



Economical Steel Bridges

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Abstract

Steel is an economical choice for bridge construction for a number of reasons, including its high strength, its light weight, as well as its resiliency in the face of extreme weather events or natural disasters. Duplex zinc coatings for steel structures consist of a metallic zinc coating, typically hot dip galvanized (HDG) or thermal sprayed zinc (TSZ), painted with a protective organic coating. The time to first maintenance of a duplex coating can easily be twice the life of the individual metallic zinc and paint coatings alone. Life-cycle cost modeling compares material and design alternatives over the entire life of the structure. Life cycle costs models have shown the benefits of using duplex zinc coatings for corrosion protection to reduce the total cost of ownership of steel bridges, as well as to show that steel bridges are competitive with concrete structures for short spans.

Keywords: zinc; galvanizing; thermal-spray; duplex-coatings; corrosion; life-cycle-cost.

1 Introduction

Modern bridge construction is primarily a mix of steel and concrete. Steel bridges will have concrete abutments and decks, while poured in place or precast concrete components use steel reinforcement. As the principal construction material, both compete for shorter span bridges while steel is the material of choice for longer spans.

One benefit of bridge construction using steel is the lighter weight, which translates into cost and time savings with smaller substructure elements. Other

benefits include the use of smaller cranes and other equipment, and fast installation. These are especially evident for short span bridges where weight restriction on local roads can impact construction planning. Designing short span bridges with prefabricated elements can also provide simpler installation and cost savings.

The economy of using steel increases as the span length increases. Longer spans reduce the need for support piers which may impact the road, rail or valley space being crossed by the bridge.

The corrosion of steel will impact the life of both concrete and steel bridges but is especially