GUIDELINES FOR THE CLASSIFICATION AND CONSTRUCTION

PART 1. SEAGOING SHIPS

VOLUME 11
GUIDELINES FOR
CONDITION ASSESSMENT PROGRAM
2015 EDITION

BIRO KLASIFIKASI INDONESIA

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PART 1. SEAGOING SHIPS

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CONDITION ASSESSMENT PROGRAM
2015 EDITION

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Foreword

Guidelines for Condition Assessment Program 2015 Edition is developed in order to guide the ship-owner and/or ship operator to prepare the assessment of their actual ship conditions.

This guideline consists three chapters, the first chapter explain about Condition assessment program itself. Chapter 2 explain about the requirements of thickness measurement process and the last chapter, it explains regarding the Condition assessment management project.

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Section 1

Guidelines for Condition Assessment Program

A. General

1. These Guidelines define the conditions under that a Condition Assessment Program (CAP) will be performed.

2. The Condition Assessment Program (CAP) is an expertise about the condition of a vessel, independent and separate from the system of classification. The Rules for Classification and Surveys, Volume I, are not applicable except for references made in these Guidelines.

3. If specifically ordered, Biro Klasifikasi Indonesia (BKI) conducts a Condition Assessment Program (CAP) on board of ships independently of classification surveys. However, it is advisable to carry CAP surveys concurrently with class renewal survey, class intermediate survey, or CAS survey, if applicable. This will help to avoid extra work and costs with regard to both surveys and repairs.

4. For representatives of BKI the latest instructions belonging to the Condition Assessment Program (CAP) are to be observed.

B. Aim

A Condition Assessment Program (CAP) is aimed to have vessel judged based on the actual condition onboard rather than the ship's age. This process is determining and assessing the actual technical condition of hull, machinery and electrical installation included with cargo handling systems at a given point of time by surveys and investigations. Under certain conditions prospects on structural risks will be given.

C. Prerequisites

1. The ship needs to be built under supervision of BKI or any classification society or any BKI recognized organization. BKI Head Office will carry out Condition Assessment Program (CAP).

2. The Condition Assessment Program (CAP) including repairs and remedies are to be completed within a **6 months period at the time** of the initial of CAP surveys.

3. Before the Condition Assessment Program (CAP) surveys started, the owner should propose suitable objectives regarding overall and detail of CAP rating. Such a decision should be based on stated or implied requirements from potential charterers, the current condition of the ship, and the time/money intended invested towards possible upgrading of the ship.

It should be noted that a specific CAP rating with BKI cannot be ordered, since this program has to be justified based on the technical condition of the ship.

4. According to the CAP contract, the owner is advisable to notify BKI at least **2 (two) months before** the requested commencement of the CAP inspection and shall provide BKI with all necessary information for planning and arranging the inspection.

Early notification is important for BKI in order to be able a preparation for inspection and to carry CAP analysis prior to requested CAP inspection. CAP is a specialized service with a limited number of qualified surveyors available and early notification is also required to arrange the manning of the projects.

5. The owner has to provide the necessary facilities for safe and effective surveys. All parts of hull, machinery and electrical installations including cargo handling systems, if subject to the Condition Assessment Program (CAP), must be accessible, clean and prepared to perform the survey in a safe and practical way as agreed upon by BKI Head Office and the attending surveyor.

D. Scope of the Program

The detailed scope of a Condition Assessment Program (CAP) will be defined by BKI Head Office for each vessel individually considering its type, age and special features.

Depending on Owner requested assessment, the CAP scope may include:
- Hull
- Machinery and electrical systems, cargo handling systems
- Full scope including hull, machinery and electrical systems, cargo handling systems
- Fatigue assessment, as a service offered in addition of above CAP scope.
  Generally, this assessment is required by several major oil companies for all tankers (except LNG carriers) of more than 20000tdw and 15 years ship's age.

Depending on the results, the scope may be adapted during the performance of the Condition Assessment Program (CAP).

E. CAP Methodology

In general, a Condition Assessment Program (CAP) contains two elements, that is:
- the CAP Survey
- the CAP Analysis

Both sections are resulting in the Summary Assessment contained in the final Certificate of Condition Assessment Program (CAP).

