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Date: 13th October 2017

Directive (18/2017)

Surveyor Guidance for Thickness Measurement

Applicable to: Ship owners, Recognized Organizations, Shipping Companies, Flag State Surveyors

1. The Department of Marine Administration circulated this directive in the exercise of the power of Section 294(B), paragraph (b) of Myanmar Merchant Shipping Act.

2. Pursuant to the provision of Section 213(A) of Myanmar Merchant Shipping Act and the International Convention for the Safety of Life at Sea, 1974, the Department of Marine Administration circulated this National guidance for the thickness measurement of hull structure for the surveyors.

3. The purpose of this directive is to ensure National guidance for measurement of thickness of Myanmar ships engaged on International Voyage to be complied with the requirements of the International Convention for the Safety of Life at Sea, 1974 as amended.

Maung Maung Oo
Director General
Department of Marine Administration

THE REPUBLIC OF THE UNION OF MYNAMR

MINISTRY OF TRANSPORT AND COMMUNICATIONS

DEPARTMENT OF MARINE ADMINISTRATION

Surveyor Guidance for Thickness Measurement

Date: 29.1.2018 **Revise - 00**

Surveyor Guidance for Thickness Measurement

1. Purpose

1.1 The purpose of this National Guidance is to provide the general information and methods to measure the thickness of hull structure for surveyor to conduct the ultrasonic thickness measurement survey of Myanmar ships engaged on international voyage.

2. Scope

2.1 This national Guidance is established by Department of Marine Administration of the Government of the Republic of the Union of Myanmar, under the provision International Convention for the Safety of Life at Sea (SOLAS), 1974, as amended for the Myanmar ships engaged on international voyage.

3. Single and Double Hull Oil Tankers, Ore/oil Ships, Ore/bulk/oil Ships

Table 3.1 Thickness measurement - Single and double hull oil tankers, ore/oil ships, ore/bulk/oil ships

<table>
<tr><th>Special Survey I
(Ships 5 years old)</th><th>Special Survey III
(Ships 15 years old)</th><th>Special Survey IV
(Ships 20 years old and over)</th></tr>
<tr><td>(1) 1 section of deck plating for the full beam of the ship within 0.5L amidships in way of a ballast tank, if any, or a cargo tank used primarily for water ballast.
(2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Close-up Survey in accordance with Appendix 1 – Table 1, Table 2, Table 3, Table 4.
(3) Critical areas, as required by the Surveyor.</td><td rowspan="3">(1) Within the cargo area:
(a) Each deck plate.
(b) 2 transverse sections, see Note 6.
(2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Closeup Survey in accordance with Appendix 1 – Table 1, Table 2, Table 3, Table 4.
(3) Selected wind and water strakes outside the cargo area.
(4) All wind and water strakes within the cargo area.
(5) All cargo hold hatch covers and coamings (plating and stiffeners), see Note 5.
(6) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank, see Notes 1 and 4.
(7) Critical areas, as required by the Surveyor.</td><td rowspan="3">(1) Within the cargo area:
(a) Each deck plate.
(b) 3 transverse sections, see Note 6.
(c) Each bottom plate.
(2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Close-up Survey in accordance with Appendix 1 – Table 1, Table 2, Table 3, Table 4.
(3) All wind and water strakes over the full length of the ship, port and starboard.
(4) All cargo hold hatch covers and coamings (plating and stiffeners), see Note 5.
(5) Remaining exposed main deck plating not considered in item (1) and representative exposed superstructure deck plating (i.e. poop, bridge and forecastle deck).
(6) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank and aft</td></tr>
<tr><th>Special Survey II
(Ships 10 years old)</th></tr>
<tr><td>(1) Within the cargo area:
(a) Each deck plate.
(b) 1 transverse section, see Note 6.
(2) Measurements for general assessment and recording of corrosion pattern of the structural members subject to Close-up Survey in accordance with Appendix 1 – Table 1, Table 2, Table 3, Table 4.
(3) Selected wind and water</td></tr>
</table>

strakes outside the cargo area. (4) Critical areas, as required by the Surveyor.		peak tank, see Notes 1 and 4. (7) All keel plates outside the cargo tank length. Also additional bottom plates in way of cofferdams, machinery space and aft end of tanks. (8) Plating of seachests. Also side shell plating in way of overboard discharges, as considered necessary by the Surveyor. (9) Critical areas, as required by the Surveyor.
NOTES 1. For areas in tanks where coatings are found to be in GOOD condition, the extent of thickness measurements may be specially considered. 2. Transverse sections should be chosen where the largest reductions are likely to occur, or as revealed by deck plating measurements. 3. Where two or three transverse sections are required to be measured, at least one is to include a ballast tank within 0,5L amidships. 4. Transverse bulkhead complete including stiffening system. 5. All cargo hold hatch covers and coamings, where fitted, are to be measured on ore/oil and ore/bulk/oil ships. 6. For oil tankers (including ore/oil and ore/bulk/oil ships), with length ≥ 130 m and over 10 years of age, the longitudinal strength is to be evaluated. In such cases, a minimum of three transverse sections are to be measured within 0,5L amidships.		

Table 3.2 - Thickness measurement - Single hull oil tankers, ore/oil ships and ore/bulk/oil ships - Bottom structure with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Bottom plating	Minimum of 3 bays across tank, including aft bay Measurement around and under all suction strums	5 point pattern for each panel between longitudinals and webs
(2) Bottom longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on vertical web
(3) Bottom girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with 1 measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across face flat. 5 point pattern on girder/bulkhead brackets
(4) Bottom transverse webs	3 webs in bays where bottom plating measured, with measurements at middle and both ends	5 point pattern over 2 m^2 area. Single measurements on face flat
(4) Bottom transverse webs	Where applicable	Single measurements

Table 3.3 Thickness measurement - Single hull oil tankers, ore/oil ships and ore/bulk/oil ships - Deck structure with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Deck plating	2 bands across tank	Minimum of 3 measurements per plate per band
(2) Deck longitudinals	Minimum of 3 longitudinals in each of 2 bays	3 measurements in line vertically on webs and 2 measurements on flange (if fitted)
(3) Deck girders and brackets	At fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with 1 measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across face flat. 5 point pattern on girder/bulkhead brackets
(4) Deck transverse webs	Minimum of 2 webs with measurement at both ends and middle of span	5 point pattern over 2 m^2 area. Single measurements on face flat
(5) Panel stiffening	Where applicable	Single measurements

