Enhanced Survey Programme (ESP)

For OIL TANKERS

Preparation for Special Survey (Planning Document)

Including the 'Survey Planning Questionnaire'

OIL TANKER

Revision 12.1 (June 2010)

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Preparation for Special Survey (Planning Document)

Contents

Reference Documents.

Rules and Regulations for the Classification of Ships, Part 1, Chapter 3

- Section 1, General - *1.5 Definitions.*
- Section 5, Special Survey – General – Hull requirements.
- Section 7, Special Survey – Oil tankers (including ore/oil ships and ore/bulk/oil ships) - Hull requirements.

I.M.O Resolution A.744 (18)

I.A.C.S Unified Requirement Z7, Z10.1 and Z10.4

Introduction

This document has been produced in compliance with I.M.O Resolution A.744 (18), I.A.C.S Unified Requirement Z10.1, Z10.4 and the Rules and Regulations for the Classification of Ships, Part 1, Chapter 3.

As a result of the introduction of the Enhanced Survey Programme, oil tankers, combination carriers, chemical tankers and dry bulk cargo ships (bulk carriers), require a Survey Planning Questionnaire and a Survey Programme (planning document) to be prepared in advance of the Special Survey & the Intermediate Survey on ships over 10 years of age.

In particular, the Rules and Regulations for the Classification of Ships require a Survey Planning Questionnaire and a Survey Programme to be prepared by the Owner at least six months in advance of the intermediate or special survey and submitted for agreement. The Programme is to include proposals for the Special Survey, including the means of providing access for close-up survey and thickness measurement. The Survey Programme at Intermediate Survey may consist of the Survey Programme agreed for the previous Special Survey supplemented by the Executive Summary of that Special Survey and later relevant Survey Reports. The Survey will not commence until a Survey Programme has been agreed. Owners are advised that they may submit a Survey Programme for Intermediate Survey subject to their survey & docking planning, for approval.

The attached guidelines are intended to assist Owners in their preparation for survey and to provide guidance on the information required in the Survey Planning Questionnaire and Special Survey Programme document.

Special surveys may be commenced at the fourth Annual Survey after completion, commissioning, or previous Special Survey, and be progressed during the succeeding year with a view to completion by the due date of the Special Survey. As part of the preparation for the Special Survey, the thickness measurement, where applicable, should be dealt with, so far as practicable, in connection with the fourth Annual Survey. However, thickness measurements should not be carried out before the fourth annual Survey.

When Special Surveys are commenced prior to the fourth Annual Survey, the entire survey is to be completed within 15 months if such work is to be credited towards the Special Survey.

Ships that are required to be surveyed in accordance with ESP requirements are identified by the notation **ESP**. Where the Special Survey is completed more than three months before the due date, the new record of Special Survey will be the final date of survey. In all other cases the date recorded will be the fifth anniversary.

LR will give timely notice to an Owner about forthcoming surveys by means of a letter or a computer printout of a ship's Quarterly Listing of Surveys, Condition of Class and Memoranda. The omission of such notice, however, does not absolve the Owner from his responsibility to comply with LR's survey requirements for maintenance of class, all of which are available to Owners on the ClassDirect Live website.

Preparation for Survey - General Guidance

1. In order to enable the attending Surveyor(s) to carry out the survey, provisions for proper and safe access are to be agreed between the Owner and LR. Tanks and spaces are to be safe for access, be gas free and properly ventilated. Prior to entering a tank, void or enclosed space, it is to be verified that the atmosphere in that space is free from hazardous gas and contains sufficient oxygen.

2. In preparation for survey, thickness measurements and to allow for a thorough examination, all spaces are to be cleaned including removal from surfaces of all loose accumulated corrosion scale. Spaces 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 protective coating. However, those areas of structure whose renewal has already been decided by the owner need only be cleaned and de-scaled to the extent necessary to determine the limits of renewed areas.

3. It should be noted that the Survey Programme is applicable to all spaces or areas within the cargo hold or cargo tank length and all salt-water ballast spaces outside the cargo hold/tank length. The remaining items and spaces for survey and/or tests are to be dealt with in the normal manner.

4. Sufficient illumination is to be provided to reveal corrosion, deformation, fractures, damages or other structural deterioration.

5. Means are to be provided to enable the Surveyor to examine the structure in a safe and practical way. Where the provisions of safety and required access are determined by the Surveyor not to be adequate, then the survey of the space(s) involved is not to proceed.

6. For surveys, including close-up survey where applicable, in cargo spaces and ballast tanks, one or more of the following means of access, is to be provided:
   (a). Permanent staging and passages through structures.
   (b). Temporary staging and passages through structures.
   (c). Lifts and movable platforms.
   (d). Portable ladders, *see* Note.
   (e). Boats or rafts.
   (f). Other equivalent means.
   Note: Portable ladders may be used, at the discretion of the Surveyor, for survey of the hull structure of single skin bulk carriers, except for the close-up survey of cargo hold shell frames, *see* 6 and 7.

7. Survey at sea or anchorage may be undertaken when the Surveyor is fully satisfied with the necessary assistance from the personnel onboard and provided the following conditions and limitations are met:
   a) Surveys of tanks by means of boats or rafts is at the sole discretion of the attending Surveyor, who is to take into account the safety arrangements provided, including weather forecasting and ship response in reasonable sea conditions. Appropriate life jackets are to be available for all participants. The boats or rafts are to have satisfactory residual buoyancy and stability even if one chamber is ruptured. A safety checklist is also to be provided. An oxygen-meter, breathing apparatus, lifeline and whistles are to be at hand during the survey. For oil tankers and chemical tankers an explosimeter is also to be provided.
   b) A communication system is to be arranged between the survey party in the tank and the responsible officer on deck. This system must include the personnel in charge of ballast pump handling if boats or rafts are to be used.
   c) Surveys of tanks by means of boats or rafts will only be permitted for the under deck areas of tanks when the coating of the under deck structure is in GOOD condition and there is no evidence of wastage. The only exception to this, at the discretion of the Surveyor, is where the depth of under deck web plating is 1.5 m or less. Alternatively, rafting may be used if a permanent means of access is provided in each bay to allow safe entry and exit. This means of access is to be direct from deck via a vertical ladder and a small platform fitted approximately 2 m below deck. Where these conditions are not met, then the under deck area will require to be staged for survey.

8. Where surveys are to be held at sea then special arrangements and precautions will require to be taken. Any proposals for these surveys should include precise details of the survey preparation and include details of safety precautions. Where it is proposed to use rafts as a means of access for survey then it is recommended that the survey be held with the ship anchored or in calm and sheltered waters. If requested, in certain circumstances a survey at sea may be permitted.

9. On ships of 20,000 tonnes deadweight and above, and where the notation ESP is assigned starting with Special Survey III, all Special and Intermediate Surveys are

to be carried out by at least two exclusive Surveyors attending on board to jointly perform the Survey. On single side skin bulk carriers of 100,000 tonnes deadweight and above the Intermediate Survey between 10 and 15 years of age is also to be carried out by at least two exclusive Surveyors attending onboard to jointly perform the survey. Though each attending Surveyor is not required to perform all aspects of the required survey, the attending Surveyors are required to consult with each other and to do joint examinations to the extent necessary for them to agree on actions required to complete the survey (i.e. with respect to overall surveys, close-up surveys, renewals, repairs, and conditions of class).

10. Adequate time should be allowed, to ensure that the overall survey, close-up survey and thickness measurement of tanks and holds can be carried out satisfactorily. It is recommended that the order of survey be discussed in detail with the attending Surveyor to ensure that surveys are carried out expediently.

11. Thickness measurements are normally to be taken by means of ultrasonic test equipment and are to be carried out by a firm qualified in accordance with Lloyd's Register Approval for Thickness Measurement of Hull Structures. Thickness measurements are to be witnessed by the Surveyor. The Surveyor is to be on board, to the extent necessary to control the process. Guidance regard thickness measurement and Close-up survey requirements can be found in the LR Group publication "Thickness Measurement and Close-up Survey Booklet".

12. For those ships assigned the ESP notation prior to commencement of any part of the Intermediate or Special Survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement company representative and the Master of the ship or an appropriately qualified representative appointed by the Master or Owner, with recommendation of the participation of the repairer in order that the Special Survey Programme & repairs be sufficiently discussed by ascertaining that all arrangements envisaged in the Survey Programme are in place and the safe and efficient conduct of the Survey & thickness measurements is to be carried out. Experience has shown that failure to discuss and agree a programme of survey and repairs has led to the Owner suffering delays and consequent financial penalty.

Preparation for Survey – Additional Guidance for Oil Tankers

1. A specific Survey Programme must be worked out in advance of the Special Survey by the Owner in co-operation with their local LR Group office surveyors and submitted for consideration in a written format.

2. In developing the Survey Programme, the following documentation should be collected and consulted with a view to selecting tanks, holds, areas, and structural elements to be examined:
   - Survey status and basic ship Information
   - On-board documentation
   - Main structural plans (scantling drawings); including information regarding use of high tensile steels (HTS),
   - Relevant previous survey and inspection reports from both LR and the Owner,
   - Information regarding the use of the ship's holds and tanks, typical cargoes and other relevant data,
   - Information regarding corrosion protection level on the new-building,
   - Information regarding the relevant maintenance level during operation.

3. This submitted Survey Programme will be reviewed/agreed and returned to Owners / Managers. The agreed Survey Programme with the covering letter, and this document, are to be retained on board for the use of attending Surveyors. Alternatively, the information required to be provided in the Survey Programme could be recorded in Appendix 2 with this being forwarded for agreement. (An example of a suitably completed Appendix 2 is contained at the end of this document).

4. Your attention is drawn to the following safety procedures, which have been issued to LR Group Surveyors.

   (a) Attention is drawn to the danger which can be present in enclosed spaces such as tanks, storerooms, etc. The danger exists whether these spaces have been empty for a long period or regularly used for the carriage of liquids and certain other cargoes. Such spaces should never be entered until they have been ventilated thoroughly and checked with a tested meter through as many openings as possible for the presence of explosive, poisonous or suffocating gases.

   (b) A communication system should be arranged between the survey party in the tank and the responsible person on deck. This system should also include the personnel in charge of ballast pump handling if boats/rafts are being used. Explosimeter, oxygen meter, breathing apparatus, lifelines and whistles should be at hand when boats/rafts are used, appropriate life jackets should be available for all participants.

   (c) When confirmed gas free the space should be entered by a responsible person carrying the gas meter who should make regular checks during the survey. The Surveyor should never enter the space ahead of the meter carrier and certainly never on his own. Additional persons with rescue equipment should be in attendance at the hatch entrance. Surveyors are reminded that the disturbance of any sediment or residue in tanks may release dangerous gases.

   (d) When spaces which may be expected to contain explosive gases are to be examined, all those taking part in the survey are to make sure that no metal objects which may become dislodged are being carried loose in pockets, etc. The wearing of rubber boots and the use of flameproof torches is imperative.

   (e) The person carrying the gas meter should remain in close contact with the Surveyor to prevent him from moving into small, undetected pockets of gas which might hang in semi-enclosed corners.

   (f) In cases of tankers having an inert gas system, the most stringent precautions are to be taken to ensure that adequate gas freeing has been completed. Inert gas is colourless, odourless and highly toxic.

