

**BUREAU
VERITAS**

Marine Division

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Condition Assessment Programme for Inland Navigation Vessels - CAP Inland -

July 2012

**Rule Note
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MARINE DIVISION

GENERAL CONDITIONS

ARTICLE 1

1.1. - BUREAU VERITAS is a Society the purpose of whose Marine Division (the "Society") is the classification ("Classification") of any ship or vessel or structure of any type or part of it or system therein collectively hereinafter referred to as a "Unit" whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

The Society:

- prepares and publishes Rules for classification, Guidance Notes and other documents ("Rules");
- issues Certificates, Attestations and Reports following its interventions ("Certificates");
- publishes Registers.

1.2. - The Society also participates in the application of National and International Regulations or Standards, in particular by delegation from different Governments. Those activities are hereafter collectively referred to as "Certification".

1.3. - The Society can also provide services related to Classification and Certification such as ship and company safety management certification; ship and port security certification, training activities; all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board.

1.4. - The interventions mentioned in 1.1., 1.2. and 1.3. are referred to as "Services". The party and/or its representative requesting the services is hereinafter referred to as the "Client". **The Services are prepared and carried out on the assumption that the Clients are aware of the International Maritime and/or Offshore Industry (the "Industry") practices.**

1.5. - The Society is neither and may not be considered as an Underwriter, Broker in ship's sale or chartering, Expert in Unit's valuation, Consulting Engineer, Controller, Naval Architect, Manufacturer, Ship-builder, Repair yard, Charterer or Shipowner who are not relieved of any of their expressed or implied obligations by the interventions of the Society.

ARTICLE 2

2.1. - Classification is the appraisal given by the Society for its Client, at a certain date, following surveys by its Surveyors along the lines specified in Articles 3 and 4 hereafter on the level of compliance of a Unit to its Rules or part of them. This appraisal is represented by a class entered on the Certificates and periodically transcribed in the Society's Register.

2.2. - Certification is carried out by the Society along the same lines as set out in Articles 3 and 4 hereafter and with reference to the applicable National and International Regulations or Standards.

2.3. - It is incumbent upon the Client to maintain the condition of the Unit after surveys, to present the Unit for surveys and to inform the Society without delay of circumstances which may affect the given appraisal or cause to modify its scope.

2.4. - The Client is to give to the Society all access and information necessary for the safe and efficient performance of the requested Services. The Client is the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out.

ARTICLE 3

3.1. - The Rules, procedures and instructions of the Society take into account at the date of their preparation the state of currently available and proven technical knowledge of the Industry. They are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.

Committees consisting of personalities from the Industry contribute to the development of those documents.

3.2. - The Society only is qualified to apply its Rules and to interpret them. Any reference to them has no effect unless it involves the Society's intervention.

3.3. - The Services of the Society are carried out by professional Surveyors according to the applicable Rules and to the Code of Ethics of the Society. Surveyors have authority to decide locally on matters related to classification and certification of the Units, unless the Rules provide otherwise.

3.4. - The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not in any circumstances involve monitoring or exhaustive verification.

ARTICLE 4

4.1. - The Society, acting by reference to its Rules:

- reviews the construction arrangements of the Units as shown on the documents presented by the Client;
- conducts surveys at the place of their construction;
- classes Units and enters their class in its Register;
- surveys periodically the Units in service to note that the requirements for the maintenance of class are met.

The Client is to inform the Society without delay of circumstances which may cause the date or the extent of the surveys to be changed.

ARTICLE 5

5.1. - The Society acts as a provider of services. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty.

5.2. - The certificates issued by the Society pursuant to 5.1. here above are a statement on the level of compliance of the Unit to its Rules or to the documents of reference for the Services provided for.

In particular, the Society does not engage in any work relating to the design, building, production or repair checks, neither in the operation of the Units or in their trade, neither in any advisory services, and cannot be held liable on those accounts. Its certificates cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.

5.3. - The Society does not declare the acceptance or commissioning of a Unit, nor of its construction in conformity with its design, that being the exclusive responsibility of its owner or builder, respectively.

5.4. - The Services of the Society cannot create any obligation bearing on the Society or constitute any warranty of proper operation, beyond any representation set forth in the Rules, of any Unit, equipment or machinery, computer software of any sort or other comparable concepts that has been subject to any survey by the Society.

ARTICLE 6

6.1. - The Society accepts no responsibility for the use of information related to its Services which was not provided for the purpose by the Society or with its assistance.

6.2. - If the Services of the Society cause to the Client a damage which is proved to be the direct and reasonably foreseeable consequence of an error or omission of the Society, its liability towards the Client is limited to ten times the amount of fee paid for the Service having caused the damage, provided however that this limit shall be subject to a minimum of eight thousand (8,000) Euro, and to a maximum which is the greater of eight hundred thousand (800,000) Euro and one and a half times the above mentioned fee.

The Society bears no liability for indirect or consequential loss such as e.g. loss of revenue, loss of profit, loss of production, loss relative to other contracts and indemnities for termination of other agreements.

6.3. - All claims are to be presented to the Society in writing within three months of the date when the Services were supplied or (if later) the date when the events which are relied on were first known to the Client, and any claim which is not so presented shall be deemed waived and absolutely barred. Time is to be interrupted thereafter with the same periodicity.

ARTICLE 7

7.1. - Requests for Services are to be in writing.

7.2. - Either the Client or the Society can terminate as of right the requested Services after giving the other party thirty days' written notice, for convenience, and without prejudice to the provisions in Article 8 hereunder.

7.3. - The class granted to the concerned Units and the previously issued certificates remain valid until the date of effect of the notice issued according to 7.2. here above subject to compliance with 2.3. here above and Article 8 hereunder.

7.4. - The contract for classification and/or certification of a Unit cannot be transferred neither assigned.

ARTICLE 8

8.1. - The Services of the Society, whether completed or not, involve, for the part carried out, the payment of fee upon receipt of the invoice and the reimbursement of the expenses incurred.

8.2. Overdue amounts are increased as of right by interest in accordance with the applicable legislation.

8.3. - The class of a Unit may be suspended in the event of non-payment of fee after a first unfruitful notification to pay.

