)		[(c1)+(c2)]/2	
					P	S	P	S	P	S	P	S	P	S
12th forward														
11th														
10th														
9th														
8th														
7th														
6th														
5th														
4th														
3rd														
2nd														
1st														
Amidships														
1st aft														
2nd														
3rd														
4th														
5th														
6th														
7th														
8th														
9th														
10th														
11th														
12th														

Operator's signature.....

Notes – see following page

* Delete as appropriate.

Notes to report TM1-DSBC(CSR)

- 1 This report should be used for recording the thickness measurement of:
 - .1 all strength deck plating within cargo length area;
 - .2 all keel, bottom shell plating and bilge plating within the cargo length area;
 - .3 side shell plating including selected wind and water strakes outside the cargo length area; and
 - .4 all wind and water strakes within the cargo length area.
- 2 The strake position should be clearly indicated as follows:
 - .1 for strength deck indicate the number of the strake of plating inboard from the stringer plate;
 - .2 for bottom plating indicate the number of the strake of plating outboard from the keel plate; and
 - .3 for side shell plating give number of the strake of plating sheerstrake and letter as shown on shell expansion.
- 3 Only the deck plating strakes outside line of openings should be recorded.
- 4 Measurements should be taken at the forward and aft areas of all plates and the single measurements recorded should represent the average of multiple measurements.
- 5 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additionally gauged, and the mark "S" should be indicated in the right-hand column.

TM2-DSBC(CSR)(i)

**Report on thickness measurement of shell and deck plating
(one, two or three transverse sections)**

Ship's name..... IMO number..... Class identity No..... Report No.....

STRENGTH DECK AND SHEERSTRAKE PLATING

STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER						SECOND TRANSVERSE SECTION AT FRAME NUMBER						THIRD TRANSVERSE SECTION AT FRAME NUMBER											
	No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)	
					P	S	P	S					P	S	P	S					P	S	P	S
Stringer																								
Plate																								
1st strake inboard																								
2nd																								
3rd																								
4th																								
5th																								
6th																								
7th																								
8th																								
9th																								
10th																								
11th																								
12th																								
13th																								
14th																								
centre strake																								
sheer strake																								
TOPSIDE TOTAL																								

Operator's signature.....

Notes – see following page

Notes to report TM2-DSBC(CSR)(i)

- 1 This report should be used for recording the thickness measurement of strength deck plating and sheerstrake plating transverse sections (one, two or three sections within the cargo length area, comprising of the structural items (1), (2) and (3) as shown on the diagram of typical transverse sections in appendix 3).
- 2 Only the deck plating strakes outside the line of openings are to be recorded.
- 3 The topside area comprises deck plating, stringer plate and sheerstrake (including rounded gunwales).
- 4 The exact frame station of measurement is to be stated.
- 5 The single measurements recorded should represent the average of multiple measurements.
- 6 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" should be indicated in the right-hand column.

TM2-DSBC(CSR)(ii)

Report on thickness measurement of shell plating (one, two or three transverse sections)

Ship's name..... IMO number..... Class identity No..... Report No.....

SHELL PLATING

STRAKE POSITION	FIRST TRANSVERSE SECTION AT FRAME NUMBER						SECOND TRANSVERSE SECTION AT FRAME NUMBER						THIRD TRANSVERSE SECTION AT FRAME NUMBER														
	No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		No. or letter	As-built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)				
					P	S	P	S					P	S	P	S					P	S	P	S			
1 st below sheer strake																											
2 nd																											
3 rd																											
4 th																											
5 th																											
6 th																											
7 th																											
8 th																											
9 th																											
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13 th																											
14 th																											
15 th																											
16 th																											
17 th																											
18 th																											
19 th																											
20 th																											
Keel strake																											
BOTTOM TOTAL																											

Operator's signature.....

Notes – see following page

Notes to report TM2-DSBC(CSR)(ii)

- 1 This report should be used for recording the thickness measurement of shell plating at transverse sections (one, two or three sections within the cargo length area, comprising of the structural items (4), (5), (6) and (7) as shown on the diagram of typical transverse sections in appendix 3).
- 2 The bottom area comprises keel, bottom and bilge plating.
- 3 The exact frame station of measurement is to be stated.
- 4 The single measurements recorded should represent the average of multiple measurements.
- 5 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" should be indicated in the right-hand column.

TM3-DSBC(CSR)

**Report on thickness measurement of longitudinal members
(one, two or three transverse sections)**

Ship's name..... IMO number..... Class identity No..... Report No.....

STRUCTURAL MEMBER	FIRST TRANSVERSE SECTION AT FRAME NUMBER							SECOND TRANSVERSE SECTION AT FRAME NUMBER							THIRD TRANSVERSE SECTION AT FRAME NUMBER									
	Item No.	As- built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		Item No.	As- built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)		Item No.	As- built thk. mm	Vol. thk. add. mm	Ren. thk. mm (a)	Gauged thk. mm (b)		Remaining corr. addition, mm (b)-(a)	
					P	S	P	S					P	S	P	S					P	S	P	S

Operator's signature.....

Notes – see following page

Notes to report TM3-DSBC(CSR)

- 1 This report should be used for recording the thickness measurement of longitudinal members at transverse sections (one, two or three sections within the cargo length area, comprising of the appropriate structural items (8) to (20) and (31) as shown on diagram of typical transverse sections in appendix 3).
- 2 The exact frame station of measurement is to be stated.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" should be indicated in the right-hand column.