   (g) The extent of the examination of a space is governed by the degree of cleanliness, the movement of the ship and the safety measures. Surveys of tanks by means of boats/rafts should only be undertaken at the discretion of the Surveyor, who should take into account the safety arrangements provided, including weather forecasting and ship's response in reasonable sea conditions.

   (h) When examining water ballast or fresh water tanks, it is advisable that a responsible person is in attendance at the pumps in the engine room to eliminate the possibility of the tanks being flooded by mistake.

   (j) The degree of danger caused by the combination of the above factors can only be judged by the Surveyor on the spot. Consequently he alone can decide

how much of the survey can be carried out safely.

5. A brief summary of any noteworthy points from the records of any inspection carried out by Owners representatives should be forwarded with the Survey Programme. The full details are to be made available to the Surveyor during surveys, together with records of the cargo/ballast history and condition of any protective coatings.

6. Owners are reminded that following the amendment of I.M.O. Resolution A.744 (18), from 01 July 2002 the evaluation of longitudinal strength is required to be carried out for oil tankers of length 130m and upwards after the ship reaches 10 years of age.

7. For those ships assigned the ESP notation prior to commencement of any part of the Intermediate or Special Survey, a survey planning meeting is to be held between the attending Surveyor(s), the Owner's representative in attendance, the thickness measurement company representative and the Master of the ship or an appropriately qualified representative appointed by the Master or Owner, with recommendation of the participation of the repairer in order that the Special Survey Programme & repairs be sufficiently discussed by ascertaining that all arrangements envisaged in the Survey Programme are in place and the safe and efficient conduct of the Survey & thickness measurements is to be carried out. Experience has shown that failure to discuss and agree a programme of survey and repairs has led to the Owner suffering delays and consequent financial penalty.

APPENDIX 1
SURVEY PLANNING QUESTIONNAIRE FOR OIL TANKER, ORE/OIL CARRIER & ORE/BULK/OIL CARRIER

Prior to the development of the Survey Programme, the Survey Planning Questionnaire should be completed by the Owner/Manager. It is essential that up-to-date information is provided when completing this questionnaire.

1. Particulars

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

A specific Survey Programme shall be worked out in advance of the renewal Survey by the Owner/Manager in co-operation with Lloyds Register. The Survey Programme shall be in written format and the Survey shall not commence until the Survey Programme has been agreed upon.

Recognised Organisation (RO): This indicates the Classification Society.

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

The means of access to the structures subject to close-up examination and thickness measurement shall be indicated in the table below. A close-up examination in an examination where the details of structural components are within the close visual inspection of the Surveyor, i.e. preferably within reach of hand.

Hold/Tank No.	Structure	C (Cargo)/ B (Ballast)	Temporary Staging	Rafts	Ladders	Direct Access	Other means (please specify)
F.P.	Fore Peak						
A.P.	Aft Peak						
Wing Tanks	Under deck						
	Side shell						
	Bottom transverse						
	Longitudinal						
	Transverse						
Centre Tanks	Under deck						
	Bottom transverse						
	Transverse						
	Webs and bulkheads						

3. Assessment of Corrosion Risk

The information below may assist in the assessment of corrosion risk and determination of areas subject to close-up examination and thickness measurement.

History of cargo with H_2S content or heated cargo for the last 3 years together with indication as to whether cargo was heated and, where available, Marine Safety Data Sheets (MSDS)*

4. Owner's inspections

The owner should provide details of the results of their inspections over the last 3 (three) years for the tanks/spaces that are subject to Survey.

Hold/Tank No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo centre tanks					
Cargo wing tanks					
Slop					
Ballast tanks					
Aft peak					
Fore peak					

Miscellaneous other spaces:					

* Inspections by the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the coating and corrosion protection system (including anodes) if any. A guidance for reporting is shown in IMO Resolution A.744 (18) (as amended in 2006)

Note: Indicate tanks which are used for oil/ballast

(1) HC = hard coating; SC = soft coating; A = anodes; 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 3 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)

5. Reports of Port State Control inspections

List the reports of Port State Control inspections containing hull structural related deficiencies, relevant information on rectification of the deficiencies:

6. Safety Management System

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

7. Name and address of the approved thickness measurement company:

Name of Owner's representative:

……

……

Signature:……..

Date:……

APPENDIX 2
SURVEY PROGRAMME FOR OIL TANKER, ORE/OIL CARRIER & ORE/BULK/OIL CARRIER

1. Particulars

Name of ship:	
IMO (LR) number:	
Type of ship (*see* Note 1):	
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 delivery of the ship:	
Owner:	
Intermediate / Special Survey:	
Due date of Intermediate / Special Survey:	
Due date of Docking Survey:	
Type of cargoes carried (*see* Note 2):	

Note 1: Oil tanker, Chemical tanker etc.
Note 2: Oil, Chemicals, oil products, Other etc

2. General Plan:

Where and when will the Intermediate / Special Survey be held?
Where and when will the docking survey be held?
Where and when will thickness measurement be carried out?
Which company will perform thickness measurement?
How will the Close-up Survey & Tank Testing be carried out; if different from the submitted Survey Planning Questionnaire?

3. Close-up Survey:

PROPOSED LOCATIONS AND EXTENT OF CLOSE-UP SURVEYS ARE AS FOLLOWS: *(The minimum requirements for Close-up survey are given in Chapter 3 of the Classification Regulations)*

4. Thickness Measurement:

PROPOSED LOCATIONS AND EXTENT OF THICKNESS MEASUREMENT ARE AS FOLLOWS: *(The minimum requirements for thickness measurement are given in Chapter 3 of the Classification Regulations)*

5. Tank / Hold Particulars:

The ship's configuration is indicated on the diagram below.
(Alternatively an A4 size general arrangement or similar showing tank / hold arrangements and usages may be submitted.)

5. Tank / Hold Particulars (continued):

The following table should provide details of all cargo holds and tanks within the cargo length and to also include all water ballast tanks outside the cargo length with their respective contents type, method of corrosion protection and condition of coating, if any, in the holds/tanks.

TANK/HOLD	TANK TYPE	FRAME LOCATION	CORROSION PROTECTION	COATING CONDITION

NOTES
Tank / hold Type: SBT = segregated ballast tank, CO = cargo oil, WBT = salt water ballast tank, SP = slop tank, CC = chemical cargo, COM = Combined Oil and Ballast, BC = Bulk Cargo, BC/SWB = Bulk Cargo/Salt Water Ballast, FO = Fuel Oil, Lub Oil = Lubrication Oil, DO = Diesel Oil, FWT = Fresh Water Tank
Protection: C = recognised coating, A = anodes, NP = No protection

Coating Condition:

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 per cent or more of areas under consideration, but less than as defined for POOR condition.
POOR	Condition with general breakdown of coating over 20 per cent or more of areas or hard scale at 10 per cent or more of areas under consideration.

5. Tank / Hold Particulars (continued):

TANK/HOLD	TANK TYPE	FRAME LOCATION	CORROSION PROTECTION	COATING CONDITION

Important reminders for Owners / Managers and attending Surveyors.

1. The main structural plans (scantling drawings), including information regarding the use of high tensile steel, and tank plan are to be made available on board for the use of the attending Surveyor(s) and thickness measurement company personnel.
2. The on board documentation required by IMO Resolution A744 (18) and any other supporting documentation is to be made available on board for the use of the attending Surveyor(s).
3. The Owners / Managers are to ensure that those tanks and spaces subject to survey are in a clean and gas free condition, with adequate ventilation, lighting and a safe means of access provided.
4. Periodical survey reports held in the ESP Hull Survey Records file shall contain details of any damage experienced by the ship. It is the responsibility of Owners / Managers to report to LR without delay, any damage, breakdown, or grounding, which could invalidate the conditions for which class has been assigned. Further details can be found in The Rules & Regulations for the Classification of Ships Part 1, Chapter 2, Section 3, 3.4.

6. 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

7. Hull Damages for Sister of similar ship (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

8. Areas identified with substantial corrosion from previous surveys

Areas identified with substantial corrosion from previous surveys

9. List of main structural plans.

Please ensure the main structural plans are available for the attending Surveyor at the time of Survey, including the following:

A) Capacity Plan

B) Midship Section

C) Shell Expansion

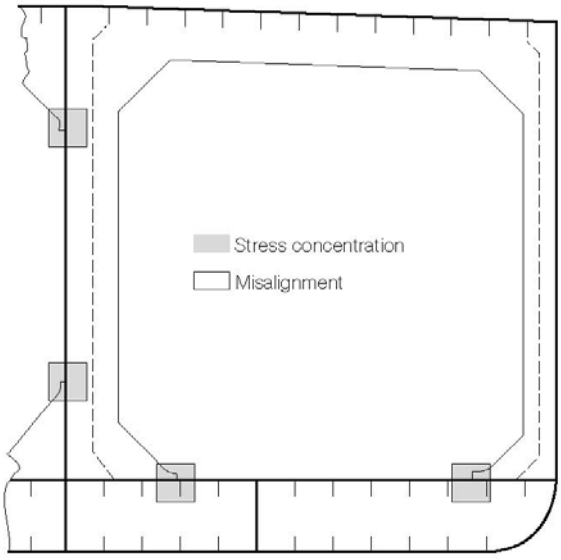
D) Longitudinal Bulkheads

E) Any other plans requested by the attending Surveyor

10. List of Critical Areas:

CARGO AREA REGION
Cargo area side structure (incl. tanks if fitted) - Critical areas in typical midship section of smaller tankers (fig 1 & 2) - Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 3) - Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 4, 5 & 6) - Critical areas in typical midship section of double hull VLCC (fig 7 & 8)
Transverse bulkhead structure - Critical areas in transverse bulkheads of smaller tankers (fig 9 & 10) - Critical areas in typical transverse bulkhead of double hull tankers up to Suezmax size (fig 11) - Critical areas in typical transverse bulkheads of double hull VLCC (fig 12, 13 & 14)
Water Ballast Tank - Transverse Web Frame (fig 15)
General
Structures adjacent to areas previously part renewed should be specially considered with respect to reduced scantlings; typically i.w.o. part renewed main frames.
Note: consequences of reduced scantlings due to corrosion: - *Buckling of deck* - *Buckling of watertight bulkheads* - *Buckling of stringers, frames and girders* - *Cracking*

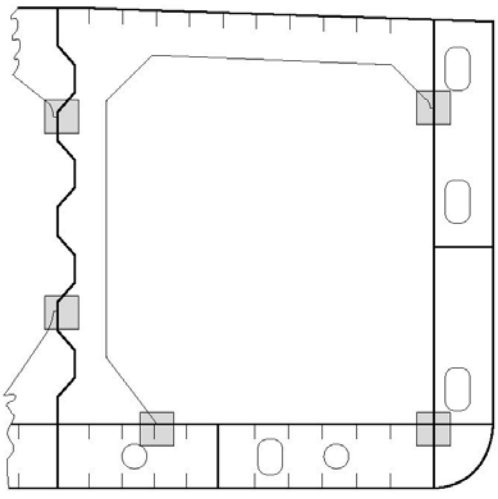
CRITICAL AREAS	CARGO AREA
	Cargo area side structure (incl. tanks if fitted) Critical areas in typical midship section of smaller tankers (fig 1)