Table 3.4 Thickness measurement - Single hull oil tankers, ore/oil ships and ore/bulk/oil ships - Shell and longitudinal bulkheads with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Deckhead and bottom strakes and strakes in way of stringer platforms	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
(2) All other strakes	Plating between every 3rd pair of longitudinals in same 3 bays	Single measurement
(3) Longitudinals – deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
(4) Longitudinals – all others	Every third longitudinal in same 3 bays	3 measurements across web and 1 measurement on flange
(5) Longitudinals – bracket	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5 point pattern over area of bracket
(6) Web frames and cross ties	3 webs with minimum of 3 locations on each web, including in way of cross tie connections	5 point pattern over 2 m^2 area, plus single measurements on web frame and cross tie face flats

Table 3.5 Thickness measurement - Single hull oil tankers, ore/oil ships and ore/bulk/oil ships - Transverse bulkheads and swash bulkheads with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Deckhead and bottom strakes in way of stringer platforms	Plating between pair of stiffeners at 3 locations: approx. 1/4, 1/2 and ¾ width of tank	5 point pattern between stiffeners over 1 m length
(2) All other strakes	Plating between pair of stiffeners at middle location	Single measurement
(3) Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange or fabricated connection	5 point pattern over 1 m^2 of plating
(4) Stiffeners	Minimum of 3 typical stiffeners	For web, 5 point pattern over span between bracket connections (2 measurements across web at each bracket connection and one at centre of span). For flange, single measurements at each bracket toe and at centre of span
(5) Brackets	Minimum of 3 at top, middle and bottom of tank	5 point pattern over area of bracket
(6) Deep webs and girders	Measurements at toe of bracket and at centre of span	For web, 5 point pattern over 1 m^2 area. 3 measurements across face flat
(7) Stringer platforms	All stringers with measurements at middle and both ends	5 point pattern over 1 m^2 area plus single measurements near bracket toes and on face flats

Table 3.6 Thickness measurement - Double hull oil tankers - Bottom, inner bottom and hopper structure with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Bottom, inner bottom and hopper plating	Minimum of 3 bays across double bottom tank, including aft bay. Measurement around and under all suction strums	5 point pattern for each panel between longitudinals and floors
(2) Bottom, inner bottom and hopper longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on vertical web
(3) Bottom girders, including watertight girders	At the fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with 1 measurement between each panel stiffener, or a minimum of 3 measurements
(4) Bottom floors, including watertight floors	3 floors in bays where bottom plating measured, with measurements at both ends and middle	5 point pattern over 2 m2 area
(5) Hopper web frame ring	3 floors in bays where bottom plating measured	5 point pattern over 1 m2 of plating. Single measurements on flange
(6) Hopper transverse watertight bulkhead or swash	i. Lower $\frac{1}{3}$ of bulkhead	(i) 5 point pattern over 1 m2 of plating

bulkhead	ii. Upper $\frac{2}{3}$ of bulkhead ii. Stiffeners (minimum of 3)	(ii) 5 point pattern over 2 m2 of plating (iii) For web, 5 point pattern over span (2 measurements across web at each end and 1 at centre of span). For flange, single measurement at each end and centre of span.
(7) Panel stiffening	Where applicable	Single measurements

Table 3.7 Thickness measurement - Double hull oil tankers – Deck structure with substantial corrosion

Structural member	**Extent of measurement**	**Pattern of measurement**
(1) Deck plating	2 transverse bands across tank	Minimum of 3 measurements per plate per band
(2) Deck longitudinals	Every 3rd longitudinal in each of 2 bands with a minimum of 1 longitudinal	3 measurements in line vertically on webs and 2 measurements on flange (if fitted)
(3) Deck girders and brackets (usually in cargo tanks only)	At the fore and aft transverse bulkhead, bracket toes and in centre of tanks	Vertical line of single measurements on web plating with 1 measurement between each panel stiffener, or a minimum of 3 measurements. 2 measurements across flange. 5 point pattern on girder / bulkhead brackets
(4) Deck transverse webs	Minimum of 2 webs, with measurements at both ends and middle of span	5 point pattern over 1 m^2area. Single measurements on the flange
(5) Vertical web and transverse bulkhead in wing ballast tank (two metres from deck)	Minimum of 2 webs, and both transverse bulkheads	5 point pattern over 1 m^2 area
(6) Panel stiffening	Where applicable	Single measurements

Table 3.8 Thickness measurement - Double hull oil tankers – Wing ballast tank structure with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Side shell and longitudinal bulkhead plating: *(i)* Upper strake and strakes in way of horizontal girders *(ii)* All other strakes	*(i)* Plating between each pair of longitudinals in a minimum of 3 bays (along the tank) *(ii)* Plating between every 3rd pair of longitudinals on same 3 bays	*(i)* Single measurements *(ii)* Single measurements
(2) Side shell and longitudinal bulkhead longitudinals on: *(i)* Upper strake *(ii)* All other strakes	*(i)* Each longitudinal in same 3 bays *(ii)* Every 3rd longitudinal in same 3 bays	*(i)* 3 measurements across web and 1 measurement on flange *(ii)* 3 measurements across web and 1 measurement on flange
(3) Longitudinals – brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5 point pattern over area of bracket
(4) Vertical web and transverse bulkheads (excluding deckhead area): *(i)* Strakes in way of horizontal girders *(ii)* Other strakes	*(i)* Minimum of 2 webs and both transverse bulkheads *(ii)* Minimum of 2 webs and both transverse bulkheads	*(i)* 5 point pattern over approximately 2 m^2 area *(ii)* 2 measurements between each pair of vertical stiffeners
(5) Horizontal girders	Plating on each girder in a minimum of 3 bays	2 measurements between each pair of longitudinal girder stiffeners
(6) Panel stiffening	Where applicable	Single measurements