ARTICLE 9

9.1. - The documents and data provided to or prepared by the Society for its Services, and the information available to the Society, are treated as confidential. However:

- clients have access to the data they have provided to the Society and, during the period of classification of the Unit for them, to the **classification file** consisting of survey reports and certificates which have been prepared at any time by the Society for the classification of the Unit;
- copy of the documents made available for the classification of the Unit and of available survey reports can be handed over to another Classification Society, where appropriate, in case of the Unit's transfer of class;
- the data relative to the evolution of the Register, to the class suspension and to the survey status of the Units, as well as general technical information related to hull and equipment damages, are passed on to IACS (International Association of Classification Societies) according to the association working rules;
- the certificates, documents and information relative to the Units classed with the Society may be reviewed during certifying bodies audits and are disclosed upon order of the concerned governmental or inter-governmental authorities or of a Court having jurisdiction.

The documents and data are subject to a file management plan.

ARTICLE 10

10.1. - Any delay or shortcoming in the performance of its Services by the Society arising from an event not reasonably foreseeable by or beyond the control of the Society shall be deemed not to be a breach of contract.

ARTICLE 11

11.1. - In case of diverging opinions during surveys between the Client and the Society's surveyor, the Society may designate another of its surveyors at the request of the Client.

11.2. - Disagreements of a technical nature between the Client and the Society can be submitted by the Society to the advice of its Marine Advisory Committee.

ARTICLE 12

12.1. - Disputes over the Services carried out by delegation of Governments are assessed within the framework of the applicable agreements with the States, international Conventions and national rules.

12.2. - Disputes arising out of the payment of the Society's invoices by the Client are submitted to the Court of Nanterre, France.

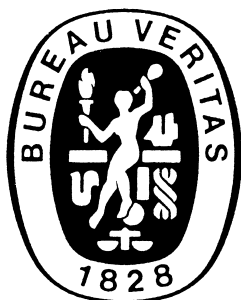
12.3. - Other disputes over the present General Conditions or over the Services of the Society are exclusively submitted to arbitration, by three arbitrators, in London according to the Arbitration Act 1996 or any statutory modification or re-enactment thereof. The contract between the Society and the Client shall be governed by English law.

ARTICLE 13

13.1. - These General Conditions constitute the sole contractual obligations binding together the Society and the Client, to the exclusion of all other representation, statements, terms, conditions whether express or implied. They may be varied in writing by mutual agreement.

13.2. - The invalidity of one or more stipulations of the present General Conditions does not affect the validity of the remaining provisions.

13.3. - The definitions herein take precedence over any definitions serving the same purpose which may appear in other documents issued by the Society.



GUIDANCE NOTE NI 575

NI 575 Condition Assessment Programme for Inland Navigation Vessels - CAP Inland -

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SECTION 3	HULL MACHINERY, FITTINGS AND SYSTEMS
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SECTION 1 GENERAL PROVISIONS

1 Condition Assessment Programme for Inland Vessels

1.1 General

1.1.1 Our clients' need for vessel condition assessment varies for each type of vessel that they own and operate. Bureau Veritas' Condition Assessment Programme for Inland Navigation (CAP Inland) has been designed so that it can be adjusted to the clients' requirements and it is also flexible therefore it doesn't interrupt the schedules of the vessel.

1.1.2 The Bureau Veritas Condition Assessment Programme for Inland vessels:

- is a service which is provided as a supplement to class and is designed to be complementary. It is a consultancy service that documents the condition of a vessel at a specific period of time in the vessel's life and identifies the actual quality standard of the vessel in comparison to class Rules
- provides a comprehensive survey report in an easily accessible and understandable format, which includes observations, ratings and photographic records
- sets quality rating, between 1- 4 (See Tab 1), that easily identifies the condition, reliability and maintenance standard associated with the vessel, or sub-system, being assessed
- is an important tool for risk assessment, that is recognised by shipping operators, charterers and terminal receivers for its standard quality
- makes use of top experts on specific type of vessel, or vessel sub-system, being assessed
- is an added value product for vessel Owners who wish an independent assessment of their vessel's condition (benchmarking), or who wish a quality document which can be used to advertise their vessel(s) to prospective buyers, charterers, terminal receivers, underwriters or other parties
- may be used as proof of managing the best practice in vessel maintenance as well as managing record of the vessel's condition in case of navigation incidents or litigation
- may be used by vessel operators for benchmarking purposes as part of their self-assessment strategy
- is not limited to BV classed vessels. BV's CAP Inland services can easily be applied to any classed or un-classed unit. For all types of vessels covered by this note, Bureau Veritas has the capacity and experts to provide tailor-made condition assessment services to fulfill the clients' needs.

1.2 Types of Vessel

1.2.1 Tankers

CAP Inland covers all types of inland tankers:

- Tanker Type N
- Tanker Type C
- Tanker Type G.

1.2.2 Other vessels

For other vessels, guidance of this note may be used taking account of the vessel's specific particulars and the equivalence or similarity of structural elements.

Table 1 : CAP Ratings

Rating	Description
1	Superior Condition
2	Good Condition
3	Acceptable Condition
4	Poor Condition

2 Tailor-Made Condition Assessment Services

2.1 General

2.1.1 Clients can choose stand-alone condition assessment modules and services from the list of which allows the compilation of their own tailor-made programme of surveys. Whether the client's programme consists of a vessel sub-system survey, or a series of surveys covering an entire vessel and sub-systems, or covers a fleet of vessels, BV's modular CAP can be tailored to suit the clients' needs.

2.2 Examples of Tailor-made services

2.2.1 Vessel Condition Assessment Programme

It is a complete Condition Assessment Programme with a comprehensive condition report which contains photographic records of the inspection, provided for each, some, or all, of the following vessel sub-systems/areas:

- a) Hull structure and cargo containment
- b) Hull machinery, fittings and systems
- c) Propulsion and auxiliary machinery, fittings and systems

2.2.2 Hull Structure Fatigue Analysis

It consists of computer analysis of the vessel structure using 2D or 2D/3D Finite Element modelling and calculation of hull girder strength. A full colour Condition Assessment Fatigue Analysis report is provided. Hot-spot maps, monitoring areas and recommended repair procedures may also be included in the report.

