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热浸镀层在青岛站的海水腐蚀行为对比(III) ——飞溅区

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摘 要:测试热浸镀锌(GI)、锌-5%铝-稀土(GF)和锌-55%铝-1.6%硅(GL)镀层钢板在青岛站的飞溅区海水腐蚀行为, 并利用腐蚀质量损失测试和显微结构分析, 研究3种镀层钢板的海水飞溅区腐蚀行为。结果表明: 3种镀层在飞溅区均未发生生物污损, 腐蚀速度在3个海水区带中最低; GI镀层由于腐蚀电流密度最大, 氧化膜保护效果不佳, 耐海水腐蚀性能最差; GF镀层由于腐蚀电流大幅度降低, 飞溅区充分的充气条件促进了镀层的钝化, 因此表现出较为优异的耐海水腐蚀性能; 由于保护性的锌的腐蚀产物被滞留在富铝的枝晶网络中, 充分的充气条件又促进了镀层富铝相的钝化, 所以GL镀层在海水飞溅区表现出最佳的腐蚀性能。对位于海水飞溅区的钢材基体提供1 a保护期所需的镀层最小厚度分别为: GI镀层14 μm ; GF镀层8 μm ; GL镀层4 μm ; GF和GL镀层在飞溅区的耐蚀性分别是厚度相当的GI的2倍和4倍。

关键字: 热浸镀; 热浸镀层; 海水腐蚀; 耐蚀性; 飞溅区

Seawater corrosion behavior of hot dip coatings at Qingdao test station (III)——Splash zone

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Abstract:The corrosion behavior of hot dip Galvanized (GI), Galfan (GF) and Galvalume (GL) coated steels exposed to splash zone of Qingdao site was investigated with seawater corrosion test and microscopy morphology analyses. Splash zone is less aggressive for hot dip coatings and biofouling does not take place in this zone. The poor performance of GI coating is mainly owing to its largest corrosion current density and less protective oxidation product film under the condition of continuously wet with well-aerated seawater. The better performance of GF coatings is attributed to its lower corrosion current density and more resistant oxidation film formed on the coating surface. Since the protective zinc corrosion products retained in the Al-rich dendritic network slows down further attack, and well-aerated condition promotes passivity of the Al-

rich phase, GL coating therefore shows the best corrosion performance in splash zone. The minimum coating thickness requirement for 1 a protection afforded to steel structure exposed to splash zone was then calculated as: GI, 14 μm ; GF, 8 μm ; GL, 4 μm . The corrosion resistance of GL and GF are therefore four and two fold as that of GI exposed to seawater splash zone.

Key words: hot dip by galvanization; hot dip coating; seawater corrosion; corrosion resistance; splash zone

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