

Corrosion Protection for COT of Crude Oil Tankers " Corrosion- Resistant Steel "



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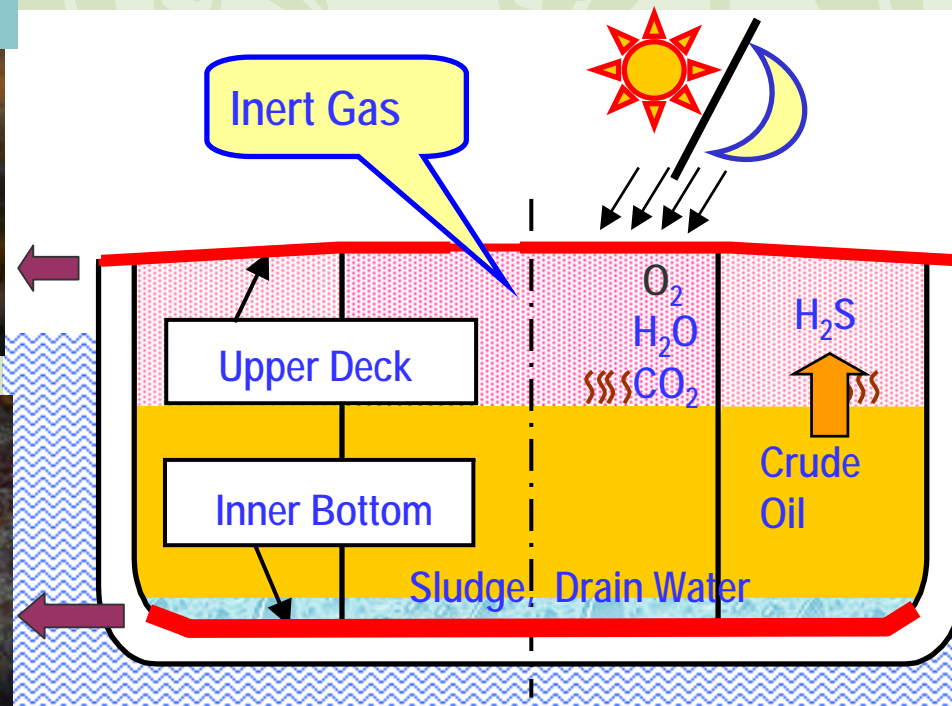
1. What is “Corrosion Resistant Steel”?

- ❖ Steel which has **sufficient corrosion resistant performance** in the **top and bottom of the COT**

Conventional Steel



Corrosion Resistance Steel



2. What is the position of “Corrosion Resistant Steel”?

❖ Corrosion Resistant Steel:

- could become **a major method** to protect corrosion of the COT, and
- could bring **large benefits** to the shipbuilding industry.

...Why?

2. What is the current position of “Corrosion Resistant Steel”?

..Because Corrosion Resistant Steel:

(1) has excellent corrosion resistance

and enough technical reliability

(2) improves shipbuilding productivity

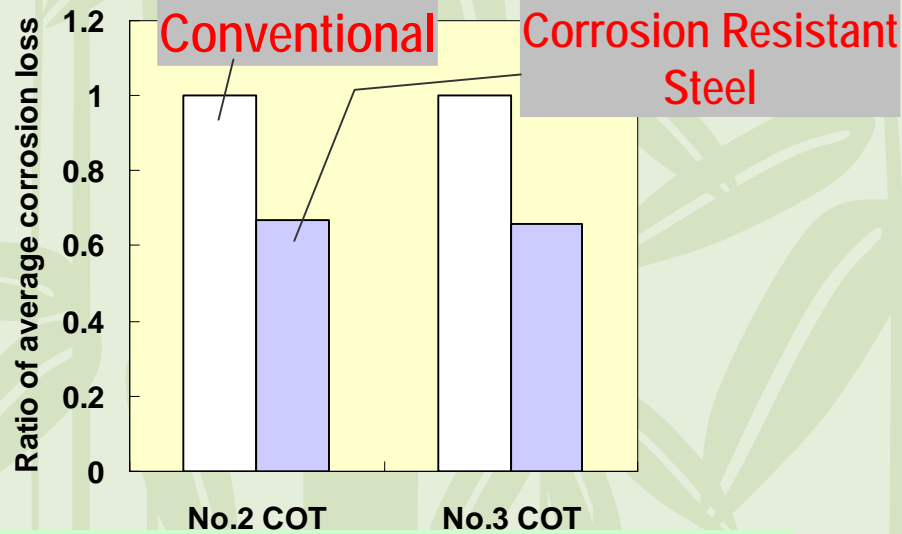
and maintenance cost

2(1).Excellent Corrosion Resistance & Enough Technical Reliability (Onboard Condition)