Table 3.9 Thickness measurement - Double hull oil tankers - Longitudinal bulkhead structure in cargo tanks with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Deckhead and bottom strakes, and strakes in way of horizontal stringers on transverse bulkheads	Plating between each pair of longitudinals in a minimum of 3 bays	Single measurement
(2) All other strakes	Plating between every 3rd pair of longitudinals in same 3 bays	Single measurement
(3) Longitudinals on deckhead and bottom strakes	Each longitudinal in same 3 bays	3 measurements across web and 1 measurements on flange
(4) All other longitudinals	Every 3rd longitudinal in same 3 bays	3 measurements across web and 1 measurements on flange
(5) Longitudinals – brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5 point pattern over area of bracket
(6) Web frames and cross ties	3 webs with minimum of 3 locations on each web, including in way of cross tie connections	5 point pattern over approximately 2 m^2 area of webs, plus single measurements on flanges of web frames and cross ties
(7) Lower end brackets (opposite side of web frame)	Minimum of 3 brackets	5 point pattern over approximately 2 m^2 area of brackets, plus single measurements on bracket flanges

Table 3.10 Thickness measurement - Double hull oil tankers - Transverse watertight and swash bulkhead structure in cargo tanks with substantial corrosion

Structural member	Extent of measurement	Pattern of measurements
(1) Upper and lower stool, where fitted	Transverse band within 25 mm of welded connection to inner bottom/deck plating Transverse band within 25 mm of welded connection to shelf plate	5 point pattern between stiffeners over 1 m length
(2) Deckhead and bottom strakes, and strakes in way of horizontal stringers	Plating between pair of stiffeners at 3 locations; approximately ¼, ½ and ¾ width of tank.	5 point pattern between stiffeners over 1 m length
(3) All other strakes	Plating between pair of stiffeners at middle location	Single measurement
(4) Strakes in corrugated bulkheads	Plating for each change of scantling at centre of panel and at flange of fabricated connection	5 point pattern over approximately 1 m^2 of plating
(5) Stiffeners	Minimum of 3 typical stiffeners	For web, 5 point pattern over span between bracket connections (2 measurements across web at each bracket connection and 1 at centre of span). For flange, single measurement at bracket toe and at centre of span
(6) Brackets	Minimum of 3 at top, middle and bottom of tank	5 point pattern over area of bracket
(7) Horizontal stringers	All stringers with measurements at both ends and middle	5 point pattern over 1 m^2 area, plus single measurements near bracket toes and on flanges

4. Single Skin and Double Skin Dry Bulk Cargo Ships (Bulk Carriers)

Table 4.1 Thickness measurement – Single skin and double skin Dry bulk cargo ships (bulk carriers)

<table>
<tr>
<th>Special Survey I
(Ships 5 years old)</th>
<th>Special Survey III
(Ships 15 years old)</th>
<th>Special Survey IV
(Ships 20 years old and over)</th>
</tr>
<tr>
<td>(1) Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey in accordance with Appendix 2 – Table 1, Table 2, Table 3.
(2) Critical areas, as required by the Surveyor.</td>
<td rowspan="2">(1) Within the cargo length area:
(a) Each deck plate outside line of cargo hatch openings.
(b) 2 transverse sections, outside line of cargo hatch openings. (A minimum of 1 of the above transverse sections is to be within 0,5L amidships).
(2) Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey in accordance with Appendix 2 – Table 1, Table 2, Table 3.
(3) All wind and water strakes within the cargo length area.
(4) Selected wind and water strakes outside the cargo length area.
(5) All cargo hatch covers and coamings (plating and stiffeners).
(6) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank see Notes 1 and 3.
(7) The aft bulkhead of the forward cargo hold on single skin ships (see Note 4).
(8) Cargo hold shell frames on single skin ships, see Note 5.
(9) Critical areas, as required by the Surveyor.</td>
<td rowspan="2">(1) Within the cargo length area:
(a) Each deck plate outside line of cargo hatch openings.
(b) 3 transverse sections, outside line of cargo hatch openings. (A minimum of 2 of the above transverse sections is to be within 0,5L amidships).
(c) Each bottom plate.
(2) Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey in accordance with Appendix 2 – Table 1, Table 2, Table 3.
(3) All wind and water strakes over the full length of the ship, port and starboard.
(4) All cargo hatch covers and coamings (plating and stiffeners).
(5) Remaining exposed main deck plates not considered in item (1) and representative exposed superstructure deck plating (i.e. poop, bridge and forecastle deck).
(6) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank and aft peak tank, see Notes 1 and 3.
(7) All keel plates outside the cargo length area. Also additional bottom plates in way of cofferdams, machinery space and aft end of tanks.
(8) Plating of seachests. Also side shell plating in way of overboard discharges, as considered necessary by the Surveyor.
(9) The aft bulkhead of the forward cargo hold on single skin ships (see Note 4).
(10) Cargo hold shell frames on single skin ships, see Note 5.</td>
</tr>
<tr>
<th>Special Survey II
(Ships 10 years old)</th>
</tr>
<tr>
<td>(1) Within the cargo length area:
(a) 2 sections of deck plating outside line of cargo hatch openings.
(2) Measurement, for general assessment and recording of corrosion pattern, of those structural members subject to Close-up Survey in accordance with Appendix 2 – Table 1, Table 2, Table 3.
(3) Wind and water strakes in way of the transverse sections considered in item (1).
(4) Selected wind and water strakes outside the cargo length area.
(5) Cargo hold shell frames on single skin ships, see Note 5.
(6) Critical areas, as required by the Surveyor.</td>
</tr>
</table>

		(11) Critical areas, as required by the Surveyor.

NOTES
The requirements in this table apply to both single skin and double skin ships unless stated otherwise.
1. For areas in spaces where coatings are found to be in GOOD condition, the extent of thickness measurement may be specially considered. Prior to any coating or re-coating of cargo holds, scantlings are to be confirmed by thickness measurement with the Surveyor in attendance.
2. Transverse sections should be chosen where the largest reductions are likely to occur, or as revealed by deck plating measurement.
3. Transverse bulkhead complete including stiffening system.
4. For ships assigned the notation ESN, the corrugated part of the aft transverse bulkhead of the forward cargo hold is to be subject to thickness measurement. This is to include each vertical corrugation at its lower and middle level including shedder plates and gusset plates, where applicable.
5. Single skin bulk carriers contracted for construction prior to 1 July 1998 are to undergo a reassessment of their cargo hold shell frames in accordance with the Provisional Rules for Existing Ships.
The number of shell frames to be measured is equivalent to the number of shell frames subject to Close-up Survey (Appendix 2 – Table 1), with representative measurements to be taken at specific areas for each frame.