TM4-DSBC(CSR)

**Report on thickness measurement of transverse structural members
in the double bottom, hopper side and topside water ballast tanks**

Ship's name..... IMO number..... Class identity No..... Report No.....

TANK DESCRIPTION:

LOCATION OF STRUCTURE

STRUCTURAL MEMBER	ITEM	As-built thickness mm	Voluntary thickness addition mm	Renewal thickness mm (a)	Gauged thickness mm		Remaining corr. addition mm	
					(b)		(b)-(a)	
					P	S	P	S

Operator's signature.....

Notes – see following page

Notes to report TM4-DSBC(CSR)

- 1 This report should be used for recording the thickness measurement of transverse structural members, comprising of the appropriate structural items (23) to (25) and (34) as shown on diagram of typical transverse section in appendix 3.
- 2 Guidance for areas of measurement is indicated on the diagrams shown in appendix 3.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" should be indicated in the right-hand column.

TM5-DSBC(CSR)

Report on thickness of cargo hold transverse bulkheads

Ship's name..... IMO number..... Class identity No..... Report No.....

HOLD DESCRIPTION:

LOCATION OF STRUCTURE: FRAME NO.:

STRUCTURAL COMPONENT (PLATING/STIFFENER)	As-built thickness mm	Voluntary thickness addition mm	Renewal thickness mm (a)	Gauged thickness mm		Remaining corr. addition mm	
				(b)		(b)-(a)	
				P	S	P	S

Operator's signature.....

Notes – see following page

Notes to report TM5-DSBC(CSR)

- 1 This report form should be used for recording the thickness measurement of watertight transverse bulkheads in cargo holds.
- 2 Guidance for areas of measurement is indicated on the diagrams shown in appendix 3.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" is to be indicated in the right-hand column.

TM6-DSBC(CSR)

Report on thickness measurement of miscellaneous structural members

Ship's name..... IMO number..... Class identity No..... Report No.....

STRUCTURAL MEMBER:					SKETCH						
LOCATION OF STRUCTURE:											
Description	As-built thk. mm	Voluntary thickness addition mm	Renewal thickness mm (a)	Gauged thickness mm					Remaining corr. addition mm		
				(b)					(b)-(a)		
				P					S	P	S

Operator's signature.....

Notes – see following page

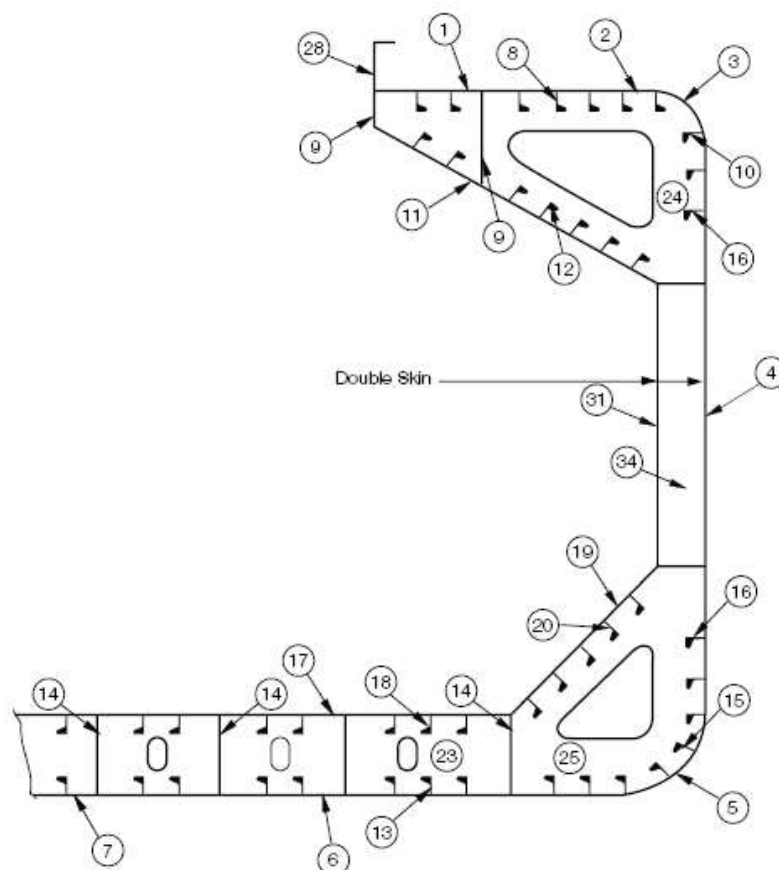
Notes to report TM6-DSBC(CSR)

- 1 This report should be used for recording the thickness measurement of miscellaneous structural members including the structural items (28), (29) and (30) as shown on diagram of typical transverse section in appendix 3.
- 2 Guidance for areas of measurement is indicated in appendix 3.
- 3 The single measurements recorded should represent the average of multiple measurements.
- 4 The remaining corrosion addition should be recorded with result of gauged thickness minus renewal thickness. If the result is negative, the structure in way should be renewed, and the mark "R" should be indicated in the right-hand column. If the result is between 0 and 0.5 mm (0 included), the structure in way should be additional gauged, and the mark "S" should be indicated in the right-hand column.

