

- *Quality of stainless steel applied to construct railings at sea side*

Samples of stainless steel had been taken from the railings situated at the Baltic Sea side after construction work and were delivered to Ancora Co. for an investigation. On the external surfaces of the samples first corrosion step in form of rust spots was observed.



Fig.1. Scratches, local grindings and rust spots present on the external surfaces of the samples



Fig.2. Overwelding was done at some points on welds on internal surface. Grinding marks were present on external surface at places corresponded to the welds

An analysis of sample chemical composition was performed using Thermo Niton XL3T 800 X-ray analyser made by ThermoFisher Scientific, USA with the purpose of the steel identification. Based on the test results it was found that stainless steel AISI 304 was applied for the railings construction. Stainless steel 304 should not be used at the coast when the distance to the sea is equal to 25-30 m

because of its inadequate corrosion resistance against salts containing chlorides. Austenitic stainless steels with low carbon content and 2% or more molybdenum and also duplex steels containing around 22% chromium and at least 3% molybdenum are corrosion resistant at sea coast exposure. Besides proper stainless steel selection it is advised to carry out pickling and passivation to improve corrosion resistance.

Stainless steel corrosion resistance at sea coast region depends very much on the surface smoothness. Roughness Ra values on external surface estimated with Surface Roughness Tester SRT 6200 were equal from 0,98 μm to 1,48 μm . According to the literature the surface roughness of AISI 316 stainless steel that may be applied at a coastal region should not be more than 0.5 μm . Stainless steel structures should not have grinding marks when applied close to the sea side. Sea water salts carried with winds easier adsorbs on a surface having lower smoothness. Stainless steel corrosion rate increases proportionally to an increase of salt concentration being an effect of water evaporation from a construction surface. If stainless steels having lower corrosion resistance are applied at the sea side a low surface roughness is an absolute requirement.

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