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Corrosion Protection of bridges for a lifetime by thermally sprayed zinc based duplex coating systems

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1. Abstract

Bridges are subject to extreme corrosion attack due to the surrounding conditions. Chlorides in a maritime atmosphere, de-icing salts or Sulphur Dioxide in an industrial atmosphere cause high corrosion rates if mild steel is left unprotected.

The paper shows the best corrosion protection for a long service life under all these conditions offered by a duplex-coating combining a thermally sprayed zinc-based layer with a fitting top-coat. It introduces the thermal spraying process and its application on bridges, which can be performed in the plant or at the worksite, during erection and for repair work.

Thermal Spraying is a well-established process which has been in existence for more than a hundred years. It is used manually, semi-automated and fully automated. Thermal Spraying with zinc and zinc-alloys is a “cold” process having no influence on the microstructure of the coated steel. It refers to worldwide standards and norms, which assure the highest quality of material, work and coatings.

Worldwide references on steel bridges are presented as well as the latest developments in research.

Throughout this abstract, the results of an intensive study over a service life of more than 26 years of duplex systems for Offshore Wind Energy plants is shown.

In conclusion, the presentation also offers a quick view to the application of thermal spraying on concrete bridge structures to protect the rebar by cathodic protection.

Keywords: Zinc, ZnAl15, duplex-coating, thermal spraying, metalizing, long-time corrosion protection, cathodic protection