Challenges To The Ship Owners Corrosion & Fouling On Ships

International Congress on Marine Corrosion and Fouling

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Anti-Trust/Competition Law Compliance Statement

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Main Content Of Presentation

- Areas Of Main Concern
- IMO, MSC.215(82) Ballast Tank Standard
- IMO, other coming standards
- Examples of performance
- CO_2 , SOX, NOX, etc., and the Marine Industry

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Areas Of Main Concern

Cargo Tanks and holds
- Corrosion oil tankers
- Cargo protection chemical tankers
- Dry holds

Ballast Tanks

Under Water Hull

Visible Areas
- Main Deck
- Accomodation, and other parts …. complex

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Background To IMO MCS.215(82)

- 1970ies computer strength calculation evolved reducing steel weight
- Class and Owners approved
- Corrosion protection – no definition
- NB yard built, owner furnished Class, paint lube. Etc.
- During oil crises 1970ies, new owners – turn key construction.

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More Background To MSC.215(82)

- Reduced Cost for yards
- More cargo for owners
- Less transport cost for general public
- But, ballast tank areas also increased over time:
- 1970 35000 m2/ship (280,000 T VLCC)
- 1985 135 000 m2/ship (same size)
- 1990 280 000 m2/ship (same size)

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Further More Background To IMO MSC.215(82)

- Increased areas to do. Tough competition led to reduced standard of work and materials.
- More and earlier corrosion
- Bulk Carrier losses, many seamen lost their lives.
- Primary contributing cause was found to be corrosion in most cases.

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IACS ESP

- IACS responded by imposing ESP on tankers and bulk carriers.
- Tanks had to be coated, and the coating was rated when ship was in service. No requirement to coat before delivery.

Enhanced Survey Programme
Class Society Survey Frequency

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
GOOD			⊕		♦			⊕		♦
FAIR	□	□	⊕	□	♦	□	□	⊕	□	♦
POOR	□	□	⊕	□	♦	□	□	⊕	□	♦

♦	Special Survey
⊕	Intermediate Survey
□	Rating Induced Survey

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What Is Then The Required Coating Standard

- Areas Under Consideration – Not tank average

	GOOD (3)	FAIR	POOR
Breakdown of coating or area rusted (1)	< 3%	3 – 20 %	> 20 %
Area of hard rust scale (1)	-	< 10 %	? 10 %
Local breakdown of coating or rust on edges or weld lines (2)	< 20 %	20 – 50 %	> 50 %
Notes **(1)** % is the percentage calculated on basis of the area under consideration or of the "critical structural area" **(2)** % is the percentage calculated on basis of edges or weld lines in the area under consideration or of the "critical structural area" **(3)** spot rusting i.e. rusting in spot without visible failure of coating			

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Performance of Ballast Tank Coatings

- A major Classification Society ran statistical analysis on ESP data:

- Time from Good-to-Fair all 8 – 10 years
- Time from Good-to-Fair upscale 15 years

- Ships normally has at least a 25 years expected life.

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DB,S 5stbd middle part

After 12 Years

Interesting
because
only
power tool
cleaned
part
failed well
before 12
12 years!!!

The Process Leading Up To The IMO PSPC

- IMO Recommendation A798 for coating at new construction
- 1/7/98, IMO create mandatory coating requirement but leaving A 798 into SOLAS as footnote
- TSCF create a guide to A798 to help
- IMO in 2002 invited IACS to form an industry group to develop the PSPC
- IMO adopts the MSC.215(82) PSPC in December 2006.
- Came into full force for all ships contracted after 1/7/08

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Target Useful Life

- 15 years as GOOD
- Not a guarantee
- Require due diligence of all parties
- MSC.215(82) PSPC is a minimum standard
- Knowingly applying a system that would not last would be negligent

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General Principles

- Success require:

1. Good structure to start with
2. Good initial coating application
3. Good maintenance (mainly to address damages that occurs during ships operations)

Guidelines for maintenance and for repair are being developed by IMO

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Coating Technical File

- Shall be prepared by NB ship yard
- Shall be maintatined onboard for ship's life
- Will contain NB coating data, but also from maintenance and repair
- Hopefully will be reasonable in size and scope
- OCIMF report for entire ship is 6-10 pages long….