2.2.3 Vessel Condition Assessment and Structural Monitoring Program

It consists of an agreed plan of time based on a condition assessment by Bureau Veritas surveyors combined with vessel staff inspection and monitoring of the vessels' structures and coating. This type of plan assists the client ensuring the structural integrity of the vessel is maintained through an appropriate monitoring program, whilst ensuring the inspection as well as maintenance records and reports for vessel structure are readily available.

2.2.4 Condition Assessment Report prior to docking or other repair period

This can be an extensive survey tailored to the client's requirements, for use with vessel docking repairs or, for use in life-extending projects.

2.2.5 General Vessel Inspection on an Annual Basis

It is tailored for vessel managers who require independent assessments of the vessel's condition to be included in their annual report to the vessel owners or shareholders.

Bureau Veritas CAP Inland experts have the flexibility to design a vessel specific condition assessment programme that suits the client's actual needs.

3 Industries Requirements for Inland Vessels

3.1 General

3.1.1 Many inland vessels today are required to have a condition assessment report and CAP Inland certificate, issued by an industry recognised CAP Inland provider, prior to being eligible for charter. The scope of such vessel condition assessments varies significantly, as the different interested parties have different requirements, depending on the vessel age, size and their specified minimum allowable vessel CAP rating.

3.2 Examples of charterer CAP requirements

3.2.1 Some charterers only require a CAP Inland for vessel's hull structure. Other charterers may require a CAP Inland for vessel's hull structure and hull machinery.

3.2.2 The vessel's age, which determines that a condition assessment must be carried out, can vary between 15 years to 20 years depending on the charterer.

3.2.3 For some charterers of tankers, the acceptable CAP rating may be CAP 2 or higher.

3.2.4 A comprehensive fatigue analysis may be required for larger inland vessels to identify potential stress hot-spots.

3.2.5 Limited areas of substantial corrosion within parts of the hull structure may not be acceptable.

3.2.6 Some charterers require that local structural areas shall have a CAP rating 2 or better for measured structure, visual condition or coating condition.

3.2.7 CAP Inland validity may vary between 2,5 years and 4 years depending on the charterer and the CAP rating itself.

4 Transparency and Class Obligation

4.1 General

4.1.1 The Bureau Veritas CAP Inland is designed to be highly transparent with the onus on clear and detailed report, photographic records and certification. Oil majors, charterers and receivers have the trust in the condition surveys held by Bureau Veritas' CAP Inland experts in the type of vessel, or vessel sub-system, being assessed.

4.1.2 Depending on the clients' requirements, the CAP Inland may be carried out independently from, or concurrently with, class surveys.

4.1.3 Should any findings below class minimum requirements be discovered and not be repaired, then the CAP Inland surveyor shall formally advise the client to use the Gap/defect list report (GAP). It should be pointed out that the vessel's operator is required to inform the vessel's Class Society of such findings.

5 CAP Inland Ratings

5.1 CAP 1 - Superior Condition

5.1.1 Examination and/or measurements carried out with the results showing either minimal or no deterioration from 'as new' condition. Superior maintenance condition exists. No preventive or corrective maintenance is required.

5.2 CAP 2 - Good Condition

5.2.1 Examination and/or measurements carried out with the results showing a level of deterioration from 'as new' condition. No preventive or corrective maintenance required.

5.3 CAP 3 - Acceptable Condition

5.3.1 Examination and/or measurements carried out with the results showing that the condition is acceptable according to class rules. No imminent corrective maintenance is required. Preventive maintenance may be required to halt deterioration.

5.4 CAP 4 - Poor Condition

5.4.1 Examination and/or measurements carried out with the results showing defects, deficiencies or condition below what is acceptable according to class rules. Imminent corrective maintenance is required.

6 CAP Inland Procedures

6.1 Request for CAP Inland Survey

6.1.1 A request for a vessel condition assessment or any tailor-made program needed by the client concerning CAP Inland is to be submitted using the request for CAP Inland form provided by the society.

6.1.2 The request can be made directly through the client's local Bureau Veritas district office, or online at BV Inland Navigation Management's website.

6.2 Planning of CAP Inland Survey

6.2.1 On receipt of a request for CAP (RFCAP), the local Bureau Veritas district office will contact the client to discuss his requirement and expectation for CAP Inland Rating in order to compile a cost efficient quotation.

6.2.2 On acceptance of quotation, the BV local office representative shall meet with the client's representative(s) to draft out the CAP Inland planning document (PLAN DOC) which sets out the scope and extent of CAP Inland surveys that are to be carried out.

6.2.3 The planning document is finalised onboard the vessel during meetings between the Lead CAP Inland surveyor and the client's representative.

6.3 Kick-off Meeting

6.3.1 CAP Inland surveys begin with a kick-off meeting held onboard the vessel. This meeting is held to familiarise all the concerning parties with Bureau Veritas' Condition Assessment Programme for the subject vessel.

6.3.2 Following points are to be discussed during the meeting:

- a) Contents of the CAP Inland planning document
- b) Scope of CAP Inland surveys
- c) Inspection arrangements
- d) Safety requirements
- e) CAP Inland Gap / defects list (GAP)
- f) Other relevant issues

6.4 CAP Inland Gap/Defect List GAP

6.4.1 During the condition assessment inspections, BV surveyor may find areas of hull structure, cargo containment system, hull fittings, machinery, etc., that are either defective or have been assessed at a rating below client's expectation. (e.g. a critical structural area may be assessed by the surveyor as being CAP 3 but the clients aim is CAP 1 for structure, i.e. a rating gap exists.)

6.4.2 All gap areas or defects are advised to the client's representative in writing and all photographic records are to be kept. If these items are upgraded/rectified then a follow up inspection is made and photographic records taken. These records form a part of the final CAP Inland report.

6.5 Closing Meeting

6.5.1 On the completion of CAP Inland surveys, minuted CAP Inland closing meeting is held and the results of the surveys and inspection are advised to the client's representative.

6.5.2 If the CAP Inland survey is carried out over several visits, then for each time that the surveyor completes his inspections, a meeting is held with the client's representative. The findings of each survey carried out are discussed and a gap / defect list, where applicable, is presented at this meeting.