Table 4.2 Thickness measurement – Single Skin Bulk carriers – Shell plating and stiffening, with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Bottom and side shell plating	Suspect plate, plus four adjacent plates	5 point pattern for each panel between longitudinals
(2) Bottom/side shell longitudinals	Minimum of three longitudinals in way of suspect areas	3 measurements in line across web and 3 measurements on flange
(3) Side shell frames	Suspect frame and each adjacent	*(a)* At each end and mid-span: 5 point pattern on both web and flange *(b)* 5 point pattern within 25 mm of welded attachment to both shell and hopper sloping plate

Table 4.3 Thickness measurement – Single Skin Bulk carriers – Double bottom and hopper structure, with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Inner bottom plating	Suspect plate plus all immediately adjacent plates	5 point pattern for each panel between longitudinals over 1 m length
(2) Inner bottom longitudinals	Three longitudinals in way of plates measured	3 measurements in line across web and 3 measurements on flange
(3) Transverse floors and longitudinal girders	Suspect plates	5 point pattern over approximately 1 m^2 of plating
(4) Watertight floors and girders	*(a)* lower 1/3 of tank	*(a)* 5 point pattern over 1 m^2 of plating
	(b) upper 2/3 of tank	*(b)* 5 point pattern alternate plates over 1 m^2 of plating
(5) Transverse web frames	Suspect plate	5 point pattern over 1 m^2 of plating

Table 4.4 Thickness measurement – Single Skin and Double Skin Bulk carriers - Transverse bulkheads in cargo holds, with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Lower stool	*(a)* Transverse band within 25 mm of welded connection to inner-bottom	*(a)* 5 point pattern between stiffeners over 1 m length
	(b) Transverse band within 25 mm of welded connection to shelf plate	*(b)* as above
(2) Transverse bulkhead	*(a)* Transverse band immediately above lower stool shelf plate	*(a)* 5 point pattern over 1 m length
	(b) Transverse band at approximately mid-height	*(b)* 5 point pattern over 1 m^2 of plating
	(c) Transverse band at part of bulkhead adjacent to upper deck or below upper stool shelf plate (for those ships fitted with upper stools)	*(c)* 5 point pattern over 1 m^2 of plating

Table 4.5 Thickness measurement - Single skin and double skin bulk carriers – Deck structure including cross strips, main cargo hatchways, hatch covers, coamings and topside tanks, with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Cross deck strip plating	Suspect cross deck strip plating	5 point pattern between underdeck stiffeners over 1 m length
(2) Underdeck stiffeners	*(a)* Transverse members	*(a)* 5 point pattern at each end and mid-span
	(b) Longitudinal member	*(b)* 5 point pattern on both web and flange
(3) Hatch covers	*(a)* Each side and end plate, 3 locations	*(a)* 5 point pattern at each location
	(b) Top plate, 3 longitudinal bands - 2 on outboard strakes and 1 on centreline strake	*(b)* 5 point measurement at each band
(4) Hatch coamings	Each side and end of coaming, one upper and one lower band	5 point measurement at each band
(5) Topside salt water ballast tanks	*(a)* Watertight transverse bulkheads	*(i)* 5 point pattern over 1 m^2 of plating
	(i) lower 1/3 of bulkhead	*(ii)* 5 point pattern over 1 m^2 of plating
	(ii) upper 2/3 of bulkhead	*(iii)* 5 point pattern over 1 m length
	(iii) stiffeners	
	(b) Swash transverse bulkheads	*(i)* 5 point pattern over 1 m^2 of plating
	(i) lower 1/3 of bulkhead	*(ii)* 5 point pattern over 1 m^2 of plating
	(ii) upper 2/3 of bulkhead	*(iii)* 5 point pattern over 1 m length
	(iii) stiffeners	
	(c) 3 representative bays of the topside sloping plate	*(i)* 5 point pattern over 1 m^2 of plating
	(i) lower 1/3 of tank	*(ii)* 5 point pattern over 1 m^2 of plating
	(ii) upper 2/3 of tank	
	(d) suspect longitudinals and adjacent plates	5 point pattern both web and flange over 1 m length
(6) Main deck plating	Suspect plates and 4 immediately adjacent plates	5 point pattern over 1 m^2 of plating
(7) Main deck longitudinals	Minimum of 3 longitudinals where plating measured	5 point pattern on both web and flange over 1 m length
(8) Web frames/transverses	Suspect plates	5 point pattern over 1 m^2 of plating

Table 4.6 Thickness measurement - Double skin bulk carriers - Bottom, inner bottom and hopper structure, with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Bottom, inner bottom and hopper structure plating	*(a)* Minimum of 3 bays across double bottom tank, including aft bay	5 point pattern for each panel between longitudinals and floors
	(b) Measurements around and under all suction bell mouths	
(2) Bottom, inner bottom and hopper structure longitudinals	Minimum of 3 longitudinals in each bay where bottom plating measured	3 measurements in line across flange and 3 measurements on the vertical web
(3) Bottom girders, including watertight girders	At fore and aft watertight floors and in centre of tanks	Vertical line of single measurements on girder plating with 1 measurement between each panel stiffener, or a minimum of 3 measurements
(4) Bottom floors, including watertight floors	3 floors in the bays where bottom plating measured, with measurements at both ends and middle	5 point pattern over 2 m^2 area
(5) Hopper structure web frame ring	3 floors in bays where bottom plating measured	5 point pattern over 1 m^2 of plating and single measurements on flange
(6) Hopper structure transverse watertight bulkhead or swash bulkhead	*(a)* lower 1/3 of bulkhead	*(a)* 5 point pattern over 1 m^2 of plating
	(b) upper 2/3 of bulkhead	*(b)* 5 point pattern over 2 m^2 of plating
	(c) stiffeners (minimum of 3)	*(c)* For web, 5 point pattern over span (2 measurements across web at each end and 1 at centre of span). For flange, single measurements at each end and centre of span
(7) Panel stiffening	Where applicable	Single measurements