Double bottom tanker

Stress concentration
Misalignment

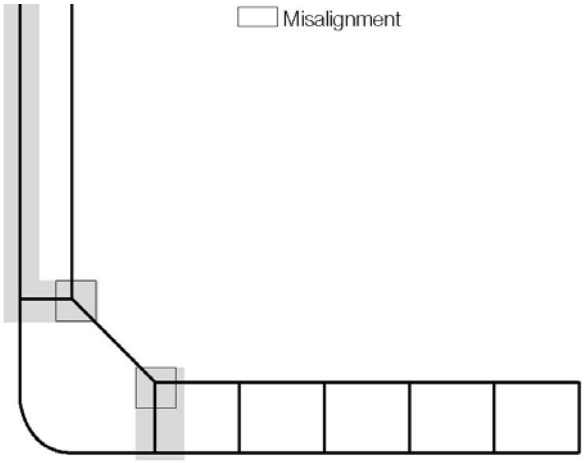
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of smaller tankers (fig 2)



Double hull tanker

Stress concentration
Misalignment

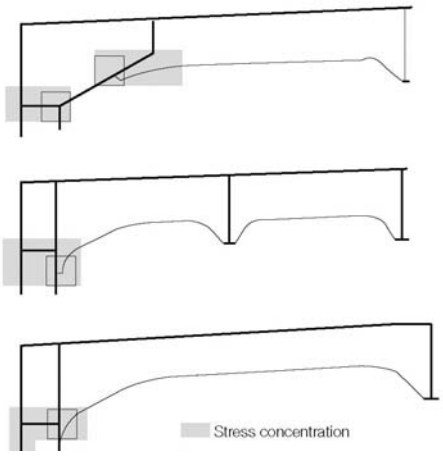
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 3)



Typical lower arrangement

Stress concentration
Misalignment

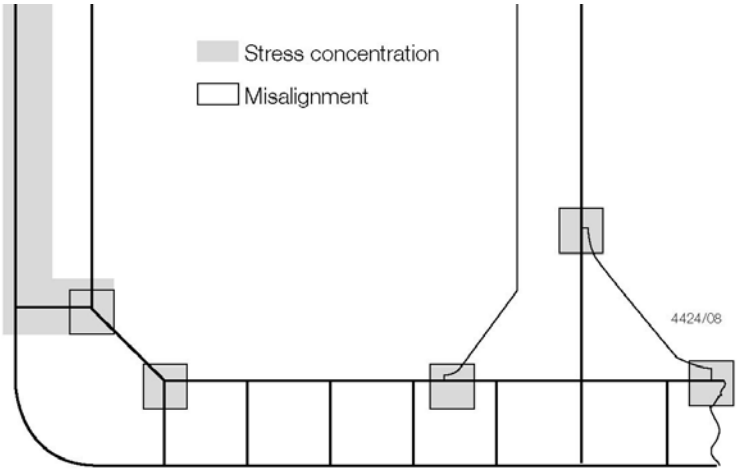
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 4)



Alterative upper arrangements

Stress concentration
Misalignment

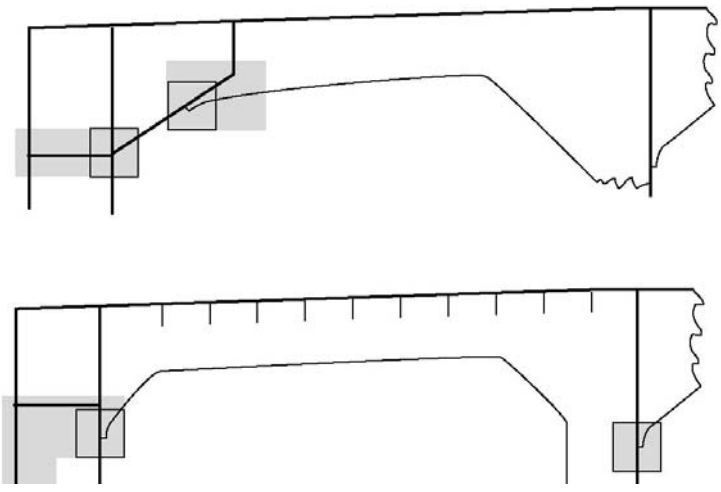
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull tankers with centreline bulkhead up to Suezmax size (fig 5)



Typical lower arrangement

Stress concentration
Misalignment

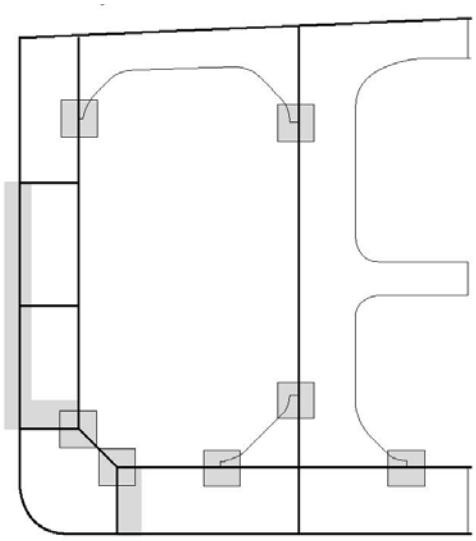
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull tankers with centreline bulkhead up to Suezmax size (fig 6)



Alterative upper arrangements

Stress concentration
Misalignment

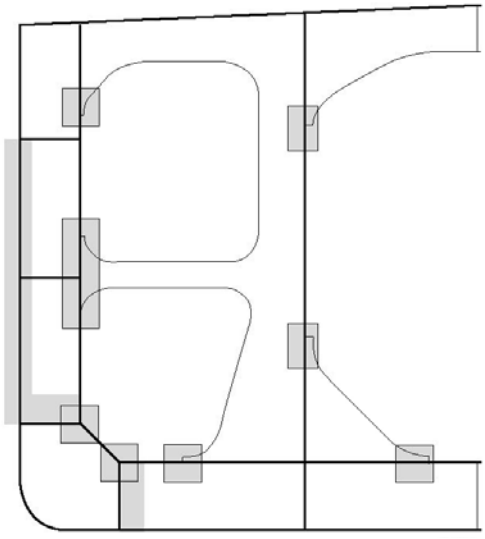
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull VLCC (fig 7)



Cross-tie in centre tank

Stress concentration
Misalignment

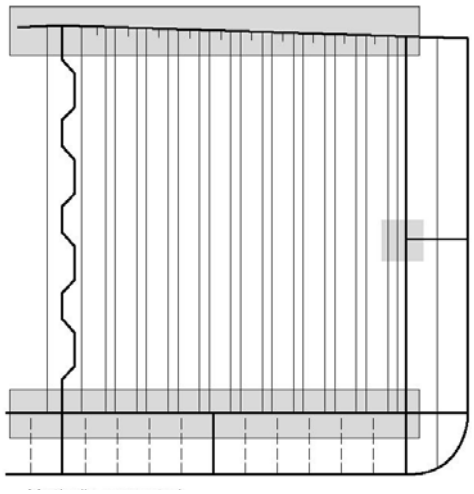
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull VLCC (fig 8)



Cross-tie in wing tank

Stress concentration
Misalignment

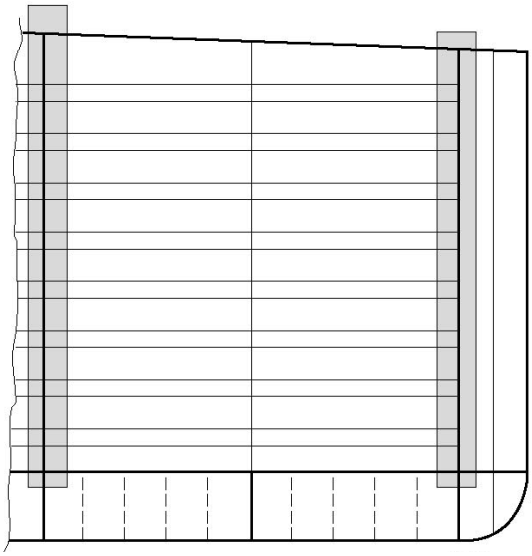
Transverse bulkhead structure
Critical areas in transverse bulkheads of smaller tankers (fig 9)



Vertically corrugated

Stress concentration
Misalignment

Transverse bulkhead structure (fig 10)
Critical areas in transverse bulkheads of smaller tankers

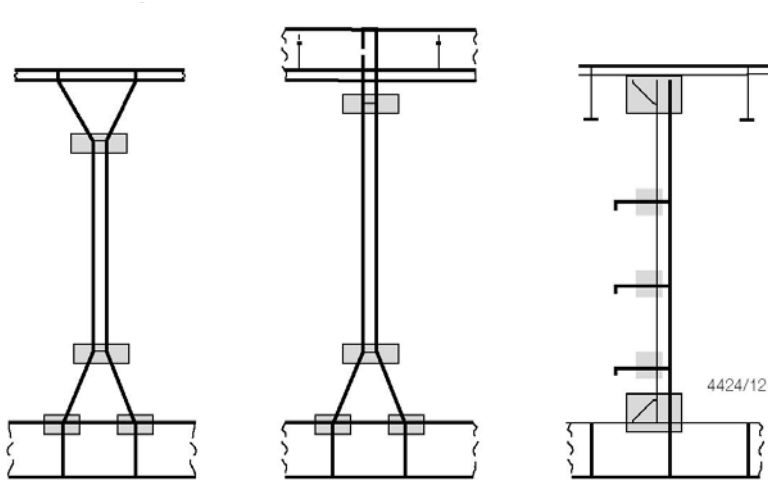


Horizontally corrugated

Stress concentration
Misalignment

Transverse bulkhead structure

Critical areas in typical transverse bulkhead of double hull tankers up to Suezmax size (fig 11)



Vertically corrugated with stools

Vertically corrugated with lower stool and external deck girder

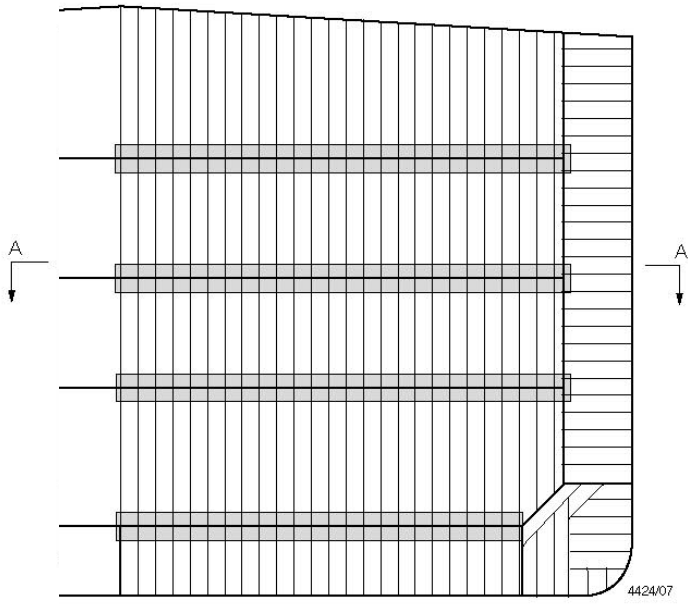
Plane with horizontal stringers

Stress concentration

Misalignment

Transverse bulkhead structure

Critical areas in typical transverse bulkheads of double hull VLCC (fig 12)