Appendix 3

GUIDANCE ON THICKNESS MEASUREMENT – DOUBLE-SIDE SKIN BULK CARRIERS BUILT UNDER IACS CSR

Typical transverse section of a double-side skin bulk carrier with indication of longitudinal and transverse members



Reports TM2-DSBC(CSR)(i) and TM2-DSBC(CSR)(ii)	
1	Strength deck plating
2	Stringer plate
3	Sheerstrake
4	Side shell plating
5	Bilge plating
6	Bottom plating
7	Keel plate

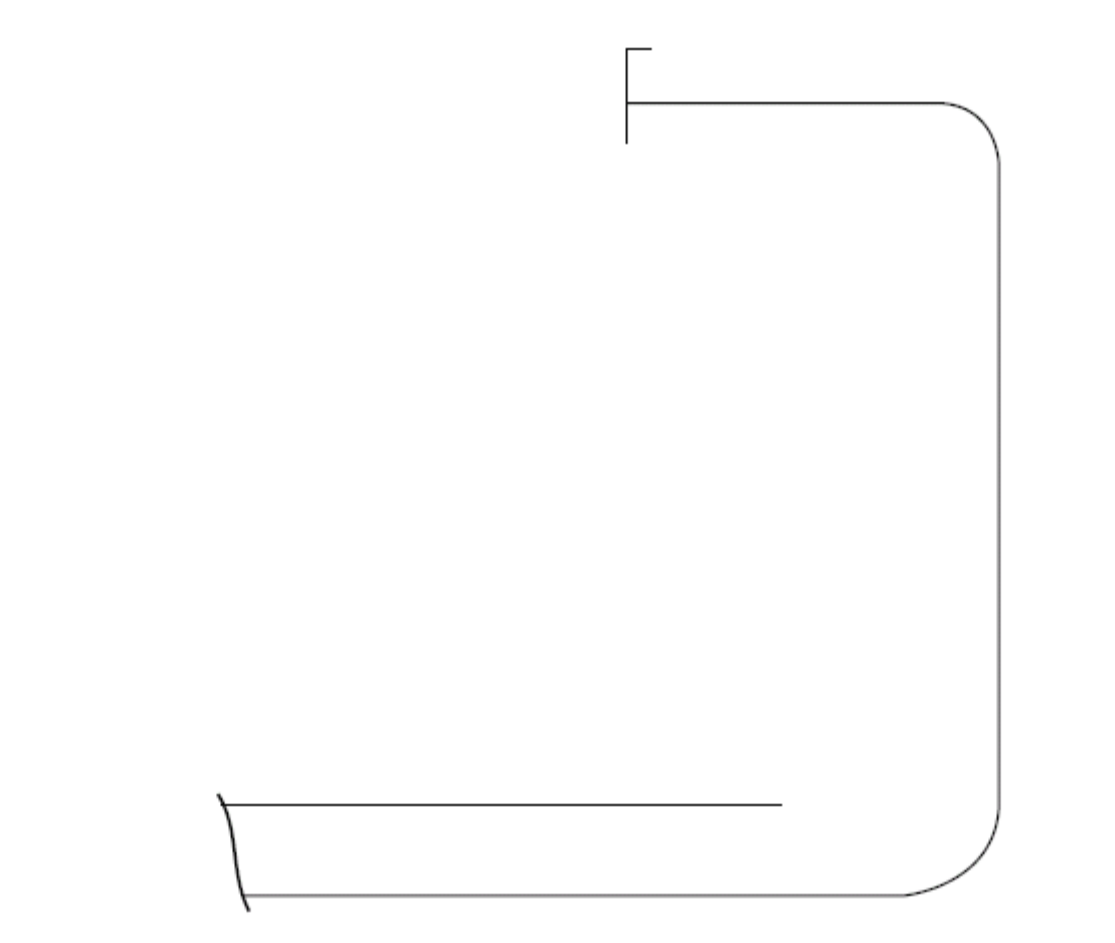
Report TM3-DSBC(CSR)			
8	Deck longitudinal	17	Inner bottom plating
9	Deck girders	18	Inner bottom longitudinals
10	Sheerstrake longitudinals	19	Hopper plating
11	Topside tank sloping plating	20	Hopper longitudinals
12	Topside tank sloping plating longitudinal	31	Inner side plating
13	Bottom longitudinals	-	Inner side longitudinals, if any
14	Bottom girders	-	Horizontal girders in wing ballast tanks
15	Bilge longitudinals		
16	Side shell longitudinals, if any		

Report TM4-DSBC(CSR)	
23	Double bottom tank floors
24	Topside tank transverse
25	Hopper side tank transverse
34	Transverse web frame
-	Ordinary transverse frame in double-sideskin tank

Report TM6-DSBC(CSR)	
28	Hatch coamings
29	Deck plating between hatches
30	Hatch covers

Transverse section outline

(This diagram may be used for those ships where the typical diagram is not suitable).



Reports TM2-DSBC(CSR)(i) and TM2-DSBC(CSR)(ii)	
1	Strength deck plating
2	Stringer plate
3	Sheerstrake
4	Side shell plating
5	Bilge plating
6	Bottom plating
7	Keel plate

Report TM3-DSBC(CSR)			
8	Deck longitudinal	17	Inner bottom plating
9	Deck girders	18	Inner bottom longitudinals
10	Sheerstrake longitudinals	19	Hopper plating
11	Topside tank sloping plating	20	Hopper longitudinals
12	Topside tank sloping plating longitudinal	31	Inner side plating
13	Bottom longitudinals	-	Inner side longitudinals, if any
14	Bottom girders	-	Horizontal girders in wing ballast tanks
15	Bilge longitudinals		
16	Side shell longitudinals, if any		

