Antwerp Maritime Academy - AMACORT

1st April 2019

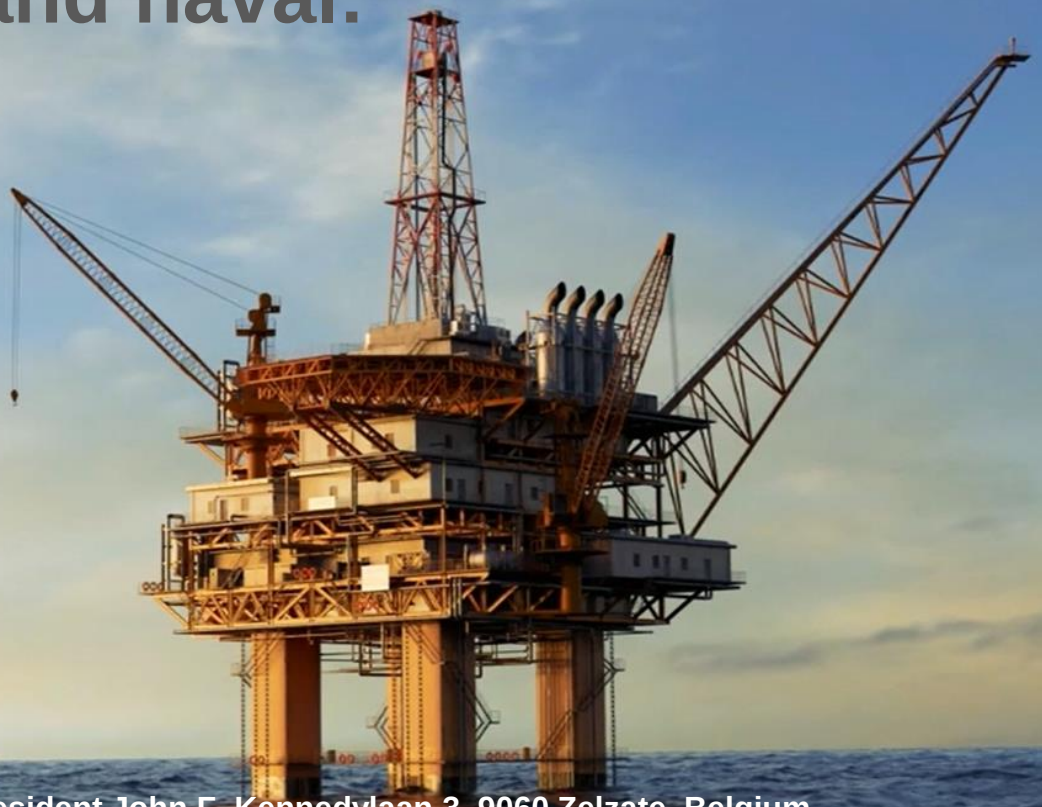
2nd International Symposium on Corrosion and Fouling

Two Natural Curses for a Ships' Hull

ArcelorMittal

Saline resistant weathering steel for offshore and naval:

Corrosion testing and Characterisation?



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Saline resistant weathering steel for offshore and naval

Development of corrosion-resistant steel

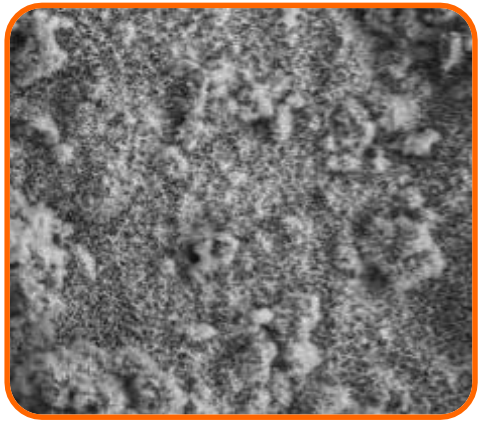
Saline resistant weathering steels for offshore application ?

Saline resistant weathering steel for offshore and naval

Development of corrosion-resistant steel

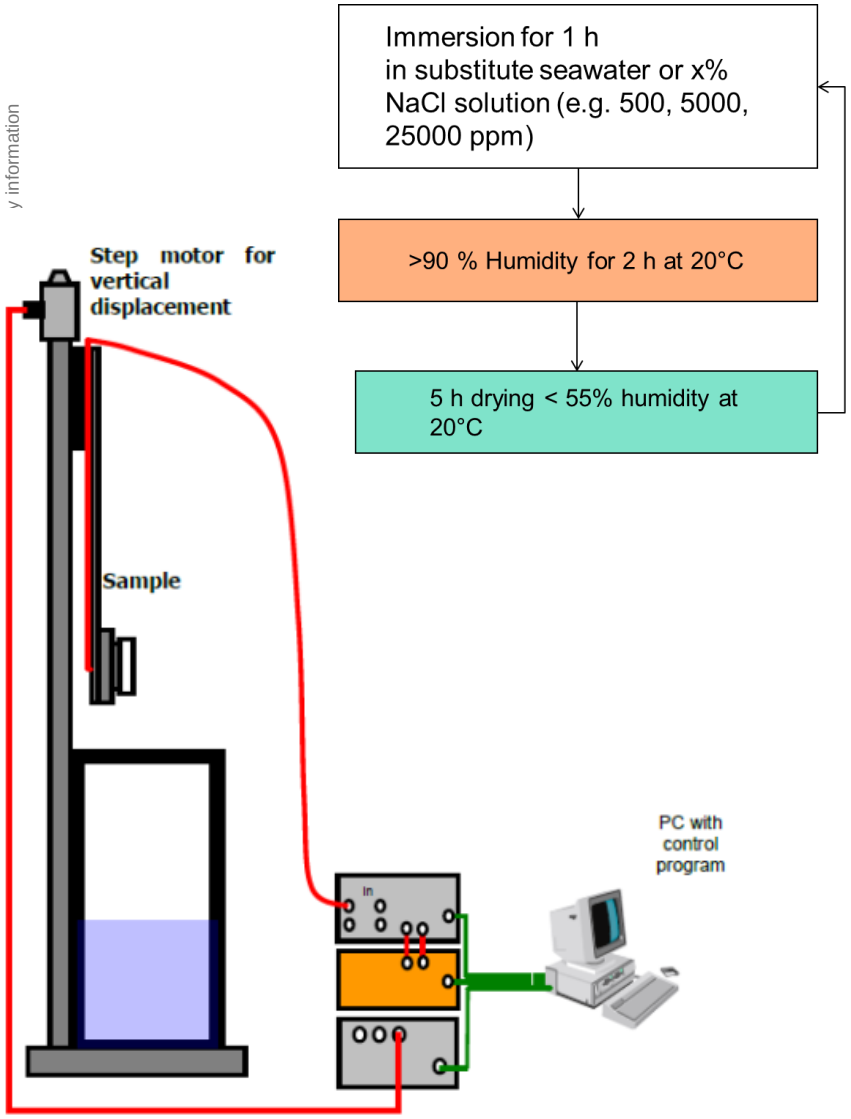
- Development of a cost-effective corrosion-resistant steel substrate, which would in fact need no coating at all, would be a step forward