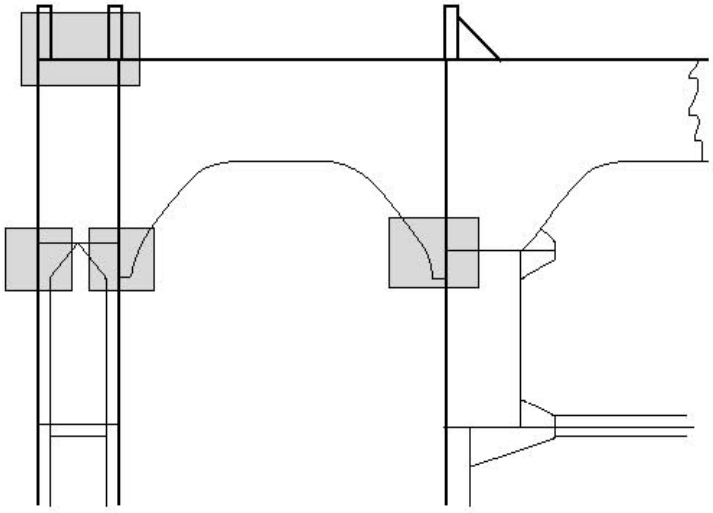


Stress concentration

Misalignment

Transverse bulkhead structure
Critical areas in typical transverse bulkheads of double hull VLCC (fig 13)

Section A-A

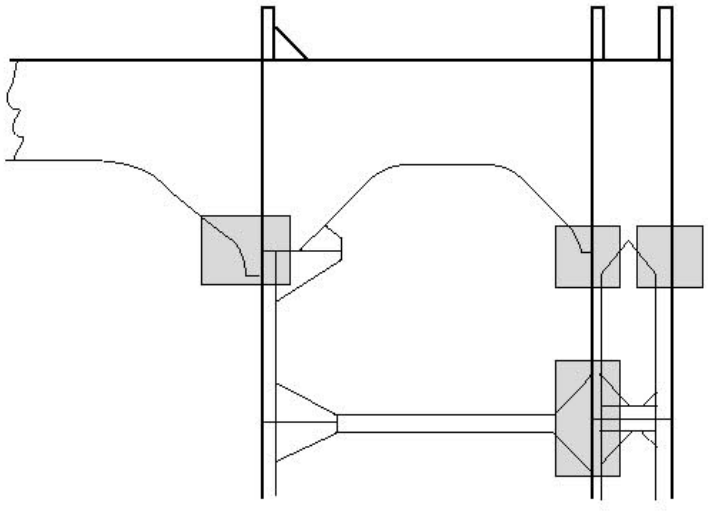


Cross-tie in centre tank

Stress concentration
Misalignment

Transverse bulkhead structure
Critical areas in typical transverse bulkheads of double hull VLCC (fig 14)

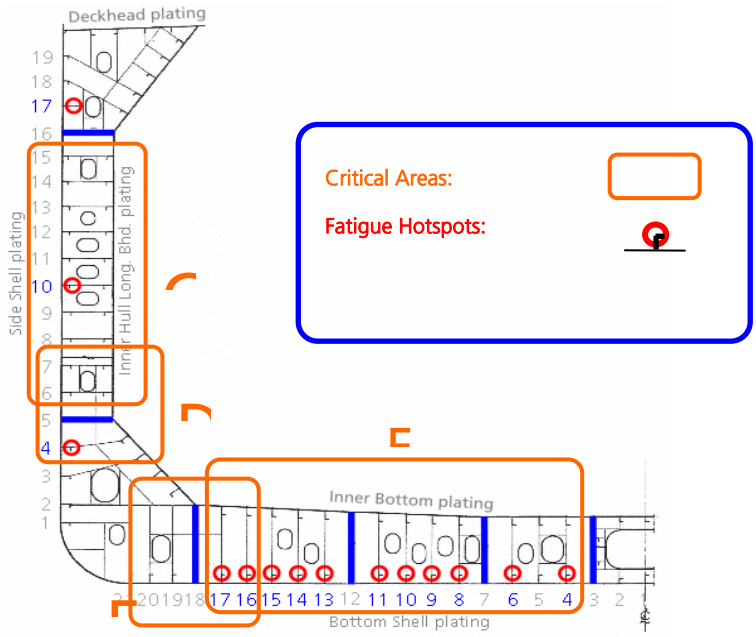
Section A-A



Cross-tie in wing tank

Stress concentration
Misalignment

WATER BALLAST TANK
Transverse Web Frame (fig 15)



Name of Owner's representative:

……

……

Signature:……..

Date:……

Appendix 3
Tank Testing Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.1 Tank testing requirements – Single hull and double Hull oil tankers, ore/oil and ore/bulk/oil ships

Special Survey I (Ships 5 years old)	Special Survey No. II and subsequent (Ships 10 years old and over)
All ballast tank boundaries Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams.	All ballast tank boundaries All cargo tank boundaries

Appendix 4
Close-up Survey Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.2 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 and subsequent (Ships 20 years old and over)
(1) One web frame ring - in a wing ballast tank, if any, or a cargo 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* Note 4): (a) in a ballast tank (b) in a cargo wing tank (c) in a cargo centre tank	(1) All web frame rings - in a wing ballast tank, if any, or a cargo wing tank used primarily for water ballast (*see* Note 1) (2) One deck transverse (*see* Note 2 and 8): (a) in each of the remaining ballast tanks, if any (b) in a cargo wing tank (c) in 2 cargo 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* Note 4): (a) in each of the remaining ballast tanks, if any (b) in a cargo wing tank (c) in 2 cargo centre tanks	(1) All web frame rings (*see* Note 1) (a) in all ballast tanks (b) in a cargo wing tank (2) A minimum of 30% of all web frame rings in each remaining cargo wing tank (*see* Notes 1 and 8 (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 8) (5) As considered necessary by the Surveyor (*see* Note 6)	(1) As Special Survey III (2) Additional transverse areas if deemed necessary by the Surveyor

NOTES

(1) Complete transverse web frame ring including adjacent structural members.
(2) Deck transverse including adjacent deck structural members.
(3) Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.
(4) Transverse bulkhead and lower part including girder system and adjacent structural members.
(5) Deck and bottom transverse including adjacent structural members.
(6) Additional complete transverse web frame ring.
(7) Ballast tanks includes peak tanks.
(8) Within the mid 0,5 length of the tank. The 30% is to be rounded up to the next whole number of structural items.

Appendix 4
Close-up Survey Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.3 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 and subsequent (Ships 20 years old and over)
(1) One web frame ring in a complete ballast tank, *see* Notes 1 & 3. (2) One deck transverse in a cargo tank, *see* Note 4 & 12. (3) One transverse bulkhead in a complete ballast tank, *see* Notes 1 & 6. (4) One transverse bulkhead in a cargo centre tank, *see* Notes 2 & 7. (5) One transverse bulkhead in a cargo wing tank, *see* Note 7.	(1) All web frame rings in a complete ballast tank, *see* Notes 1 & 3. (2) The *knuckle area* and the upper part (approx. 5 metres) 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* Note 1 & 6. (5) One transverse bulkhead in two cargo centre tanks, *see* Notes 2 & 7. (6) One transverse bulkhead in a cargo wing tank, *see* Note 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* Note 5 & 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.

NOTES

(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.

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

(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.

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

(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.

(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.

(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.

(8) The *knuckle area* and the upper part (approximately 5 metres), 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 metres from the corners both on the bulkhead and the double bottom.

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

(10) Additional complete transverse web frame ring.

(11) Ballast tanks includes peak tanks.

(12) Within the mid 0,5 length of the tank.

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.6 Thickness Measurement – Single hull and double Hull oil tankers, ore/oil ships and ore/bulk/oil ships

Special Survey I (Ships 5 years old)	Special Survey III (Ships 15 years old)	Special Survey IV and subsequent (Ships 20 years old and over)
(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 Table 3.7.2, Table 3.7.3, Table 3.7.4 or Table 3.7.5. (3) Critical areas, as required by the Surveyor.	(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 close-up survey in accordance with Table 3.7.2, Table 3.7.3, Table 3.7.4 or Table 3.7.5.. (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* Note 1 & 4). (7) Critical areas, as required by the Surveyor.	(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 Table 3.7.2, Table 3.7.3, Table 3.7.4 or Table 3.7.5. (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 peak tank (*see* Note 1 & 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.
Special Survey II (Ships 10 years old) (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 Table 3.7.2, Table 3.7.3, Table 3.7.4 or Table 3.7.5. (3) Selected wind and water strakes outside the cargo area. (4) Critical areas, as required by the Surveyor		

NOTES
(1) For areas in tanks where coatings are found to be in GOOD condition, as defined in 1.5, 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 10 years old and above, the longitudinal strength is to be evaluated. In such cases, a minimum of three transverse sections are to be measured within 0.5L amidships.

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.7 Thickness measurement – Single hull oil tankers, ore/oil 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 foe 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 bay where bottom plating measured, with measurements at middle and both ends	5 point pattern over 2 square metre area. Single measurements on face flat
(5) Panel stiffening	Where applicable	Single measurements

Table 3.7.8 Thickness measurement – Single hull oil tankers, ore/oil 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 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 square metre area. Single measurements on face flat
(5) Panel stiffening	Where applicable	Single measurements

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.9 Thickness measurement – Single hull oil tankers, ore/oil 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 square metre area plus single measurements on web frame and cross tie face flats

Table 3.7.10 Thickness measurement – Single hull oil tankers, ore/oil 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 3/4 width of tank	5 point pattern between stiffeners over 1 metre 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 square metre 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 square metre. 3 measurements across face flat
(7) Stringer platforms	All stringers with measurements at middle and both ends	5 point pattern over 1 square metre of area plus single measurements near bracket toes and on face flats

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.11 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 bulkhead	(i) Lower $^1/_3$ of bulkhead (ii) Upper $^2/_3$ of bulkhead (iii) Stiffeners (minimum of 3)	(i) 5 point pattern over 1 m² of plating. (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

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.12 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^2 area. 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

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.13 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	(i) Plating between each pair of longitudinals in a minimum of 3 bays (along the tank)	(i) Single measurements
(ii) All other strakes	(ii) Plating between every 3rd pair of longitudinals on same 3 bays	(ii) Single measurements
(2) Side shell and longitudinal bulkhead longitudinals on:		
(i) Upper strake	(i) Each longitudinal in same 3 bays	(i) 3 measurements across web and 1 measurement on flange
(ii) All other strakes	(ii) Every 3rd longitudinal in same 3 bays	(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	(i) Minimum of 2 webs and both transverse bulkheads	(i) 5 point pattern over approximately 2 m² area
(ii) Other strakes	(ii) Minimum of 2 webs and both transverse bulkheads	(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

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.14 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 measurement 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

Appendix 5
Thickness Measurement Requirements

The following information has been extracted from the Rules and Regulations for the Classification of Ships - Part 1, Chapter 3, Section 7.