1. CAP Hull methodology

1.1 AP hull is extensive inspection of the ship to identify extent of local corrosion and defects. The thicknesses of all main structural elements subject to CAP surveys are measured to establish the extent of general corrosion. The analysis of thickness measurement data are basis for the CAP Hull rating.

1.2 Hull rating definitions

CAP Hull rates the ship by specifying a rating scale from 1 (very good) to 4 (poor). The CAP hull ratings is defined by description as shown in table 1.1 and table 1.2.

1.3 A CAP hull survey generally contains:
- Examine documents in which can specify the ship history, as following:
  - the Class and Trading Certificates and associated documents
  - the damage history
  - the cargo history
  - the trading history
  - the maintenance records
- Survey/close-up survey of all ballast water tanks
- Survey/close-up survey of all cargo holds or cargo tanks
- Survey of main deck, hatch coamings, hatch covers, side shell, stem and stern
- Survey of all rooms, spaces and all other areas forming part of the hull structure
- Survey of accommodation

- Survey of closing appliances and safety related attachments
- Survey of the cargo gear, lifting appliances etc
- Testing of all tanks for tightness
- Tightness test of selected compartments
- Bottom survey
- Thickness measurements

1.3.1 The survey of hull structures will be specially focused on elements having been exposed to high - mainly dynamical - loads and to corrosion and wear due to seawater, cargo or cargo operation.

1.3.2 The type and condition of the corrosion prevention system will be considered for the individual structures depending on the proneness for corrosion or certain service conditions.

1.3.3 The CAP hull surveys may be divided into several visits onboard depending on schedules and condition for inspection. Ideally, it should be completed in one inspection. The final CAP hull survey to be completed **less than 6 months** after the initial survey (ref. C.2).

1.4 CAP Hull rating is decided by using a rating methodology that is criteria based, transparent and predictable.

The items rated are:

- Ballast tanks
- Cargo holds/ tanks and void space
- Pump room, or all rooms, spaces and all other areas forming part of the hull structure
- The ship's external structure (main deck, ship side and bottom)
- Structural strength

Each item will be rating based on main structural elements of each item, ie. bulkhead zone (longitudinal or transverse), side zone, deck zone, bottom zone, and internal structure that support structural element. The rating of each main structural element is averaged rating based on i) visual inspection, in which can establish extent of local corrosion and defect; ii) analysis of thickness measurements to establish extent of general corrosion; and iii) extent and condition of coating system and/or corrosion protection system of water ballast tank. Thus, iv) extent and condition of coating system and/ or corrosion protection system of cargo hold/tank, if applicable. Thus, the ship's rating is the overall average rating for all items rate as mention above. This rating is not to be better than one grade above any strength rating; thickness measurement, visual inspection or coating/corrosion protection system for any structural element in any tank/space/structure.

It should be noted that CAP rating committee decides the final CAP Hull rating.

1.5 CAP Hull analysis

1.5.1 The CAP analysis is a mandatory section of CAP service. Its primary aim is to verify the result of the CAP survey by analyzing the grade of residual strength of the hull structure.

The hull structural strength analysis is performed at selected cross section in the midship area (ref. section 2.B.3) in an "as measured" condition based on available thickness measurements. The ship's approved still water bending limits are used in the analysis.

The hull strength is rated for the following items:

- Hull section modulus
- Global buckling capacity of plate & stiffeners

1.5.2 Applied ships other than Bulk Carriers below 20000tdw for rating '3' and applied ships below 3000tdw in general

It is assumed that the approved as-built scantlings are adequate for the present purpose without necessitating

a comparison to the latest edition of the BKI Rules for Classification and Construction.

The assessment of the thickness measurements is carried out taking the as-built scantlings of the new building condition as the reference original thickness. In general, the corrosion allowance is taken from the latest edition of the BKI Rules for Classification and Construction.

In special cases, the corrosion allowance can be taken from the rules applicable at the time of construction by recalculation of the structure in question.

Generally, a fatigue assessment is not carried out except the owner requests on it.