Upper Deck Plate



2 year and 9 month after launching
(Example)



corrosion rate
40% less than conventional steel

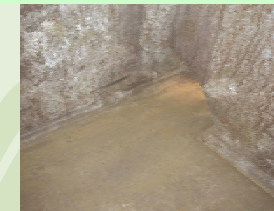
Bottom Plate



2 year and 3 month after launching
(Example)



Conventional

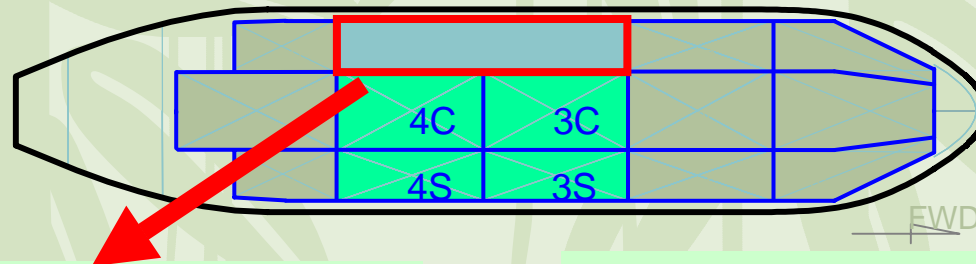


Corrosion Resistant Steel

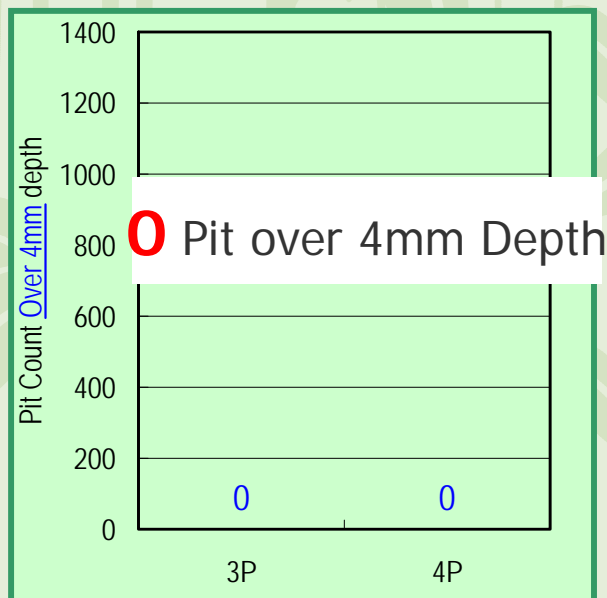


2(1).Excellent Corrosion Resistance & Enough Technical Reliability (Onboard Condition :Cont)

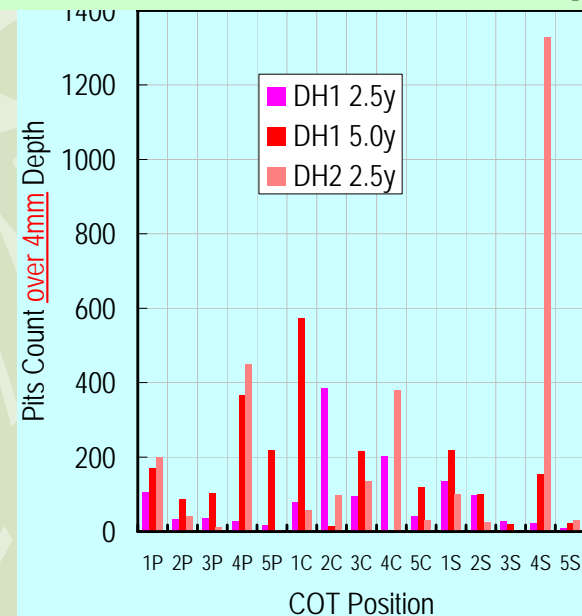
Bottom Plate



4.2 year after launching
(Corrosion Resistance Steel: Example)



2.5year and 5 year after launching
(Conventional Steel: Example)

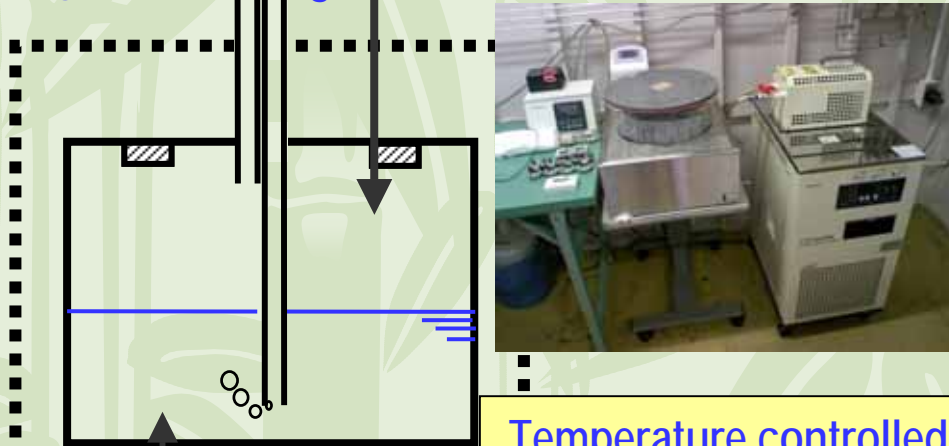


2(1).Excellent Corrosion Resistance & Enough Technical Reliability (Qualification Test)