- Development of **weathering steel with improved saline resistance**:
  - ✓ Protective patina formation in chloride environments
  - ✓ Offshore welding pre-qualification + HAZ toughness
  - ✓ Promising potential to reduce maintenance costs

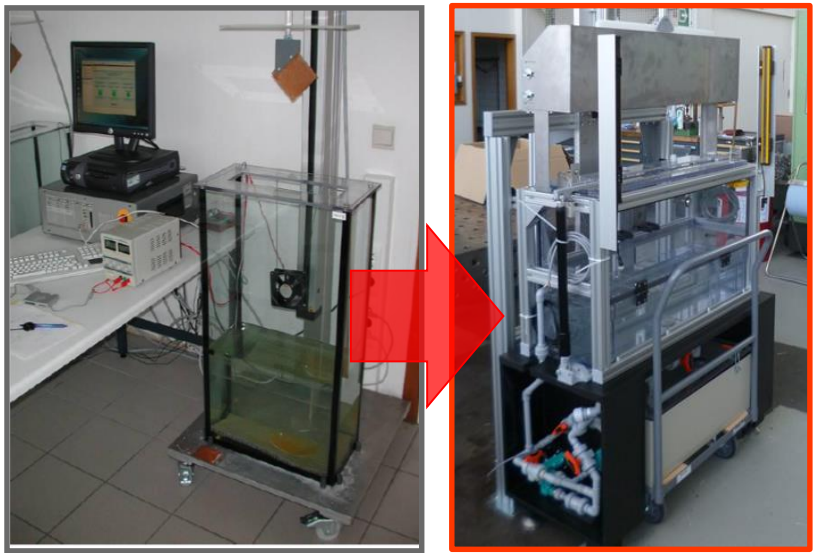


Saline resistant weathering steel for offshore and naval

Accelerated corrosion test: dip-dry tester



- Accelerated corrosion tests with conditions close to the natural outdoor conditions
- Sample is subject to wet, humid and dry conditions by alternating immersion in an electrolyte
- Artificial seawater per ASTM D1141-98 (2.5% NaCl + 0.5%$MgCl_2$ + 0.1%$CaCl_2$)
- TOW: 37.5%
- New home built dip-dry setup with controlled test conditions: reproducible data!



Saline resistant weathering steels for offshore and naval

Offshore marine exposure

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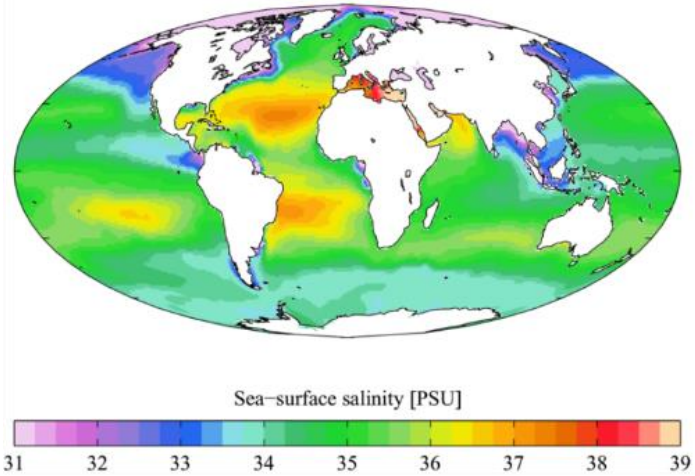
- Different offshore exposure sites to evaluate different offshore conditions
- Critical parameters: TOW, RH, T,…



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Average Cl conc @ platform Ostend/North Sea Belgium): 23,4 g/L

- Exposure of coupons in marine environment in Static platform in Ostend (Belgium) – North Sea environment
- Evaluation after 3, 6 and 12 months

Conclusions

"USE OF CORROSION RESISTANT STEEL AS SHIP CONSTRUCTION MATERIAL"

Capt. Dr. Kris De Baere
AMACORT - Antwerp Maritime Academy

International Research Conference on Sustainable Energy, Engineering, Materials and Environment 2017 - Newcastle

- ✓ **Offshore conditions are very severe for all metals and steel constructions**

Development of weathering steels with improved saline resistance will offer a solution and will reduce the maintenance costs