

## Hot-Dip Galvanizing as a Barrier Protection Coating for Steel Hydraulic Structures

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**Abstract :** The total economic damage caused by corrosion in Germany is estimated to be more than 3% of the GDP per year. Additionally, corrosion and suitable corrosion protection systems are also significant factors in the consideration of life cycle costs for steel hydraulic structures. In addition to classic coating systems (for example, epoxy resin or polyurethane), zinc and its alloys offer effective and very durable corrosion protection for steels. As a protective layer, hot-dip galvanizing prevents the corrosive media from penetrating into the steel matrix and acts as a sacrificial anode, which corrodes in preference to the steel. However, hot-dip galvanizing as a corrosion protection system has not yet been approved by the relevant authority, the Federal Waterways Engineering and Research Institute (BAW) in Germany. In order to make hot-dip galvanizing usable as a corrosion protection system for steel hydraulic structures in the future, different factors must be considered. These factors are (i) corrosion protection type, (ii) resistance to mechanical stress (i.e., abrasion resistance), (iii) combinability with cathodic corrosion protection, (iv) environmental effects and (v) the crack formation and propagation during hot-dip galvanizing. In this work, hot-dip galvanizing as a corrosion protection system for steel hydraulic steel structures, as well as open questions, are discussed. This paper is based on initial long-term exposure tests with corrosion protection systems consisting of hot-dip galvanizing and duplex systems.

**Keywords :** steel hydraulic structure, hot-dip galvanizing, corrosion, corrosion resistance, zinc coating, organic coating, duplex systems

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