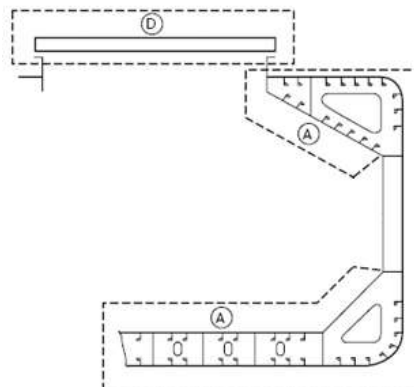
Report TM4-DSBC(CSR)	
23	Double bottom tank floors
24	Topside tank transverses
25	Hopper side tank transverses
34	Transverse web frame
-	Ordinary transverse frame in double-sideskin tank

Report TM6-DSBC(CSR)	
28	Hatch coamings
29	Deck plating between hatches
30	Hatch covers

Close-up survey and thickness measurement areas

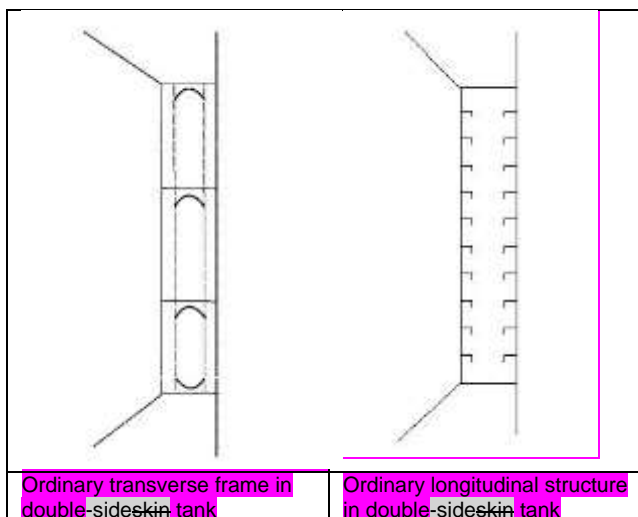
Areas subject to close-up survey and thickness measurement are areas (A) to (E) as defined in annex 1. The thicknesses to be reported in forms TM3-DSBC(CSR), TM4-DSBC(CSR), TM5-DSBC(CSR) and TM6-DSBC(CSR), as appropriate.

Typical transverse section
Areas A and D



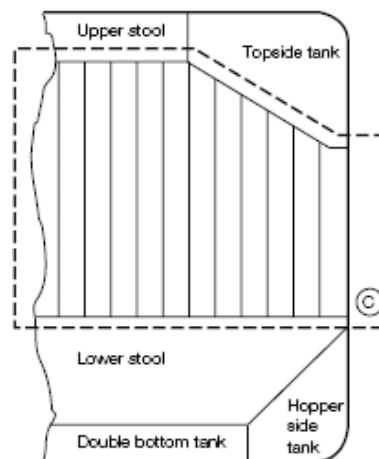
Thickness to be reported on TM3-DSBC(CSR), TM4-DSBC(CSR), TM6-DSBC(CSR) as appropriate

Framing in double-side tanks
Area (B)



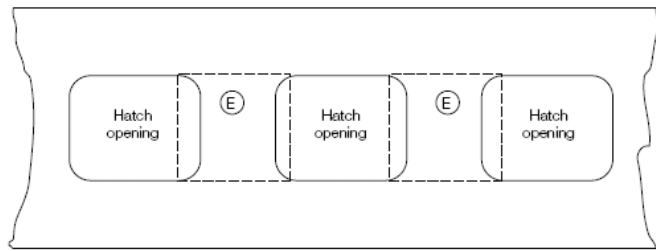
Thickness to be reported on TM4-DSBC(CSR)

A cargo hold transverse bulkhead
Area C



Thickness to be reported on TM5-DSBC(CSR)

Typical areas of deck plating inside
line of hatch openings between
cargo hold hatches
Area E



Thickness to be reported on TM6-DSBC(CSR)

ANNEX 9

GUIDELINES FOR TECHNICAL ASSESSMENT IN CONJUNCTION WITH PLANNING FOR ENHANCED SURVEYS OF DOUBLE-SIDE SKIN BULK CARRIERS – RENEWAL SURVEY HULL*

1 Introduction

These guidelines contain information and suggestions concerning technical assessments, which may be of use in conjunction with the planning of enhanced renewal surveys of double-side skin bulk carriers. As indicated in 5.1.5, the guidelines are a recommended tool which may be invoked at the discretion of the Administration, when considered necessary and appropriate, in conjunction with the preparation of the required survey programme.

2 Purpose and principles

2.1 Purpose

2.1.1 The purpose of the technical assessments described in these guidelines is to assist in identifying critical structural areas, nominating suspect areas and in focusing attention on structural elements or areas of structural elements which may be particularly susceptible to, or evidence a history of, wastage or damage. This information may be useful in nominating locations, areas holds and tanks for thickness measurement, close-up survey and tank testing.

2.1.2 Critical structural areas are locations which have been identified from calculations to require monitoring or from the service history of the subject ship or from similar or sister ships (if available) to be sensitive to cracking, buckling or corrosion which would impair the structural integrity of the ship.

2.2 Minimum requirements

However, these guidelines may not be used to reduce the requirements pertaining to thickness measurement, close-up survey and tank testing contained in annexes 1 and 2 of part B and in 2.7, respectively, which, in all cases, should be complied with as a minimum.

2.3 Timing

As with other aspects of survey planning, the technical assessments described in these guidelines should be worked out by the owner or operator in cooperation with the Administration well in advance of the commencement of the renewal survey, i.e. prior to commencing the survey and normally at least 12 to 15 months before the survey's completion due date.

