Inclusion of cut edges and bending in technical life time assessment of inorganic coatings on carbon steel sheet

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Technical life time assessment of inorganic coatings on carbon steel sheet materials are often requested from producers and users as basis for certification/type approval or quality control purposes. Coated sheet materials are often produced in large coils which are then further processed through various operations (cutting, pressing, bending, welding, hole-punching etc.) which could influence the protective coating, and thus also the technical life time, of the final product. While methods including accelerated corrosion tests and visual inspections are indispensable for the assessment of the technical life time of protective coatings, most common post processing techniques likely to affect the corrosion protective capability of a coating, are often not considered in the assessment. To fully evaluate the corrosion protection performance of a coating on steel sheet intended for further processing, areas affected by such operations need to be taken into consideration.

In this study, a method for including assessment of cut edges and bending (90 and 180 °) in Nordtest NT MAT 003[1] has been developed and its applicability as tool for quantitative rating of the corrosion protection has been evaluated. Three common types of inorganic coatings have been exposed in an accelerated corrosion test for a total of 22 weeks. Visual inspections of base metal corrosion at the cut edges and surface areas directly affected by the bending, were carried out weekly. The results of the accelerated test will be compared to results from field testing on a site on the west coast of Sweden. Assessment of field test results will be performed during 2019-2021. The results from this study will contribute to the development of methods for technical life time assessments of inorganic coatings on carbon steel sheet with the inclusions of parameters relevant for its intended use.

[1] Nordtest, NT MAT 003 Assessment of corrosion protection classes for inorganic coatings on steel. Espoo: Nordtest, 2002.