



MANAGING RISK

# Condition Assessment Programme (CAP)



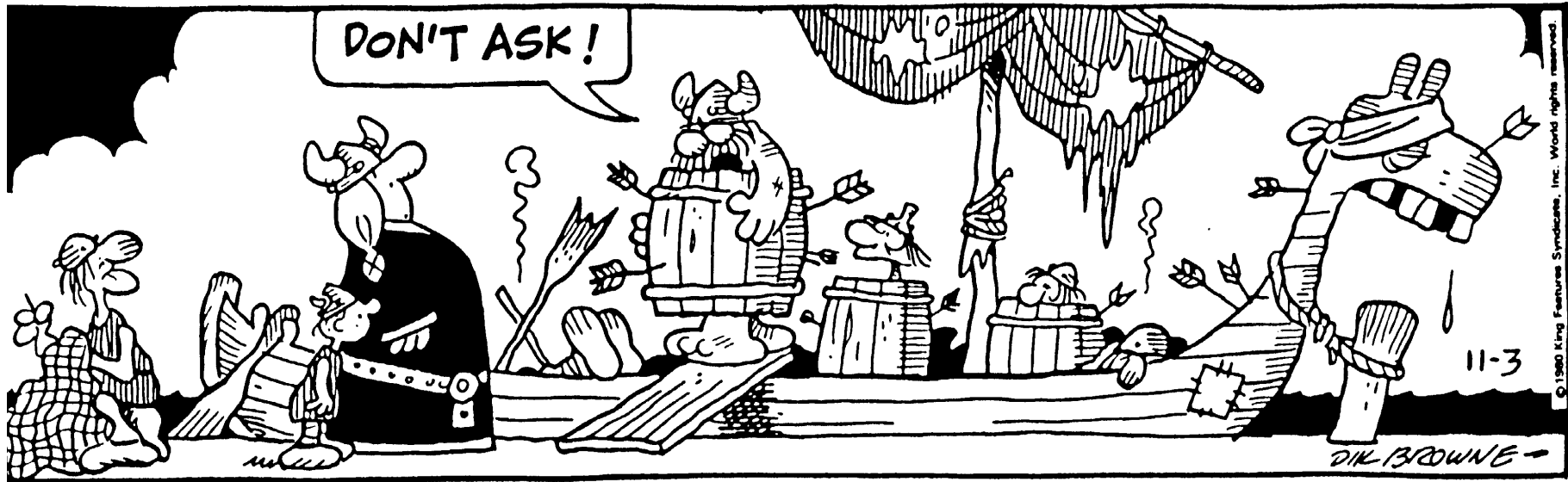
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An introduction to CAP Hull

Øystein Wikeby

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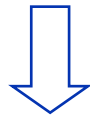
- **Background for today's legislation and requirements**
- What is CAP
- Commercial Aspects
- Basic Principles & Methodology
- Practical Project Management



- Shipping is perceived by the public as an industry
  - partly made up of rustbuckets and ticking environmental bombs crossing the oceans.
  - where operators are always on the lookout for even more lenient flags of convenience, even cheaper crews, more corners to cut .....
  - collisions and similar incidents are partly tolerated as an unavoidable part of life, but
  - ships breaking in two for no particular reason is neither understood, nor tolerated, particularly when causing major pollution.

# Erika / Prestige

- Oil tanker accidents in European waters in 1999 / 2001 causing major pollution
- Initial political reflex: Ban single hull tankers from European waters.
- EU pressure on IMO by threats of unilateral action
- Accelerated phase-out of single skin tankers and introduction of CAS
- CAP as a commercial requirement
- A paradigm shift within the shipping industry

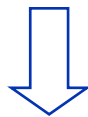


# Enron / WorldCom / Tyco



MANAGING RISK

- A string of corporate scandals involving fraud and “creative book-keeping” by some of the largest companies in the US
- Involved directors recently sentenced to up to 25 years in prison
- Led to introduction of the Sarbanes-Oxley accounting / auditing rules

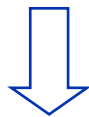


- A paradigm shift in the general business climate





- Global Auditing firm with 90.000 employees
- One of the world's most respected companies
- Failed to detect and report irregularities as Enron's auditor
- Media claims of shredding of documents and attempted cover-up
- Entire company wiped out within months
- Recently acquitted of any wrongdoing by the US Supreme Court



- Involved in the fraud or innocent victim of false perceptions?
- Bottom line: It does not matter – the risk is real!

The perceived situation is no longer tolerated by the public, and the response is manifested at different levels

- Political response
- Pressure group attention
- Media attention
- Legal implications / liability
- Regulations
- Commercial requirements



A new risk reality!

The need to manage this risk applies to all players in the maritime sector

- Classification societies
- Oil majors / cargo owners
- Shipowners / management companies

It has resulted in increased focus on

- Quality (documented and verified)
- Transparency
- Media / Information strategy



Photo: Uferas Gerard / RAPHO - TOTAL document



**Thierry Desmarest**  
Chairman and Chief  
Executive Officer -  
TOTAL

*“Civil society expects companies, especially the biggest ones, to manage the environmental impact of their operations and industrial risk. In practical terms, that means engaging in broader dialogue with a wide array of stakeholders. But more than that, it means we have to tailor our practices, organization, decision-making processes, and management systems to these new developments.”*

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There is a general scepticism to ageing vessels in the market

- Charterers, cargo owners, insurers, port authorities etc.
- Irrespective of their technical standard
- Which may not be known.

As a consequence, vessels down to 15 years of age are sometimes termed "over aged".

A Need from Shipowners operating well maintained and sometimes extensively modernised older vessels

- To have the technical standard of their vessels more specifically verified and documented
- The vessels to be judged based on the actual condition rather than their age alone



Avoid that these two vessels are treated equally

- DNV developed CAP in close co-operation with stakeholders
- Introduced in 1989
- Rapidly followed by other leading Classification Societies
- All with different Scopes, different Rating Scales, different Rating Levels
  
- DNV took initiative to harmonise the assessment schemes between Lloyds, ABS and DNV
- Resulted in Harmonised CAP Schemes with identical scope and ratings
- Effective from 1st June 1996

The purpose of CAP is:

- To have the vessel judged based on the actual condition on board rather than age
- To contribute to protecting life, property and the environment and to ensure safest possible transportation of the cargo
- To establish a sound basis for decisions on repair or investments in order to extend the lifetime of the vessel
- To document a vessel's technical condition towards/in connection with:
  - Charterers
  - Cargo owners and/ or authorities in connection with entry into new charters or extension of existing charters
  - Refinancing of the vessel
  - Sale or termination of management agreements etc.
  - Ports and terminals
  - Flag states

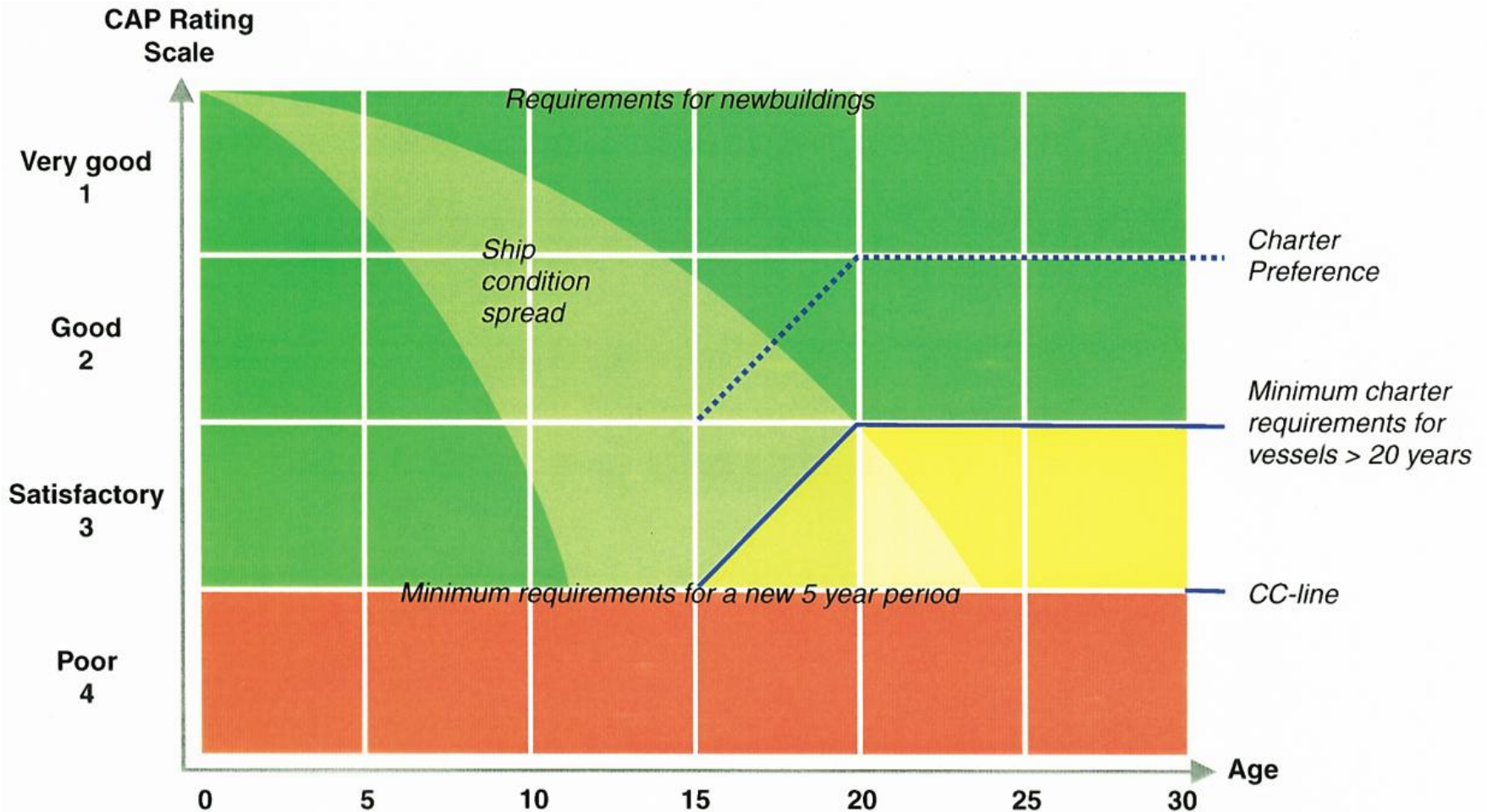
# Difference between CAP and Class

- CAP is a consultancy service and is independent, yet complementary, to classification
- The CAP-service is rendered according to a contract with the client and rendered to ships with or without DNV class
- CAP is a voluntary service

Class is a **continuous service** based on **regular inspections** and the issuing of class certificates with specified validity periods

A CAP Declaration is issued documenting the **actual condition** of the vessel **at the time of the inspection**

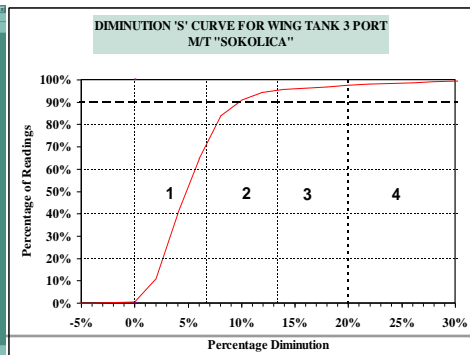
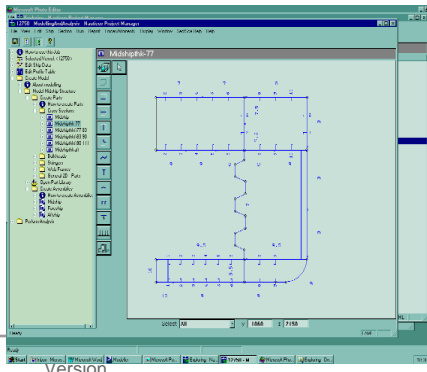
# Difference between CAP and Class





- Class is aimed at ensuring a minimum standard for the vessel whereas the main purpose of CAP is to evaluate and report the vessel's condition above minimum class standard

**The scope for CAP Hull is more comprehensive than for class surveys with respect to the combination of close up inspections, extent and analysis of thickness measurements, structural strength evaluation and reporting**



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Photo: Uferas Gerard / RAPHO - TOTAL document



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*“Civil society expects companies, especially the biggest ones, to manage the environmental impact of their operations and industrial risk. In practical terms, that means engaging in broader dialogue with a wide array of stakeholders. But more than that, it means we have to tailor our **practices**, organization, **decision-making processes**, and management systems to these new developments.”*

Most Oil Majors have made policy decisions to only charter vessels of documented good quality, assured by:

- Vetting
- CAP rating of 2 or better for older vessels.
  