6.5.3 Preliminary ratings for surveyed parts may be presented during the closing meeting(s) however the final CAP rating shall only be determined after final review in BV Inland Navigation Management or delegated office.

6.5.4 It is recommended that CAP Inland inspections are completed during a single visit. However, this may not be possible due to the vessel's schedule, or due to the type of vessel being surveyed. Should several visits be necessary, then the timeframe between the first inspection and the last inspection may not exceed 6 months. Where a vessel is in lay-up, subjected to an elongated repair timeframe or is being specially modified, then the CAP Inland timeframe between the first and the last visit may be extended on application to and agreement by BV Inland Navigation Management.

6.6 Condition Assessment Certification

6.6.1 Each Condition Assessment Certificate (CERT) details the scope of surveys carried out on each vessel or vessel sub system.

6.6.2 CAP Inland certificates issued by Bureau Veritas do not have validity. They are issued to certify that the vessel, or vessel sub-system, has a specific CAP rating on a specific date. Depending on the charterer, a Condition Assessment Certificate may be recognised by them to have a validity period of 2.5, 3 or 4 years.

6.7 Condition Assessment Reporting

6.7.1 On the completion of the condition assessment surveys, the lead CAP Inland surveyor provides a report that details the extent of surveys carried out, the condition of the vessel and vessel sub-systems at the time of survey, details of repairs and upgrades together with photographic records.

6.7.2 Where a structural condition assessment survey has been carried out and a critical area review has been undertaken, then a Structural Monitoring Plan (SMP) shall be proposed if any anomalies were found that would warrant monitoring. This plan shall include a list of items to be monitored, a proposed timeframe for monitoring and sketches/photographs, if applicable.

6.7.3 The BV CAP Inland report shall normally be issued within the period of one month to three months from the end of the survey, depending on the scope of the client's requirements for CAP Inland survey and certification. The CAP Inland report is provided with both paper and electronic copies according to the client's needs and requirements for reporting.

6.7.4 All BV condition assessment reports include an Executive Summary which gives an overview of the surveys carried out, the surveys' findings and the CAP rating(s) awarded.

6.7.5 The format of the condition assessment report varies depending on the scope of surveys and this format is normally agreed with the client prior to the commencement of the surveys. For an extensive CAP Inland, the following report layout is typical:

- a) Cover page (Identifying the type of report with the vessel's photo.)
- b) Bureau Veritas general conditions
- c) CAP Inland report index of documents
- d) Vessel's particulars
- e) CAP Inland Certificate (CERT)
- f) CAP Inland report Executive Summary (EXEC SUM)
- g) Request for CAP Inland survey (RFCAP)
- h) CAP Inland Planning Document (PLAN DOC)
- i) Surveyor's CAP Inland survey report summary (REP SUM)
 - Gap/defects report (GAP)**
- j) Vessel history report (VHR) **
 - Class Hull Condition Evaluation Report **
 - Class Ballast Tanks Protection Report **
 - Previous Structural and Condition Assessments carried out **
- k) Structure & Fatigue Analysis (SFA)**
 - Areas to be monitored **
 - Repair proposal **
- l) Critical Structure Area Review (CSAR) **
- m) Hull Structure Report - with photos (HSR) **
- n) Ultrasonic thickness measurements review (TMA) **
- o) Structural Monitoring Plan (SMP) **
- p) Cargo containment system report - with photos (CCR) **
- q) Hull machinery, fittings and systems report - with photos (HMR) **
- r) Propulsion & auxiliary machinery, fittings & systems report - with photos (PMR) **

Note 1: **: If not applicable these items are left empty

6.8 Safety During Surveys

6.8.1 The client is responsible for providing the necessary facilities for the safe execution of the CAP Inland surveys.

6.8.2 The client will assume, with respect to the BV CAP Inland surveyor(s), all the responsibility of an employer for his workforce, such as to meet the provision of applicable legislation. As a rule, the surveyor(s) have to be constantly accompanied during surveys by the client's personnel.

6.8.3 Tank and void spaces are to be made safe for access i.e. gas freed, ventilated and illuminated. Adequate ventilation and lighting is also to be provided for machinery spaces and accommodation areas if they are under survey.

6.8.4 In preparation for survey and to allow a thorough examination, all spaces, machinery, fittings and piping 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. However, those areas of structures whose renewal has already been decided and planned by the owner, need only be cleaned and de-scaled to a necessary extent allowing to determine the limits of the areas that are to be renewed.

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

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

6.8.7 For overall survey, means of inspection are to be provided by the client to enable the surveyor to examine the hull structure in a safe and practical way.

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

- a) Permanent staging and passages through structures
- b) Temporary staging and passages through structures
- c) Lifts and movable platforms
- d) Other equivalent means

6.8.9 Survey afloat or at anchorage may be accepted provided that the surveyor is given the necessary assistance from the personnel on board

6.8.10 Communication system is to be arranged between the survey party in the tank and the responsible officer on deck.

6.8.11 Explosimeter, oxygen meter, breathing apparatus, life line and whistles are to be at hand during the survey.

SECTION 2 HULL STRUCTURE

1 General

1.1 Concept of condition assessment of hull structure

1.1.1 Bureau Veritas' Condition Assessment Programme for hull structure makes use of modern techniques in survey and verification to extensively analyse, identify and report on the actual condition of the vessel's structure. CAP Inland structural surveys may be carried out either in dry-dock or with the vessel is afloat.

1.1.2 The concept of condition assessment programme for hull structure combines the results of expert examination from design data with an extensive vessel structural survey to produce a thorough assessment of the vessel's condition and the assignment of a CAP rating. The BV rating system for inland vessels is broadly defined in Sec 1, [5].

The range of structural CAP Inland surveys offered by Bureau Veritas varies depending on the client's requirements.

The extent of surveys required to be carried out and the subsequent reporting requirements, are discussed and agreed with the client prior to inputting the survey scope into the CAP Inland Planning document (PLAN DOC) (See Sec 1, [6.2]).

1.2 Scope of CAP Inland for hull structure surveys

1.2.1 For vessels that are less than 15 years of age, the scope of surveys shall be equivalent to the scope of overall surveys, close-up surveys and ultrasonic thickness gauging as required for the vessel's third class renewal survey, with an additional 30% increase in structural close-up surveys and an additional 30% increase in ultrasonic thickness gauging above that specified by the BV Inland Rules applicable at the time of the CAP Inland surveys.