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Coating Maintenance of a VLCC. A tall task!

The guide that IMO is developing gives a lot of good advise.

It is not ready yet.

Waiting for IACS to update their guidance for Areas Under Consideration.

It is clear that a good start and a clear maintenance strategy is an absolute prerequisite for success.

Repairs done at a repair shipyard will have to be reported in the CTF at same detail as at NB.

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Primary Surface Preparation

- ISO 8501 Sa 2 ½
- Inhibitor free zinc silicate shop primer
- Inhibitors are osmotically active and promote blistering

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Steel Preparation & Secondary Surface Preparation

- ISO 8501-3 grade P2
- Practical
- Reasonable
- Sa 2 ½ of welds and damaged shop primer
- Sa 2 – 70% shop primer removal on intact shop primer.

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Secondary Surface Preparation Hull Stage

- ISO8501 St 3 allowed, but Sa 2 ½ preferred for erection areas and damages
- Not ideal – St 3 will not last 15 years
- Damages up to certain size, and to a limited amount also allowed St 3
- Reason is this is common yard practice and to mandate blasting on all ships would in many cases not be practical.

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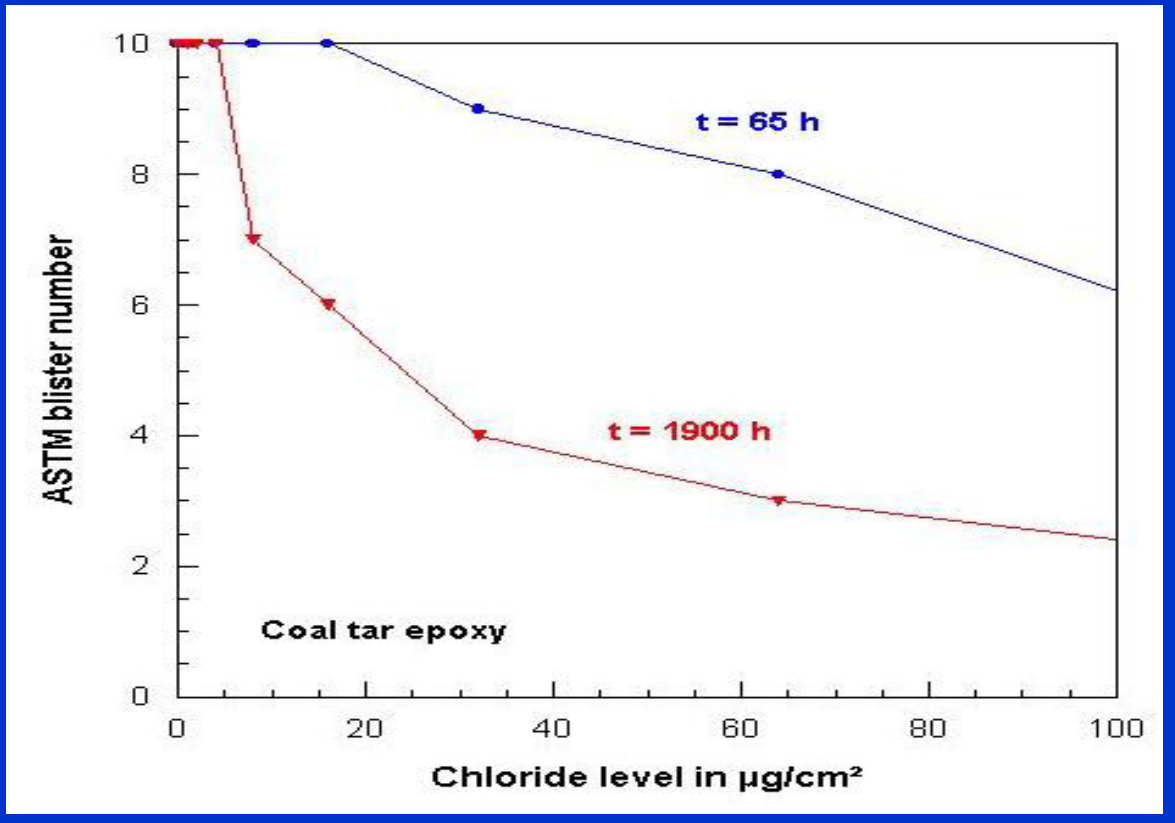
Salt Contamination Levels