The section modulus in deck and bottom as measured cross section are compared to 10 % of the new building requirement of the latest edition of the BKI Rules for Classification and Construction. The section modulus is rated according to Table 1.3.

Depending on the survey result, an individual analysis of the structure in question has to be performed.

1.5.3 Applied ships other than Bulk Carriers above 3000tdw for a rating "1" or "2" and applied Bulk carriers in generals

The assessment of the thickness measurements of structural elements is carried out based on the required scantlings including the corrosion allowances of the latest edition of the BKI Rules for Classification and Construction.

The section modulus in deck and bottom as measured cross section are compared to the new building requirement of the latest edition of the BKI Rules for Classification and Construction. The section modulus is rated according to Table 1.3.

1.5.4 Global buckling capacity of plate and stiffeners in deck and bottom of representative as measured cross section are calculated according to Rules for Hull, Volume II section 3.F. The utilization factor is determined and buckling capacity is rated based on Table 1.3 and final rate of buckling capacity is derived from the lower rating of deck and bottom.

1.5.5 For all vessels, which a CAP Hull is inquired with fatigue assessment as addition of CAP scope, an assessment of the thickness measurements of structural elements is carried out based on the required scantlings including the corrosion allowances of the latest edition of the BKI Rules for Classification and Construction.

A fatigue analysis is to be performed for the structural elements based on the number of load cycles for the envisaged lifetime.

1.5.6 The results of the hull strength analysis are assessed by governing the lowest rating of hull section modulus and buckling capacity. Fatigue analysis is shown by the remaining rate of the required margin with respect to their margin of fatigue strength.

It is noted that if hull structural rating is “3”, it indicates that the ship are fulfilled minimum class requirement. Therefore, hull structural rating of “4” indicates that the ship fail to fulfill the condition of class.

1.5.7 Any relevant deviations are assessed - irrespective of the ship's class - applying the requirements as per BKI Rules for Classification and Construction.

1.6 Ultrasonic thickness measurements

The owner should arrange for CAP’s thickness measurements to be carried out by a qualified approved BKI thickness measurement company in accordance to section 2. Failure to carry out thickness measurement in accordance with that section may prevent completion of CAP. The thickness measurement data are reported

using the BKI UT report template.

The thickness measurement is carried out in presence of BKI surveyor and be verified by BKI. It is highly recommended to carry out parts of the thickness measurements in the presence of CAP surveyor, so that he will be able to advice regarding extent, locations and reporting.

A preliminary thickness measurement report is to be prepared and presented to BKI CAP surveyor before thickness measurement team leaves the ship in electronic version. The representative thickness data for all main structural elements in all tanks/spaces in the cargo area should be completed. The final thickness measurement reports, is the updated version after renewals, is to be delivered both in electronic format and hard copy including sketches.

Thickness measurements are to be **less than 12/15 months old** at the time of the initial CAP survey.

2. CAP Machinery & Electrical, including Cargo handling methodology

2.1 CAP Machinery, Electrical, & Cargo Handling is extensive inspection and risk management tool designed to assess the overall maintenance condition as well as the actual operational condition of the onboard Machineries, Electrical, Cargo Systems and fittings. BKI will assess and make use of the records of condition monitoring and planned maintenance systems, analyses and reports which are already part of the day to day maintenance management. The vessel's records, vibration analysis, lubricating oil analysis, Insulation resistance test, Infrared Thermography and other systems' analyses are reviewed during this process.

2.2 Machinery, Electrical, & Cargo Handling rating definitions

CAP Machinery, Electrical, & Cargo Handling rates the ship by specifying a rating scale from 1(very good) to 4(poor). Rating equipment is carried out based on the results of site inspection, relevant testing, document review, also rating for maintenance, which is awarded based on an audit of the vessel's planned maintenance system (PMS) if available. The overall rating of CAP Machinery, Electrical, & Cargo Handling is determined after comprehensive consideration of the ratings of system/equipment. The CAP Machinery, Electrical, & Cargo Handling ratings are defined by description as shown in Table 1.1 and Table 1.2.