Table 3.7.15 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 measurement
(1) Upper and lower stool, where fitted	Transverse band within 25mm of welded connection to inner bottom/deck plating Transverse band within 25mm 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

Appendix 6
Table of Maximum Permissible Diminution of Individual Plates and Stiffeners

Maximum Permissible Diminution of Individual Plates and Stiffeners

STRUCTURAL ITEM	CATEGORY 1 SHIPS	CATEGORY 2 AND 3 SHIPS
Hull envelope ; individual plates, shell and deck plating recorded along the strake (deck, bottom, side, wind and water)	20% *See* note 2	30%
Hull envelope ; transverse section, plates recorded by frame number and strake position (deck and sheer/bottom and side)	20%	30%
Longitudinal structural members (including deck and shell longitudinal stiffeners, longitudinal bulkhead plating and stiffeners, inner bottom plating and stiffeners, hopper sloping plating and stiffeners. *See* note 4 for additional Bulk Carrier diminution criteria)	*(Plating)* 20% *(Stiffeners)* 25%	*(Plating)* 30% *(Stiffeners)* 25%
Transverse structural members in C.O. and W.B. tanks (including web frame plating and face plates)	20%	25%
W.T and O.T transverse bulkheads (*See* note 4 for additional Bulk Carrier diminution criteria)	*(Plating)* 25% *(Stiffeners & corrugated bulkhead Plating)* 25%	*(Plating)* 30% *(Stiffeners & corrugated bulkhead plating)* 25%
Miscellaneous structural members (including deck plating inside the line of cargo hatch openings)	*(Plating)* 25% *(Stiffeners)* 25%	*(Plating)* 30% *(Stiffeners)* 25%
Cargo hold transverse frames and end brackets (*See* note 4 for additional bulk carrier diminution criteria)	20%	25%

NOTES

Note 1. For ships with (cc) notation Surveyors are to compare the measurements with the original Rule thickness and not the reduced, as built, scantlings which were approved in association with the (cc) notation.

Note 2. For tankers of category 1 the strength deck residual buckling thickness requirement is to be complied with in accordance LR's requirements as advised by the attending Surveyor.

Note 3. Where extensive additional measurements are taken of continuous longitudinal plating these may be recorded on form TM3 or TM6.

Note 4. Additional **Bulk Carrier** diminution criteria :

4.1 Cargo hold transverse bulkheads

(a) Corrugated parts within cargo holds designed to be fully filled with salt-water ballast (deep tank) - 25%.

(b) Corrugated parts within cargo holds designed to be partially filled with salt water ballast - 15%.

(c) Corrugated parts of the aft transverse bulkhead of the forward cargo hold - 15% *See* (f) below.

(d) Corrugated parts of the remaining transverse bulkheads in cargo holds - 20%.

(e) All plain transverse bulkhead plating (including stool plating) - 25%.

(f) The aft transverse bulkhead of the forward cargo hold on ships which have been assessed and/or upgraded in order to comply with requirements for the notation ESN – refer to the *Approved Bulkhead Upgrade Plan* for diminution criteria.

4.2 Cargo hold inner bottom & hopper sloping plating

(a) Where the notation *Strengthened For Heavy Cargoes* is assigned and length *L* is greater than 150 metres then the maximum diminution applicable is 25%. For all other Bulk Carriers refer to Longitudinal structural members above.

4.3 Cargo hold transverse frames (shell frames)

(a) For single skin bulk carriers contracted for construction prior to 01 July 1998 undergoing a re-assessment of their cargo hold shell frames in accordance with the *Provisional Rules for Existing Ships,* measurements are to be compared against the minimum thickness values shown in the evaluation records. These measurements are to be recorded on TM7(b). For all other bulk carriers refer to 'Cargo hold transverse frames and end brackets' above.

Note 5. For definition of ship category, *see* Appendix 5, Note 6.

Note 6. The maximum diminutions are for the average thickness measured over the plate area or the length between supports.

Appendix 7
Table of Maximum Permissible Diminution of Topside and Bottom Areas.

Maximum Permissible Diminution of Topside and Bottom Areas.

STRUCTURAL ITEM		CATEGORY 1 SHIPS		CATEGORY 2 SHIPS		CATEGORY 3 SHIPS	
		Over 0.5L amidships	At 0.075L from ends	Over 0.5L amidships	At 0.075L from ends	Over 0.5L amidships	At 0.075L from ends
Topside Area Assessment as reported on TM2(a) & TM3	Plating	10%	20%	10%	30%	15%	30%
	Longitudinals	15%	25%	15%	25%	20%	30%
Bottom Area Assessment as reported on TM2(b) & TM3	Plating – single bottom construction	10%	20%	10%	30%	15%	30%
	Plating – double bottom construction	15%	20%	15%	30%	20%	30%
	Longitudinals	15%	25%	15%	25%	20%	30%

NOTES

Note 1. Intermediate values are to be obtained by linear interpolation.

Note 2. Topside area comprises deck (outside line of openings for dry cargo ships), stringer and sheer strake (including rounded gunwales) together with associated longitudinals.

Note 3. Bottom area comprises keel, bottom and bilge plating together with associated longitudinals.

Note 4. For ships of category 1 and 2 a greater diminution may be permitted over 0.5L amidships provided the hull girder section modulus, using the actual gauged thicknesses, is not less than 90 per cent of the Rule section modulus as a new ship. A reassessment of scantlings would be required where consideration of this is required.

Note 5. For ships with(cc) notation, *see* table I , Note 1.

Note 6. Ship categories are defined as follows:

Category 1 Oil tankers, chemical tankers, dry bulk cargo ships, combination carriers and liquefied gas ships having a length L equal to or greater than 90 metres.

Category 2 All remaining ships types not included in category 1 and having a length L equal to or greater than 90 metres.

Category 3 All ship types having a length L less than 90 metres.

(L is the Rule Length defined in Part3, Chapter 1.6.1 of the Rules for Ships.)

Note 7. Where the diminution of the topside or bottom area (plating and longitudinals) is in excess of 0.75 of the values given above, additional transverse sections are to be measured as recommended by the Surveyor.

EXAMPLE OF A COMPLETED APPENDIX 1 SURVEY PLANNING QUESTIONNAIRE FOR OIL TANKER

Prior to the development of the Survey Programme, the Survey Planning Questionnaire should be completed by the Owner/Manager. It is essential that up-to-date information is provided when completing this questionnaire.

1. Particulars

Ship name:	ATLANTIC HARMONY
IMO number:	8010567
Flag State:	PANAMA
Port of registry:	PANAMA
Owner:	SHIPMAN LTD.
Recognized organization (RO):	LLOYD'S REGISTER (LR)
Gross tonnage:	37,580
Deadweight (metric tonnes):	59.210
Date of delivery:	1981.01

A specific Survey Programme shall be worked out in advance of the renewal Survey by the Owner/Manager in co-operation with Lloyds Register. The Survey Programme shall be in written format and the Survey shall not commence until the Survey Programme has been agreed upon.

Recognised Organisation (RO): This indicates the Classification Society.

EXAMPLE OF A COMPLETED APPENDIX 1
SURVEY PLANNING QUESTIONNAIRE
FOR OIL TANKER

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

The means of access to the structures subject to close-up examination and thickness measurement shall be indicated in the table below. A close-up examination in an examination where the details of structural components are within the close visual inspection of the Surveyor, i.e. preferably within reach of hand.

Hold/Tank No.	Structure	C (Cargo)/ B (Ballast)	Temporary Staging	Rafts	Ladders	Direct Access	Other means (please specify)
F.P.	Fore Peak			X	X		
A.P.	Aft Peak			X	X		
Wing Tanks	Under deck						CHERRY PICKER
	Side shell						CHERRY PICKER
	Bottom transverse						CHERRY PICKER
	Longitudinal						CHERRY PICKER
	Transverse					X	CHERRY PICKER
Centre Tanks	Under deck					X	CHERRY PICKER
	Bottom transverse					X	
	Transverse					X	
	Webs and bulkheads					X	

3. Assessment of Corrosion Risk

The information below may assist in the assessment of corrosion risk and determination of areas subject to close-up examination and thickness measurement.

History of cargo with H_2S content or heated cargo for the last 3 years together with indication as to whether cargo was heated and, where available.
15 APRIL 2004 – 24 APRIL 2004, CARGO TANK 1 PORT & 1 STARBOARD
18 NOVEMBER 2003 – 26 NOVEMBER 2003, CARGO TANK 1 CENTRE

4. Owner's inspections

The owner should provide details of the results of their inspections over the last 3 (three) years for the tanks/spaces that are subject to Survey.

Hold/Tank No.	Corrosion protection (1)	Coating extent (2)	Coating condition (3)	Structural deterioration (4)	Hold and tank history (5)
Cargo centre tanks					
1C	HC	L	G	N	-
2C	HC	L	G	N	-
3C	HC	L	G	N	-
4C	HC	L	G	N	-
5C	HC	L	G	N	-
Cargo wing tanks					
1P	HC	L	G	N	-
1S	HC	L	G	N	-
3P	HC	L	G	N	-
3S	HC	L	G	N	-
5P	HC	L	G	N	-
5S	HC	L	G	N	-
Slop					
PORT	HC	C	G	N	-
STARBOARD	HC	C	G	N	-
Ballast tanks					
Aft peak	HC & A	C	G	N	-
Fore peak	HC & A	C	G	N	-
2P	HC & A	C	G	N	-
2S	HC & A	C	G	N	-
4P	HC & A	C	G	N	-

4S	HC & A	C	G	N	-
Miscellaneous other spaces:					

* Inspections by the Owner's personnel during the last 3 years with reference to structural deterioration in general, leakages in tank boundaries and piping and condition of the coating and corrosion protection system (including anodes) if any. A guidance for reporting is shown in IMO Resolution A.744 (18) (as amended in 2006)

Note: Indicate tanks which are used for oil/ballast

(1) HC = hard coating; SC = soft coating; A = anodes; 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 3 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)

5. Reports of Port State Control inspections

List the reports of Port State Control inspections containing hull structural related deficiencies, relevant information on rectification of the deficiencies:
NONE

6. Safety Management System

List non-conformities related to hull maintenance, including the associated corrective actions:
NONE

7. Name and address of the approved thickness measurement company:

LR APPROVED SERVICE SUPPLIER – "SCANTECH CO. LTD"

Name of Owner's representative:

Mr J Bloggs……

Signature:…

Date:……21/12/2006……

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

1. Particulars

Name of ship:	ATLANTIC HARMONY
IMO (LR) number:	8010567
Type of ship (*see* Note 1):	OIL TANKER (SINGLE HULL)
Flag State:	PANAMA
Port of registry:	PANAMA
Gross tonnage:	37,580
Deadweight (metric tonnes):	59.210
Length between perpendiculars (m):	170.6
Shipbuilder:	MANIC SHIPYARDS
Hull number:	01012
Recognized organization (RO):	LLOYD'S REGISTER (LR)
RO ship identity:	8010567
Date of delivery of the ship:	1981.01
Owner:	MANAGERS LTD
Intermediate / Special Survey:	SPECIAL SURVEY IV
Due date of Intermediate / Special Survey:	31.01.2008
Due date of Docking Survey:	01.2008
Type of cargoes carried (*see* Note 2):	CRUDE OIL

Note 1: Oil tanker, Chemical tanker etc.
Note 2: Oil, Chemicals, oil products, Other etc

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

2. General Plan:

Where and when will the Intermediate / Special Survey be held? SHANGHAI, P.R. CHINA, 01.2008
Where and when will the docking survey be held? SHANGHAI, P.R. CHINA, 01.2008
Where and when will thickness measurement be carried out? DURING DRY-DOCKING AT SHANGHAI, P.R. CHINA, 01.2008
Which company will perform thickness measurement? LR APPROVED SERVICE SUPPLIER – "SCANTECH CO. LTD.", 01.2008
How will the Close-up Survey & Tank Testing be carried out; if different from the submitted Survey Planning Questionnaire? SEE PLANNING QUESTIONNAIRE

3. Close-up Survey:

PROPOSED LOCATIONS AND EXTENT OF CLOSE-UP SURVEYS ARE AS FOLLOWS: *(The minimum requirements for Close-up survey are given in Chapter 3 of the Classification Regulations)*

All web frame rings in all ballast tanks :

Fore peak tank Aft peak tank
No.2 P&S tanks No.4 P&S tanks.