ASTM rates 10 as no blisters, and the lower the rating the more blister problems are present



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Salt Contamination Level

- 50 mg/m2 weight as Sodium Chloride as per ISO8502-9
- 1st Washing initially required
- 2nd Washing requirement removed when some said not needed to meet criteria
- 3rd Higher salt levels then asked for because sometimes salt levels higher than spec (since no washing) = full circle.

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Coating Prequalification Testing

- Similar to the tests carried out all through the 1990ies – minimum requirement
- There is also an alternative system test
- Coating manufactuers must also conduct other tests to satisfy them selves that the coating will perform. Such tests needs not be documented under the PSPC

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Stripe Coating

- Brush versus roller ... Long discussions. The original intent was bush striping with rollers to be used only in scallops. But, wording still not clear.
- Just recently a revised text was proposed to IMO that state brush for general striping and rollers for scallops and such only ... But it is not yet adopted.
- Pre-stripe aid wetting and adhesion in the most critical parts – always advantageous
- To mandate pre-striping for all ships and all ballast tanks was not possible
- PSPC allows striping before or after each coat.

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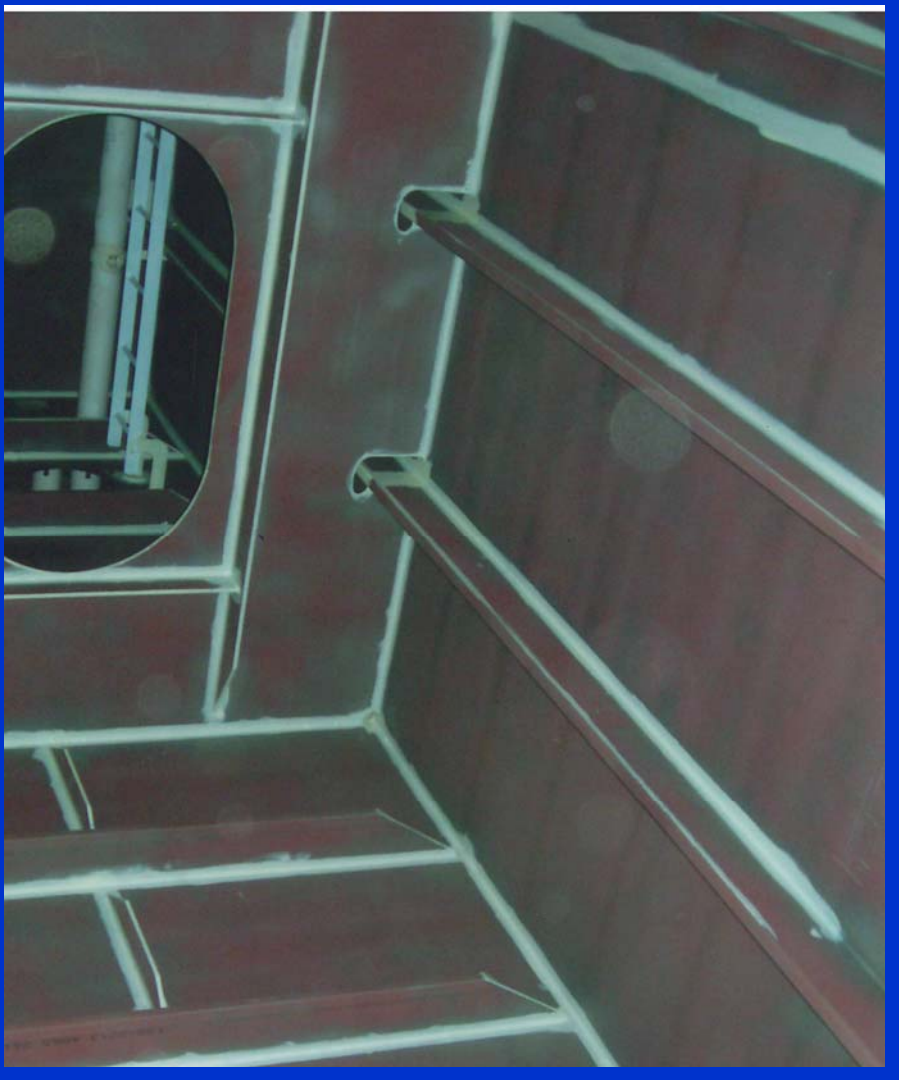
- Pre-striping is in fact done in some yards today!
This blasting Is not up to MSC.215(82)