Table 4.7 Thickness measurement - Double skin bulk carriers - Double side space structure (including wing void spaces of ore carriers), with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
(1) Side shell and inner plating: *(i)* Upper strake and strakes in way of horizontal girders *(ii)* All other strakes	*(i)* Plating between each pair of transverse frames/longitudinals in a minimum of 3 bays along the tank *(ii)* Plating between every third pair of longitudinals in same 3 bays	*(i)* Single measurement *(ii)* Single measurement
(2) Side shell and inner side transverse frames/longitudinals on: *(i)* Upper strake *(ii)* All other strakes	*(i)* Each transverse frame/longitudinal in same 3 bays *(ii)* Every third transverse frame/ longitudinal in same 3 bays	*(i)* 3 measurements across web and 1 measurement on flange *(ii)* 3 measurements across web and 1 measurement on flange
(3) Transverse frames/longitudinals - brackets	Minimum of 3 at top, middle and bottom of tank in same 3 bays	5 point pattern over area of bracket
(4) Vertical web and transverse bulkheads: *(i)* Strakes in way of horizontal girders *(ii)* Other strakes	*(i)* Minimum of 2 webs and both transverse bulkheads *(ii)* Minimum of 2 webs and both transverse bulkheads	*(i)* 5 point pattern over approx. 2 m^2 area *(ii)* 2 measurements between each pair of vertical stiffeners
(5) Horizontal girders	Plating on each girder in a minimum of 3 bays	2 measurements between each pair of longitudinal girder stiffeners
(6) Panel stiffening	Where applicable	Single measurements

5. General dry cargo ships

Table 5.1 Thickness measurement – General dry cargo ships

<table>
<tr><th>Special Survey I
(Ships 5 years old)</th><th>Special Survey III
(Ships 15 years old)</th><th>Special Survey IV
(Ships 20 years old and over)</th></tr>
<tr><td>(1) Critical areas, as required by the Surveyor.

Special Survey II
(Ships 10 years old)
(1) Within 0,5L amidships: 1 transverse section of deck plating in way of a cargo space.
(2) Measurements for the general assessment and recording of corrosion pattern of those structural members subject to Close-up Survey in accordance with Appendix 3 – Table 1, see Note 5.
(3) Critical areas, as required by the Surveyor.</td><td>(1) Within 0,5L amidships:
2 transverse sections in way of two different cargo spaces, see Notes 2, 3 and 4.
(2) Measurements for the general assessment and recording of corrosion pattern of those structural members subject to Close-up Survey in accordance with Appendix 3 – Table 1, see Note 5.
(3) Within the cargo length area;
(i) Each deck plate outside the line of cargo hatch openings.

(ii) All wind and water strakes.
(4) Selected wind and water strakes outside the cargo length area.
(5) All cargo hold hatch covers and coamings (plating and stiffeners)
(6) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank, see Notes 3 and 6
(7) Critical areas, as required by
the Surveyor</td><td>(1) Within 0,5L amidships: a minimum of 3 transverse sections, see Notes 2, 3 and 4
(2) Measurements for the general assessment and recording of corrosion pattern of those structural members subject to Close-up Survey in accordance with Appendix 3 – Table 1, see Note 5.
(3) Within the cargo length area:
(i) Each deck plate outside the line of cargo hatch openings.
(ii) Each bottom plate, including turn of bilge.
(iii) Duct keel or pipe tunnel plating and internals.
(4) All wind and water strakes over the full length of the ship, port and starboard.
(5) All cargo hold hatch covers and coamings (plating and stiffeners).
(6) Representative exposed superstructure deck plating (i.e. poop, bridge and forecastle deck).
(7) Lowest strake and strakes in way of ‘tween deck of all transverse bulkheads in cargo spaces together with internals in way, see Note 3.
(8) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank and aft peak tank, see Note 3 and 6.
(9) All keel plates over the full length of the ship. Also additional bottom plates in way of cofferdams, machinery spaces and aft end of tanks.
(10) Plating of seachests. Also side shell plating in way of overboard discharges, as considered necessary by the Surveyor
(11) Critical areas, as required by</td></tr>
</table>

		the Surveyor

NOTES

1. Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering cargo and ballast history and arrangement, and condition of protective coatings.
2. A transverse section is to include all longitudinal members such as plating, longitudinals and girders at deck, sides, bottom, inner bottom, hopper side and longitudinal bulkheads, where fitted.
3. Where the protective coating is in GOOD condition, then the extent of thickness measurements of internals may be specially considered at the discretion of the attending Surveyor.
4. For ships having length L less than 100 m:
(a) the number of transverse sections required at Special Survey III may be reduced to one.
(b) the number of transverse sections required at Special Survey IV and subsequent surveys may be reduced to two.
5. For areas in cargo holds and salt-water ballast tanks subject to Close-up Survey, the thickness measurements may be dispensed with provided the Surveyor is satisfied with the Close-up Survey examination, that there is no structural diminution and the protective coating remains effective.
6. Transverse bulkhead complete including stiffening system.

Table 5.2 Thickness measurement - Additional requirements in way of structure identified with substantial corrosion

Structural member	Extent of measurement	Pattern of measurement
Plating	Suspect areas and adjacent plates	5 point pattern over $1m^2$
Stiffeners	Suspect areas	3 measurements each in line across web and flange

6. Other ship types

Table 6.1 Thickness measurement – General

<table>
<tr><th>Special Survey I
(Ships 5 years old)</th><th>Special Survey III
(Ships 15 years old)</th><th>Special Survey IV
(Ships 20 years old and over)</th></tr>
<tr><td>(1) Critical areas, as required by the Surveyor</td><td rowspan="3">(1) Within 0,5L amidships:
2 transverse sections in way of two different cargo spaces, see Notes 2, 3 and 4
(2) All cargo hold hatch covers and coamings (plating and stiffeners)
(3) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank (see Notes 3 and 5)
(4) Critical areas, as required by the Surveyor</td><td rowspan="3">(1) Within 0,5L amidships: a minimum of 3 transverse sections in way of cargo spaces, see Notes 2, 3 and 4
(2) All cargo hold hatch covers and coamings (plating and stiffeners)
(3) All exposed main deck plating over full length of ship
(4) All wind and water strakes over the full length of the ship, port and starboard.
(5) Representative exposed superstructure deck plating (i.e. poop, bridge and forecastle deck)
(6) Lowest strake and strakes in way of ‘tween deck of all transverse bulkheads in cargo spaces together with internals in way, see Note 3
(7) All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank and aft peak tank, see Notes 3 and 5
(8) All keel plates over the full length of the ship. Also additional bottom plates in way of cofferdams, machinery space and aft end of tanks
(9) Plating of seachests. Also side shell plating in way of overboard discharges, as considered necessary by the Surveyor
(10) Critical areas, as required by the Surveyor</td></tr>
<tr><th>Special Survey II
(Ships 10 years old)</th></tr>
<tr><td>(1) Within 0,5L amidships:
1 transverse section of deck plating in way of a cargo space
(2) Critical areas, as required by the Surveyor</td></tr>
</table>