- Negative impact:
  - Cost & complexity
- Positive impact:
  - Significant lift of the quality of the tanker fleet
  - Barring low quality ships and operators from lucrative markets, thus...
  - Supporting strong freight-rates for quality tonnage

# Requirements of some oil majors

COMPANY	HULL	FATIGUE	MACHINERY	COMMENT
BP/AMOCO	X	X		
EXXON/MOBIL	ITM	(X)		UTM 75%
SHELL		(X)		
VELA	X			
TOTAL	X	X		
STATOIL	X		X(>20years)	
PETROBRAS	X		X	
PETRONAS	X	X	X	
REPSOL	X		X (as from 2006)	
FORTUM	X		X(>20years)	
GAS NATURAL	X	X		LNG

- It is not DNV, but the charterers who ultimately decide the technical acceptance criteria for a vessel.
- It is DNV's experience that requirements change over time, and that the trend is consistent towards stricter requirements.
- Some variations between Oil Majors exist, but general acceptance criteria are similar

# Typical market requirements

- CAP is required for oil, chemical and LPG vessels above 20,000 dwt and older than 15 years or LNG vessels older than 20 years.
- CAP for the former set of vessels should also include a simplified fatigue analysis.
- The acceptable overall CAP rating for the vessel is 2 or better.

- **Substantial corrosion** within the cargo tank length or ballast space is not accepted.
- **Poor coating** conditions will require a plan from the owners for upgrading and confirmation on completion.
- Tank internal **inspections** of areas where there are potential **fatigue** hot spots should not exceed 12 months for ballast spaces and 30 months for cargo tanks, high fatigue sensitivities will increase the frequency of inspection.
- Note: It is difficult to obtain explicit requirements from the Oil Majors on this. The above are DNV's interpretations.



- Alt. 1) Minimum overall CAP 2.
- Alt. 2) Minimum overall CAP 2, and
  - no substantial corrosion.
- Alt. 3) Minimum overall CAP 2, and
  - no substantial corrosion.
  - no local visual or UTM rating 3.
- Alt. 4) Minimum overall CAP 2, and
  - no substantial corrosion.
  - no local visual or UTM rating 3.
  - no POOR coating (coating rating 3).
- Alt. 5) Overall CAP 1 (no single 3 rating of any item allowed and average of rated items is CAP 1)

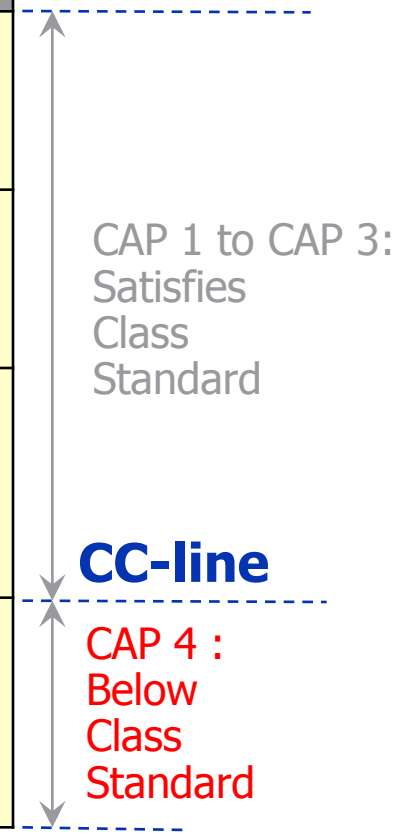
- To ensure general acceptance by the end users, alternative 4 is recommended.
  - Alt. 4) Minimum overall CAP 2, and
    - no substantial corrosion.
    - no local visual or UTM rating 3.
    - no POOR coating (coating rating 3).
- When deciding on CAP rating objectives it is advisable to take into account also the **technical condition** of the vessel at the start of the process, as well as the time and money intended spent on possible **upgrading**.
- It should be noted that a specific CAP rating with DNV cannot be ordered. It has to be justified based on the technical condition of the ship.
- CAP 1 overall may be a commercial advantage, but is generally not a requirement from end users.

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# Rating scale



CAP Rating	Condition	Definition
CAP 1	Very good	Superficial reductions from “as new” or current rule scantlings. No maintenance or repair required.
CAP 2	Good	Deficiencies of a minor nature not requiring correction or repairs and/or found to have thickness significantly above class limits.
CAP 3	Satisfactory	Deficiencies, which do not require immediate corrective actions, or found to have thickness, although generally above class renewal levels, with substantial corrosion.
CAP 4	Poor	Deficiencies which may affect the ship’s potential to remain in class, or found to have, in some areas, thickness which are at or below the class renewal acceptance criteria.



# Rating scale - coating

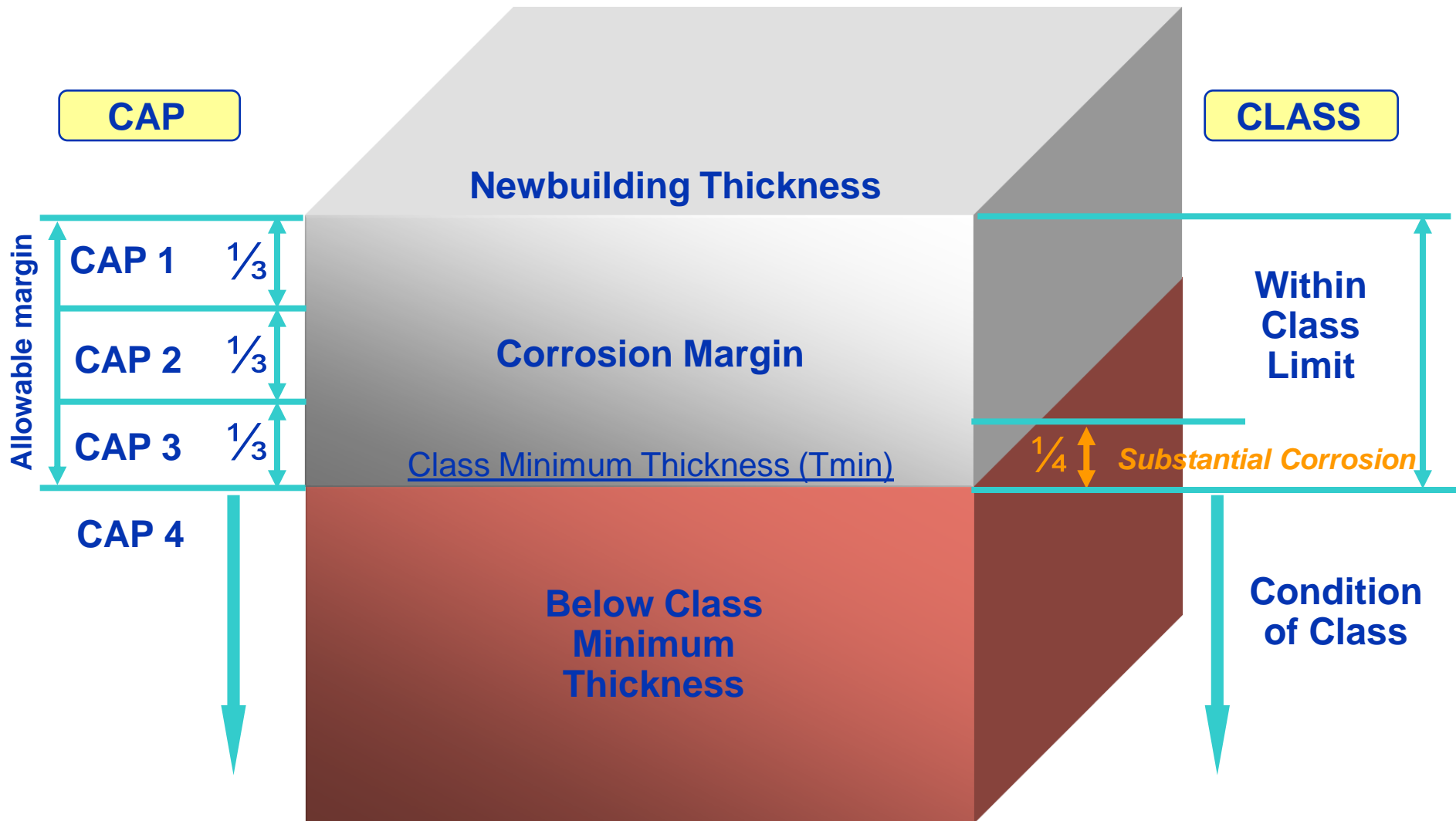
CAP Rating	Condition	Definition
CAP 1	GOOD	Condition with only minor spot rusting.
CAP 2	FAIR	Condition with local breakdown at edges of stiffeners and weld connections and/or light rusting over 20% or more of areas under consideration, but less than as defined for POOR condition.
CAP 3	POOR	No coating or condition with general breakdown of coating over 20% or more of areas or hard scale at 10% or more of areas under consideration.
CAP 4	-	N/A

Coating Condition – As defined in DNV Rules Pt.7

- Ballast tanks.
- Cargo tanks and void spaces.
- External structure (main deck, ship sides and bottom).
- Structural strength.

- The rating of each main structural element is based on the following input:
  - **Visual inspection** to establish extent of local corrosion and defects, and to give a visual impression of the overall condition.
  - Analysis of thickness measurements (**UTM**) to establish extent of general corrosion.
  - Extent and condition of **coating** for segregated ballast tanks.