The item of overall condition rating including:

- Machinery spaces
- Propulsion installations
- Electrical power generation and distribution systems
- Auxiliary machineries
- Steam generation and distribution
- Hydraulic oil systems
- Bilge/ ballast systems
- Cargo Handling System
- Fire/ Smoke/ gas detection and fire fighting systems
- Other auxiliary machinery and fitting
- Automation and safety device
- Environmental management
- Machinery planned maintenance management (PMS)
- Gear
- Anchoring and mooring equipment, deck fitting, and piping

2.3 A CAP Machinery, Electrical, & Cargo Handling survey and scope

2.3.1 A CAP Machinery, Electrical, & Cargo Handling survey generally contains:

- Examine validity of class certificates related to Machinery, Electrical, & Cargo Handling including statutory certificates and class certificates.
- Examine ship's survey records.
- Examine validity of planned maintenance scheme (PMS) for machinery (including the

repair/change item in the PMS report made by the chief engineer), if the PMS is applied.
- Examine the maintenance records
- Survey of the systems and components in the engine room and related spaces
- Running tests
- Measurements of wear down figures
- Survey and tests of the cargo related systems (on tankers)
- Survey and tests of the safety systems, automation and remote control systems
- Internal survey of selected components
- Ultrasonic Thickness Measurement, if necessary as evidence of deterioration
- Insulation resistance test
- Examine Lubricating/ Hydraulic oil analysis
- Infrared thermography, if the client request.

2.3.2 A CAP Machinery, Electrical, & Cargo Handling Survey Condition

In general, the surveyor will not request to open up equipment for inspection of component parts, however, where equipment is found disassembled for maintenance during CAP surveys, and then this should be documented within the Machinery and Cargo Systems & Fittings report and a photographic record taken.

During the operational surveys, the surveyor may determine to extend the scope of the surveys e.g. the surveyor may request that a unit be disassembled for inspection where the item show signs of deterioration in external condition or during function testing. The final CAP survey for machinery, electrical, & cargo handling systems to be completed less than 6 months after the initial survey.

2.4 Machinery, Electrical Installation and Cargo handling systems

The machinery and electrical installation is assessed by the grade of affect to the safe operation caused by any stipulated deficiency. As the survey is essentially based on the proof of maintenance their documentation and status is considered with respective high priority.

3. CAP Survey Documents

3.1 CAP Defect list

All defects, which results along ship's history and all findings in condition of class, are included in CAP defect list. Those defects have to repair, and the CAP surveyor will ensure that all finding defects are being repaired or formally handled as Condition of class when CAP surveys are carried out.

3.2 CAP Upgrade report

Excluded of the CAP defect list, other findings considered above class minimum requirements may effect the local visual, ultrasonic thickness measurement and coating rating. For this case, the repairs of these findings are up to the owner decision. Various levels of upgrading above BKI class minimum requirement may be necessary in order to reach the owner's local or overall CAP rating. These upgrading items are described in a CAP Upgrade report.

The upgrading is voluntary, and it is should be noted that the owner takes responsibility for it. BKI and the CAP surveyor will assist as possible in order to achieve a successful outcome of the project.

CAP rating is assessed by averaging several factors, and it may be complicated to give exact advice regarding the level of upgrading necessary to obtain a specific overall CAP rating.

F. Results and Conclusions

1. Report

1.1 The results of the CAP Survey and the CAP Analysis are summarized in a report. This report describes in line with the agreed scope of the Condition Assessment Program.

1.2 The report of CAP Hull and Fatigue analysis if requested, consist of:

- Statement of facts and particulars of the ship
- The summary of finding from survey conditions,
- Descriptions, observations and ratings for each main structural element in each tank/space
- Assessment of thickness measurements and rating for each main structural elements in each tank/ space
- Analysis results and the rating for individual structures and components
- Descriptions of repairs and upgrading
- Description and photo documentation of defect if appropriate
- Description and photo documentation of the condition of each tank/space
- CAP Hull rating summary

1.3 The report of CAP Machinery, electrical systems, cargo handling systems report at least consist of :

- statement of facts
- general information and particulars of the ship
- summary of assessment of machinery and electrical installations
- record of taken measurement or assessment of machinery and electrical installations including automation and remote control systems
- report for analysis of lubrication oil
- results of the performance calculation of main engine/ generating set prime mover during sea trial
- results of the vibration measurement as applicable
- extensive photographic documentation/ evidence reflecting of machinery and electrical condition
- report for brake tests for windlass and winch as applicable.