All web frame rings in a cargo wing tank :

No. 3 port cargo oil tank.

A minimum of 30% of all web frame rings - in each remaining cargo wing tank :

No.1 P&S fr. 63 No. 3 stbd fr. 53
No. 5 P&S fr. 43

All transverse bulkheads - in all cargo and ballast tanks (*see* Note 3)

At frs. 14, 40, 45, 50, 55, 60, 65 and 66

A minimum of 30% of deck and bottom transverses - in each cargo centre tank :

No.1 fr. 63 No. 4 fr. 48
No.2 fr. 58 No. 5 fr. 43.
No. 3 fr. 53

Additional transverse areas if deemed necessary by the Surveyor.

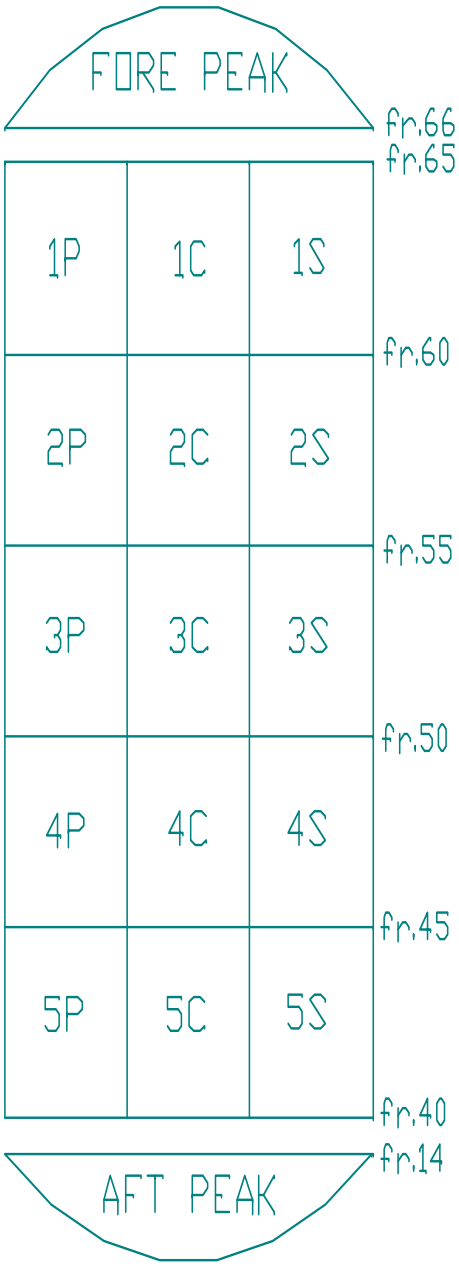
4. Thickness Measurement:

PROPOSED LOCATIONS AND EXTENT OF THICKNESS MEASUREMENT ARE AS FOLLOWS: *(The minimum requirements for thickness measurement are given in Chapter 3 of the Classification Regulations)*

1. Within the cargo tank length (frames 40-65)
   i) Each deck plate
   ii) 3 Transverse sections (at frs. 48, 53 and 58)
   iii) Each bottom plate
3. Measurements for general assessment and recording of corrosion pattern of the structural members subject to close-up survey (*See* above).
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. Remaining exposed main deck plating not considered in item (1) and representative exposed superstructure deck plating (i.e. poop, bridge and forecastle deck).
7. All transverse webs with associated plating and longitudinals, and the transverse bulkhead complete in the fore peak tank and aft peak tank.
8. All keel plates outside the cargo tank length. 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
10. Critical areas, as required by the Surveyor.

5. Tank / Hold Particulars:

The ship's configuration is indicated on the diagram below.
(Alternatively an A4 size general arrangement or similar showing tank / hold arrangements and usages may be submitted.)



EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

5. Tank / Hold Particulars (continued):

The following table should provide details of all cargo holds and tanks within the cargo length and to also include all water ballast tanks outside the cargo length with their respective contents type, method of corrosion protection and condition of coating, if any, in the holds/tanks.

TANK/HOLD	TANK TYPE	FRAME LOCATION	CORROSION PROTECTION	COATING CONDITION
FORE PEAK	WBT	FR.66 -FWD	C & A	GOOD
AFT PEAK	WBT	FR.14 -AFT	C & A	GOOD
NO.1 PORT	CO	FR.60-65	C	FAIR
NO.1 CENTRE	CO	FR.60-65	C	FAIR
NO.1 STBD	CO	FR.60-65	C	FAIR
NO.2 PORT	WBT	FR.55-60	C & A	GOOD
NO.2 CENTRE	CO	FR.55-60	C	FAIR
NO.2 STBD	WBT	FR.55-60	C & A	GOOD
NO.3 PORT	CO	FR.50-55	C	FAIR
NO.3 CENTRE	CO	FR.50-55	C	FAIR
NO.3 STBD	CO	FR.50-55	C	FAIR
NO.4 PORT	WBT	FR.45-50	C & A	GOOD
NO.4 CENTRE	CO	FR.45-50	C	FAIR
NO.4 STBD	WBT	FR.45-50	C & A	GOOD
NO.5 PORT	CO	FR.40-45	C	FAIR
NO.5 CENTRE	CO	FR.40-45	C	FAIR
NO.5 STBD	CO	FR.40-45	C	FAIR

NOTES

Tank / hold Type: SBT = segregated ballast tank, CO = cargo oil, WBT = salt water ballast tank, SP = slop tank, CC = chemical cargo, COM = Combined Oil and Ballast, BC = Bulk Cargo, BC/SWB = Bulk Cargo/Salt Water Ballast, FO = Fuel Oil, Lub Oil = Lubrication Oil, DO = Diesel Oil, FWT = Fresh Water Tank

Protection: C = recognised coating, A = anodes, NP = No protection

Coating Condition:

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 per cent or more of areas under consideration, but less than as defined for POOR condition.

POOR — Condition with general breakdown of coating over 20 per cent or more of areas or hard scale at 10 per cent or more of areas under consideration.

EXAMPLE OF A COMPLETED APPENDIX 2 SURVEY PROGRAMME FOR OIL TANKER

5. Tank / Hold Particulars (continued):

TANK/HOLD	TANK TYPE	FRAME LOCATION	CORROSION PROTECTION	COATING CONDITION
NO.10 PORT	FWT	FR.35-40	NP	-
NO.11 STBD	FWT	FR.35-40	NP	-
NO.12 F.O.T	FUEL	FR.30-35	NP	-
NO.13 F.O.T	FUEL	FR.30-35	NP	-
NO.14 F.O.T	FUEL	FR.25-30	NP	-
NO.15 F.O.T	FUEL	FR.25-30	NP	-
NO.16A D.O.T	DIESEL	FR.30-35	NP	-
NO.16B D.O.T	DIESEL	FR.30-35	NP	-
NO.17 SETTLING	-	FR.26-29	NP	-
NO. 18 SETTLING	-	FR.26-29	-	-
LUB OIL PORT	LUB OIL	FR.21-24	C	-
LUB OIL STBD	LUB OIL	FR.21-24	C	-

Important reminders for Owners / Managers and attending Surveyors.

1. The main structural plans (scantling drawings), including information regarding the use of high tensile steel, and tank plan are to be made available on board for the use of the attending Surveyor(s) and thickness measurement company personnel.
2. The on board documentation required by IMO Resolution A744 (18) and any other supporting documentation is to be made available on board for the use of the attending Surveyor(s).
3. The Owners / Managers are to ensure that those tanks and spaces subject to survey are in a clean and gas free condition, with adequate ventilation, lighting and a safe means of access provided.
4. Periodical survey reports held in the ESP Hull Survey Records file shall contain details of any damage experienced by the ship. It is the responsibility of Owners / Managers to report to LR without delay, any damage, breakdown, or grounding, which could invalidate the conditions for which class has been assigned. Further details can be found in The Rules & Regulations for the Classification of Ships Part 1, Chapter 2, Section 3, 3.4.

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

3. Hull Damages Sorted by Location for this Ship

Damage experience related to the ship

Spaces Aff	Inc Type	Def Type	Def Location (IWO)	Repair Type	Date of repair
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STIFFENER	PART RENEWAL	18/03/2002
FR.69 TO 93 / P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / PLATING	PART RENEWAL	18/03/2002
FWD	WASTAGE	EXCESSIVE WASTAGE	CHAIN LOCKER / BOUNDARY BULKHEAD / PLATING	FULL RENEWAL	18/03/2002
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	18/03/2002
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STIFFENER	PART RENEWAL	18/03/2002
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / PERFORATED FLAT / PLATING (SIDE SHELL)	PART RENEWAL	18/03/2002
N0.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD / PLATING	PART RENEWAL	18/03/2002
NO.1,2P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING CARGO TANK / SIDE SHELL / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING CARGO TANK / LONGITUDINAL BULKHEAD / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / TRANSVERSE	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD / PLATING	PART RENEWAL	18/03/2002
NO.3P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / PLATING	PART RENEWAL	18/03/2002

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

Spaces Aff	Inc Type	Def Type	Def Location (IWO)	Repair Type	Date of repair
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	18/03/2002
NO.4S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	18/03/2002
NO.7P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD / PLATING	PART RENEWAL	18/03/2002
NO.7P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / STIFFENER	PART RENEWAL	18/03/2002
NO.7P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / TRANSVERSE	PART RENEWAL	18/03/2002
NO.7P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / TRANSVERSE	PART RENEWAL	18/03/2002
NO.7P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	18/03/2002
PUMP ROOM	WASTAGE	HOLED (CORROSION)	PUMP ROOM / TRANSVERSE BULKHEAD / PLATING (ENGINE ROOM BULKHEAD)	PART RENEWAL	26/06/2002

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

4. Hull Damages for Sister or similar ship (if available) in the case of design related damage

Hull Damage for sister or similar ships

Spaces Aff	Inc Type	Def Type	Def Location (IWO)	Repair Type	Date of repair
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TANK CROWN / BEAM	PART RENEWAL	26/06/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STRINGER-HORIZONTAL GIRDER / END BRACKET	PART RENEWAL	21/02/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STIFFENER / END BRACKET	PART RENEWAL	21/02/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK SPACE / TRANSVERSE BULKHEAD	PART RENEWAL	21/02/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TANK CROWN	PART RENEWAL	21/02/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / PLATING	PART RENEWAL	21/02/2003
AFT	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE / WASHBULKHEAD	PART RENEWAL	26/02/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STRINGER-HORIZONTAL GIRDER	PART RENEWAL	21/02/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / SIDE SHELL PLATING	PART RENEWAL	21/02/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD	PART RENEWAL	21/02/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / LONGITUDINAL WASH BULKHEAD	PART RENEWAL	21/02/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / SIDE SHELL / FRAME	PART RENEWAL	26/06/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / SIDE SHELL / BEAM KNEE	PART RENEWAL	26/06/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / TRANSVERSE BULKHEAD / STIFFENER / END BRACKET (DECK CONNECTION)	PART RENEWAL	26/06/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / LONGITUDINAL WASH BULKHEAD / PLATING	PART RENEWAL	26/06/2003
FWD	WASTAGE	EXCESSIVE WASTAGE	PEAK TANK / SIDE SHELL / STRINGER-HORIZONTAL GIRDER	PART RENEWAL	26/06/2003

