

Thermal Spraying of Titanium-Based Alloys on Steel and Aluminum Substrates

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Abstract : Thermal spraying emerges as a versatile and robust technique for enhancing construction steel with protective coatings tailored for anti-corrosion, insulation, and aesthetics. This study showcases the successful application of flame thermal sprayed titanium-based coatings on EN-S273JR steel substrates and on aluminum. Optimizing the process at a 150 mm spray distance and employing argon as a carrier gas, we achieved coatings with characteristic morphologies and a minimal amount of oxides presence at particle boundaries. Corrosion tests in 3.5% wt. NaCl solution confirmed the coatings' superior performance, displaying an improved corrosion resistance increase over uncoated steel or aluminum. These results underscore the efficacy of thermal spraying in significantly bolstering the durability of construction steel and aluminum, marking it as a pivotal technique for multifunctional coating applications.

Keywords : thermal spraying, corrosion resistance, surface properties, mechanical properties

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