

Dual layer corrosion protection coatings

Innovation description

Offshore wind turbine foundations is exposed to highly corrosive environments. The cost of corrosion protection with coatings is the sum of initial application of the coating and following maintenance/repair of the coating. Pure organic coatings has the lowest cost in a short term perspective. However, experience has shown that dual layer coatings combining a metallic layer and an organic coatings provide longer lifetime, and hence lower total cost in a long term perspective. Standard dual layer coatings utilizes a metallic layer of aluminium or zinc/aluminium. SINTEF has tested dual layer coating with pure thermally sprayed zinc (TSZ). TSZ shows to provide better corrosion protection than both dual coatings based on thermally sprayed aluminum (TSA) and 3 layer organic coating/paint.

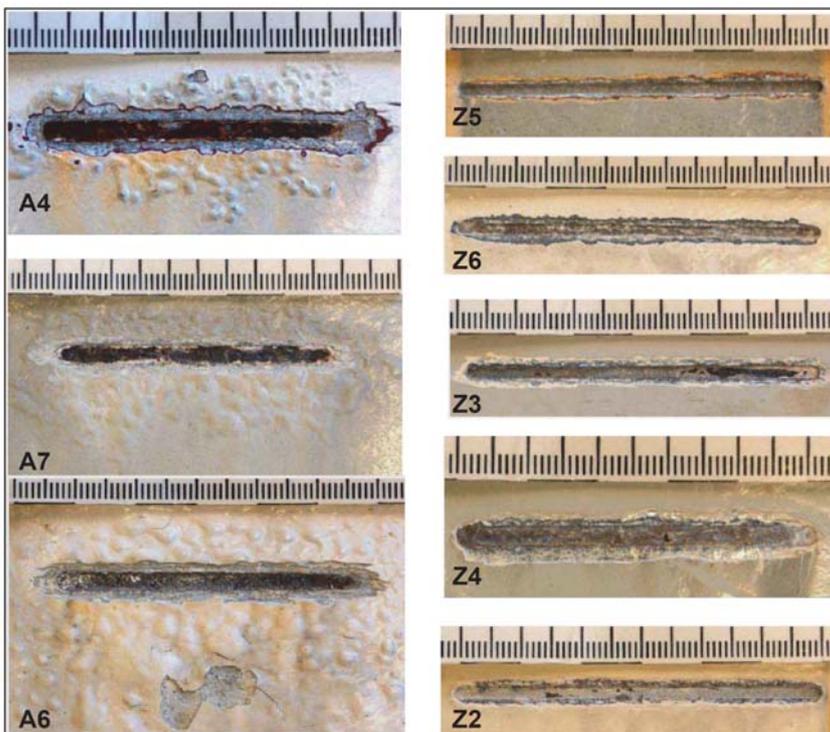


Figure 2. Pictures of some of the coating systems after exposure for five years in corrosive marine atmosphere. Left: Coating systems with thermally sprayed aluminium. Right: Coating systems with thermally sprayed zinc.

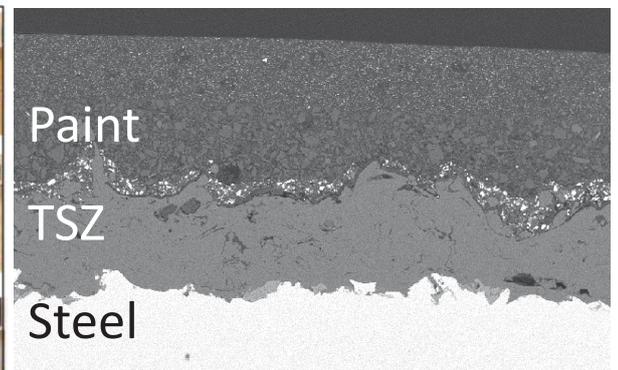


Figure 1 Microscope picture of cross section of steel coated with TSZ and paint

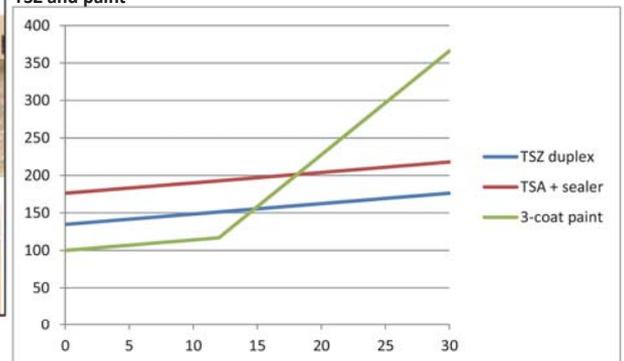


Figure 3. Life cycle cost estimates as function of construction lifetime.

Impact

- Reduced corrosion related maintenance and repair
- More reliable and cheaper substructures

Further development

- Optimization of layer thickness to minimize cost

References

- Low maintenance coating systems for constructions with long lifetime, OØ Knudsen, A Bjørgum and LT Døssland, NACE 2012
- Report, SINTEF F26619, New coatings for corrosion protection of offshore wind turbines (D3.3.17)