2.4 Aspects to be considered

2.4.1 Technical assessments, which may include quantitative or qualitative evaluation of relative risks of possible deterioration, of the following aspects of a particular ship may be used as a basis for the nomination of holds, tanks and areas for survey:

- .1 design features such as stress levels on various structural elements, design details and extent of use of high-tensile steel;

* This annex is recommendatory.

- .2 former history with respect to corrosion, cracking, buckling, indents and repairs for the particular ship as well as similar vessels, where available; and
- .3 information with respect to types of cargo carried, use of different holds/tanks for cargo/ballast, protection of holds and tanks and condition of coating, if any.

2.4.2 Technical assessments of the relative risks of susceptibility to damage or deterioration of various structural elements and areas should be judged and decided on the basis of recognized principles and practices, such as may be found in references 2, 3 and 4.

3 Technical assessment

3.1 General

3.1.1 There are three basic types of possible failure, which may be the subject of technical assessment in connection with planning of surveys; corrosion, cracks and buckling. Contact damages are not normally covered by the survey planning since indents are usually noted in memoranda and assumed to be dealt with as a normal routine by surveyors.

3.1.2 Technical assessments performed in conjunction with the survey planning process should, in principle, be as shown schematically in figure 1.

The approach is basically an evaluation of the risk in the following aspects based on the knowledge and experience related to:

- .1 design; and
- .2 corrosion.

3.1.3 The design should be considered with respect to structural details, which may be susceptible to buckling or cracking as a result of vibration, high stress levels or fatigue.

3.1.4 Corrosion is related to the ageing process, and is closely connected with the quality of corrosion prevention systems fitted at new building, and subsequent maintenance during the service life. Corrosion may also lead to cracking and/or buckling.

3.2 Methods

3.2.1 Design details

3.2.1.1 Damage experience related to the ship in question and sister and/or similar ships, where available, is the main source of information to be used in the process of planning. In addition, a selection of structural details from the design drawings should be included.

3.2.1.2 Typical damage experience to be considered will consist of:

- .1 number, extent, location and frequency of cracks; and
- .2 location of buckles.

3.2.1.3 This information may be found in the survey reports and/or the owner's files, including the results of the owner's own inspections. The defects should be analysed, noted and marked on sketches.

3.2.1.4 In addition, general experience should be utilized. Also, reference should be made to reference 2, which contains a catalogue of typical damages and proposed repair methods for various structural details on single-skin bulk carriers. Reference should also be made to reference 3, which contains catalogues of typical damages and proposed repair methods for double-hull oil tanker structural details which may to some extent be similar to structural details in double-side skin bulk carriers. Such figures should be used together with a review of the main drawings, in order to compare with the actual structure and search for similar details that may be susceptible to damage. In particular, chapter 3 of reference 3 deals with various aspects specific to double-hull tankers, such as stress concentration locations, misalignment during construction, corrosion trends, fatigue considerations and areas requiring special attention, while chapter 4 of reference 3 addresses experience gained on structural defects in double-hulls (chemical tankers, OBO carriers, ore/oil carriers, gas carriers), which should also be considered in working out the survey planning.

3.2.1.5 The review of the main structural drawings, in addition to using the above-mentioned figures, should include checking for typical design details where cracking has been experienced. The factors contributing to damage should be carefully considered.

3.2.1.6 The use of high-tensile steel (HTS) is an important factor. Details showing good service experience where ordinary, mild steel has been used may be more susceptible to damage when HTS, and its higher associated stresses, are utilized. There is extensive and, in general, good experience, with the use of HTS for longitudinal material in deck and bottom structures. Experience in other locations, where the dynamic stresses may be higher, is less favourable, e.g. side structures.

3.2.1.7 In this respect, stress calculations of typical and important components and details, in accordance with relevant methods, may prove useful and should be considered.

3.2.1.8 The selected areas of the structure identified during this process should be recorded and marked on the structural drawings to be included in the survey programme.

3.2.2 *Corrosion*

3.2.2.1 In order to evaluate relative corrosion risks, the following information should generally be considered:

- .1 usage of tanks, holds and spaces;
- .2 condition of coatings;
- .3 cleaning procedures;
- .4 previous corrosion damage;
- .5 ballast use and time for cargo holds;
- .6 risk of corrosion in cargo holds and ballast tanks; and
- .7 location of ballast tanks adjacent to heated fuel oil tanks.

3.2.2.2 Reference 4 gives definitive examples which can be used for judging and describing coating condition, using typical pictures of conditions.

3.2.2.3 The evaluation of corrosion risks should be based on information in both reference 2 and reference 4, as far as applicable to double-side skin construction, together with relevant information on the anticipated condition of the ship as derived from the information collected in order to prepare the survey programme and the age of the ship. The various holds, tanks and spaces should be listed with the corrosion risks nominated accordingly.

3.2.3 *Locations for close-up survey and thickness measurement*

3.2.3.1 On the basis of the table of corrosion risks and the evaluation of design experience, the locations for initial close-up survey and thickness measurement (areas and sections) may be nominated.

3.2.3.2 The sections subject to thickness measurement should normally be nominated in tanks, holds and spaces where corrosion risk is judged to be the highest.

3.2.3.3 The nomination of tanks, holds and spaces for close-up survey should initially be based on highest corrosion risk, and should always include ballast tanks. The principle for the selection should be that the extent is increased by age or where information is insufficient or unreliable.