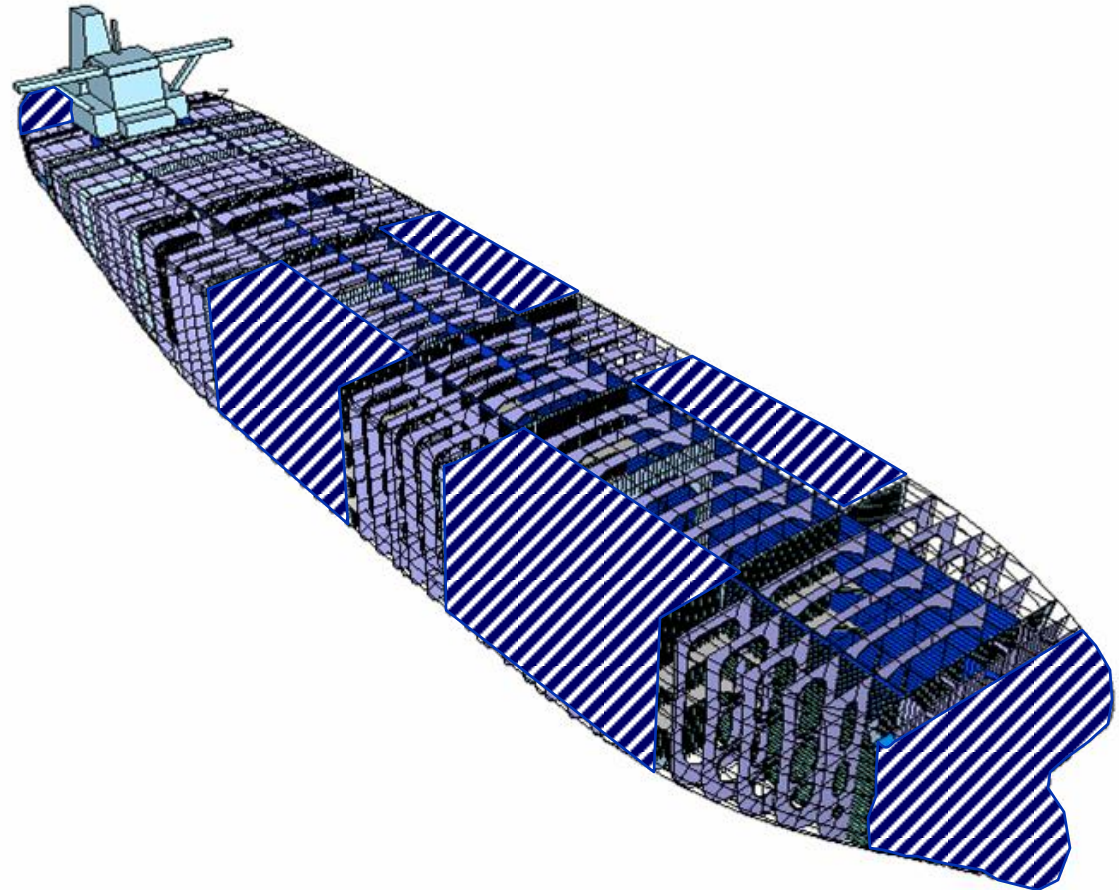
# Rating principle



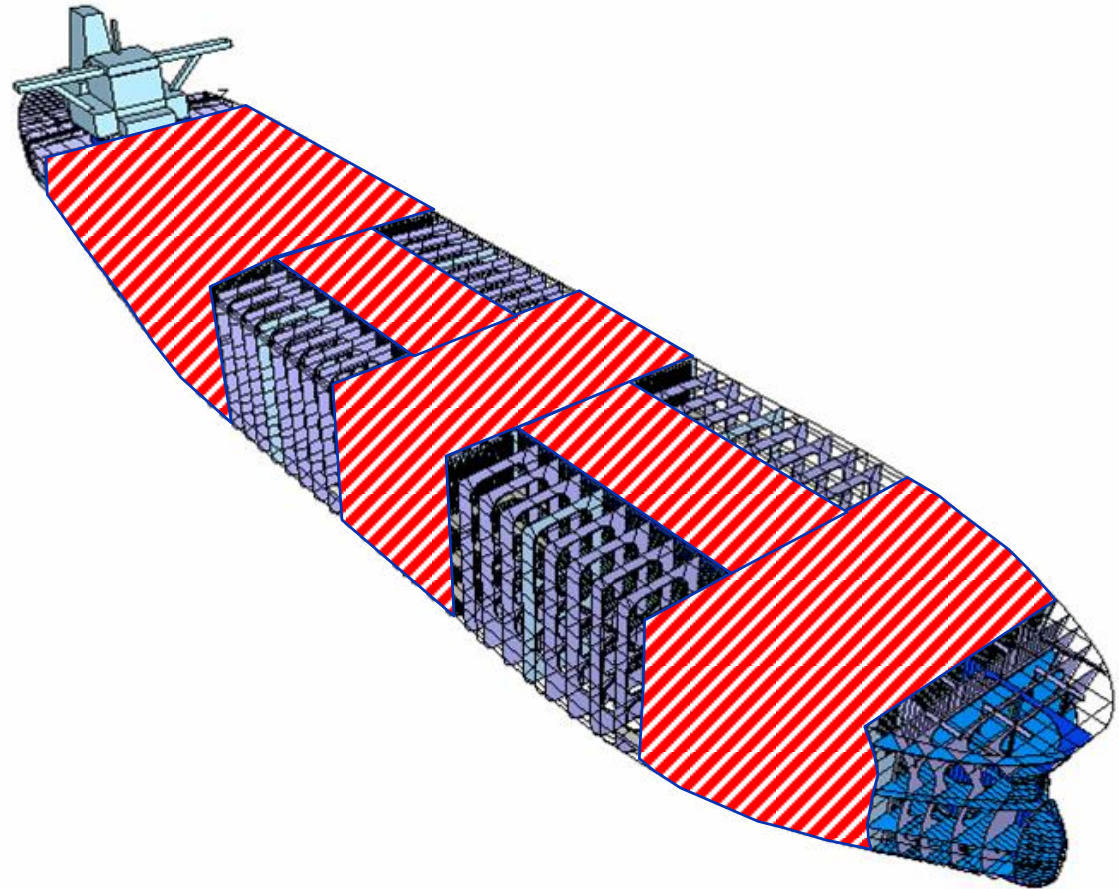


# Ballast tanks

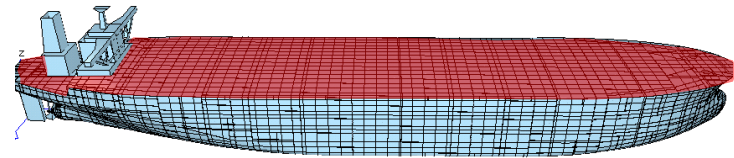
- UTM
- Visual condition
- Coating



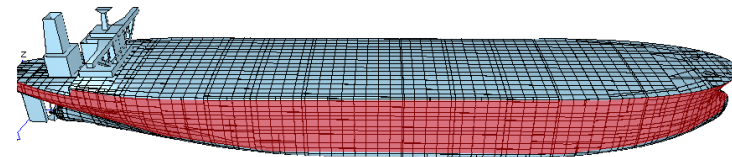
- UTM
- Visual condition
- Coating described, but not rated



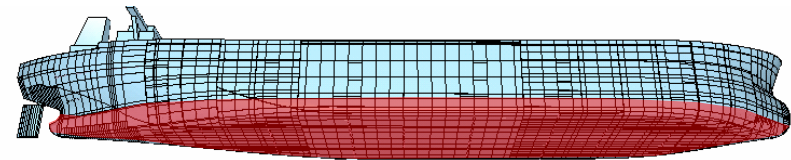
- UTM
- Visual condition
- Coating described, but not rated



**Maindeck**

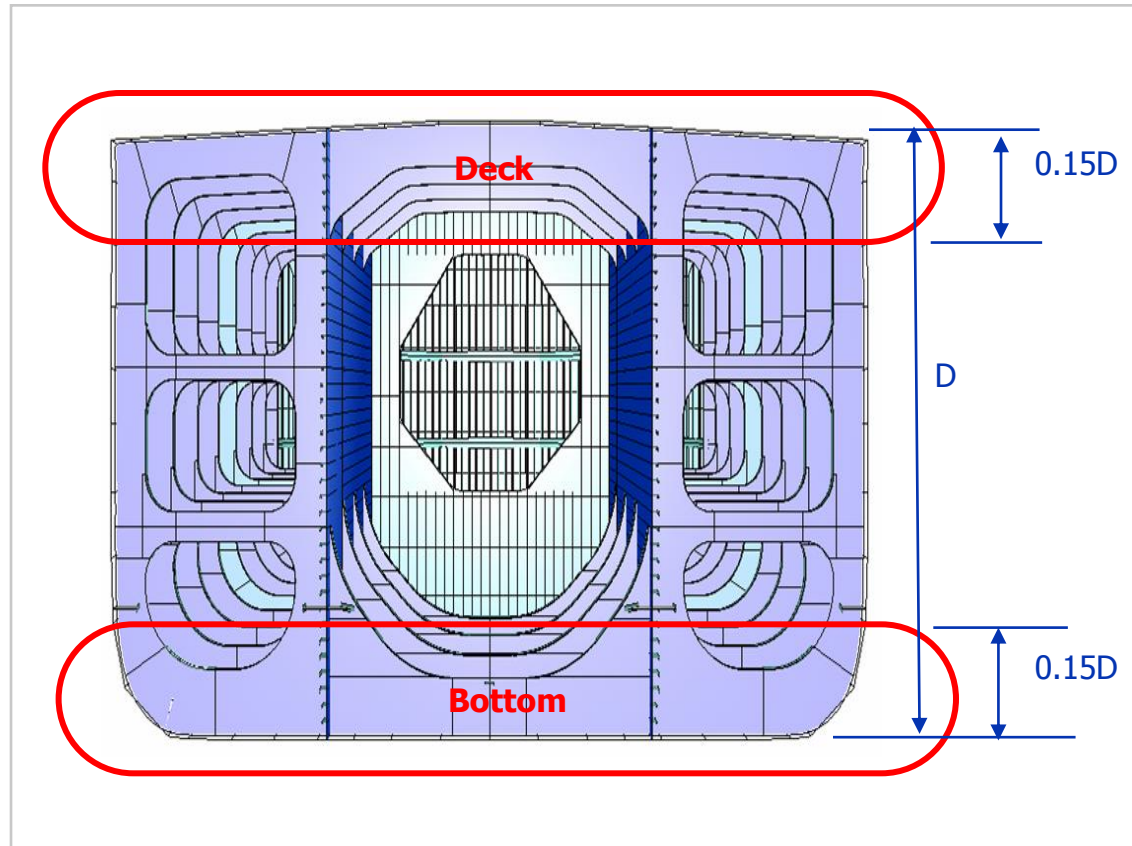


**Shipside**

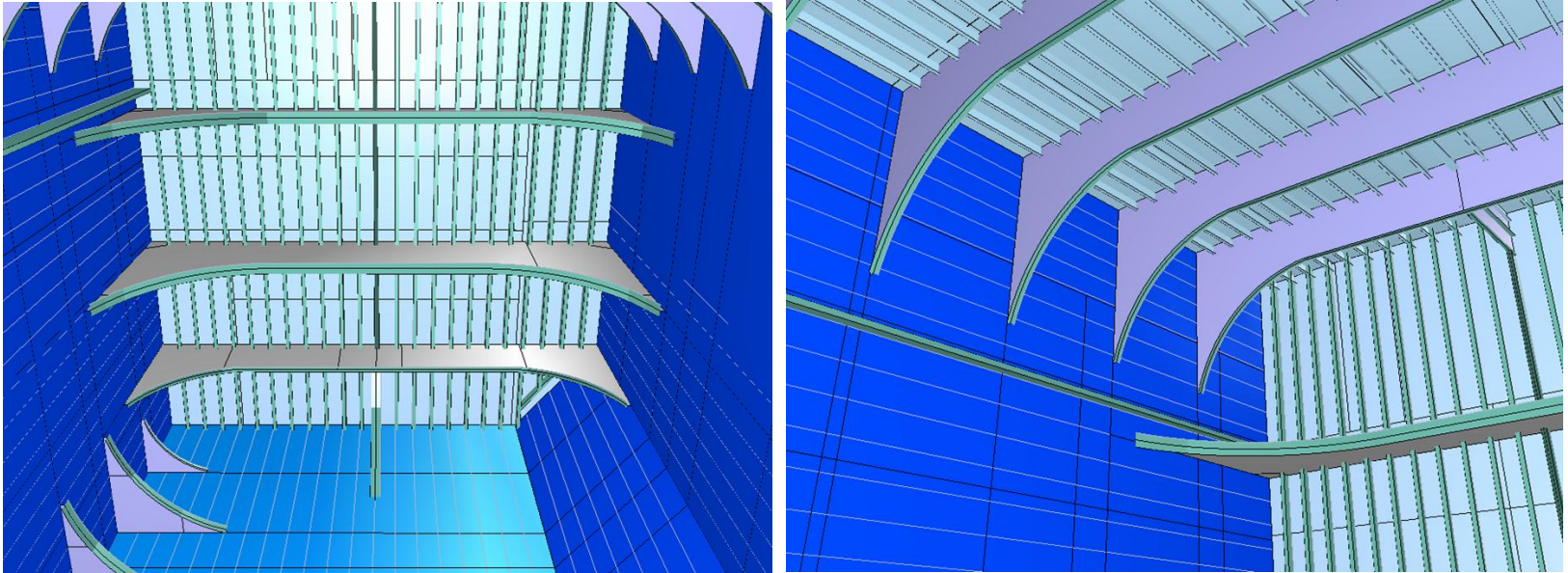


**Bottom**

- Section Modulus
- Buckling Capacity of Deck and Bottom Panels



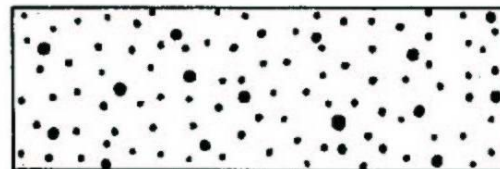
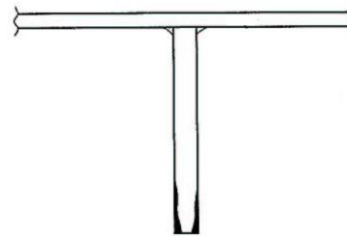
Buckling capacity is calculated using DNV's program PULS (Panel Ultimate Limit State)



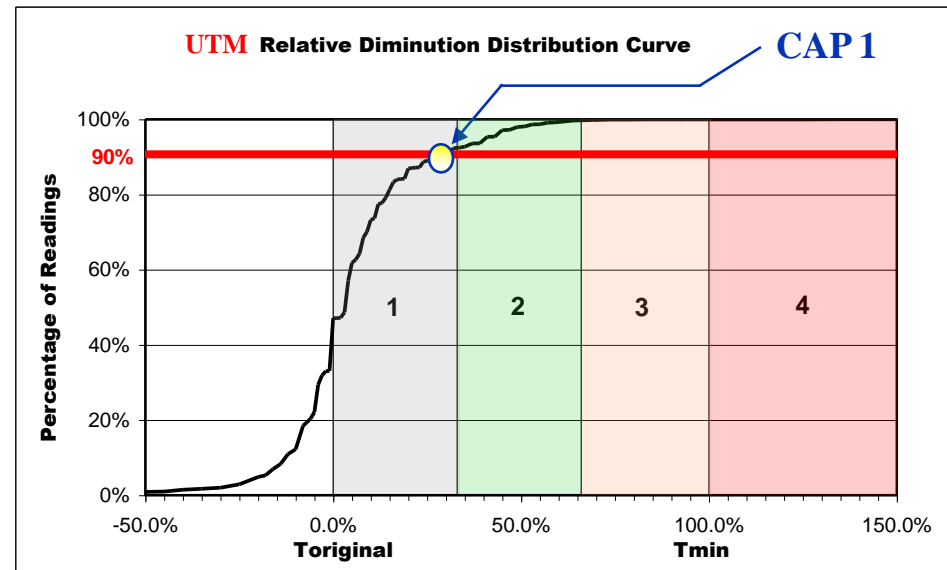
- Each tank/space is rated.
- The rating is boundary oriented:
  - Deckhead, side, bottom, longitudinal / transverse bulkheads and internal structure is rated separately.