1.4 On special request, received before the commencement of the survey, a list of proposals for appropriate measures and/or modifications intended to improve the actual technical condition will be included in report by BKI.

2. CAP Rating decision

All reports are being review and assessed by the CAP Rating Committee before final decision and issue. The CAP Rating Committee consists of appointed BKI technical staff representing their relevant disciplines, capabilities and expertise.

The CAP Rating Committee decides the final CAP Rating.

3. Certificate

3.1 On completion of the Condition Assessment Program, it issues a CAP Rating declaration and it is stated in "Certificate of Condition Assessment Program". The declarations contain the overall CAP Rating depending on the requested scope;

- the vessel's identification data
- the place and period of survey
- a final CAP rating depending on the requested scope
- comments or exceptions
- a reference age for the vessels standard of safety concerning structural risk and a prospective time for continuing service derived (if fatigue assessment is applied)

3.2 The date of issuance will correspond to the date of release by Head Office.

3.3 The certificate will be issued without a defined period of validity, but charterers have introduced their own acceptance periods.

G. Determination of Repair Measures required

All components not meeting the requirements are to be replaced by components according to the BKI's Rules. Where necessary, components are also to be renewed which can not be proved to be of adequate residual fatigue strength due to advanced previous damages. All work becoming due on account of repair measures is to be supervised by BKI Surveyors.

H. Impairment of Certificates

If rating "4" has to be applied for BKI class ships, the respective items may influence the maintenance of class and validity of trading certificates, issued by Biro Klasifikasi Indonesia.

I. Obligation

If during a CAP project a condition was established affecting the safety of life, the integrity of structures and equipment or which will impair the environment, BKI reserves the right to take appropriate averting action. Information might be passed to responsible authorities or societies.

Table 1.1 CAP Rating system (exclude Bulk Carriers)

Rating	Condition assessment survey		Condition assessment analysis
	Hull[1)]	**Machinery & electrical installation, Cargo handling systems[2)]**	**Strength & Fatigue analysis[3)]**
1	Structure with no evidence of wastage, wear and tear.	Components and systems found with no deficiencies affecting the safe operation and/or normal performance.	Strength evaluation according to current valid Newbuilding Rules. A continued life expectancy over the next 5 years.
Very good Condition	Coating system in at least good condition.	Maintenance and documentation found in very good order. No maintenance or repair considered necessary	At least 50 % of allowable corrosion margin is remaining.
2	Structure with negligible deficiencies not requiring correction or repair	Components and systems found with minor deficiencies not affecting the safe operation and/or normal performance.	Strength evaluation according to current valid Newbuilding Rules. An increased probability of failure in the next 5 years.
Good condition	Coating system in at least **fair** condition.	Maintenance and documentation found in good order. No maintenance or repair considered necessary	At least 25 % of allowable corrosion margin is remaining.
3	Structure with deficiencies, affecting neither the minimum strength nor the operability and do not require immediate corrective action	Components and systems found with deficiencies, and it is not affecting the safe operation and/or normal performance.	Strength evaluation according to BKI rules valid at year of build. A likely probability of failure in the next 5 years.
Class condition	Coating system in **poor** condition, but corrosion protection system in **good** condition.	Maintenance and documentation considered to be satisfactory. No maintenance or repair considered necessary	Less than 25 % of allowable corrosion margin is remaining.
4	Structure with deficiencies which may affect the ship's potential to remain in class..	Components and systems found with deficiencies affecting the safe operation and/or normal performance.	Hot Spots found. A likely probability of failure within 5 years.
Poor condition	Coating system in at least **poor** condition, and/or corrosion protection system in **fair** or **poor** condition.	Maintenance and documentation found to be poor. Maintenance or repair required to reinstate serviceability.	Allowable corrosion margin is exceeded.