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

Spaces Aff	Inc Type	Def Type	Def Location (IWO)	Repair Type	Date of repair
NO.1,2,3,4,5 P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / LONGITUDINAL / HATCH COAMING PLATING	PART RENEWAL	19/03/2003
NO.1P	SUBMERGED OBJECT	TORN	WING CARGO TANK / SIDE SHELL / PLATING	PART RENEWAL	30/09/2002
NO.1P	SUBMERGED OBJECT	BUCKLED	WING CARGO TANK / SIDE SHELL / TRANSVERSE	PART RENEWAL	30/09/2002
NO.1P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / PLATING	PART RENEWAL	19/03/2003
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	26/06/2003
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / TRANSVERSE	PART RENEWAL	26/06/2003
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	26/06/2003
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / TRANSVERSE (BRACKET TOE)	PART RENEWAL	26/06/2003
NO.2P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / LONGITUDINAL (BRACKET TOE)	PART RENEWAL	26/06/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE WASH BULKHEAD	PART RENEWAL	21/02/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	21/02/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK	PART RENEWAL	21/02/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD	PART RENEWAL	21/02/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD	PART RENEWAL	21/02/2003
NO.4P	CONTACT	INDENTED	WING BALLAST TANK / SIDE SHELL / PLATING	PART RENEWAL	21/02/2003
NO.4P	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL	PART RENEWAL	21/02/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / LONGITUDINAL	PART RENEWAL	26/06/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / TRANSVERSE (BRACKET TOE)	PART RENEWAL	26/06/2003

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

Spaces Aff	Inc Type	Def Type	Def Location (IWO)	Repair Type	Date of repair
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / LONGITUDINAL (BRACKET TOE)	PART RENEWAL	26/06/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	26/06/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / TRANSVERSE	PART RENEWAL	26/06/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD / PLATING	PART RENEWAL	26/06/2003
NO.4P & S	WASTAGE	EXCESSIVE WASTAGE	UPPER DECK / WING TANK / PLATING	PART RENEWAL	26/06/2003
NO.5P	WASTAGE	PITTED	WING CARGO TANK / BOTTOM SHELL / PLATING	COMPOUND USED	21/02/2003
NO.7S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / TRANSVERSE	PART RENEWAL	26/06/2003
NO.7S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / SIDE SHELL / FRAME	PART RENEWAL	26/06/2003
NO.7S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / TRANSVERSE BULKHEAD / PLATING	PART RENEWAL	26/06/2003
NO.7S	WASTAGE	EXCESSIVE WASTAGE	WING BALLAST TANK / LONGITUDINAL BULKHEAD / STIFFENER	PART RENEWAL	26/06/2003

5. Areas identified with substantial corrosion from previous surveys

Areas identified with substantial corrosion from previous surveys
NONE

6. List of main structural plans.

Please ensure the main structural plans are available for the attending Surveyor at the time of Survey, including the following:

F) Capacity Plan

G) Midship Section

H) Shell Expansion

I) Longitudinal Bulkheads

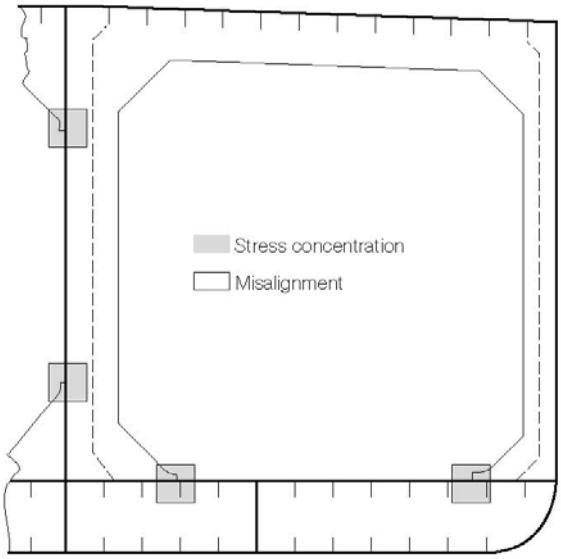
J) Any other plans requested by the attending Surveyor

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

7. List of Critical Areas:

CARGO AREA REGION
Cargo area side structure (incl. tanks if fitted) - Critical areas in typical midship section of smaller tankers (fig 1 & 2) - Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 3) - Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 4, 5 & 6) - Critical areas in typical midship section of double hull VLCC (fig 7 & 8)
Transverse bulkhead structure - Critical areas in transverse bulkheads of smaller tankers (fig 9 & 10) - Critical areas in typical transverse bulkhead of double hull tankers up to Suezmax size (fig 11) - Critical areas in typical transverse bulkheads of double hull VLCC (fig 12, 13 & 14)
Water Ballast Tank - Transverse Web Frame (fig 15)
General
Structures adjacent to areas previously part renewed should be specially considered with respect to reduced scantlings; typically i.w.o. part renewed main frames.
Note: consequences of reduced scantlings due to corrosion: - *Buckling of deck* - *Buckling of watertight bulkheads* - *Buckling of stringers, frames and girders* - *Cracking*

CRITICAL AREAS	CARGO AREA
	Cargo area side structure (incl. tanks if fitted) Critical areas in typical midship section of smaller tankers (fig 1)

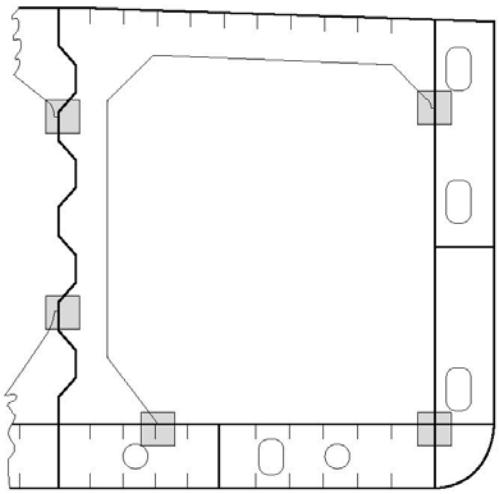


Double bottom tanker

Stress concentration

Misalignment

Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of smaller tankers (fig 2)



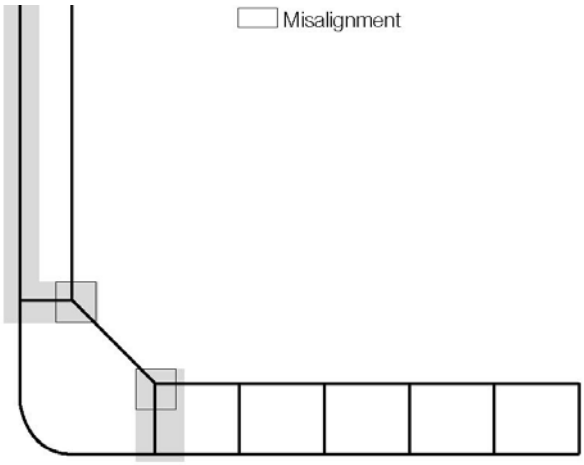
Double hull tanker

Stress concentration

Misalignment

Cargo area side structure (incl. tanks if fitted)

Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 3)

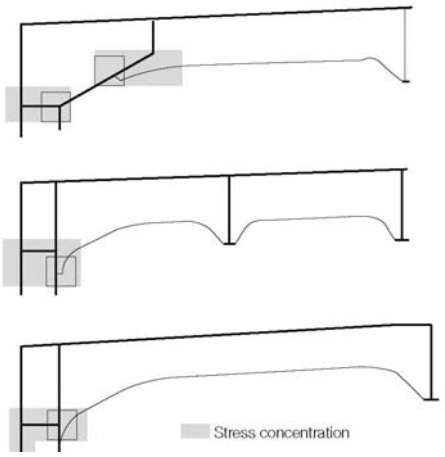


Typical lower arrangement

Stress concentration
Misalignment

Cargo area side structure (incl. tanks if fitted)

Critical areas in typical midship section of double hull tankers with no centreline bulkhead up to Suezmax size (fig 4)

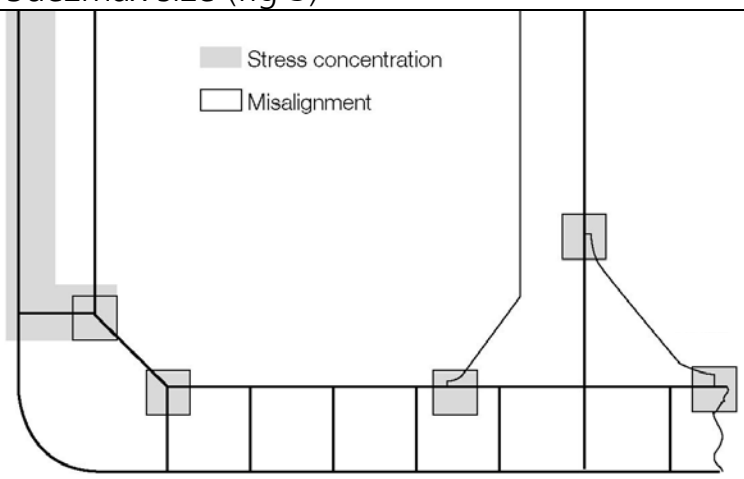


Alterative upper arrangements

Stress concentration
Misalignment

Cargo area side structure (incl. tanks if fitted)

Critical areas in typical midship section of double hull tankers with centreline bulkhead up to Suezmax size (fig 5)



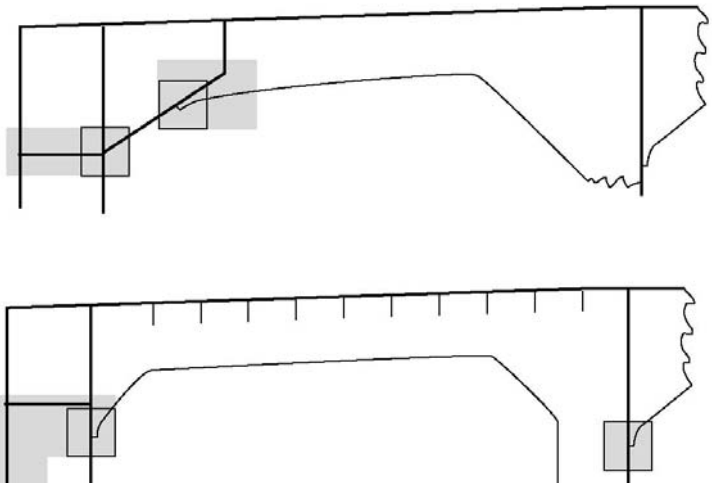
Typical lower arrangement

Stress concentration

Misalignment

Cargo area side structure (incl. tanks if fitted)

Critical areas in typical midship section of double hull tankers with centreline bulkhead up to Suezmax size (fig 6)