# Visual condition rating

- Visual
  - Edge corrosion, incl. openings
  - Grooving
  - Pitting
  - Indents
  - Any other local defect (e.g. Crack, buckling)
- UTM
- Coating



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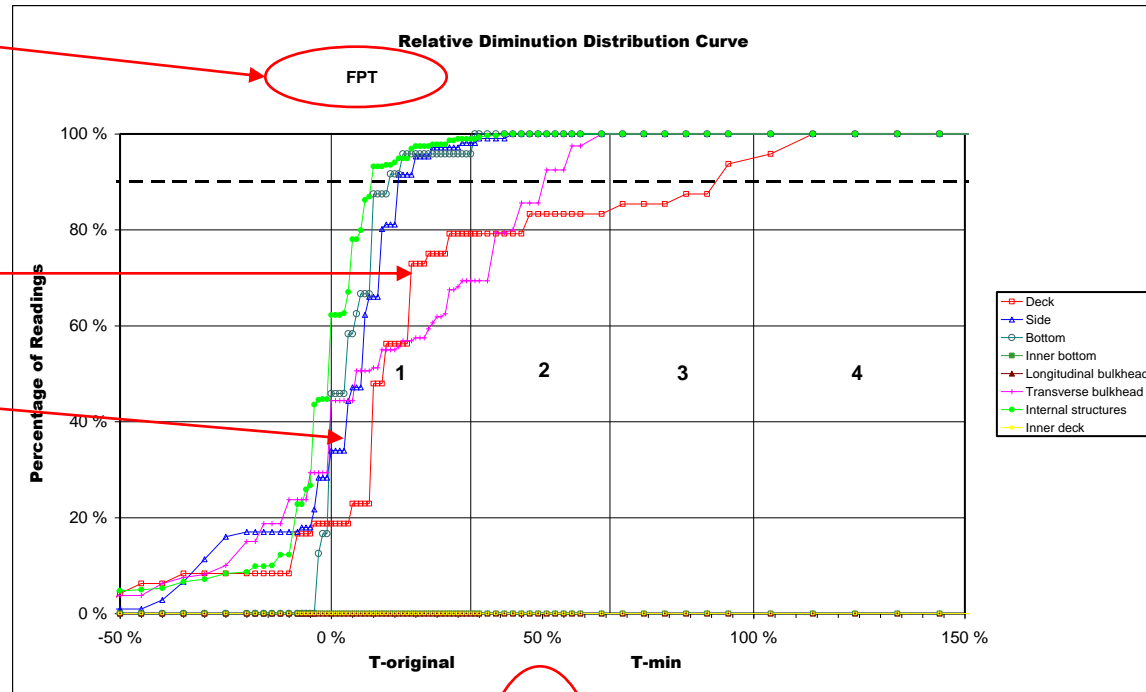


# UTM based rating

For every Tank/Space :

Distribution curves for all Main Structural Elements:

- Deck
- Side
- Bottom
- Inner bottom
- Inner deck
- Longitudinal bulkhead
- Transverse bulkhead
- Internal structures



Main structural element	<i>UTM</i>	<i>Visual</i>	<i>Coating</i>	<i>Overall</i>
Deckhead	3	2	2	2,3
Side	1	1	1	1,0
Bottom	1	1	1	1,0
Transverse bulkhead	2	2	2	2,0
Internal structure	1	2	2	1,7
Tank average rating				1,6
<b>Tank overall rating</b>				<b>2</b>

(as applicable for each tank/space)

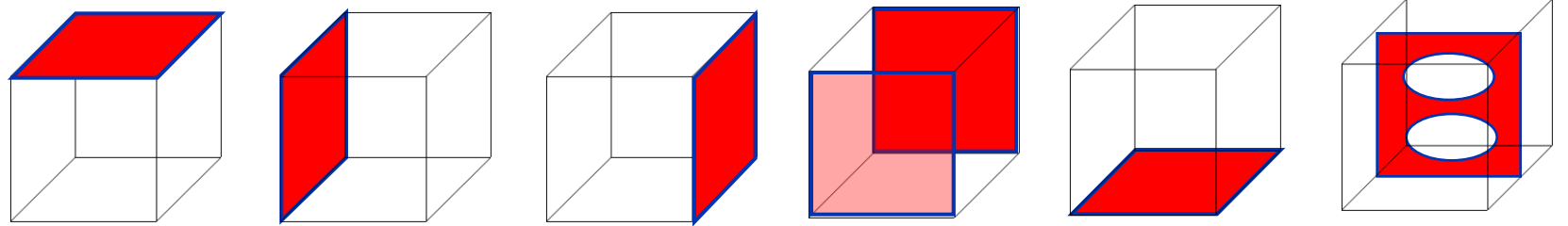


- Visual
  - Edge corrosion, incl. openings
  - Grooving
  - Pitting
  - Indents
  - Any other local defect (e.g. Crack, buckling)
- UTM
- Coating



**Coating rating only for  
Ballast Tanks**

# Ballast & Cargo tanks



Deckhead

Side

Longi Bhd

Tran. Bhd

Bottom

Internal str.

overall rating  
e.g. 1.7

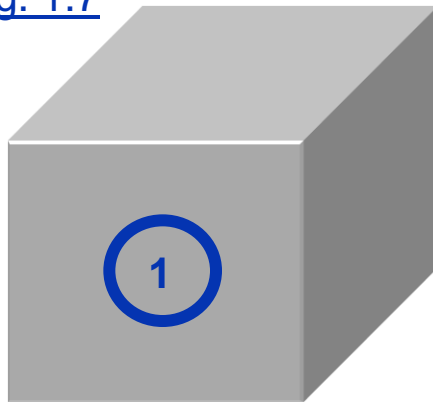
1.0

2.0

1.3

1.0

1.0



**Tank Overall Rating**



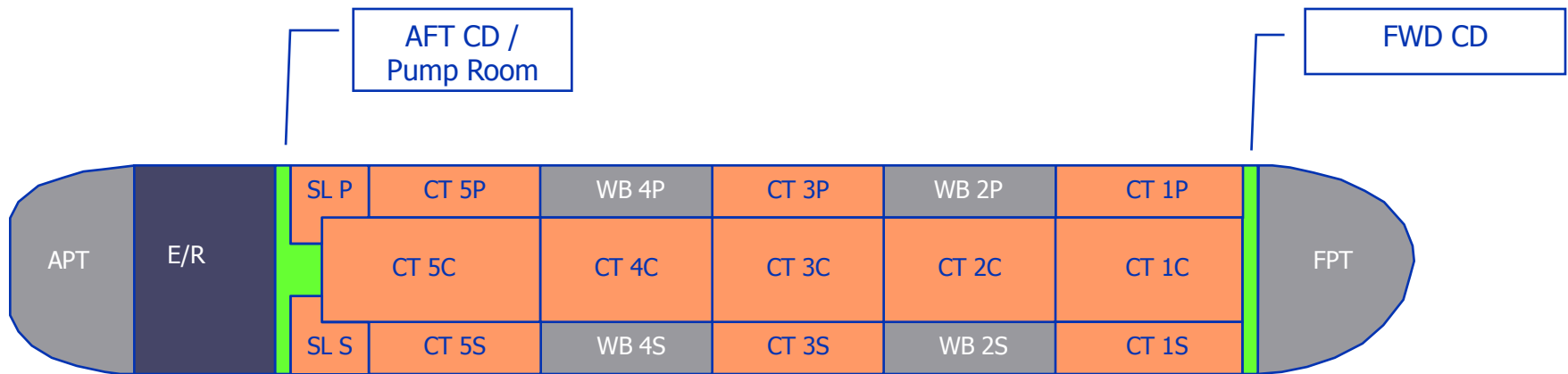
Structural element	<i>UTM</i>	<i>Visual</i>	<i>Coating</i>	<i>Overall</i>
Deckhead	2	2	1	1.7
Side	1	1	1	1.0
Longitudinal Bulkhead	2	2	2	2.0
Transverse bulkheads	2	1	1	1.3
Bottom	1	1	1	1.0
Internal structure	1	1	1	1.0
Tank average rating				1.3
<b>Tank overall rating</b>				<b>1</b>

All tanks / spaces are rated accordingly

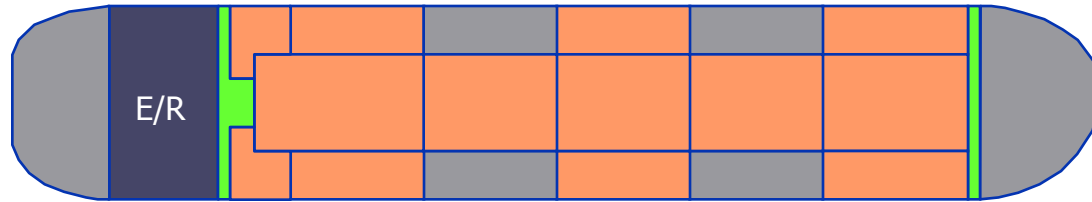
# Ballast & Cargo tanks

## Tank rating

### Example: Single skin oil tanker



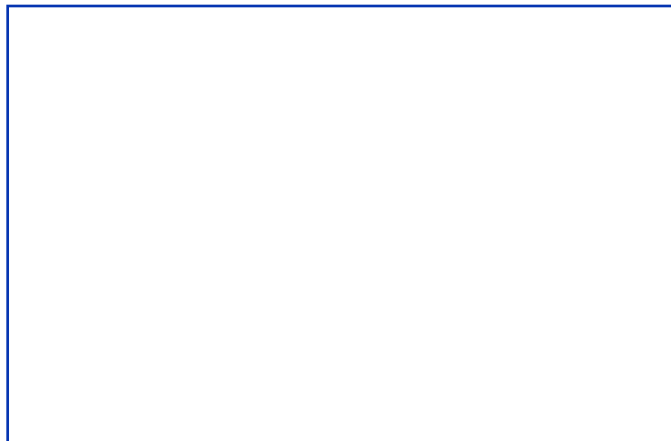
# Ballast & Cargo tanks



## Rating Cargo Tanks & Cofferdams

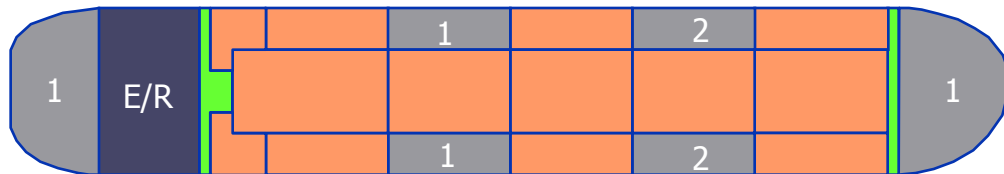


## Rating Ballast Tanks



# Ballast tanks – overall rating

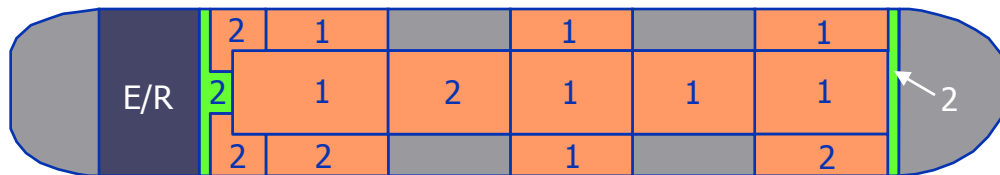
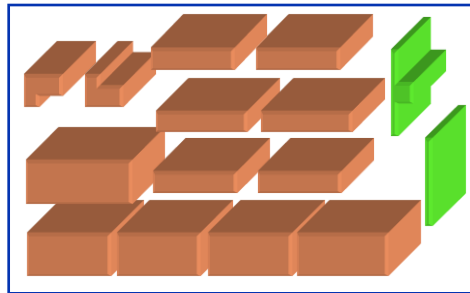
Ballast Tanks



Ballast Tanks	Rating
Forepeak	1
Aft peak	1
Ballast WingTank 2P	2
Ballast Wing Tank 2S	2
Ballast Wing Tank 4P	1
Ballast Wing Tank 4S	1
Ballast tanks average rating	1.3
<b>Ballast tanks overall rating</b>	<b>1</b>

# Cargo tanks – overall rating

Cargo Tanks & Cofferdams



Cargo Tanks, voids, etc.	Rating
Cargo Center Tank 1C	1
Cargo Center Tank 2C	1
Cargo Center Tank 3C	1
Cargo Center Tank 4C	2
Cargo Center Tank 5C	1
Cargo Wing Tank 1P	1
Cargo Wing Tank 1S	2
Cargo Wing Tank 3P	1
Cargo Wing Tank 3S	2
Slop Tank P	2
Slop Tank S	2
Forward Cofferdam	2
Aft Pump Room	2
Cargo tanks, voids, etc. average rating	1.5
<b>Cargo tanks, voids, etc. overall rating</b>	<b>2</b>

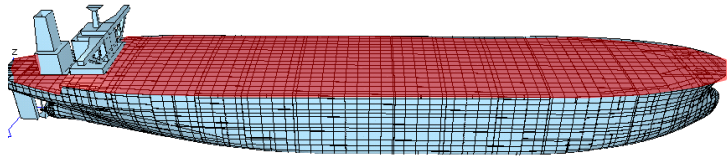
# External structure



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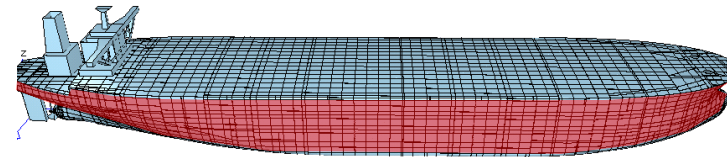