References

- 1 IACS, Unified Requirement Z10.5, Hull Surveys of Double Skin Bulk Carriers
- 2 IACS, Bulk Carriers: Guidelines for Surveys, Assessment and Repair of Hull Structures, January 2007
- 3 TSCF, Guidelines for the Inspection and Maintenance of Double Hull Tanker Structures, 1995
- 4 TSCF, Guidance Manual for Tanker Structures, 1997

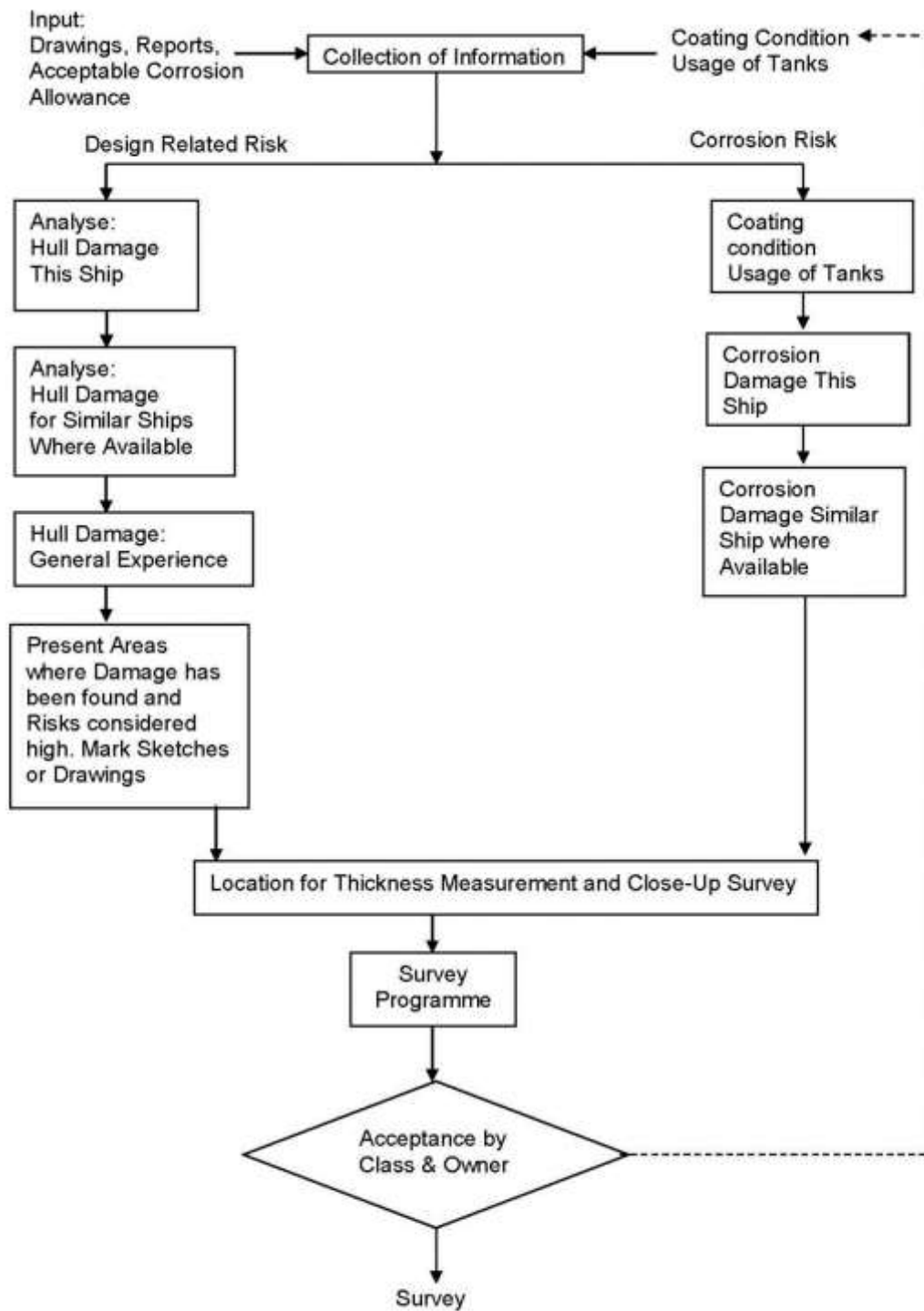


Figure 1: Technical Assessment and the Survey Planning Process

ANNEX 10

REQUIREMENTS FOR EXTENT OF THICKNESS MEASUREMENTS AT THOSE AREAS OF SUBSTANTIAL CORROSION OF BULK CARRIERS WITH DOUBLE-SIDE SKIN CONSTRUCTION WITHIN THE CARGO LENGTH AREA BULK CARRIERS

Table 1 – Bottom, inner bottom and hopper structure

Structural member	Extent of measurement	Pattern of measurement
Bottom, inner bottom and hopper structure plating	Minimum of three bays across double-bottom tank, including aft bay Measurements around and under all suction bell mouths	Five-point pattern for each panel between longitudinals and floors
Bottom, inner bottom and hopper structure longitudinals	Minimum of three longitudinals in each bay where bottom plating measured	Three measurements in line across flange and three measurements on the vertical web
Bottom girders, including the watertight ones	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with one measurement between each panel stiffener, or a minimum of three measurements
Bottom floors, including the watertight ones	Three floors in the bays where bottom plating measured, with measurements at both ends and middle	Five-point pattern over 2 m ² area
Hopper structure web frame ring	Three floors in bays where bottom plating measured	Five-point pattern over 1 m ² of plating Single measurements on flange
Hopper structure transverse watertight bulkhead or swash bulkhead	– lower 1/3 of bulkhead	five-point pattern over 1 m ² of plating
	– upper 2/3 of bulkhead	five-point pattern over 2 m ² of plating
	– stiffeners (minimum of three)	For web, five-point pattern over span (two measurements across web at each end and one at centre of span). For flange, single measurements at each end and centre of span
Panel stiffening	Where applicable	Single measurements