1.2.2 For vessels that are 15 years of age or more, the scope of surveys shall be equivalent to the scope of overall surveys, close-up surveys and ultrasonic thickness gauging as required for the vessel's fourth class renewal survey, with an additional 30% increase in structural close-up surveys and an additional 30% increase in ultrasonic thickness gauging above that specified by the BV Inland Rules applicable at the time of the CAP Inland surveys.

1.2.3 A comprehensive structural analysis is recommended. A fatigue analysis may also be carried out, depending on the vessel characteristics and operating conditions.

1.2.4 A Vessel History Report (VHR) is collated based on the previous 10 years of the vessels service life to enable a review of the structural history of the vessel (See [3]).

1.2.5 A Critical Structural Area Review (CSAR) is carried out which assesses the results of structural computations and/or review the vessel history report, so that critical areas can be identified and included for inspection within the survey scope. A review report is provided (See [4]).

1.2.6 On the completion of all CAP Inland surveys, Structural Monitoring Plan (SMP) is compiled, in cooperation with the client, as an aid for future monitoring of the vessel's structure (See [11.2]).

2 CAP Inland Structure and Fatigue Analysis

2.1 General

2.1.1 CAP Inland Structural and Fatigue Analysis (SFA) is carried out using BV's calculation programs. These programs use direct engineering calculations and 2D/3D modelling to provide information regarding the strength of the vessel structure (hull girder, secondary stiffeners, plating, primary supporting members) and to estimate eventually the design fatigue life of structural details.

The Structural and Fatigue Analysis report calculations should be performed prior to the commencement of the physical onboard condition assessment survey in order to provide information on structural items that may require specific inspection during the close-up surveys as part of the CAP Inland surveys.

Note 1: The Vessel History Report is reviewed to identify repairs and/or modifications that may have been carried out so that these can be taken into consideration during calculations.

2.2 Structural Strength Calculations

2.2.1 Structural strength calculations are to be carried out using the 'Net Scantling' approach in accordance with Bureau Veritas' Rules for the classification of inland navigation vessels.

As a first step, Bureau Veritas' MARS Inland is employed to analyse the midship section in order to check the overall longitudinal strength of the vessel and the local strength of plates and stiffeners.

The analysis of the stress and buckling behaviour of the primary supporting members within the cargo area is then carried out on coarse 3D models using the finite element method. Fine mesh 3D models are carried out subsequently on areas where important gradient of stress are present in coarse modelling.

On completion of the structural strength calculations, the results are assessed against BV's rules to identify whether the following items fulfill the rules requirements:

- a) Longitudinal Strength (Hull section modulus at deck and at bottom of the midship section are assessed against the strength criteria).
- b) Local strength of plates
- c) Local strength of secondary stiffeners
- d) Buckling and Stress (The results are displayed with ratio of the actual value of stress over the permissible one). The following stresses are shown in ratio:
 - Yielding and buckling criteria
 - Longitudinal stress
 - Transversal stress
 - Shear stress
 - Von Mises combined stress

2.3 Fatigue assessment

2.3.1 Depending on the vessel characteristics and operating conditions, the fatigue analysis may be included in the scope of a tailor-made condition assessment and carried out in accordance with Society's Rules, using the 'Notch Stress' approaches.

2.4 CAP Inland Structure and Fatigue Analysis Report (SFA)

2.4.1 On the completion of the structure analysis, a comprehensive report is issued which includes the following deliverables:

- a) A report on the structural strength calculations and identifications of hot-spots.
- b) If applicable according to [2.3], a report on fatigue analysis and identification of a 'List of structures found critical for fatigue'.
- c) Recommendations on structural areas to be modified, if any, and/or a repair methodology is to be proposed.
- d) Recommendations on structural areas to be monitored, if any, including the provision of sketches to identify the hot-spots areas.

Should this comprehensive analysis identify areas which require regular inspection or monitoring then the results are added to the scope of close-up surveys, included in the Structure Monitoring Plan (SMP) and are reported within the Critical Structural Areas Review (CSAR).

2.5 Alternative Structure Analysis

2.5.1 In some cases, clients may require an alternative Structure Analysis for a particular vessel due to the size of the vessel, type of the vessel, recurring damage in a specific location, or for a specific charterer's requirement.

In such cases, Bureau Veritas' experts are able to give advice on specific requirements and can assemble a tailor-made package of Structural Analysis which covers specific requirement in this regard.

3 Vessel History Report (VHR)

3.1 General

3.1.1 Investigation into the vessel's history is an important part of any condition assessment regime and should be performed prior to the commencement of the physical onboard condition assessment. The aim is to provide information on structural items that may require specific inspections during the close-up surveys as part of the surveys.

The vessel history may also identify instances of repairs and/or modifications that may have been executed and which affects the outcome of structural assessment calculations. The vessel's trading patterns may also influence such calculations.

3.1.2 In general, the vessel's previous ten years history is reviewed for the VHR.

3.1.3 For non-BV classed vessels, the client is requested to provide the CAP Inland surveyor with the access to class reports and vessel records covering this period.

3.2 Support Documents

3.2.1 The following documents should be provided for the VHR:

- a) Class Hull Condition Evaluation Reports, where applicable, or copies of the vessels structural history based on previous class reports as well as memorandum, visas, recommendations, conditions of class for the timeframe that is being evaluated.
- b) Class ballast tanks protection report and/or clients records.
- c) Previous vessel structural and condition assessments which are carried out from non-BV sources.

4 Critical Structural Area Review (CSAR)

4.1 General

4.1.1 Critical structural areas are locations which have been found to be sensitive to cracking, buckling and corrosion which could impair the structural integrity of the vessel.

CSAR report examines the results from the analysis of structural assessment calculations from SFA and findings of the vessel's history from VHR. It also consists of Bureau Veritas' experience of similar or sister vessels in order to identify areas of the vessel which require specific and regular inspection and monitoring.