# External structure



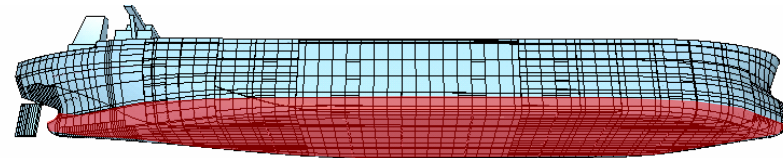
Maindeck

Structural element	UTM	Visual	Overall
Maindeck	1	1	1



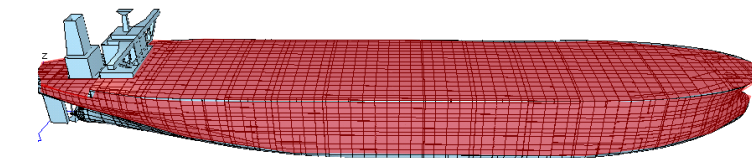
Shipside

Structural element	UTM	Visual	Overall
Shipside	1	2	2



Bottom

Structural element	UTM	Visual	Overall
Bottom	1	2	2



External Structure

External structure	Rating
Maindeck	1
Shipside	2
Bottom	2
<b>External structure average rating</b>	<b>1.7</b>
<b>External structure overall rating</b>	<b>2</b>

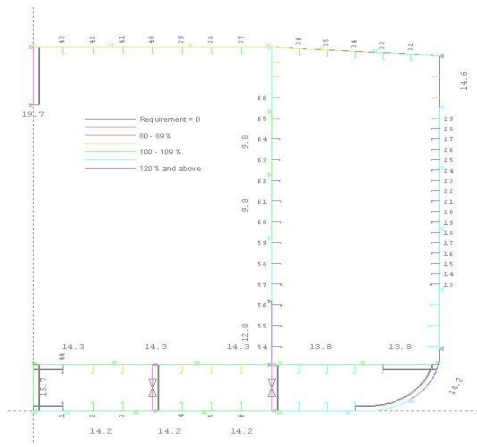
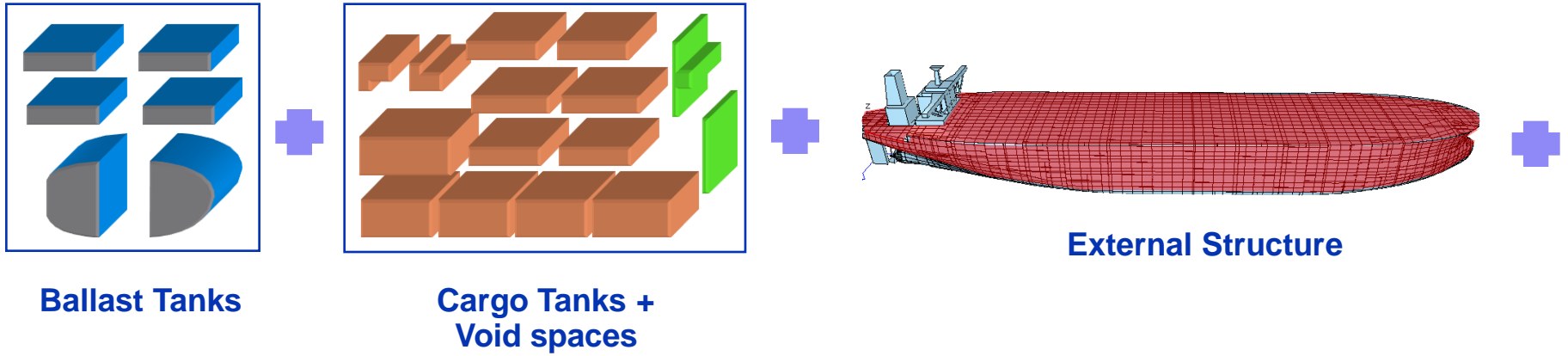


- Hull section modulus
- Buckling capacity

<b>Structural strength rating</b>	<b><i>Rating</i></b>
Hull section modulus rating	<i>1</i>
Buckling capacity	<i>2</i>
<b>Structural strength overall rating</b>	<b>2</b>

The lower rating governs the overall rating

# Vessel overall rating



Vessel Overall	Rating
Ballast tanks overall rating	1
Cargo tanks, voids, etc. overall rating	2
External structure overall rating	2
Structural strength overall rating	2
Vessel average rating	1,8
<b>Vessel overall rating</b>	<b>2</b>

# Vessel overall rating - Limitations

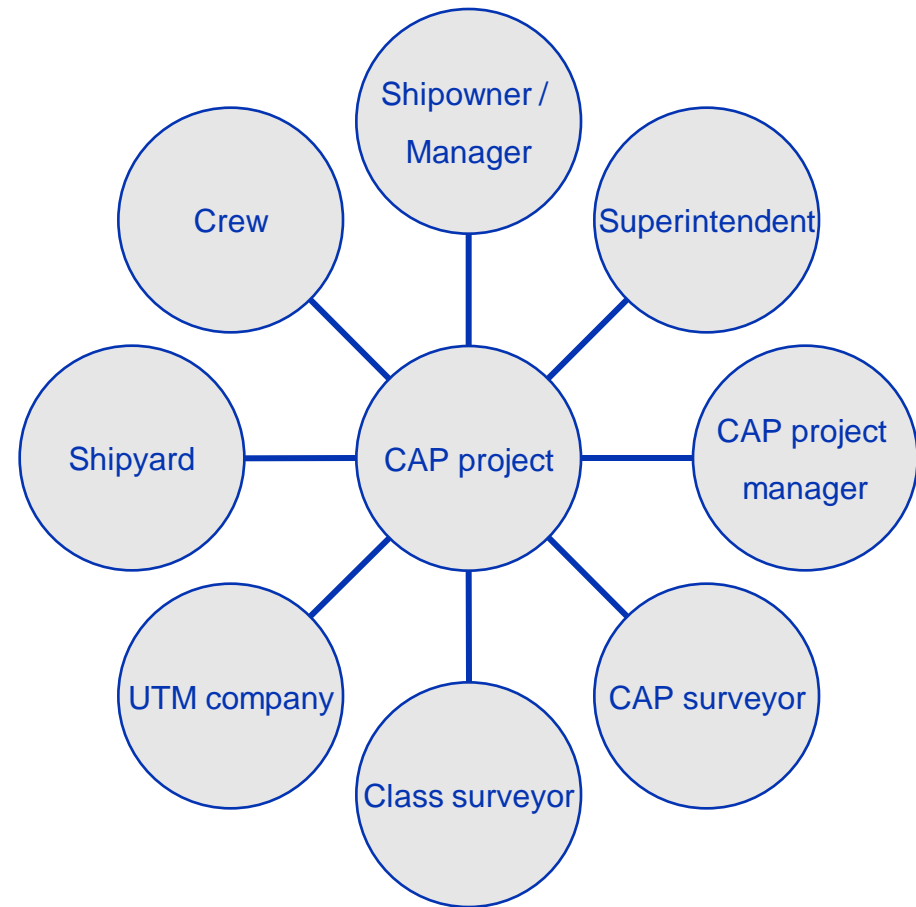
- A tank overall rating is 3 if *substantial corrosion* is found in any area of the tank.
  
- Each tank overall rating is not to be better than one grade above any part rating for the tank.
  - (UTM, visual or coating rating for any structural element in the tank)
  
- The vessel overall rating is not to be better than one grade above any part rating in the report.
  - (Strength, UTM, visual or coating rating for any structural element in any tank)
  
- The final rating is decided by DNV's CAP Rating Committee

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- **Practical Project Management**

# Phases of a CAP project

1. Request
2. Contract
3. Preliminary Strength Check
4. Minimum Thicknesses / CAP Thicknesses / Survey Panning Doc
5. Fatigue Assessment (Optional)
6. Kick-off meeting onboard
7. Inspection + UTM on board
8. Repairs / Upgrading + inspection and reporting of same
9. Issue Preliminary CAP Hull Declaration
10. UTM Analysis
11. Strength Analysis
12. Full Report
13. Rating Committee
14. Issue CAP Hull Declaration + Final Report

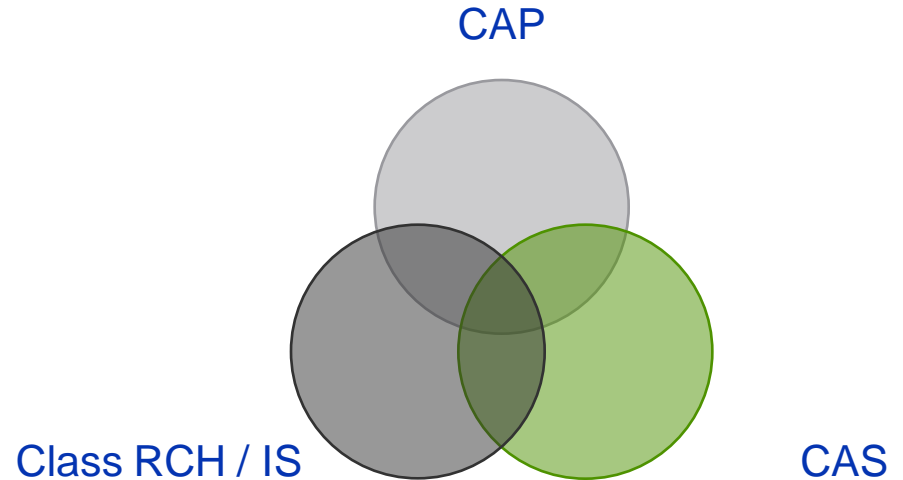
- A successful CAP project relies on co-operation from all the involved parties.
- Success also depends on feedback of information, and communication throughout the process.
- It is advisable to allocate appropriate resources towards the management of the project.



# Interface with class and flagstate

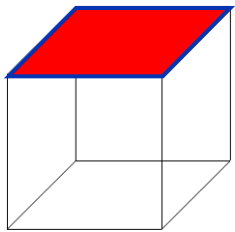
- Co-ordinating the different surveys applicable will save:

- Cost of the surveys
- Cost and time of repairs
- Downtime and off-hire

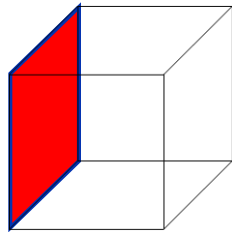


# Ultrasonic Thickness Measurements (UTM)

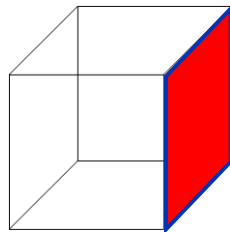
- Representative thickness data for all main structural elements in all tanks/spaces in the cargo area are required.



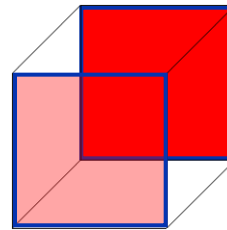
Deckhead



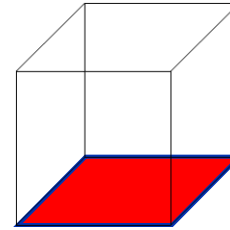
Side



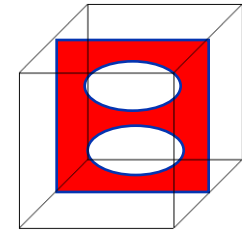
Longi Bhd



Tran. Bhd



Bottom



Internal str.

- The final thickness measurements report is to be updated after renewals



# Ultrasonic Thickness Measurements (UTM)



MANAGING RISK

- The thickness measurement data are to be reported using the DNV UTM Template.

THICKNESS MEASUREMENT REPORT															
Ship's Name:		Exampleship			Id.No: 12345		Report No: 9876		Legend:		Substantial corr Below class min				
Tank / Space	Tank/Space Reverse side	Structural Element	Element / Frame No.	Draw ref.	Orig thk. mm	Class min thk. mm	Gauged		Diminution				Renewed		Comments, Defects found
							Port mm	Stbd mm	Port mm %		Starboard mm %		Port mm	Stbd mm	
WT2		Longitudinal stiffener	102	1	12,50	8,00	8,30	10,00	4,20	33,6%	2,50	20,0%			
WT2		Longitudinal stiffener	103	2	12,50	8,00	9,00	11,90	3,50	28,0%	0,60	4,8%			
WT2		Longitudinal stiffener	104	3	12,50	8,00	10,00	12,00	2,50	20,0%	0,50	4,0%			
WT2		Longitudinal stiffener	105	4	12,50	8,00	10,20	12,30	2,30	18,4%	0,20	1,6%			
WT2		Longitudinal stiffener	106	5	12,50	8,00	10,00	12,40	2,50	20,0%	0,10	0,8%			
WT2	CT2	Bulkhead plating	A1	6	12,00	8,00	10,00	11,50	2,00	16,7%	0,50	4,2%			
WT2	CT2	Bulkhead plating	A1	7	12,00	8,00	11,40	11,80	0,60	5,0%	0,20	1,7%			
WT2	CT2	Bulkhead plating	A1	8	12,00	8,00	11,70	10,00	0,30	2,5%	2,00	16,7%			
WT2	CT2	Bulkhead plating	A1	9	12,00	8,00	11,80	11,50	0,20	1,7%	0,50	4,2%			
WT2	CT2	Bulkhead plating	A2	10	12,00	8,00	12,00	12,00	0,00	0,0%	0,00	0,0%			
WT2	CT2	Bulkhead plating	A2	11	12,00	8,00	12,00	12,00	0,00	0,0%	0,00	0,0%			
WT2	CT2	Bulkhead plating	A2	12	12,00	8,00	12,00	12,60	0,00	0,0%	0,00	0,0%			
WT2	CT2	Bulkhead plating	A2	13	12,00	8,00	11,80	11,80	0,20	1,7%	0,20	1,7%			
CT2	CT2	Centreline Bulkhead plating	P5	14	15,00	12,00	11,30	11,30	3,70	24,7%	3,70	24,7%			
CT2	CT2	Centreline Bulkhead plating	P6	15	15,00	12,00	13,00	13,00	2,00	13,3%	2,00	13,3%			