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Paint thickness

- Originally specified minimum 300 mic and maximum as per paint makers rec.
- Changed to 320 microns with a 90/10 rule in place (after discussing; 85/15, 80/10, etc.)
- Maybe need now to validate the 90/10 rule statistically. I hope not!
- Who needs 1000s of reading numbers on a paper?
- Maximum is not defined in the PSPC. I advocate 2.5 x specified (320) as a maximum (= 800 mic.) spot reading – spot as per SSPC PA 2 designation.
- Gauge calibration as per SSPC PA2 is in the spec.

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Coating Inspector Requirement

- NACE
- FROSIO
- Same or slightly different – who cares! The inspector must be certificated by either.
- PR34 by IACS has reduced the level of the course to gain “equivalence” – this is of concern.
- Other organizations are thus develping equivalent courses of lesser quality...

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Can Shipyards Do This

- Many shipyards are already doing better
- They have blasting and painting cells not because of PSPC but because it is good for business (takes weather out of the picture).
- Some yards are yet to see the merit of these facilities – it will come.
- Intelligently implemented the IMO PSPC should save money.. Not incease in cost!

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IMO Cargo Oil Tank PSPC

- Not complete or adopted yet
- Bottoms may be power tool cleaned up to 20% - that will obviously not last 15 years
- An attempt to allow 20% power tool cleaning (from 3%) also on the over head was not approved.
- The CTO PSPC standard is similar to but differ some from the IMO.215(82) for ballast tanks.
- Major discussion now remaining is about pre-qualification testing

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Testing Discussion

- Many delegates argued that the test should mimic the worst cargos, to incorporate all crude oil cargoes in the approval process.
- Some argues successfully that most of the time the coatings are not exposed to the most aggressive crude oils, and that the test should NOT include the outer boudaries, but rather the more benign “normal” cargoes. This means additional testing and certification for the more aggressive cargoes – Not good!
- Still not resolved!

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Void Space PSPC by IMO

- Adopted as none mandatory at last DE
- More relaxed than the ballast tanks standard.
- Should have been same as ballast PSPC for voidspaces in the cargo areas.. But that is not what came out.
- Has much higher allowable salt cut-off values. This will cause confusion.

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On The Subject Of CO_2 Emissions

- The Marine Industry voluntarily adopted the IMO TBT-ban treaty early.
- It will finally come into force this year September
- Virtually no TBT-based AF applied since 1/1/2003
- Many new technologies presented, none has performed on par
- CDP took an increased market share in 2003.