1) If both criteria for structure and corrosion prevention system are not matching one rating level, the structural condition is decisive.
2) If both criteria for condition and maintenance are not matching one rating level, the more critical deficiency is decisive.
3) Fatigue analysis is offered additional service for Condition assessment program (CAP) Hull

Table 1.2 CAP Rating system (Bulk Carriers)

Rating	Condition assessment survey		Condition assessment analysis
	Hull[1)]	**Machinery & electrical installation, Cargo handling systems**[2)]	**Strength & Fatigue analysis**[3)]
1	Structure with no evidence of wastage, wear and tear.	Components and systems found with no deficiencies affecting the safe operation and/or normal performance.	Strength evaluation according to current valid Newbuilding Rules. A continued life expectancy over the next 5 years.
Rightship CAP2/5	Coating system in at least good condition.	Maintenance and documentation found in very good order. No maintenance or repair considered necessary	At least 50 % of allowable corrosion margin is remaining.
2	Structure with negligible deficiencies not requiring correction or repair	Components and systems found with minor deficiencies not affecting the safe operation and/or normal performance.	Strength evaluation according to current valid Newbuilding Rules. An increased probability of failure in the next 5 years.
Rightship CAP2/3	Coating system in at least good condition or Coating system in at least **fair** condition but supplemented by corrosion protection system in **good** condition.	Maintenance and documentation found in good order. No maintenance or repair considered necessary	At least 25 % of allowable corrosion margin is remaining.
3	Structure with deficiencies, affecting neither the minimum strength nor the operability and do not require immediate corrective action	Components and systems found with deficiencies, and it is not affecting the safe operation and/or normal performance.	Strength evaluation according to BKI rules valid at year of build. A likely probability of failure in the next 5 years.
Class condition	Coating system in **poor** condition, but corrosion protection system in **good** condition.	Maintenance and documentation considered to be satisfactory. No maintenance or repair considered necessary	Less than 25 % of allowable corrosion margin is remaining.
4	Structure with deficiencies which may affect the ship's potential to remain in class..	Components and systems found with deficiencies affecting the safe operation and/or normal performance.	Hot Spots found. A likely probability of failure within 5 years.
Poor condition	Coating system in at least **poor** condition, and/or corrosion protection system in **fair** or **poor** condition.	Maintenance and documentation found to be poor. Maintenance or repair required to reinstate serviceability.	Allowable corrosion margin is exceeded.

1) If both criteria for structure and corrosion prevention system are not matching one rating level, the structural condition is decisive.
2) If both criteria for condition and maintenance are not matching one rating level, the more critical deficiency is decisive.
3) Fatigue analysis is offered additional service for Condition assessment program (CAP) Hull

Table 1.3 Structural strength rating system

Structural strength/Rating	1	2	3	4
Section Modulus	≥ 0.97	≥ 0.93	≥ 0.90	< 0.90
Exclude Bulk Carrier, double hull tanker w/o a long. Bulkhead, gas Carrier1				
Deck's utilization factor	≤ 0.90	≤ 0.95	≤ 1.0	> 1.0
Bottom utilization factor	≤ 0.77	≤ 0.81	≤ 0.85	> 0.85
For Bulk Carrier, double hull tanker w/o a long. Bulkhead, gas Carrier[1)]				
Deck's utilization factor	≤ 0.90	≤ 0.95	≤ 1.0	> 1.0
Bottom utilization factor	≤ 0.72	≤ 0.76	≤ 0.80	> 0.80
1) For panel with flat bar or bulb stiffeners, a one tenth higher utilization is allowed.				

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Section 2

CAP Thickness Measurement Specification

A. General

1. This specification describes the extent of thickness measurements required for BKI Condition Assessment Programme (CAP) Hull. Requirements to thickness measurements for class surveys are specified in BKI Rules for Classification of Ships.

2. BKI uses thickness measurement data for a statistical analysis of diminution as a basis for the CAP rating. Representative data for all main structural elements in all tanks/spaces are required. The main structural elements in a CAP context are deck, shipside, bottom, inner bottom, inner deck, longitudinal bulkhead, transverse bulkhead (i.e. tank/space boundaries with plating and stiffeners) and internal structure (i.e. web-frames, stringers, girders, floors etc.)

