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

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Contents

1. What is “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

Diagram:
- Conventional Steel
- Corrosion Resistance Steel
- Inert Gas
- Upper Deck
- Inner Bottom
- O₂, H₂O, CO₂
- H₂S
- Crude Oil
- Sludge, Drain Water
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

Bottom Plate

2 year and 9 month after launching
(Example)

No.2 COT

No.3 COT

Conventional

Corrosion Resistant Steel

corrosion rate

40% less than conventional steel
2(1). Excellent Corrosion Resistance & Enough Technical Reliability

(Onboard Condition : Cont)

Bottom Plate

4.2 year after launching
(Corrosion Resistance Steel: Example)

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

Pits Count over 4mm

Pit over 4mm Depth

Pits Count over 4mm Depth

DH1 2.5y
DH1 5.0y
DH2 2.5y
2(1). Excellent Corrosion Resistance & Enough Technical Reliability
(Qualification Test)

Upper Deck Plate
- Reproduced COT gas condition

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**

<table>
<thead>
<tr>
<th>Item</th>
<th>Coating</th>
<th>Corrosion-Resistant Steel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target</strong></td>
<td>15 years, - “GOOD” condition</td>
<td>25 years, - diminution within allowance - no leakage</td>
</tr>
<tr>
<td><strong>Inspector</strong></td>
<td>Qualified coating inspector</td>
<td>None</td>
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</table>
| **Additional work during construction** | - Edge treatment  
- Surface treatment (blasting, cleaning, etc.)  
- Multiple coating application  
- Measurements of salts, Dry film thickness etc.  
- Repair of Defects | None                                                          |
| **Additional work after construction** | - Inspection of coating condition  
- Repair by recoat, weld, steel renewal | None (Less Maintenance and Possibility of no repair) |
### 2(3). Strong User Needs

(vessels applied corrosion resistant steel)

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</tbody>
</table>

(*) 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.