Upper Deck Plate

Reproduced COT gas condition

gas outlet gas inlet

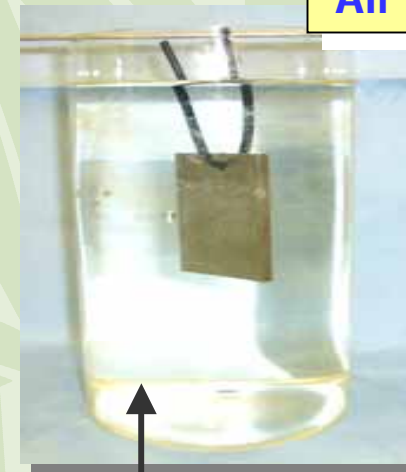


Distilled water

Temperature controlled vessel

Bottom Plate

Air Open



Solution
(10%mass NaCl + HCl)

Draft test procedure was submitted at DE51 (Mar.2007)

2(1).Excellent Corrosion Resistance & Enough Technical Reliability **(Result)**

❖ Qualification Test & Onboard Condition

excellent corrosion resistance
and
Enough Technical Reliability

2(2). shipbuilding productivity & maintenance cost (**Coating vs Corrosion Resistant Steel**)

Item	Coating	Corrosion-Resistant Steel
Target	15 years, - "GOOD" condition	25 years, - diminution within allowance - no leakage
Inspector	Qualified coating inspector	
<u>Additional work during construction</u>	<ul style="list-style-type: none"> -Edge treatment -Surface treatment (blasting, cleaning, etc.) -Multiple coating application -Measurements of salts, Dry film thickness etc. -Repair of Defects 	None
<u>Additional work after construction</u>	<ul style="list-style-type: none"> -Inspection of coating condition -Repair by recoat, weld, steel renewal 	None (Less Maintenance and <u>Possibility of no repair</u>)

2(3). Strong User Needs (vessels applied corrosion resistant steel)

Year (*)	Size
2004	VLCC
2005	Aframax
2005	Aframax
2005	Aframax
2006	VLCC
2006	VLCC
2007	Aframax
2007	Aframax

Year	Size
2008	VLCC
2008	VLCC
2009	VLCC
2009	VLCC
2009	VLCC
2009	VLCC
2009	VLCC
2009	VLCC
2009	VLCC

Year	Size
2010	VLCC
2010	VLCC
2010	VLCC
2010	VLCC

⋮

(*) Year: Year of Built, Under Building or Planning

3. What has been discussed at IMO? (Schedule of IMO)

Draft SOLAS amendment on
protection of COT of tankers

- ▶ was agreed in Working Group of DE51(2008.3)
- ▶ would be finally agreed in DE52(2009.3)
- ▶ would be accepted in MSC86(2009.5)
- ▶ would be adopted in MSC87(2010.5)

3. What has been discussed at IMO? (Draft SOLAS amendment)

3 All cargo oil tanks of crude oil tankers shall be:

.1 coated during the construction of the ship in accordance with the Performance standard for protective coatings for cargo oil tanks of crude oil tankers, adopted by the Maritime Safety Committee by resolution MSC...(...),

or

.2 protected by **alternative means of corrosion protection, the effectiveness** of which shall be **no less than the objectives** that are achieved by meeting the requirements of paragraph 3.1 and approved in accordance with the appropriate Performance Standard adopted by the Organization.

3. What has been discussed at IMO? (Draft SOLAS amendment (Cont.))

4 The Administration may exempt a crude oil tanker from the requirements of paragraph 3 of this regulation to **allow the use of novel prototype alternatives to the coating system specified in paragraph 3.1**, for testing, provided they are subject to suitable controls, regular assessment and acknowledgement of the need for immediate remedial action if the system fails or is shown to be failing. Such exemption shall be recorded on an exemption certificate.

**IMO starts to open the door
for Corrosion Resistant Steel.**

4. Conclusion

- ❖ Corrosion Resistant Steel could be a main method for corrosion protection of the COT of Tankers.
- ❖ Corrosion Resistant Steel could make the shipbuilding industry a large benefit.
- ❖ IMO starts to open the door for Corrosion Resistant Steel.

4. Conclusion (Cont.)

We would like to

- Make more wind to open up the door for corrosion resistant steel &
- Share information, value and assessment of the concept among our shipbuilding industries.