4.1.2 The deliverables from this review are to identify the following:

- Specific structural areas which require to be added to the CAP Inland survey planning document (PLAN DOC) to ensure that these critical areas are to be included for inspection during the close-up as part of the physical onboard condition assessment survey.
- Specific structural area which require monitoring on a regular basis from the vessel's management after the CAP Inland surveys and which require to be added in the Structural Monitoring Plan (SMP).

5 Vessel Section and Area(s) Under Consideration (AUC)

5.1 Definition

5.1.1 To facilitate the assessment, review and reporting of the vessel's structural condition, the vessel structure is broken into different "Sections" such as external hull, main deck, cargo tanks, cargo holds, ballast space, etc.

5.1.2 Each Section is then further subdivided into several "Sub-sections" or "Elements" which are small enough to be readily examined and evaluated by the surveyor, but not so small as to be structurally insignificant or too numerous to be practically reported on.

These Sub-sections are termed as Areas Under Consideration (AUC). The number of AUC's incorporated into a vessel Section will usually be a minimum of six, however, there can be more depending on the layout of the Section or depending on the surveyor's review.

5.2 AUC’s Average Rating

5.2.1 During close-up and overall surveys, each AUC is individually assessed and given a rating for visual structure condition, wastage structure and coating condition. All individual AUC ratings are then combined to give a structural condition rating for the specific vessel section being surveyed and reported upon. An overall rating for the hull structure surveys is then computed by averaging the ratings attributed to the different surveyed sections of the hull structure, as explained in [10].

Fig 1 shows a hypothetical assessment to illustrate an example of vessel section and individual AUC’s.

Figure 1 : Example of vessel section and AUC’s

Vessel Section	No. 1 Centre Cargo Tank			
Areas Under Consideration (AUC)	Visual Structure	Visual Coatings	Measured Wastage	Average Ratings
Top plating and attachments	1	1	1	1.0
Portside longitudinal bulkhead	1	2	1	1.3
Starboard longitudinal bulkhead	1	2	1	1.3
Transverse bulkhead forward	1	1	1	1.0
Transverse bulkhead aft	1	1	1	1.0
Bottom plating and attachment	1	2	1	1.3
Average Structural Rating				1.2
Structural Condition Rating				1
Revised Structural Rating				N/A

6 Visual Structure Condition

6.1 General

6.1.1 Visual structure condition of the AUC’s are assessed during overall and close-up surveys and a rating from 1 to 4 is given to each AUC in each vessel section.

6.2 Overall Surveys

6.2.1 An overall survey of the hull structure is a survey intending to assess and report on the overall condition of the vessel's hull. Visual inspection of the condition of structure are carried out, whereby the surveyor inspect for evidence of damage, deformation, indents, buckling, cracks, leakages, pitting, grooving, erosion, coatings, breakdown, anodes wastage, etc. Depending on the vessel type, this type of inspection includes:

- a) External examination of deck, deck openings, hatches, river chests, vessel's sides and bottom, including corrosion protection system.
- b) Examination of under deck longitudinals through openings in deck and from access hatches and ladders.
- c) Inspection of forecastle, chain lockers, cofferdam, fuel tanks, sludge tanks and tanks in machinery spaces adjacent to the vessel hull.
- d) Examination of cargo spaces and containment systems, ballast spaces, cofferdams and void spaces.
- e) Visual inspection of deck girders or transverse rings in way of deck from the access platforms.
- f) Examination of cargo hold hatch covers and coamings (plating and stiffeners).
- g) Inspection of condition of access ladders, stringers and platforms.
- h) Examination of structure adjacent to each stringer/platform e.g. vessel sides, longitudinal and transverse bulkheads, bulkhead stiffeners, centre line bulkheads, swash bulkheads, transverse rings, brackets, etc.
- i) Examination of tank/hold/containment bottom structure, plating, longitudinals, transverse rings, bilge area and under pipe suction bell-mouth.

- j) Inspection of hot-spot areas (buckling, etc) identified during computer modelling of the vessel, if applicable.
- k) Tank testing, usually undertaken during the vessel's renewal survey or when tank boundaries have been repaired. Where tank testing has been carried out this is to be reported in the CAP Inland report. The surveyor examines the bulkheads under test in the adjacent tanks or holds, voids or cofferdams. Tank testing is to be performed in compliance with BV's Inland Rules.

During the overall surveys, CAP Inland surveyor may determine to extend the scope of the close-up surveys.

6.2.2 During survey the CAP Inland surveyor is to take representative photographs of the structural condition to enable the client to gain an overview and insight into the hull's general condition. These photographs are attached to the hull structure report (HSR).

6.2.3 Defects found during the overall survey are advised to the owner's representative using the GAP document.

6.3 Close-up Surveys

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

6.3.2 Depending on the vessel's age, the scope of close-up surveys should be at least equivalent to that required for either the vessel's third, or the vessel's fourth, class renewal survey, as per App 1.

The particular requirements for close-up surveys differ depending on the type of vessel. However, the scope of the close-up survey may be extended as deemed necessary by the surveyor, after consideration of the findings of the overall surveys and the Critical Structural Area Review (CSAR).

6.3.3 Vessels with reduced scantling are subject to special consideration. The areas with reduced scantling must be specially examined and subjected to close-up survey.

6.3.4 In cases where the scope of surveys is extended or reduced by the surveyor upon his findings, the report must reflect these changes together with proper justifications.

6.3.5 By definition, close-up surveys require access to parts of a tank/hold/void space which are normally not within reach and this means that safe access is to be provided as discussed in Sec 1, [6.8].

6.3.6 The following areas deserve special attention during the survey:

- a) End of main girders, stringers and struts with associated brackets. Particular attention should be paid to the toes of brackets, bracket ends of shell, deck and bulkhead stiffeners.
- b) Connections of shell, deck and bulkhead longitudinals to transverse web frames.
- c) Discontinuities in the form of misalignment or abrupt change of section.
- d) Plating in way of cut or openings.
- e) Areas of substantial corrosion or other suspect areas.
- f) Areas which show signs of damage or buckling.
- g) Areas identified by the Critical Structural Area Review (CSAR) as having a previous history of recurring structural failures such as cracks, buckling, etc.
- h) Areas identified for regular inspection/monitoring as per vessel's critical structure area monitoring plan SMP.

