



Sustainable and environmentally friendly zinc coatings for protecting steel bridges in Europe

M.C. van Leeuwen

International Zinc Association, Brussels, Belgium

P.M. Gagné, B. Duran

International Zinc Association, Durham, NC, USA

Dr. F. Prenger

Grillo-Werke, Duisburg, Germany

Contact: mvanleeuwen@zinc.org

Abstract

Metallic zinc coatings are well established as cost-effective corrosion protection for steel bridges. The zinc coating acts first as barrier protection, isolating the base steel from corrosive elements, and secondly by cathodic protection, acting as a sacrificial anode to protect the steel should the coating be compromised. Bridge operators can be confronted by disproportional high maintenance costs for bridges in use as removal of (in)organic paint systems with hazardous and toxic compounds require expensive waste disposal and environmental protection measures. Metallic zinc coatings are recognized as environmentally friendly, sustainable, and low maintenance, providing the lowest life cycle cost corrosion protection. Various case studies with bridges protected with metallic zinc coatings in and outside Europe are illustrated.

Keywords: Hot dip galvanizing; Thermal sprayed zinc; Zinc-rich paint; Corrosion; Zinc; Sustainability; Durability.

1 Introduction

Steel is a strong, versatile and inexpensive material with uses in many different construction industries, the bridge industry amongst others. It has the highest strength to weight ratio of all construction metals and is recyclable. However, in order to enhance and protect this vital asset, corrosion prevention is essential. Zinc coatings provide excellent corrosion protection and ensure long lifetimes of steel constructions.

The most common and used zinc coating applications for protecting steel from corrosion are hot-dip galvanizing, thermal spraying with zinc and painting with zinc-rich paints.

Compared to other industrial metals, zinc and steel both have low environmental burdens per kg of production, are completely recyclable, have benign health effects, and in the case of zinc, actually is essential for human health.