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More On CO_2 Emissions

- Result is more fouling as evident at all indockings now
- More fouling = more CO_2 emissions
- Need to address the issue of hull resistance holistically
- Not only a case of choosing an antifouling paint; hull roughness, slime and weed fouling are other issues to be addressed

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Typical Indocking Condition Today

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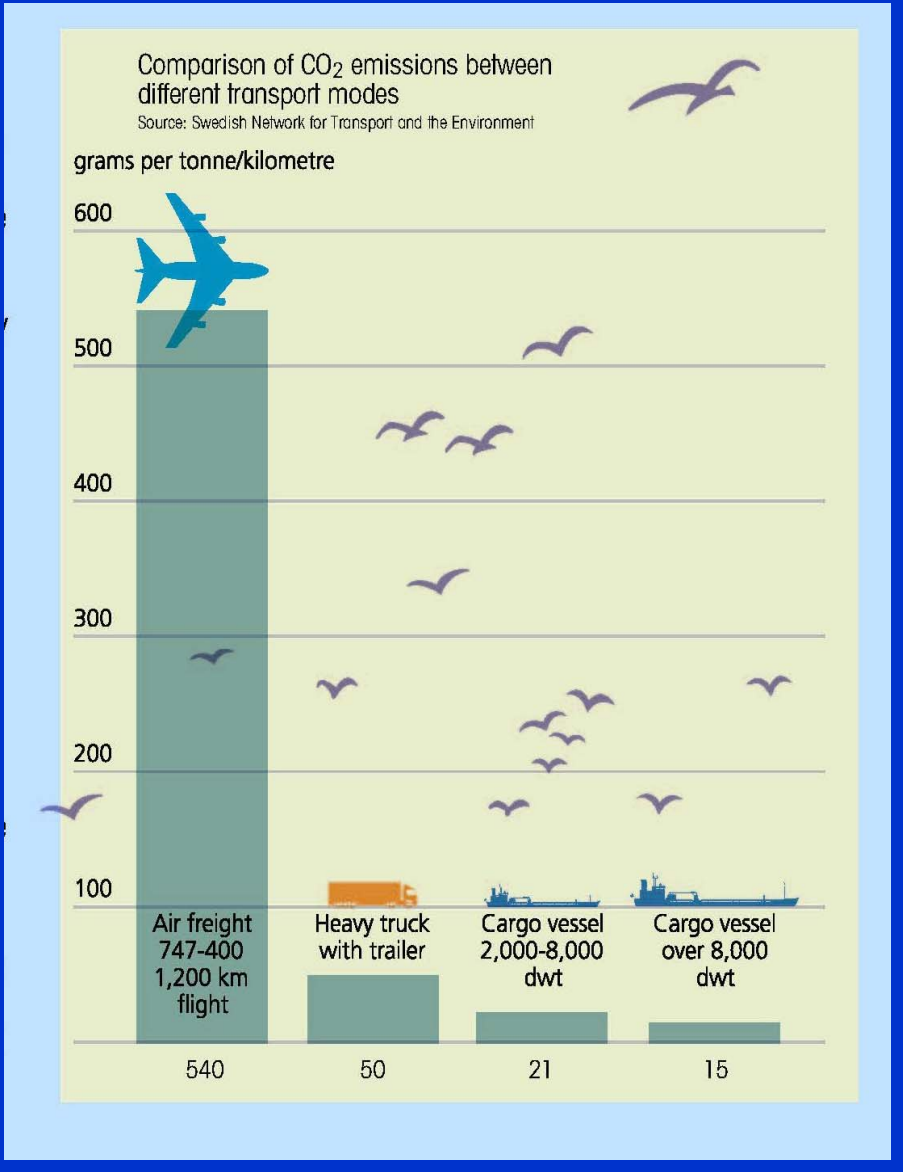

Ships are clean
But can be even better

On CO_2 Emissions

- Shipping is more CO_2 efficient per ton-km cargo carried than any other means of transport
- Shipping is a vital link in the global economy
- Shipping can, and will, do even better though.
- Need to take all factors contributing to hull drag into account

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Again Other Parts of the Ship

- Potable Water Tanks
- Cargo Tanks
- Main Deck
- Accommodation out and in
- Engine Room and airconditioned spaces
- Stores and other none airconditioned ones
- Sewage and grey water ... Lots to talk about, but so little time!