6.3.7 During the close-up surveys, the CAP Inland surveyor has to take representative photographs of areas identified by UTM, SFA, CSAR or SMP as requiring special inspection.

6.3.8 Should defects be found during the close-up surveys, then these defects will be advised to the client's representative in writing using GAP report and photographic records will be made. If these items are upgraded/rectified, a follow-up inspection will be made and photographs are taken to show the rectifications. These defects/rectifications are part of the final CAP Inland report and will be taken into consideration within the structural CAP ratings issued at the completion of the surveys.

6.3.9 Should structural modifications be carried out to the hull structure during the timeframe of the CAP Inland surveys then these modifications are also subject to close-up inspections and photographic records have to be taken. These modifications form part of the final CAP Inland report and will be taken into consideration within the structural CAP ratings issued at the completion of the surveys.

6.4 Visual Structure Condition Rating

6.4.1 In accordance with the rating criteria given in Sec 1, [5], the ratings for visual structure condition are defined in Tab 1. Surveys are undertaken to assess the condition of structure as regards damages, indents, buckling, cracks, tightness, grooving, pitting; crevice corrosion, erosion corrosion, bacterial corrosion, stress corrosion and other type of defects.

Table 1 : Visual structure condition ratings

Rating	Description	Allowable margin for defects
1	Superior Condition	0 to 25%
2	Good Condition	25 to 75%
3	Acceptable Condition	75 to 100%
4	Poor Condition	More than 100%

7 Wastage of Structure - Ultrasonic Thickness Measurements (UTM)

7.1 General

7.1.1 Ultrasonic thickness measurements form a major element in the CAP Inland surveys of hull structure and the analysis of these measurements is a prominent factor to determine the amount of wastage of structure and subsequent assessment of CAP ratings.

7.1.2 Where a client wishes to submit a UTM report that has been accepted by another recognised society, or submits a UTM report previously accepted by BV which was carried out more than 6 months prior to CAP Inland survey, then these are to be reviewed on a case by case basis. In such a case, the date and scope of UTM gauging reports is to be highlighted in the Executive Summary of the CAP Inland report.

7.1.3 UTM supplier must be certified as a service supplier according to applicable Society's Rules.

7.2 Ultrasonic Thickness Measurements Scope

7.2.1 Depending on the age of the vessel, the scope of thickness measurements should be at least equivalent to the requirement either for the vessel's third, or vessel's fourth class renewal survey, as per App 1.

The additional measurement areas consistent with the 30% increase in scope above class the class minimum requirement are agreed with the client prior to survey commencement. The full scope of the agreed UTM measurement requirements is then to be included in the Planning Document (PLAN DOC).

7.2.2 The scope may be extended further, to other areas e.g. fuel tanks, pipelines, pipe supports, accommodation decks etc., if deemed necessary by the surveyor, after consideration of findings during overall and close-up surveys.

7.3 Wastage of structure assessment

7.3.1 Rating

Wastage of structure ratings are assigned using a two-stage UTM based approach. Firstly, at the AUC level by using a combination of survey techniques to allow assessment of the vessel and secondly by rating the vessel as a whole based solely on the UT measurements.

Both approaches use the same UTM readings which are reviewed against permissible diminution of structure, according to the acceptance criteria defined in NR597 Requirement for Thickness Measurements Applicable to Inland Vessels.

In accordance with the general rating criteria given in Sec 1, [5], ratings are applied for wastage of structure as defined in Tab 2.

Table 2 : UTM CAP Ratings for wastage of structure

Rating	Description	% of permissible diminution
1	Superior Condition	0 to 25%
2	Good Condition	25 to 75%
3	Acceptable Condition	75 to 100%
4	Poor Condition	More than 100%

7.3.2 AUC Approach of UTM Assessment

In this approach, the UT measurements taken in way of each Area under Consideration (AUC) are assessed according to the criteria given in Tab 2 and a rating for structural wastage is applied for each AUC.

The ratings for structural wastage applied for each AUC are then combined with ratings for visual structure and for coatings condition to enable a combined structural rating to be given to each AUC, as explained in [10].

Note 1: Due to various circumstances such as inaccurate measurement, stray pits, etc., then there will be some deviations in UTM readings which means that some flexibility in assessment is required. Therefore an allowance of 10% of 'errant' readings may be allowed as long as these are randomly scattered and no repairs are deemed necessary by the surveyor.

7.3.3 Group Approach of UTM Assessment (Thickness measurement analysis report and global rating for UTM)

The group approach is where the full set of structural UTM readings are assessed on the basis of groups of structures (e.g. Transverse bulkheads are one group) and ratings are assigned for each group as per the criteria given in Tab 2 and the results assembled into a summarised report entitled Thickness Measurement Analysis report (TMA).

The cover page of this report contains a compilation of the groups of structure (e.g. main deck plating group, bottom plating group, side strakes group, transverse bulkheads group, etc.) with the structural ratings applied to each of these groups.

A Global rating for hull thickness measurement analysis is then computed from the average of the combined results from the groups, rounded to the nearest integer.

The Global rating for UTM is used as a guideline for the final CAP Inland structural rating for the vessel. i.e. The final CAP Inland Structural Rating cannot be better than the rating computed solely from the hull thickness measurement analysis.

7.4 Areas of substantial corrosion

7.4.1 Substantial corrosion is an extent of corrosion such that the assessment of the corrosion pattern indicates a wastage in excess of 75% of allowable margins, but within acceptable limits. i.e. a CAP 3.

7.4.2 If any individual AUC of the vessel shows a rating of 3 then the overall CAP rating awarded for the vessel's structure cannot be higher than CAP 2.

7.4.3 Areas of substantial corrosion shall be included in the surveyors' proposals to the client for regular inspection as part of the Structural Monitoring Plan (SMP).

Note 1: Some charterers make the stipulation that any areas of substantial corrosion must be repaired prior to their chartering a vessel i.e. they only accept a vessel with all assessed AUC of rating 2 or better.

7.5 Ultrasonic Thickness Measurements Reporting

7.5.1 The final CAP Inland contains thickness measurement analysis report TMA which is a summary and analysis of the UTM measurements which were used for assessment of wastage of hull structure. The groups of items considered in the calculations are also listed in this analysis report.