The specification, template and other supporting documents may be downloaded from <http://cap.dnv.com>

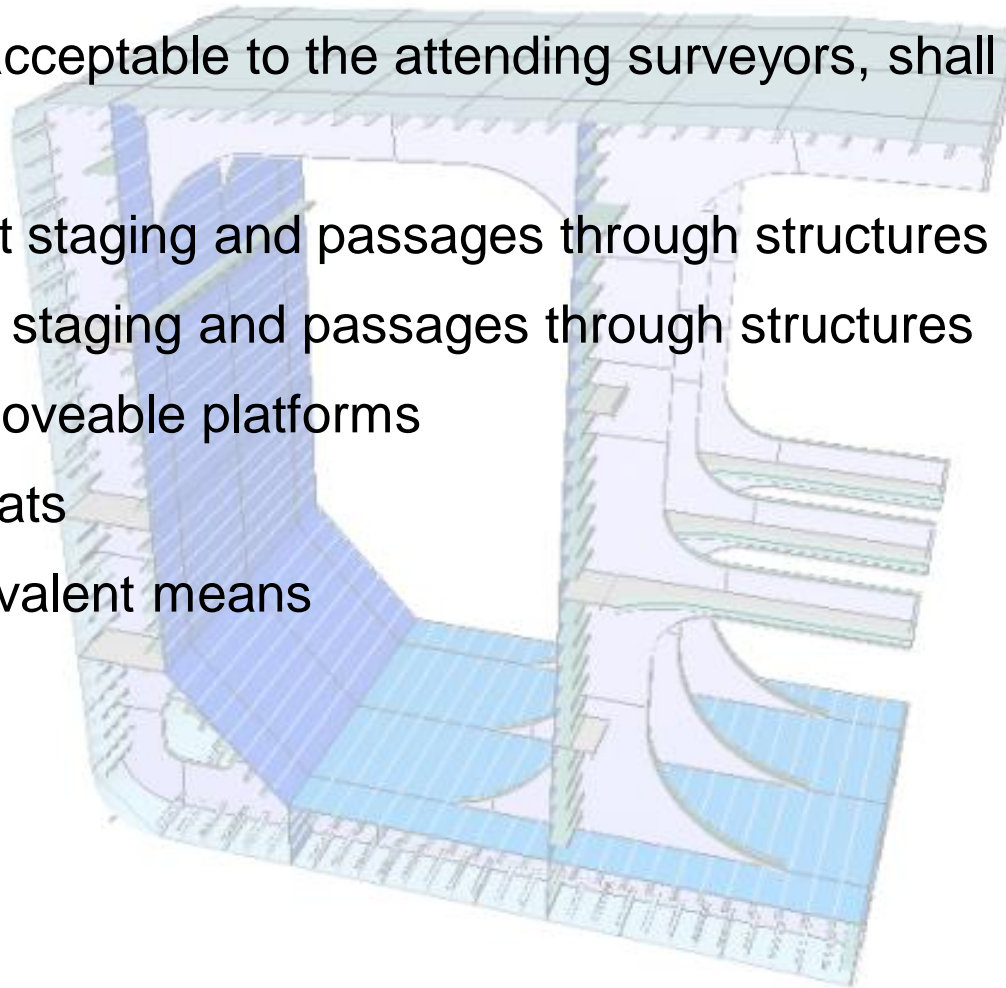
- According to the CAP contract, the client is responsible for providing
  - satisfactory safety and access for the CAP surveyors
  - suitable lighting
  - ventilation
  - cleanliness
  
- Means of access are to be ensured in accordance with recognised international standards and DNV instructions.
  
- Safe access for close-up inspection of all ballast tanks and access for overall inspection and/or close-up inspection of all other tanks and spaces in the cargo area are required for CAP Hull inspection.

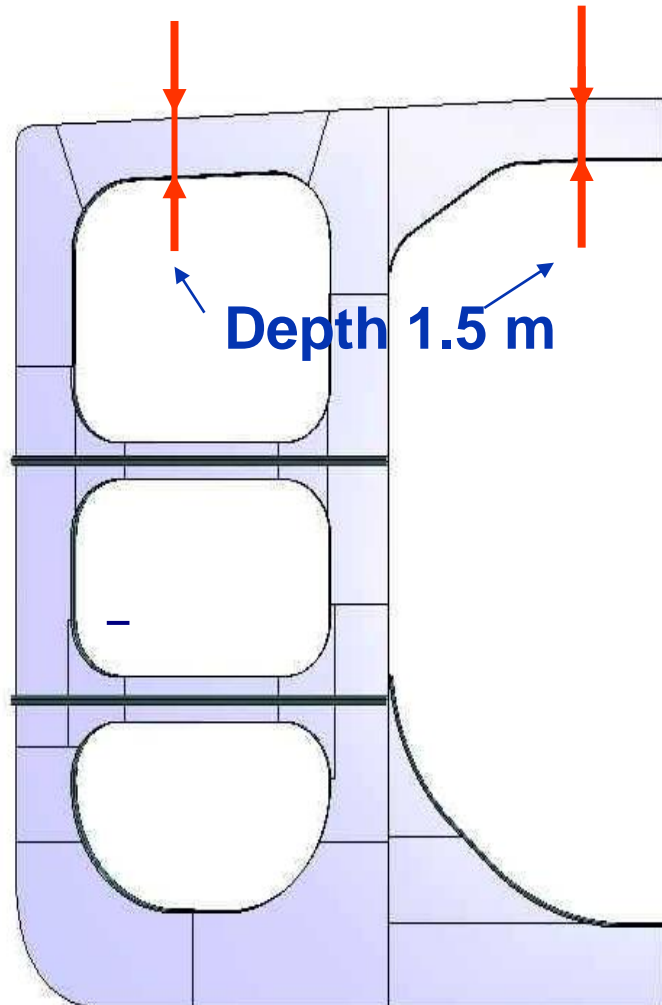
- Safe access and cleaning/de-scaling of the structure require preparations in advance of the CAP inspection.
- Insufficient provisions for access/cleaning/de-scaling may lead to an incomplete inspection and/or a conservative CAP rating due to uncertainty of the condition.
- Defects may also remain undetected.
- If insufficient information is obtained, no overall rating of the vessel can be given.

- Rafting must be carried out in calm waters. DNV's safety limit regarding peak-to-peak amplitude of the water surface is 0.5 m
- Professional standard rafts should be provided.
- Deballasting restrictions in MARPOL Special Areas may be a limiting factor that should be considered.
- If the close-up survey is to take place from staging it may only commence after completion of the staging.

For close-up examination, one or more of the following means for access, acceptable to the attending surveyors, shall be provided:

- permanent staging and passages through structures
- temporary staging and passages through structures
- lifts and moveable platforms
- rafts or boats
- other equivalent means





- Rafts or boats alone may be allowed for survey of the under deck areas within tanks if the depth of the webs is 1.5 m or less
- The revised IACS UR are harmonized with the requirements applicable for Condition Assessment Scheme (CAS)




If the depth of the webs is more than 1.5 m, rafts alone may be allowed if:

- The coating of under deck structure is in **GOOD** condition and there is no evidence of wastage.
- An escape route through the air space is provided.



# Execution of a CAP Inspection

- The CAP inspection will be started with a kick-off meeting onboard to:
  - familiarise all parties with CAP
  - clarify scope of inspection & UTM
  - clarify owner's objectives regarding CAP Hull Ratings.
  - highlight known defects or problem areas
  - discuss practical issues like sequence of inspections, safety, etc.

Item no.	Item discussed	Comments / to be followed up by:																							
	 <b>DNV</b> Section for CAP, ERS and Stability Consultancy Services (MTPNO 362)																								
	Condition Assessment Program - CAP M/T "VESSEL"																								
	Page 1 <b>MINUTES OF MEETING – KICK OFF AND CLOSING</b>																								
	<b><u>KICK-OFF MEETING</u></b>																								
	Date : DNV CAP Surveyor :  DNV Class Surveyor :  Owner Representatives :  UTM Company Representatives:	Agree and Sign:																							
1.	Owner's Objectives regarding CAP Hull Ratings: <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Min vessel overall rating</th> <th rowspan="2">Min individual tank rating</th> <th colspan="3">Min individual element rating</th> </tr> <tr> <th>UTM</th> <th>Visual</th> <th>Coating</th> </tr> </thead> <tbody> <tr> <td>○ 1</td> <td>○ 1</td> <td>○ 1</td> <td>○ 1</td> <td>○ 1</td> </tr> <tr> <td>○ 2</td> <td>○ 2</td> <td>○ 2</td> <td>○ 2</td> <td>○ 2</td> </tr> <tr> <td>○ 3</td> <td>○ 3</td> <td>○ 3</td> <td>○ 3</td> <td>○ 3</td> </tr> </tbody> </table> <p><u>Important Note:</u> The extent of upgrading / repairs is the responsibility of the Owners. Final ratings are subject to decision of DNV's CAP Rating Committee based on ship's strength and reported ship's condition in consideration with repairs/upgrading. The above ratings are not to be interpreted as guaranteed ratings from DNV.</p>	Min vessel overall rating	Min individual tank rating	Min individual element rating			UTM	Visual	Coating	○ 1	○ 1	○ 1	○ 1	○ 1	○ 2	○ 2	○ 2	○ 2	○ 2	○ 3	○ 3	○ 3	○ 3	○ 3	
Min vessel overall rating	Min individual tank rating			Min individual element rating																					
		UTM	Visual	Coating																					
○ 1	○ 1	○ 1	○ 1	○ 1																					
○ 2	○ 2	○ 2	○ 2	○ 2																					
○ 3	○ 3	○ 3	○ 3	○ 3																					
2.	<u>Scope of CAP Hull inspection</u> including extent of close-up survey (based on results from fatigue assessment) was explained by CAP surveyor and was agreed by Owner's representatives, attending ship's officers and UTM company representatives.	☑ OK																							
3.	<u>Scope of UTM</u> was explained by CAP surveyor and was agreed by UTM company																								



- Based on the latest feedback from Oil Majors, it seems advisable to avoid any local CAP 3 ratings:

Owner's Objectives regarding CAP Hull Ratings:

Min vessel overall rating	Min individual tank rating	Min individual element rating		
		UTM	Visual	Coating
<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1	<input type="radio"/> 1
<input checked="" type="radio"/> 2	<input checked="" type="radio"/> 2	<input checked="" type="radio"/> 2	<input checked="" type="radio"/> 2	<input checked="" type="radio"/> 2
<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3	<input type="radio"/> 3

For advising the client how to upgrade areas within acceptable class limits, but below the target rating, DNV uses the CAP Upgrade Report.

## ■ Close-up inspection:

- All web frame rings in all ballast tanks (see note 1)
- All web frame rings in a cargo wing tank (see note 1 and 4)
- Web frame rings in each remaining cargo wing tank (see note 1, 3 and 4)
- All transverse bulkheads in all cargo and ballast tanks (see note 2 and 4)
- Deck and bottom transverses including adjacent structural members in each cargo centre tank (see note 3 and 4)
- All cofferdams in cargo area
- Aft peak tank and fore peak tank
- External structure, including dry dock inspection of bottom (see note 5)
- Fatigue critical details, i.e. details identified in fatigue assessment report (if applicable) with fatigue life expectancy less than the current age of the vessel
- Possible problem areas as identified during inspection or in the Hull Survey Programme (see note 6)

### Notes:

1. Complete transverse web frame ring including adjacent structural members
2. Complete transverse bulkhead, including girder and stiffener system in adjacent members
3. 30 % (rounded up the next whole integer)
4. Valid for single hull oil tankers, ore/oil ships only. For other vessels, 30-50 % of the cargo tanks are to be completely close-up inspected. Alternatively, for chemical tankers all cargo tanks may be partially close-up inspected (e.g. from ladders, stringers and scaffolding) provided sufficient representative areas are accessible for close-up inspection.
5. An underwater inspection in the presence of a CAP surveyor may be accepted on a case-by-case basis
6. If design related fatigue cracks are found, all similar locations are to be close-up inspected

## ■ Overall inspection:

- All remaining tanks in cargo area
- Deep tanks
- All voids and holds in gas tankers, including tank support structures (see note 7)

### Notes:

7. If design related fatigue cracks are found, all similar locations are to be close-up inspected



# CAP Defects List



- Only items considered to represent a Condition of Class (CC).
- The items on the list will be converted to one CC at the end of the CAP inspection, referring to the CAP Defects List.