NOTES

1. Thickness measurement locations are to be selected to provide the best representative sampling of areas likely to be most exposed to corrosion, considering cargo and ballast history and arrangement, and condition of protective coatings.
2. A transverse section is to include all longitudinal members such as plating, longitudinals and girders at the deck, sides, bottom, inner bottom, hopper side and longitudinal bulkheads, where fitted.
3. Where the protective coating is in GOOD condition, then the extent of thickness measurements of internals may be specially considered at the discretion of the Surveyor.
4. For ships having length L less than 100 m:

(a) the number of transverse sections required at Special Survey III may be reduced to one;

(b) the number of transverse sections required at Special Survey IV and subsequent surveys may be reduced to two;

(c) at Special Survey III, thickness measurements of exposed deck plating within 0,5L amidships may be required.

5. Transverse bulkhead complete including stiffening system.

Appendix 1

Table 1 Minimum requirements for Close-up Survey - Single hull oil tankers

Special Survey I **(Ships 5 years old)**	**Special Survey II** **(Ships 10 years old)**	**Special Survey III** **(Ships 15 years old)**	**Special Survey IV** **(Ships 20 years old and over)**
(1) One web frame ring – in a ballast wing tank, if any, or a cargo oil wing tank used primarily for water ballast. *See* Note 1. *(2)* One deck transverse – in a cargo oil tank. *See* Note 2. *(3)* One transverse bulkhead. *See* Notes 4 and 8: *(a)* in a ballast tank. *(b)* in a cargo oil wing tank. *(c)* in a cargo oil centre tank.	*(1)* All web frame rings – in a ballast wing tank, if any, or a cargo oil wing tank used primarily for water ballast. *See* Note 1. *(2)* One deck transverse, *See* Note 2: *(a)* In each of the remaining ballast tanks, if any *(b)* In a cargo oil wing tank *(c)* In 2 cargo oil centre tanks *(3)* Both transverse bulkheads – in a wing ballast tank, if any, or a cargo oil wing tank used primarily for water ballast, *see* Note 3 *(4)* One transverse bulkhead. *See* Notes 4 and 8: *(a)* In each remaining ballast tank. *(b)* In a cargo oil wing tank. *(c)* In 2 cargo oil centre tanks.	*(1)* All web frame rings, *See* Note 1: *(a)* in all ballast tanks. *(b)* in a cargo oil wing tank. *(2)* A minimum of 30% of all web frame rings in each remaining cargo wing tank. *See* Notes 1 and 7. *(3)* All transverse bulkheads – in all cargo and ballast tanks, *see* Note 3. *(4)* A minimum of 30% of deck and bottom transverses in each cargo centre tank. *See* Notes 5 and 7. *(5)* As considered necessary by Surveyor. *See* Note 6.	*(1)* As Special Survey III. *(2)* Additional transverses if deemed necessary by the Surveyor.

Note 1. Complete transverse web frame ring including adjacent structural members.	Note 5. Deck and bottom transverse including adjacent structural members.
Note 2. Deck transverse including adjacent deck structural members.	Note 6. Additional complete transverse web frame ring.
Note 3. Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.	Note 7. The 30% is to be rounded up to the next whole number of structural items.
Note 4. Transverse bulkhead lower part including girder system and adjacent structural members.	Note 8. Where there are no centre tanks, the transverse bulkheads in wing tanks are to be subject to Close-up Survey. Where there are no wing tanks, the transverse bulkheads in centre tanks are to be subject to Close-up Survey.

Table 2 Minimum requirements for Close-up Survey - Double hull oil tankers

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) One web frame ring in a complete ballast tank. *See* Notes 1 and 3. *(2)* One deck transverse in a cargo tank.*See* Note 4. *(3)* One transverse bulkhead in a complete ballast tank. *See* Notes 1 and 6. *(4)* One transverse bulkhead in a cargo centre tank. *See* Notes 2 and 7. *(5)* One transverse bulkhead in a cargo wing tank. *See* Notes 2 and 7.	*(1)* All web frame rings in a complete ballast tank. *See* Notes 1 and 3. *(2)* The knuckle area and the upper part (approx. 5 m) of one web frame ring in each remaining ballast tank. *See* Note 8. *(3)* One deck transverse in two cargo tanks. *See* Note 4. *(4)* One transverse bulkhead in each complete ballast tank. *See* Notes 1 and 6. *(5)* One transverse bulkhead in two cargo centre tanks. *See* Notes 2 and 7. *(6)* One transverse bulkhead in a cargo wing tank. *See* Notes 2 and 7.	*(1)* All web frame rings in all ballast tanks. *See* Note 3. *(2)* All web frame rings in a cargo tank. *See* Note 9. *(3)* One web frame ring in each remaining cargo tank. *See* Note 9. *(4)* All transverse bulkheads– in all cargo and ballast tanks. *See* Notes 5 and 6. *(5)* As considered necessary by the Surveyor. *See* Note 10.	*(1)* As Special Survey III. *(2)* Additional transverse areas if deemed necessary by the Surveyor. *See* Note 10.

Note 1. Complete ballast tank means double bottom tank plus the double side tank and the double deck tank, as applicable, even if these are separate.

Note 2. Where there are no centre tanks, the transverse bulkheads in wing tanks are to be subject to Close-up Survey. Where there are no wing tanks, the transverse bulkheads in centre tanks are to be subject to Close-up Survey.

Note 3. Web frame ring in a ballast tank includes the vertical web in side tank, hopper web in hopper tank, floor in double bottom tank and deck transverse in a double deck tank and adjacent structural members. In peak tanks a web frame means a complete transverse web frame, including adjacent structural members.

Note 4.Deck transverse including adjacent deck structural members (or external structure on deck in way of the tank, where applicable).

Note 5.Transverse bulkhead complete in cargo tanks, including girder system, adjacent structural members (including longitudinal bulkheads) and internal structure of lower and upper stools, where fitted.

Note 6. Transverse bulkhead complete in ballast tanks, including girder system and adjacent structural members including longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, connecting brackets.

Note 7.Transverse bulkhead lower part in cargo tanks, including girder system, adjacent structural members (including longitudinal bulkheads) and internal structure of lower stool, where fitted.