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Conclusion

- INTERTANKO viewes IMO's PSPC efforts positively
- Some extra cost is expected with the MSC.215(82), but seen as a good investment
- Good shipyards has no problems
- Some of the "other" shipyards will struggle at first
- Shipping is efficient – needed for a globalized market economy
- Hull resistance needs to be addressed more holistically
- The ship owners are proud to serve our customers and the general public well

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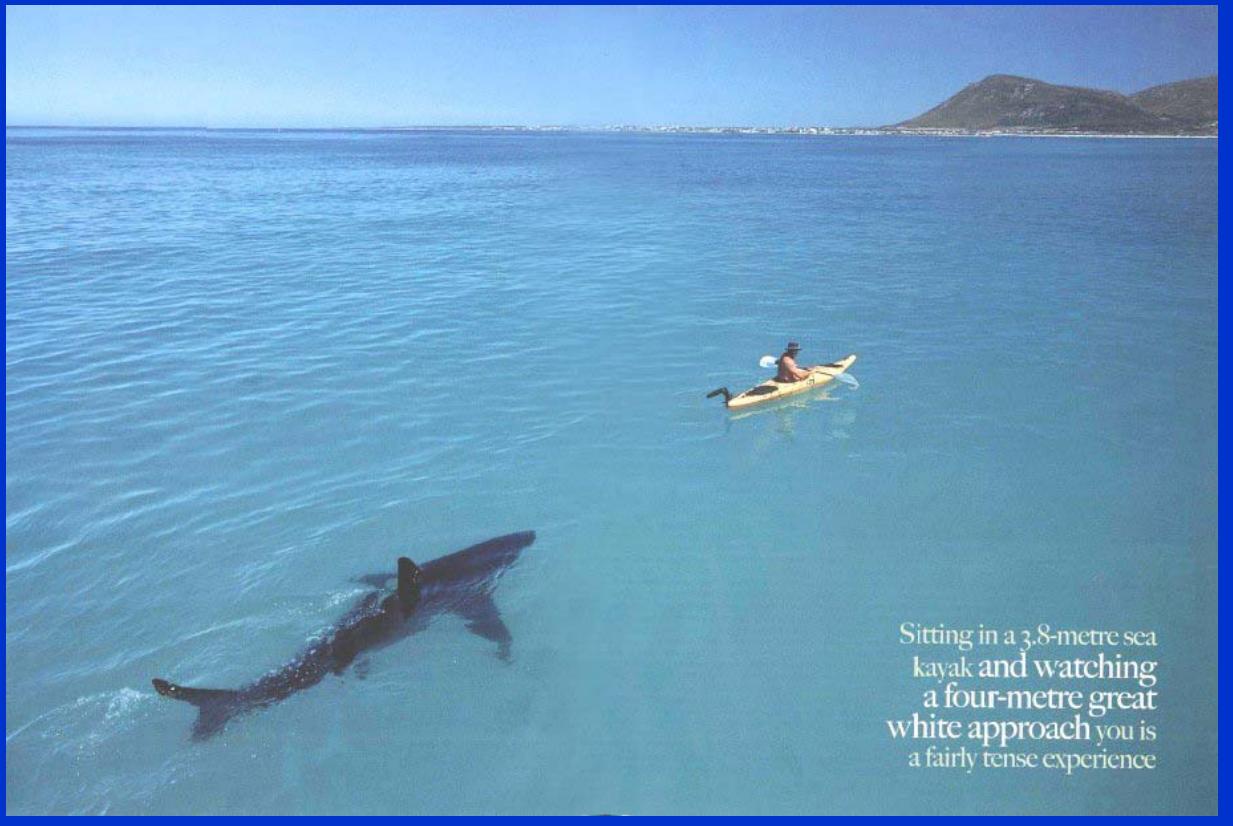
Please Don't View The IMO Standards Like This



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Thanks!

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