8 Vessel Structure Protective Coatings

8.1 Rating and evaluation guidance

8.1.1 During the overall and close-up surveys, the vessel's structural protective coatings are surveyed and reported upon. During these surveys the condition of the coatings for the various AUC's are defined and ratings are then applied. (See [10.1.1] and Tab 3).

8.1.2 In a similar fashion to the methodology explained in [6] for Visual Structure, individual ratings are awarded for coatings' condition for each Area Under Consideration (AUC) within the survey. These ratings are then combined with individual ratings for Visual Structure and Wastage to give an overall average rating, which is then rounded to the nearest whole number to give a final individual rating for the specific tank, cargo hold, or other space being surveyed.

8.1.3 App 2 has been developed as assistance to surveyor when performing condition assessment surveys.

Note 1: Some charterers require that AUC's with a coatings rating of 3, should be repaired, prior to chartering the vessel.

Table 3 : Coating condition ratings criteria

CAP Rating	Coating Condition	Definition
1	Good	Condition with spot rusting on less than 3% of the area under consideration without visible failure of the coating. Rusting at edges or welds, must be on less than 20 % of edges or weld lines in the area under consideration.
2	Fair	Condition with breakdown of coating or rust penetration on less than 20 % of the area under consideration. Hard rust scale rust penetration must be less than 10 % of the area under consideration. Rusting at edges or welds must be on less than 50 % of edges or weld lines in the area under consideration.
3	Poor	Condition with breakdown of coating or rust penetration on more than 20% or hard rust scale on more than 10% of the area under consideration or local breakdown concentrated at edges or welds on more than 50 % of edges or weld lines in the area under consideration.
N/C	-	No protective coating fitted
N/A	-	Not applicable
Note 1: Soft Coatings or Semi Hard Coatings are not rated in the scope of this document, however where these are found to have been fitted then these are to be identified within the HSR report. Note 2: Spot rusting is rusting in spots without visible failure of coating. Note 3: Blistering is bubble formation scattered on the surface of a paint film, with diameter ranging from 3 - 4 mm to 20 - 30 mm.		

9 Anodes (Cathodic Protection)

9.1 Rating

9.1.1 Although it is not a class requirement that anodes are fitted in ballast tanks, cargo tanks and other areas of the vessel hull, some clients and charterers require that the condition of anodes to be reported. Therefore, during overall and close-up surveys, corrosion protective anodes (if fitted) are to be assessed according to each AUC where these are fitted and rating is given depending on the amount of wastage of anode found. See Tab 4.

Note 1: This rating is given for information purposes. The existence of, or lack of, anodes does not affect the overall CAP rating of the vessel.

Table 4 : Anodes condition assessment ratings criteria

Rating	Description	% of wastage
1	Superior Condition	0 to 25%
2	Good Condition	25 to 50%
3	Acceptable Condition	50 to 75%
4	Poor Condition	Above 75 or 0% conductivity
N/F	Anodes Not Fitted	
N/A	Not Applicable	

10 Condition Assessment of Hull Structure, CAP Rating

10.1 General

10.1.1 The Bureau Veritas rating system for condition assessment is broadly defined within Sec 1, [5].

10.1.2 To arrive at an overall rating for the vessel structure, the following elements pertaining to structure, structural strength and maintenance of structure are rated individually and collectively:

- a) Visual inspection of structure:
For damage, deformation, indents, buckling, cracks, leakages, pitting, grooving, erosion, etc.
- b) Visual inspection of protective coatings:
For coating breakdown, cracking, flaking, blistering, detachment, etc.

c) Wastage of structure:

Assessment based on ultrasonic thickness measurements (UTM) and the percentage of diminution of structure.

Individual ratings are awarded for each of the above elements. These individual ratings are combined into an overall rating for hull structure and then finally a CAP rating for the vessel structure condition is awarded.

10.2 Individual Structural Rating for AUC's

10.2.1 During CAP Inland surveys, individual ratings are awarded for Visual Structure condition, Coatings Condition and Wastage of Structure for each Area Under Consideration (AUC) surveyed. These ratings are then combined to give an average rating, rounded to the nearest first decimal point for each AUC.

10.2.2 Each AUC average rating is then tabulated and combined to give an overall average rating, which is then rounded to the nearest whole number to give a final individual rating for the specific vessel 'section' being surveyed.

10.2.3 The following example shows how the rating for a vessel section, such as a tank, hold or space, is computed.

a) Structural condition rating rounded to the nearest integer:

The example described in Fig 2 shows the type of table that is normally used to show the individual ratings for AUC's together with the overall rating for that vessel section.

In this example the hypothetical vessel section that is being rated is No. 1 Centre Cargo Tank and there are six AUC's.

In the example above the average rating for the tank is given as 1.2 and the final structural condition rating awarded for No. 1 Centre Cargo Tank (vessel section) is 1.

b) Revised structural rating:

The example described in Fig 3 makes use of the same type of table to assess the CAP rating for a side ballast tank.

In this example, the average reading is calculated as 1.2 which is then rounded to a structural condition rating of 1. However, as the connecting space has been awarded with a coating rating of 3 then a structural rating of 1 cannot be awarded.

This is because the final rating cannot be better than one rating grade better than the lowest rating. Therefore, the rating is revised upwards.

In this example, the best rating that can be applied to the No.3 side ballast tank is a rating of 2.

c) Structural condition rating rounded to the nearest integer:

The example described in Fig 4 makes use of the same type of table for assessing the structural rating of a tanker's deck.

In this case, the vessel's section is the main deck and it consists of six Areas Under Consideration (AUC).

Figure 2 : Illustration of structural condition rating - rounded to the nearest integer

Vessel Section No. 1 Centre Cargo Tank				
Areas Under Consideration (AUC)	Visual Structure	Visual Coatings	Measured Wastage	Average Ratings
Top plating and attachments	1	1	1	1.0
Portside longitudinal bulkhead	1	2	1	1.3
Starboard longitudinal bulkhead	1	2	1	1.3
Transverse bulkhead forward	1	1	1	1.0
Transverse bulkhead aft	1	1	1	1.0
Bottom plating and attachment	1	2	1	1.3
Average Structural Rating				1.2
Structural Condition Rating				1
Revised Structural Rating				N/A