Note 8.The knuckle area and the upper part (approximately 5 m), including adjacent structural members. Knuckle area is the area of the web frame around the connections of the sloping hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 m from the corners both on the bulkhead and the double bottom.

Note 9.Web frame ring in cargo tank includes deck transverse, longitudinal bulkhead vertical girder and cross ties, where fitted, and adjacent structural members.

Note 10.Additional complete transverse web frame ring.

Table 3 Minimum requirements for Close-up Survey - Ore/oil ships

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) One web frame ring – in a wing ballast tank, if any, or a cargo oil wing tank used primarily for water ballast. *See* Note 1. *(2)* One deck transverse – in a cargo tank. *See* Note 2. *(3)* One transverse bulkhead. *See* Notes 4 and 8: *(a)* in a ballast tank. *(b)* in a cargo oil wing tank. *(c)* in a cargo oil centre tank.	*(1)* All web frame rings – in a wing ballast tank, if any, or a cargo oil wing tank used primarily for water ballast. *See* Note 1. *(2)* One deck transverse. *See* Notes 2 and 8: *(a)* in each of the remaining ballast tanks, if any. *(b)* in a cargo oil wing tank. *(c)* in 2 cargo oil centre tanks. *(3)* Both transverse bulkheads – in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast. *See* Note 3. *(4)* One transverse bulkhead.*See* Notes 4 and 8: *(a)* in each remaining ballast tank. *(b)* in a cargo oil wing tank. *(c)* in 2 cargo oil centre tanks. *(5)* Selected cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 9. *(6)* Selected areas of deck plating inside line of hatch openings between cargo hold hatches.	*(1)* All web frame rings. *See* Note 1: *(a)* in all ballast tanks. *(b)* in a cargo oil wing tank. *(2)* A minimum of 30% of all web frame rings in each remaining cargo oil wing tank. *See* Notes 1 and 7. *(3)*All transverse bulkheads – in all cargo and ballast tanks. *See* Note 3. *(4)* A minimum of 30% of deck and bottom transverses in each cargo oil centre tank. *See* Notes 5 and 7. *(5)* As considered necessary by the Surveyor. *See* Note 6 *(6)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 9. *(7)* All deck plating inside line of hatch coamings between cargo hold hatches.	*(1)* As Special Survey III. *(2)* Additional transverses if deemed necessary by the Surveyor.

Note 1. Complete transverse web frame ring including adjacent structural members.

Note 2. Deck transverse including adjacent deck structural members.

Note 3. Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.

Note 4. Transverse bulkhead lower part including girder system and adjacent structural members.

Note 5. Deck and bottom transverse including adjacent structural members.

Note 6. Additional complete transverse web frame ring.

Note 7. The 30% is to be rounded up to the next whole number of structural items.

Note 8. Where there are no centre tanks, the transverse bulkheads in wing tanks are to be subject to Close-up Survey. Where there are no wing tanks, the transverse bulkheads in the centre tanks are to be subject to Close-up Survey.

Note 9. Subject to 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.

Table 4 Minimum requirements for Close-up Survey - Ore/bulk/oil ships

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) 25% of shell frames and their end attachments in the forward cargo hold at representative positions. *(2)* Selected frames and their end attachments in remaining cargo holds. *(3)* 1 transverse web with associated plating and longitudinals in 2 representative water ballast tanks of each (i.e. topside, peak, double bottom and hopper side tank). *(4)* 2 selected cargo hold transverse bulkheads including internal structure of upper and lower stools where fitted. This is to include the aft bulkhead in the forward cargo hold. *See* Note 1.	*(1a)* For OBOs with a deadweight less than 100,000 tonnes, all shell frames in the forward cargo hold and 25% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(1b)* For OBOs with a deadweight equal to or greater than 100,000 tonnes, all shell frames in the forward cargo hold and 50% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(2)* 1 transverse web with associated plating and longitudinals in each water ballast tank. *(3)* Forward and aft transverse bulkhead in 1 side ballast tank, including stiffening system. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2 *(6)* All areas of deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.	*(1)* All shell frames in the forward and one other selected cargo cargo hold and 50% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(2)* All transverse webs with associated plating and longitudinals in each water ballast tank. *(3)* All transverse bulkheads in ballast tanks, including stiffening system. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.	*(1)* All shell frames in all cargo holds including their end attachments and adjacent shell plating. *(2)* All transverse webs with associated plating and longitudinals in each water ballast tank. *(3)* All transverse bulkheads in ballast tanks, including stiffening system. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between cargo hold hatches.

Note 1. Close-up Survey of cargo hold transverse bulkheads 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.

Note 2. Subject to 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.

Appendix 2

Table 1 Minimum requirements for Close-up Survey - Single skin bulk carriers

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) 25% of shell frames and their end attachments in the forward cargo hold at representative positions. *(2)* Selected shell frames and their end attachments in remaining cargo holds. *(3)* 1 transverse web with associated plating and longitudinals in 2 representative water ballast tanks of each type (i.e. topside, peak, double bottom and hopper side tank). *(4)* 2 selected cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. This is to include the aft bulkhead of the forward hold.*See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	*(1a)* For bulk carriers with a deadweight less than 100,000 tonnes, all shell frames in the forward cargo hold and 25% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(1b)* For bulk carriers with a deadweight equal to or greater than 100,000 tonnes, all shell frames in the forward cargo hold and 50% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(2)* 1 transverse web with associated plating and longitudinals in each water ballast tank. *(3)* Forward and aft transverse bulkhead in 1 side ballast tank, including stiffening system. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings, (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.	*(1)*All shell frames in the forward and one other selected cargo hold and 50% of frames in each of the remaining cargo holds, including their upper and lower end attachments and adjacent shell plating. *(2)* All transverse webs with associated plating and longitudinals in each water ballast tank. *(3)* All transverse bulkheads in ballast tanks, including stiffening system. *(4)* All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.	*(1)* All shell frames in all cargo holds, including their end attachments and adjacent shell plating. *(2)* All transverse webs with associated plating and longitudinals in each water ballast tank. *(3)* All transverse bulkheads in ballast tanks, including stiffening system. *(4)* All cargo hold transverse bulkheads, including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.

Note 1. Close-up Survey of transverse bulkheads 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.

Note 2. Subject to 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.