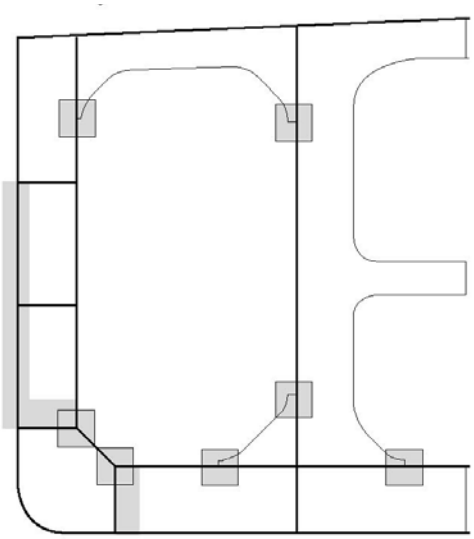


Alterative upper arrangements

Stress concentration

Misalignment

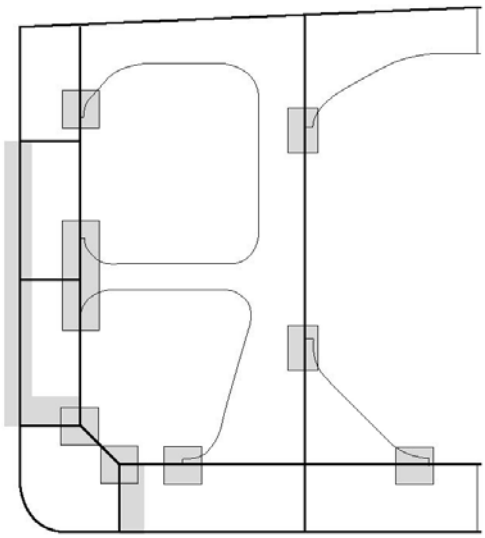
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull VLCC (fig 7)



Cross-tie in centre tank

Stress concentration
Misalignment

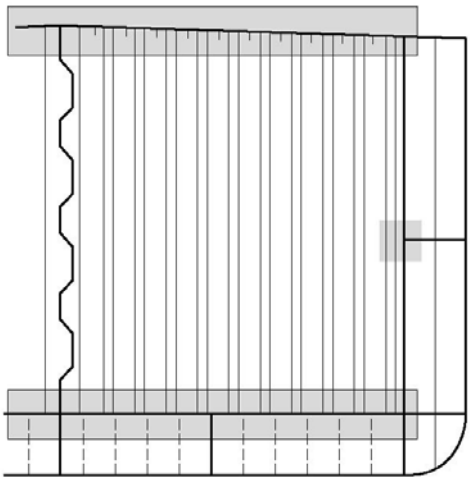
Cargo area side structure (incl. tanks if fitted)
Critical areas in typical midship section of double hull VLCC (fig 8)



Cross-tie in wing tank

Stress concentration
Misalignment

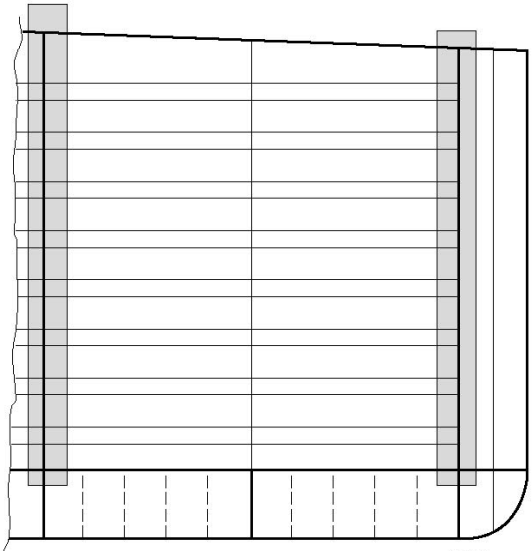
Transverse bulkhead structure
Critical areas in transverse bulkheads of smaller tankers (fig 9)



Vertically corrugated

Stress concentration
Misalignment

Transverse bulkhead structure (fig 10)
Critical areas in transverse bulkheads of smaller tankers

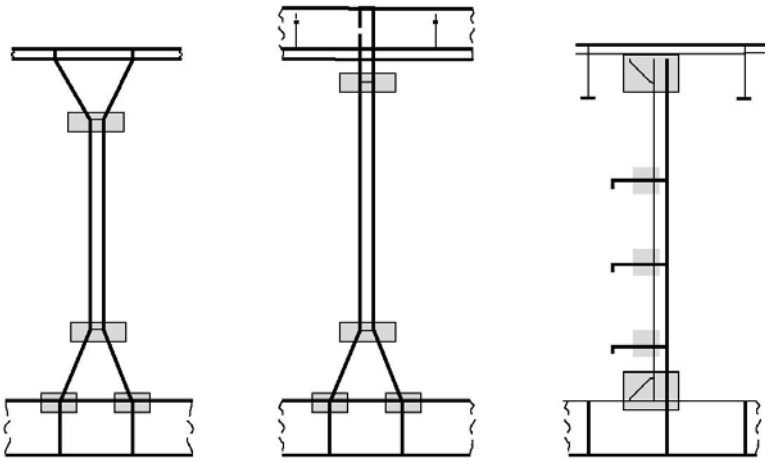


Horizontally corrugated

Stress concentration
Misalignment

Transverse bulkhead structure

Critical areas in typical transverse bulkhead of double hull tankers up to Suezmax size (fig 11)



Vertically corrugated with stools

Vertically corrugated with lower stool and external deck girder

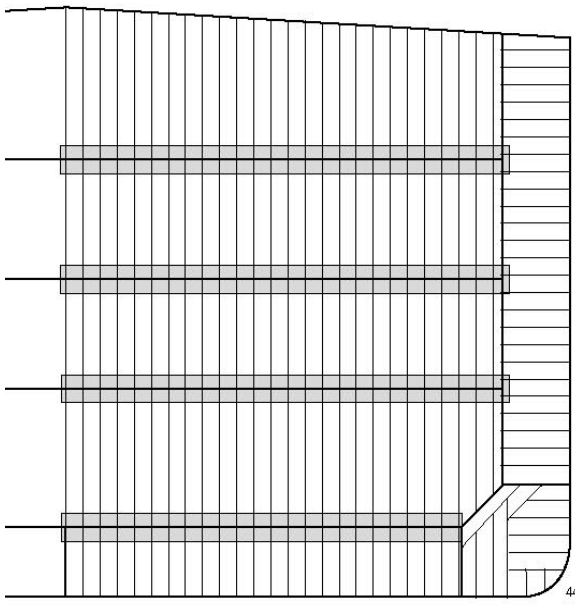
Plane with horizontal stringers

Stress concentration

Misalignment

Transverse bulkhead structure

Critical areas in typical transverse bulkheads of double hull VLCC (fig 12)

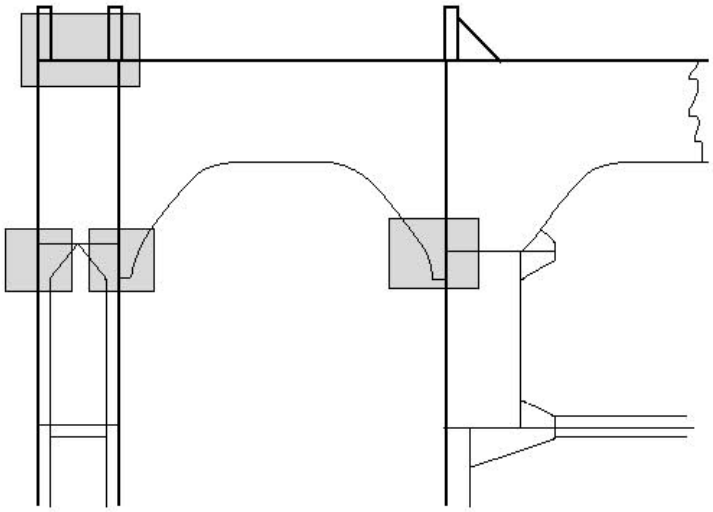


Stress concentration

Misalignment

Transverse bulkhead structure
Critical areas in typical transverse bulkheads of double hull VLCC (fig 13)

Section A-A

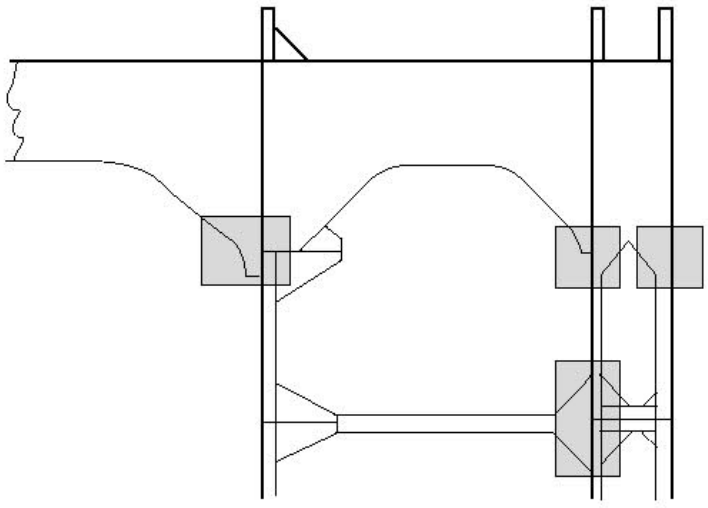


Cross-tie in centre tank

Stress concentration
Misalignment

Transverse bulkhead structure
Critical areas in typical transverse bulkheads of double hull VLCC (fig 14)

Section A-A

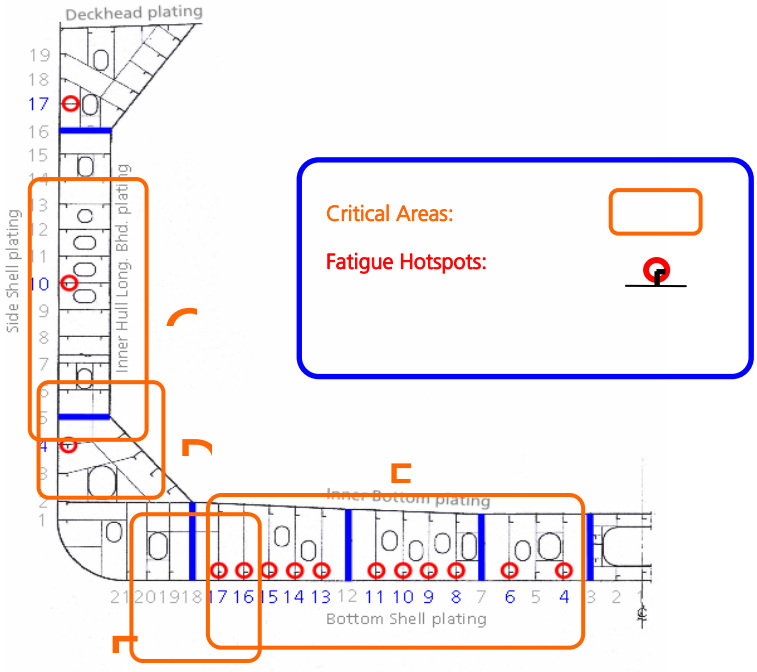


Cross-tie in wing tank

Stress concentration
Misalignment

EXAMPLE OF A COMPLETED APPENDIX 2
SURVEY PROGRAMME
FOR OIL TANKER

WATER BALLAST TANK
Transverse Web Frame (fig 15)



Name of Owner's representative:

Mr J Bloggs.....

Signature:...

Date:.....21/12/2006.....