Table 2 – Deck structure including cross strips, main cargo hatchways, hatch covers, coamings and topside tanks

Structural member	Extent of measurement	Pattern of measurement
Cross deck strip plating	Suspect cross deck strip plating	Five-point pattern between under deck stiffeners over 1 m length
Under deck stiffeners	Transverse members Longitudinal member	Five-point pattern at each end and mid span Five-point pattern on both web and flange
Hatch covers	Side and end skirts, each three locations Three longitudinal bands, outboard strakes (2) and centreline strake (1)	Five-point pattern at each location Five-point measurement each band
Hatch coamings	Each side and end of coaming, one band lower 1/3, one band upper 2/3 of coaming	Five-point measurement each band, i.e. end or side coaming
Topside ballast tanks	a) watertight transverse bulkheads: – Lower 1/3 of bulkhead – Upper 2/3 of bulkhead – Stiffeners	Five-point pattern over 1 m ² of plating Five-point pattern over 1 m ² of plating Five-point pattern over 1 m length
Topside ballast tanks	b) two representative swash transverse bulkheads: – Lower 1/3 of bulkhead – Upper 2/3 of bulkhead – Stiffeners	Five-point pattern over 1 m ² of plating Five-point pattern over 1 m ² of plating Five-point pattern over 1 m length
Topside ballast tanks	c) three representative bays of slope plating: – Lower 1/3 of tank – Upper 2/3 of tank	Five-point pattern over 1 m ² of plating Five point pattern over 1 m ² of plating

Structural member	Extent of measurement	Pattern of measurement
Topside ballast tanks	d) Longitudinals, suspect and adjacent	Five point pattern on both web and flange over 1 m length
Main deck plating	Suspect plates and adjacent (4)	Five-point pattern over 1 m ² of plating
Main deck longitudinals	Suspect plates	Five point pattern on both web and flange over 1 m length
Web frames/transverses	Suspect plates	Five-point pattern over 1 m ² of plating

Table 3 – Structure in double-side spaces of double-side skin bulk carriers including wing void spaces of ore carriers

Structural member	Extent of measurement	Pattern of measurement
Side shell and inner plating: – Upper strake and strakes in way of horizontal girders – All other strakes	– Plating between each pair of transverse frames/longitudinals in a minimum of three bays (along the tank) – Plating between every third pair of longitudinals in same three bays	– Single measurement – Single measurement
Side shell and inner side transverse frames/longitudinals on: – upper strake – all other strakes	– Each transverse frame/longitudinal in same three bays – Every third transverse frame/longitudinal in same three bays	– Three measurements across web and one measurement on flange – Three measurements across web and one measurement on flange
Transverse frames/longitudinals: – brackets	Minimum of three at top, middle and bottom of tank in same three bays	Five-point pattern over area of bracket
Vertical web and transverse bulkheads: – strakes in a way of horizontal girders – other strakes	– Minimum of two webs and both transverse bulkheads – Minimum of two webs and both transverse bulkheads	– Five-point pattern over approximately 2 m ² area – Two measurements between each pair of vertical stiffeners
Horizontal girders	Plating on each girder in a minimum of three bays	Two measurements between each pair of longitudinal girder stiffeners
Panel stiffening	Where applicable	Single measurements

Table 4 – Transverse bulkheads in cargo holds

Structural member	Extent of measurement	Pattern of measurement
Lower stool, where fitted	– Transverse band within 25 mm of welded connection to inner bottom – Transverse bands within 25 mm of welded connection to shelf plate	– Five-point pattern between stiffeners over 1 m length – Five-point pattern between stiffeners over 1 m length
Transverse bulkheads	– Transverse band at approximately mid height – Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools)	– Five-point pattern over 1 m ² of plating – Five-point pattern over 1 m ² of plating

ANNEX 11

**STRENGTH OF CARGO HATCH COVER SECURING ARRANGEMENTS
FOR BULK CARRIERS**

1 Securing devices

The strength of securing devices ~~should is to~~ comply with the following requirements:

.1 Panel hatch covers ~~should is are to~~ be secured by appropriate devices (bolts, wedges or similar) suitably spaced alongside the coamings and between cover elements. Arrangement and spacing ~~should are to~~ be determined with due attention to the effectiveness for weathertightness, depending upon the type and the size of the hatch cover, as well as on the stiffness of the cover edges between the securing devices.

.2 The net sectional area of each securing device ~~should is~~ not ~~to~~ be less than:

$$A = 1.4 a/f \text{ (cm}^2\text{)}$$

where:

a = spacing between securing devices not to be taken less than 2 m

$$f = (\sigma_Y / 235)^e$$

σ_Y = specified minimum upper yield stress in N/mm² of the steel used for fabrication, not to be taken greater than 70% of the ultimate tensile strength

$$e = 0.75 \text{ for } \sigma_Y > 235 \\ = 1.0 \text{ for } \sigma_Y \leq 235$$

Rods or bolts ~~should are to~~ have a net diameter not less than 19 mm for hatchways exceeding 5 m² in area.

.3 Between cover and coaming and at cross-joints, a packing line pressure sufficient to obtain weathertightness ~~should is to~~ be maintained by the securing devices. For packing line pressures exceeding 5 N/mm, the cross section area ~~should is to~~ be increased in direct proportion. The packing line pressure ~~should is to~~ be specified.