Table 2 Minimum requirements for Close-up Survey - Double skin bulk carriers (excluding ore carriers)

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) 1 transverse web with associated plating and longitudinals in 2 representative water ballast tanks of each type. This is to include the foremost topside and double side tanks; peak tanks and double bottom tanks. *(2)* 2 selected cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(3)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	*(1)* 1 transverse web with associated plating and longitudinals in each water ballast tank. *(2)* Forward and aft transverse bulkheads, including stiffening system, in one complete double side ballast tank on one side of the ship (i.e. port or starboard), *see* Note 3. *(3)* 25% of ordinary transverse frames for transverse framing system or 25% of longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft parts, in the foremost double side tanks. *(4)* One transverse bulkhead in each cargo hold including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). See Note 2. *(6)*All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.	*(1)*All transverse webs with associated plating and longitudinals in each water ballast tank. *(2)* All transverse bulkheads in ballast tanks, including stiffening system. *(3)* 25% of ordinary transverse frames for transverse framing system or 25% of longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft parts, in all double side tanks. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.	*(1)* All transverse webs with associated plating and longitudinals in each water ballast tank. *(2)* All transverse bulkheads in ballast tanks, including stiffening system. *(3)* All ordinary transverse frames for transverse framing system or all longitudinals for longitudinal framing system on side shell and inner side plating at forward, middle and aft parts, in all double side tanks. *(4)* All cargo hold transverse bulkheads including internal structure of upper and lower stools, where fitted. *See* Note 1. *(5)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(6)* All deck plating and underdeck structure inside line of hatch openings between all cargo hold hatches.

Note 1.Close-up survey of transverse bulkheads 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.

Note 2. Subject to 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.

Note 3. Complete ballast tank means topside tank, hopper tank, double bottom tank and double side tank, even if these are separate.

Table 3 Minimum requirements for Close-up Survey - Double skin bulk carriers (excluding ore carriers)

Special Survey I (Ships 5 years old)	**Special Survey II (Ships 10 years old)**	**Special Survey III (Ships 15 years old)**	**Special Survey IV (Ships 20 years old and over)**
(1) 1 web frame ring complete including adjacent structural members in a water ballast wing tank. *(2)* 1 transverse bulkhead lower part including girder system and adjacent structural members in a ballast tank. *(3)* 2 selected cargo hold transverse bulkheads, including internal structure of upper and lower stools where fitted. *See* Note 1. *(4)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	*(1)* All web frame rings complete including adjacent structural members in a water ballast wing tank. *(2)* 1 deck transverse including adjacent structural members in each remaining water ballast tank. *(3)* Forward and aft transverse bulkheads including girder system and adjacent structural members in a ballast wing tank. *(4)* 1 transverse bulkhead lower part including girder system and adjacent structural members in each remaining ballast tank. *(5)* 1 transverse bulkhead in each cargo hold, including internal structure of upper and lower stools where fitted. *See* Note 1. *(6)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(7)* All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.	*(1)* All web frame rings complete including adjacent structural members in each water ballast tank. *(2)* All transverse bulkheads including girder system and adjacent structural members in each ballast tank. *(3)* 1 web frame ring complete including adjacent structural members in each wing void space. *(4)* Additional web frame rings including adjacent structural members in void spaces as deemed necessary by the Surveyor. *(5)* All cargo hold transverse bulkheads, including internal structure of upper and lower stools where fitted. *See* Note 1. *(6)*All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(7)*All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.	*(1)* All web frame rings complete including adjacent structural members in each water ballast tank. *(2)* All transverse bulkheads including girder system and adjacent structural members in each ballast tank. *(3)* 1 web frame ring complete including adjacent structural members in each wing void space. *(4)* Additional web frame rings including adjacent structural members in void spaces as deemed necessary by the Surveyor. *(5)* All cargo hold transverse bulkheads, including internal structure of upper and lower stools where fitted. *See* Note 1. *(6)* All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2. *(7)* All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.

Note 1. Close-up Survey of transverse bulkheads 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.

Note 2. Subject to 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.

Appendix 3

Table 3.1 Minimum requirements for Close-up Survey - General dry cargo ships

Special Survey I (Ships 5 years old)	Special Survey II (Ships 10 years old)	Special Survey III (Ships 15 years old)	Special Survey IV and subsequent (Ships 20 years old and over)
(1) Selected shell frames in one forward and one aft cargo hold and associated 'tween deck spaces.	(1) Selected shell frames in all cargo holds and 'tween deck spaces.	(1) All shell frames in the forward lower cargo hold and 25% of shell frames in each remaining cargo hold and 'tween deck spaces, including their upper and lower end attachments and adjacent shell plating.	(1) All shell frames in all cargo holds and 'tween deck spaces, including their upper and lower end attachments and adjacent shell plating.
(2) One selected cargo hold transverse bulkhead.	(2) One transverse bulkhead in each cargo hold, including stiffening system.	(2) All cargo hold transverse bulkheads, including stiffening system.	(2) All cargo hold transverse bulkheads, including stiffening system.
(3) All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	(3) Forward and aft transverse bulkhead in one side ballast tank, including stiffening system.	(3) All transverse bulkheads in ballast tanks, including stiffening system.	(3) All transverse bulkheads in ballast tanks, including stiffening system.
	(4) One transverse web with associated plating and framing in two representative water ballast tanks of each type (i.e. topside, hopper side, side tank, peak tank or double bottom tank).	(4) All transverse webs with associated plating and framing in each water ballast tank.	(4) All transverse webs with associated plating and framing in each water ballast tank.
	(5) All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	(5) All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.	(5) All cargo hold hatch covers and coamings (plating and stiffeners). *See* Note 2.
	(6) Selected areas of all deck plating and underdeck structure inside the line of hatch openings between cargo hold hatches.	(6) All deck plating and underdeck structure and inside the line of hatch openings between cargo hold hatches.	(6) All deck plating and underdeck structure inside the line of hatch openings between cargo hold hatches.
	(7) Selected areas of inner bottom plating.	(7) All areas of inner bottom plating.	(7) All areas of inner bottom plating.

Note 1. Close-up survey of cargo hold transverse bulkheads to be carried out at the following areas:

(a) Immediately above the inner bottom and immediately above the 'tween decks, as applicable.

(b) Mid-height of the bulkhead for the holds without 'tween decks.

(c) Immediately below the main deck plating and 'tween deck plating.

Note 2. Subject to 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.