DET NORSKE VERITAS CAP DEFECTS LIST			
Name of vessel <b>Exemplship</b>		Name of owner <b>SHIPOWNERCO</b>	DNV id. no. <b>12345</b>
		Date <b>2005-09-14</b>	Rev. 0.0
<p><b>Scope of Survey</b></p> <p>This is to confirm that the undersigned surveyor was requested to carry out the following inspections:                      CAP Hull inspection.                      CAP Hull repair inspection of previously reported deficiencies.                      Reference is made to CAP Deficiencies List dated 200Y-MM-DD.</p> <p><b>Outstanding items</b></p> <p>The following items are outstanding towards completion of the full scope of the CAP Hull inspection:                      Outstanding survey items                      Outstanding LITS</p>			
<p>The report lists all deficiencies found during the CAP survey. All items on the list may be converted to Conditions of Class (CC) at completion of the CAP survey.</p>			
Responsible Unit		Place of survey	Survey started
Surveyor's name		Surveyor's signature	
<small>                     If any person suffers loss or damage which is proved to have been caused by any negligence or omission of Det Norske Veritas, then Det Norske Veritas shall be liable in compensation to such person for the full amount of such loss or damage, however, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In the provision 'Det Norske Veritas' shall mean the Founder/Det Norske Veritas as well as its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.                 </small>			
<small>                     DET NORSKE VERITAS AS, VERITAVEI 1, N-1204 DRØKKVOR, TEL: INT. +47 47 27 96 00, TEL: RUS. +47 47 27 96 11                      Issue: June 2004                 </small>			

# CAP Upgrade Report



MANAGING RISK

- The CAP Upgrade Report identifies all main structural elements with proposed rating below the owner's target.
- The reason for rating an element accordingly is given.

		DET NORSKE VERITAS <b>CAP UPGRADE REPORT</b>		Rev. 0.0
		Name of vessel	Name of owner	DNV id. no.

The report lists all main structural elements that have been considered to be below the client's stated objectives regarding CAP ratings, as outlined in Minutes of Meeting dated **200y-mm-dd**

regarding CAP ratings, as outlined in Minutes of Meeting dated **200y-mm-dd**.

#### Conditions and limitations

This list has been assembled by DNV as assistance to the client towards obtaining his stated objectives regarding CAP ratings. The list has been assembled in good faith, and it is believed that upgrading of the vessel accordingly will lead to fulfilment of the objectives. However, it should be noted that the final ratings will be decided by DNV's CAP rating committee. A full description of the CAP hull rating methodology is available from <http://cap.dnv.com>.

In addition to any items on this list all structures identified to have thicknesses below the relevant CAP limit should be renewed.

Completion of the repairs is voluntary. All structural repairs are to be surveyed by DNV as outlined in "DNV Rules for Classification of Ships".

Tank / Structure	Description of condition or upgrading	Ref. previous CAP Upgrade Report
------------------	---------------------------------------	----------------------------------

DB2

Tank / Structure	Main struct. element	Description of condition
1.	Internal str.	Edges of manholes found thinned

Responsible Unit	Place of survey	Survey started	Survey completed
Surveyor's name		Surveyor's signature	

If any person suffers loss or damage which is proved to have been caused by any negligence or omission of Det Norske Veritas, then Det Norske Veritas shall only compensate to such person for the proved special loss or damage, provided the compensation shall not exceed an amount equal to the limit of the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 5 million. In the provision Det Norske Veritas shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

Det Norske Veritas AS, VERITASVEIEN 1, N-1322 HEBVIK, NORWAY. TEL: INT. +47 67 97 00 00, TELEFAX: +47 67 97 01 11  
Issue: June 2004

# CAP Hull Report

DET NORSKE VERITAS



M/T "VESSEL NAME", Report No: 200Y-0000, rev. 00

TECHNICAL REPORT

## 6.1.2 Fore Peak Tank

### Results from visual CAP inspection

The Internal structure was found in a satisfactory structural condition with thin edges of manholes and stringer openings.

Shipside longitudinal No. 15 was found cracked at starboard webframe No. 92.

### Photos


Location	Location
Location	Location

### Thickness measurements

### Rating

Structural element	UTM	Visual	Coating	Overall
Deckhead				-
Side		1		-
Bottom				-
Transverse bulkhead				-
Internal structure		3		-
Tank average rating				-
Tank overall rating				-

**DET NORSKE VERITAS**  
**CAP UPGRADE REPORT** Rev. 0.0 0



Name of vessel	Name of owner	DNV id. no.	Date
----------------	---------------	-------------	------

**Scope of Survey**  
This is to confirm that the undersigned surveyor was requested to carry out the following inspections:  
CAP Hull inspection.  
CAP Hull upgrade inspection.  
Reference is made to CAP Upgrade Report dated 200Y-MM-DD.

**General**  
The report lists all main structural elements that have been considered to be below the client's stated objectives regarding CAP ratings, as outlined in Minutes of Meeting dated 200y-mm-dd.

**Conditions and limitations**  
This list has been assembled by DNV as assistance to the client towards obtaining his stated objectives regarding CAP ratings, as outlined in Minutes of Meeting dated 200y-mm-dd. However, it should be noted that the final ratings will be decided by DNV's CAP rating committee. A full description of the CAP hull rating methodology is available from <http://cap.dnv.com>.

**Owner's Objectives regarding CAP Hull Ratings**

Min vessel overall rating	Min individual tank rating	Min individual element rating		
		UTM	Visual	Coating
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3

Responsible Unit	Place of survey	Survey started	Survey completed
Surveyor's name	Surveyor's signature		

If any owner suffers loss or damage which is proved to have been caused by any negligence or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such owner for the proved loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In the event Det Norske Veritas shall mean the Foundation Det Norske Veritas as well as its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.

DET NORSKE VERITAS AS, VERITASVEIEN 1, NO-2007 HØVING, NORWAY, TEL: +47 67 57 00 00, TELEFAX: +47 67 57 00 11, ISSUED: JUNE 2004

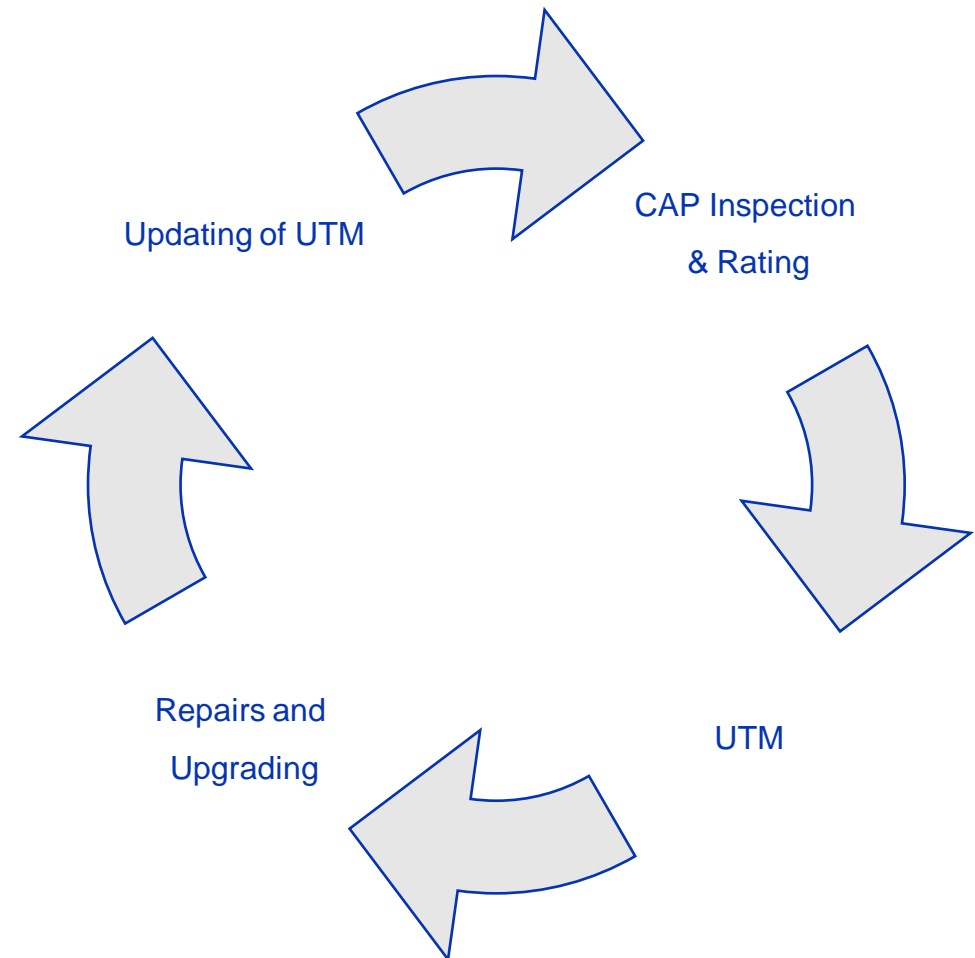
Owner's Objectives regarding CAP Hull Ratings

Min vessel overall rating	Min individual tank rating	Min individual element rating		
		UTM	Visual	Coating
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3

Responsible Unit	Place of survey	Survey started	Survey completed
Surveyor's name	Surveyor's signature		

# Completion and follow-up

- The CAP report describes:
  - the condition of the vessel at the time of the inspection (with photos)
  - defects found (with photos)
  - the repair of defects
  - any upgrading carried out
  - condition at the end of the process (with photos.)
- A CAP completion survey is normally required to document the final condition





# Updating of UTM after repairs



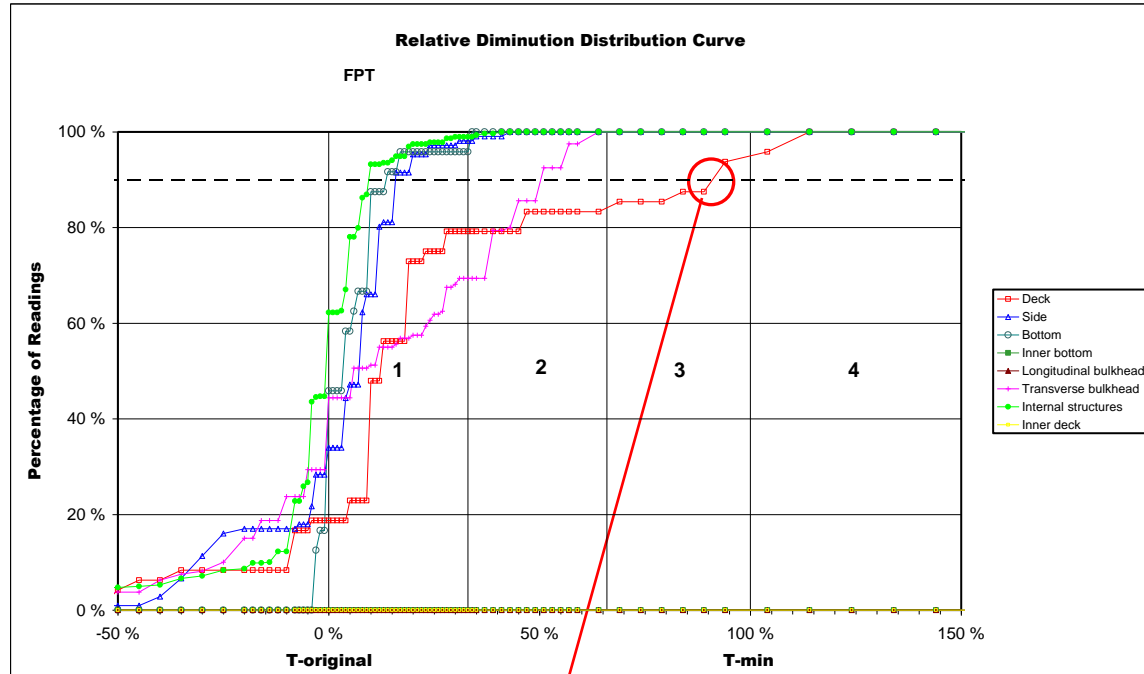
## ■ Example: Initial UTM report for deck in forepeak tank:

THICKNESS MEASUREMENT REPORT															
Ship's Name:		Exemplship			Id.No: 12345		Report No: UTMCO-4321			Legend: <b>Substantial corr</b> <b>Below class min</b>					
Tank / Space	Tank/Space Reverse side	Structural Element	Element / Frame No.	Draw ref.	Orig thk.	Class min thk.	Gauged		Diminution				Renewed		Comments, Defects found
							Port	Stbd	Port		Starboard		Port	Stbd	
						mm	mm	mm	mm	%	mm	%	mm	mm	
										-		-			
Deck	FPT	Deck Plating - centre plate - fwd	201~216	inboard	11,00	8,80	9,00	8,50	2,00	18,2%	2,50	22,7%			
Deck	FPT	Deck Plating - centre plate - fwd	201~216	outboard	11,00	8,80	9,20	8,80	1,80	16,4%	2,20	20,0%			
Deck	FPT	Deck Plating - centre plate - middle	201~216	middle	11,00	8,80	9,50	8,70	1,50	13,6%	2,30	20,9%			
Deck	FPT	Deck Plating - centre plate - aft	201~216	inboard	11,00	8,80	10,00	9,00	1,00	9,1%	2,00	18,2%			
Deck	FPT	Deck Plating - centre plate - aft	201~216	outboard	11,00	8,80	10,00	9,00	1,00	9,1%	2,00	18,2%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~216	inboard	11,00	8,80	11,20	11,20	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~216	outboard	11,00	8,80	11,20	11,10	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - middle	201~216	middle	11,00	8,80	10,80	11,20	0,20	1,8%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~216	inboard	11,00	8,80	10,50	10,60	0,50	4,5%	0,40	3,6%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~216	outboard	11,00	8,80	10,90	10,60	0,10	0,9%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - fwd	201~216	inboard	11,00	8,80	10,60	10,40	0,40	3,6%	0,60	5,5%			
Deck	FPT	Deck Plating - 2nd outboard - fwd	201~216	outboard	11,00	8,80	10,80	10,60	0,20	1,8%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - middle	201~216	middle	11,00	8,80	10,60	10,60	0,40	3,6%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - aft	201~216	inboard	11,00	8,80	10,60	10,80	0,40	3,6%	0,20	1,8%			
Deck	FPT	Deck Plating - 2nd outboard - aft	201~216	outboard	11,00	8,80	10,40	10,60	0,60	5,5%	0,40	3,6%			
Deck	FPT	Deck Plating - outboard - fwd	201~206	inboard	11,00	8,80	12,20	11,80	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - outboard - aft	201~206	inboard	11,00	8,80	12,10	12,00	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - centre plate - fwd	201~207	outboard	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - centre plate - aft	201~207	outboard	20,00	16,00	19,60	19,50	0,40	2,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~207	inboard	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~207	outboard	20,00	16,00	19,60	19,50	0,40	2,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - middle	201~207	middle	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~207	inboard	20,00	16,00	19,80	19,50	0,20	1,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~207	outboard	20,00	16,00	19,50	19,60	0,50	2,5%	0,40	2,0%			