3. Failure to carry out thickness measurements according to this specification may prevent completion of CAP.

B. Requirements of Thickness Measurments process

1. Thickness measurements shall be carried out by a qualified company approved by BKI.

2. A BKI CAP surveyor shall be onboard while the measurements are taken to the extent necessary to control the process.

3. The thickness measurements data shall be reported using the BKI UT report template. All information required in the template is to be completed by the thickness measurement company.

4. One electronic version and one paper version of the thickness measurement report with sketches and relevant documentation is to be submitted to the responsible BKI unit.

5. Readings to be included in the thickness measurement report shall be representative for the area measured and shall normally be single point readings. If a single reading is not considered to be representative for the area it represent, additional readings may be carried out in same area and included in the report together with a comment stating that these are additional readings. Alternatively, the average value of several readings in a small area may be included in the report together with a comment stating that this is an average value. In such cases, all the readings to be averaged are to be taken within the affected area. Low readings shall not be averaged out by several readings in adjacent un-corroded areas.

6. Pits, grooves and local corrosion are to be measured and included in the report with a suitable comment.

7. Cracks, buckling and other deficiencies identified are to be reported to the attending CAP surveyor and included as comments/sketches in the thickness measurement report.

C. Standard Extent of Thickness Measurements

1. The standard extent of measurements is described in this section. Reductions in the standard extent of measurements are only accepted in accordance with criteria listed in Section D.

2. The following structure is to be completely measured with 5 points per plate:

- Exposed main deck plating
- Bottom plating
- Wind and water strakes
- Inner bottom plating
- Continuous longitudinal stringers and inner deck plating

3. At least three transverse sections in the cargo area are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements. The transverse sections are normally to be located outside the line of cargo hatch openings if fitted. The complete section is to be measured, including:

- Within 0.15H (where H is the moulded depth of the ship) from deck and bottom every longitudinal and girder shall be measured on the web and flange and every plate shall be measured one point between each longitudinal.
- Between deck and bottom area every longitudinal and girder shall be measured on the web and flange and every plate strake at least one point per plate.

4. All tanks in the cargo area are to be measured in at least three transverse web frame rings for each tank, normally located in the forward, middle and aft parts of the tank. Measurements in two transverse web frame rings are sufficient for tanks of less than 15 meters length. All structures in and adjacent to these web frame rings are to be measured, including:

- Longitudinals and other stiffeners with one representative measurement on both web and flange.
- Shipside (outside wind and water strakes) and longitudinal bulkhead plates (2 points per plate strake).
- Stringer platforms with associated structure (2 points per plate).
- Transverse bulkheads including swash bulkheads with associated structure (plates and stiffeners at three horizontal levels).
- Web frames with flanges, stiffeners and brackets.

5. The following structure is to be measured in fore and aft peak tanks:

- All transverse webs with associated plating and longitudinals.
- Transverse bulkhead complete with associated structure.
- Deck head (tank top) and stringers with associated structure.
- Bottom and shipside with stiffeners.

6. Any other ballast tanks outside of cargo area are to be measured as described in Section C.4.

7. For cofferdams, voids and other spaces in the cargo area, representative thickness data for all main structural elements are required.

8. Cargo hatches with coamings and associated structure are to be measured for all holds.

9. Additional measurements are to be carried out if one or more readings indicate corrosion exceeding requirement to CAP 2 (67 % of allowable margin).

10. Extent of measurements may be increased as considered necessary by the attending CAP surveyor.

D. Reduced Extent of Measurements

1. Extent of measurements in shell plating (ref. Section C.2) and in three transverse sections in cargo area (ref. Section C.3) including three transverse belts for each tank (ref. Section C.4) is not to be reduced.

2. The number of readings may only be reduced if the structure in question is:

- made of solid stainless steel, or
- coated with original coating still intact on both sides of the structure, or
- located within fuel or cargo tank(s)
- representative thickness measurements reveal no or negligible steel loss, well within the requirements for CAP 1 (33 % of allowable margin). The representative measurements are to be taken in areas expected to represent worst case corrosion.