.4 The cover edge stiffness ~~should is to~~ be sufficient to maintain adequate sealing pressure between securing devices. The moment of inertia, I , of edge elements ~~should is~~ not ~~to~~ be less than:

$$I = 6 p a^4 \text{ (cm}^4\text{)}$$

where:

p = packing line pressure in N/mm, minimum 5 N/mm

a = spacing in metres of securing devices.

- .5 Securing devices ~~should are to~~ be of reliable construction and securely attached to the hatchway coamings, decks or covers. Individual securing devices on each cover ~~should are to~~ have approximately the same stiffness characteristics.
- .6 Where rod cleats are fitted, resilient washers or cushions ~~should are to~~ be incorporated.
- .7 Where hydraulic cleating is adopted, a positive means ~~should are to~~ be provided to ensure that it remains mechanically locked in the closed position in the event of failure of the hydraulic system.

2 Stoppers

- 2.1 Nos.1 and 2 hatch covers ~~should are to~~ be effectively secured, by means of stoppers, against the transverse forces arising from a pressure of 175 kN/m².
- 2.2 No.2 hatch covers ~~should are is to~~ be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 175 kN/m².
- 2.3 No.1 hatch cover ~~should is to~~ be effectively secured, by means of stoppers, against the longitudinal forces acting on the forward end arising from a pressure of 230 kN/m². This pressure may be reduced to 175 kN/m² if a forecastle is fitted.
- 2.4 The equivalent stress in stoppers and their supporting structures and calculated in the throat of the stopper welds is not to exceed the allowable value of 0.8 σ_Y .

3 Materials and welding

Where stoppers or securing devices are fitted to comply with this annex, they ~~should are to~~ be manufactured of materials, including welding electrodes, to the satisfaction of the Administration.

ANNEX 12

PROCEDURAL REQUIREMENTS FOR THICKNESS MEASUREMENTS

1 General

Thickness measurements required in the context of hull structural surveys, if not carried out by the society itself should be witnessed by a surveyor. The attendance of the surveyor should be recorded. This also applies to thickness measurements taken during voyages. Thickness measurements required in the context of hull structural surveys, if not carried out by the recognized organization acting on behalf of the Administration, should be witnessed by a surveyor of the recognized organization. The attendance of the surveyor should be recorded. This also applies to thickness measurements taken during voyages.

2 Survey meeting

2.1 Prior to commencement of the renewal or intermediate survey, a meeting should be held between the attending surveyor(s), the owner's representative(s) in attendance and the thickness measurement firm's representative(s) so as to ensure the safe and efficient execution of the surveys and thickness measurements to be carried out on board. Prior to commencement of the renewal or intermediate survey, a meeting is to be held between the attending surveyor(s), the master of the ship or an appropriately qualified representative appointed by the master or company, the owner's representative(s) in attendance and the thickness measurement firm's representative(s) so as to ensure the safe and efficient execution of the surveys and thickness measurements to be carried out on board.

2.2 Communication with the thickness measurement operator(s) and owner's representative(s) should be agreed during the meeting, with respect to the following:

- .1 reporting of thickness measurements on a regular basis to the attending surveyor;
- .2 prompt notification to the surveyor in case of findings such as:
 - .1 excessive and/or extensive corrosion or pitting/grooving of any significance;
 - .2 structural defects like buckling, fractures and deformed structures;
 - .3 detached and/or holed structure; and
 - .4 corrosion of welds.

2.3 The survey report should indicate where and when the meeting took place and who attended (the name of the surveyor(s), the owner's representative(s) and the thickness measurement firm's representative(s)). When thickness measurements are taken in association with intermediate or renewal surveys, a documented record indicating where and when the meeting took place and who attended (the name of the surveyor(s), the master of the ship or an appropriately qualified representative appointed by the master or company, the owner's representative(s) and the representative(s) of the thickness measurement firm(s)) is to be maintained.

3 Monitoring of the thickness measurement process on board

3.1 The surveyor ~~should~~ **is to** decide final extent and location of thickness measurements after overall survey of representative spaces on board.

3.2 In case the owner prefers to commence the thickness measurements prior to the overall survey, then the surveyor ~~should~~ **is to** advise that the planned extent and locations of thickness measurements are subject to confirmation during the overall survey. Based on findings, the surveyor may require additional thickness measurements to be taken.

3.3 The surveyor ~~should~~ **is to** direct the gauging operation by selecting locations such that readings taken represent, on average, the condition of the structure for that area.

3.4 Thickness measurements taken mainly to evaluate the extent of corrosion, which may affect the hull girder strength, ~~should~~ **are to** be carried out in a systematic manner such that all longitudinal structural members are gauged, as required.

3.5 Where thickness measurements indicate substantial corrosion or wastage in excess of allowable diminution, the surveyor ~~should~~ **is to** direct locations for additional thickness measurements in order to delineate areas of substantial corrosion and to identify structural members for repairs/renewals.

3.6 Thickness measurements of structures in areas where close-up surveys are required ~~should~~ **are to** be carried out simultaneously with close-up survey.

4 Review and verification

4.1 Upon completion of the thickness measurements, the surveyor ~~should~~ **is to** confirm that no further gaugings are needed, or specify additional gaugings.

4.2 ~~Where these guidelines allow the extent of thickness measurements to be reduced after special considerations by the surveyor, these special considerations should be reported, where appropriate. If, where special consideration is allowed by this Code, the extent of thickness measurements is reduced, the surveyor's special consideration is to be reported.~~

4.3 In case thickness measurements are partly carried out, the extent of remaining thickness measurements ~~should~~ **are to** be reported for the use of the next surveyor.