# Updating of UTM after repairs

## ■ Example:

- Initial UTM analysis
- and rating for FPT



Main structural element	UTM	Visual	Coating	Overall
Deckhead	3	2	2	2,3
Side	1	1	1	1,0
Bottom	1	1	1	1,0
Transverse bulkhead	2	2	2	2,0
Internal structure	1	2	2	1,7
Tank average rating				1,6
<b>Tank overall rating</b>				<b>2</b>

# Updating of UTM after repairs



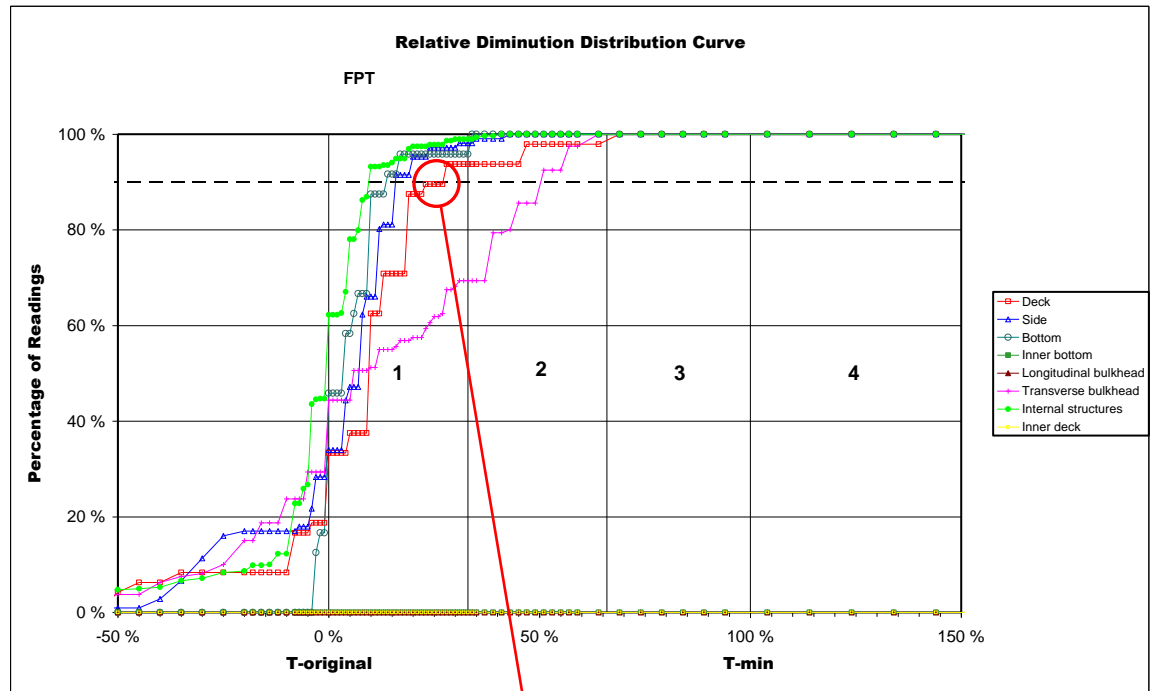
- Example: Updated UTM report for deck in forepeak tank:

THICKNESS MEASUREMENT REPORT															
Ship's Name:		Exampleship			Id.No: 12345		Report No: UTMCO-4321			Legend: <b>Substantial corr</b> <b>Below class min</b>					
Tank / Space	Tank/Space Reverse side	Structural Element	Element / Frame No.	Draw ref.	Orig thk.	Class min thk.	Gauged		Diminution				Renewed		Comments, Defects found
							Port	Stbd	Port		Starboard		Port	Stbd	
						mm	mm	mm	mm	%	mm	%	mm	mm	
Deck	FPT	Deck Plating - centre plate - fwd	201~216	inboard	11,00	8,80	9,00	8,50	2,00	18,2%	2,50	22,7%	11,00	11,00	
Deck	FPT	Deck Plating - centre plate - fwd	201~216	outboard	11,00	8,80	9,20	8,80	1,80	16,4%	2,20	20,0%	11,00	11,00	
Deck	FPT	Deck Plating - centre plate - middle	201~216	middle	11,00	8,80	9,50	8,70	1,50	13,6%	2,30	20,9%		11,00	
Deck	FPT	Deck Plating - centre plate - aft	201~216	inboard	11,00	8,80	10,00	9,00	1,00	9,1%	2,00	18,2%		11,00	
Deck	FPT	Deck Plating - centre plate - aft	201~216	outboard	11,00	8,80	10,00	9,00	1,00	9,1%	2,00	18,2%		11,00	
Deck	FPT	Deck Plating - 1st outboard - fwd	201~216	inboard	11,00	8,80	11,20	11,20	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~216	outboard	11,00	8,80	11,20	11,10	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - middle	201~216	middle	11,00	8,80	10,80	11,20	0,20	1,8%	0,00	0,0%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~216	inboard	11,00	8,80	10,50	10,60	0,50	4,5%	0,40	3,6%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~216	outboard	11,00	8,80	10,90	10,60	0,10	0,9%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - fwd	201~216	inboard	11,00	8,80	10,60	10,40	0,40	3,6%	0,60	5,5%			
Deck	FPT	Deck Plating - 2nd outboard - fwd	201~216	outboard	11,00	8,80	10,80	10,60	0,20	1,8%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - middle	201~216	middle	11,00	8,80	10,60	10,60	0,40	3,6%	0,40	3,6%			
Deck	FPT	Deck Plating - 2nd outboard - aft	201~216	inboard	11,00	8,80	10,60	10,80	0,40	3,6%	0,20	1,8%			
Deck	FPT	Deck Plating - 2nd outboard - aft	201~216	outboard	11,00	8,80	10,40	10,60	0,60	5,5%	0,40	3,6%			
Deck	FPT	Deck Plating - outboard - fwd	201~206	inboard	11,00	8,80	12,20	11,80	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - outboard - aft	201~206	inboard	11,00	8,80	12,10	12,00	0,00	0,0%	0,00	0,0%			
Deck	FPT	Deck Plating - centre plate - fwd	201~207	outboard	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - centre plate - aft	201~207	outboard	20,00	16,00	19,60	19,50	0,40	2,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~207	inboard	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - 1st outboard - fwd	201~207	outboard	20,00	16,00	19,60	19,50	0,40	2,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - middle	201~207	middle	20,00	16,00	19,60	19,60	0,40	2,0%	0,40	2,0%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~207	inboard	20,00	16,00	19,80	19,50	0,20	1,0%	0,50	2,5%			
Deck	FPT	Deck Plating - 1st outboard - aft	201~207	outboard	20,00	16,00	19,50	19,60	0,50	2,5%	0,40	2,0%			

# Updating of UTM after repairs

## ■ Example:

- Updated UTM analysis
- and rating for FPT



Main structural element	<i>UTM</i>	<i>Visual</i>	<i>Coating</i>	<i>Overall</i>
Deckhead	1	2	2	1,7
Side	1	1	1	1,0
Bottom	1	1	1	1,0
Transverse bulkhead	2	2	2	2,0
Internal structure	1	2	2	1,7
Tank average rating				1,5
<b>Tank overall rating</b>				<b>1</b>

# Completion and follow-up

DET NORSKE VERITAS

M/T "ExampleShip", Report No: 200Y-0000, rev. 00

TECHNICAL REPORT



## 6.1.2 Fore Peak Tank

### Results from visual CAP inspection

The shipside as found in a very good structural condition.

The internal structure was found in a satisfactory structural condition with thin edges of manholes and stringer openings.

### Deficiencies found during CAP inspection

Shipside longitudinal No. 15 was found cracked at starboard webframe No. 92.

### Repairs and upgrading carried out after CAP inspection

### Photos

Location	Photos of condition after repairs and upgrading
Location	

### Thickness measurements


#### Rating


Structural element	UTM	Visual	Coating	Overall
Deckhead				-
Side		1		-
Bottom				-
Transverse bulkhead				-
Internal structure		--- 2		-
Tank average rating				-
Tank overall rating				-

Normally no change of rating!

DET NORSKE VERITAS  
**CAP UPGRADE REPORT**

Rev. 0.0





Name of vessel <b>EXAMPLESHIP</b>	Name of owner <b>SHIPOWNERCO LTD.</b>	DNV id. no. <b>12345</b>	Date <b>2004-08-30</b>
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**Scope of Survey**

This is to confirm that the undersigned surveyor was requested to carry out the following inspections:  
CAP Hull upgrade inspection.  
Reference is made to CAP Upgrade Report dated 2004-08-01.

**General**

The report lists all main structural elements that have been considered to be below the client's stated objectives regarding CAP ratings, as outlined in Minutes of Meeting dated 2004-08-01.

**Conditions and limitations**

This list has been assembled by DNV as assistance to the client towards obtaining his stated objectives regarding CAP ratings. The list has been assembled in good faith, and it is believed that upgrading of the vessel accordingly will lead to fulfilment of the objectives. However, it should be noted that the final ratings will be decided by DNV's CAP rating committee. A full description of the CAP hull rating methodology is available from <http://cap.dnv.com>.  
In addition to any items on this list all structures identified to have thicknesses below the relevant CAP limit should be renewed.  
Completion of the repairs is voluntary. All structural repairs are to be surveyed by DNV as outlined in "DNV Rules for Classification of Ships".

**Shipside longitudinal No. 15 Fr. 92 was repaired by insert.**

Tank / Structure	1. FP
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**All edges of manholes and stringer openings were renewed by inserts.**

Responsible Unit	Place of survey	Survey started	Survey completed
Surveyor's name	Surveyor's signature		

If any person suffers loss or damage which is proved to have been caused by any negligence or omission of Det Norske Veritas, then Det Norske Veritas shall be liable in compensation to such person for the proved amount of damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In the event Det Norske Veritas shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, divisions, offices, branches, agencies and any other acting on behalf of Det Norske Veritas.

DET NORSKE VERITAS AS, VERITASVEIEN 1, N-1322 HØVIK, NORWAY. TEL: +47 67 59 00. TELEFAX: +47 67 19 11  
Issue: June 2004

- Required for completion of the final CAP Hull Report:
  - Final UTM report
  - Verification of repairs and upgrading
- Based on the above:
  - Statistical analysis of UTM data
  - Strength calculation based on as-measured scantlings
  - Completion of the CAP Hull Report
- Evaluation and decision by the CAP Rating Committee
- Issue of final CAP Hull Report and CAP Hull Declaration



The image shows a thumbnail of a document titled "CONDITION ASSESSMENT PROGRAMME DECLARATION". At the top center is the DNV logo, which consists of a blue square with a white anchor and a white scale of justice, and a green square with the letters "DNV" in white. Below the logo, the title "CONDITION ASSESSMENT PROGRAMME DECLARATION" is centered in a white box with a black border. The main text of the document is as follows:

This is to confirm that Det Norske Veritas AS has carried out a condition assessment of the hull structure, machinery and cargo systems onboard:

*Name of Vessel* : M/T "EXAMPLESHIP"  
*Class* : DNV H1A1 Tanker for Oil ESP ECO ICE-1C  
*IMO No.* : 987654

in accordance with DNV's *Condition Assessment Programme - CAP*

The Overall Rating awarded the vessel by the Rating Committee is:

**HULL STRUCTURE** : **1** (Rating Scale 1 - 4, see overleaf)

*Place and Time of Inspections:*  
*Hull:* Port, Country Date 2005-09-02 to 2005-09-10

For detailed documentation with ratings and basis for the assessment, see CAP-report No. 2005-1470.

Place and Date of Issue: Høvik, 2005-09-22

Det Norske Veritas AS

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Head of Department

DET NORSKE VERITAS



[www.dnv.com](http://www.dnv.com)

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