3. Where the number of thickness measurements is reduced, it is to be ensured that representative measurements are obtained for all main structural elements (ref. Section A.2) in all tanks/spaces. An absolute minimum of 10 representative readings for each main structural element in all tanks/spaces are required. If measurements reveal that the conditions given in Section D.2 are not met, the standard extent of measurements as described in Section C is to be carried out.

4. No reduction in extent of measurements is to be applied unless accepted by the attending CAP surveyor.

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Section 3

CAP Project Management

A. General

1. A successful of CAP project relies on the good cooperation from all the involved parties. In order to achieve the objective of the project may involve considerable costs in connection with surveys (preparation of surveys), repairs and upgrading of the ship. It is advisable to allocate the appropriate staffs in order to manage of the project.

2. It is advisable to carry CAP surveys concurrently with class renewal survey, class intermediate survey, or CAS survey, if applicable. This will help to avoid extra work and costs with regard to both surveys and repairs.

B Contacts and communication

1. Once the CAP contract project is agreed and signed, BKI will appoint a CAP Project Manager. The project manager is the point of contact of BKI throughout the CAP project.

2. CAP surveyor is appointed after notification of the intended time and place for the CAP surveys. Number of CAP surveyor is decided based on the ship dimensions. Exclude CAP surveyor, a Team expert also be appointed in order to analyzes hull strength and fatigue assessment, machinery & electrical systems, and cargo handling systems.

3. Owner should provide BKI with the contact details of the person in charge of the CAP project, including ship's agent and/or ship's master when the time and place for the surveys is decided.

C Planning & Preparation for CAP surveys

1. Based on the CAP contract, owner should notify BKI before the requested CAP survey is commenced and give BKI all necessary information regarding planning and arranging of the surveys (ref. section 1.C.4).

Owner is also advisable to notice the ship's staff at an early stage so that the preparation of the upcoming surveys could be initiated.

2. It should be noted that if CAP survey is carried out together with CAS survey, early planning is important. CAS survey involves stringent notification and information that is needed an approval from the flag state.

3. The CAP surveys and inspects all regions of the ship structure. Finishing time of this survey is dependable to the ship's size, its general condition, finding defects/damages, the means of access, the level of survey preparations, and organization onboard, etc. Normally, a ship in which be surveyed with two surveyors need two weeks to complete.

The CAP surveys may be divided into several surveys onboard depending to the condition for inspection. The final CAP survey to be completed less than 6 months after the initial survey (ref. section 1.E.2.3.3 and section 1.E.3.3.2).

D Execution of a CAP survey

1. The CAP survey is started with a kick of meeting onboard. The CAP surveyors, Class surveyors, master/chief officer, chief engineer, superintendent, and UT company operators attend this meeting. In this meeting, all aspect regarding CAP, clarification of CAP rating objective, practical aspect regarding CAP survey is discussed. During the kick of meeting, highlighting of known defects / damage or problem areas and the results of company internal inspection, should also be communicated in order to make the CAP survey more efficient.

2. The extent of CAP survey as stipulated in section 1, may need to be extended if defects/damage or substantial corrosion are found.

3. In the end of CAP survey, a closing meeting should be held with attending by CAP surveyors, Class surveyors, master/chief officer, chief engineer, superintendent, and UT Company operators. In the closing meeting, information regarding the status of the survey, thickness measurement, repairs and upgrading required achieving of CAP rating objective, and the outstanding items for CAP survey completion are informed.

E Completion and follow up

1. CAP report describes both the condition of the ship at the time of inspection, defects found with photo, the repairs of the defects, any upgrading carried out and the condition at the end of the process (ref. section 1.F.1,).

2. Once repairs and upgrading of the ships finish, CAP surveyor will re-survey the ship and update the report based on the latest condition. Repairs of items on CAP defect list (or corresponding to Class condition) may be surveyed by Class Surveyor. Repairs and upgrading of findings based on CAP Upgrade report must be surveyed by CAP surveyor. Similarly, UT report analysis and rating in the CAP report must be updated if steel plate of ship structure is renewed. UT Company submits the updated CAP UT report.

The final CAP report is completed base don the latest documented condition of the CAP process.