The durability and service life benefits of Stainless Steel Rebar and the underpinning properties and features – A stainless industry primer for owner's, planners, specifiers, and designers on the technical and market realities

Richard Huza, B. Eng.

Director, Business Development

Salit Specialty Rebar / Salit Steel

Contact: rhuza@salitsteel.com

Abstract

The tremendous cost of deteriorating infrastructure as caused by the corrosive effects of chlorides in North America is well documented as being in the billions of dollars annually. Owners, planners, specifiers, operators and designers of reinforced concrete structures faced with solving the problem of deteriorating concrete caused by chloride attack of the steel rebar from chlorides are looking for long term, low cost solutions and to solve the heavy cost burden of premature replacement of structures, excessive repair and maintenance costs, traffic congestion and reduced utilization. This paper makes the case that the fundamental and unique properties and features of stainless steel reinforcement are the underpinnings of the vast body of indisputable evidence pointing to stainless steel reinforcement as being a significant positive contributor to extending the service life of existing structures and enhancing the durability of new structures exposed to chloride attack. The author offers his engineering and product/market development perspective as a stainless steel reinforcement industry insider providing details regarding the unique mechanical properties, the chemistry of this product and the benefits which can be leveraged, an overview of the important aspects of the ASTM standard for mill production, the evolvement of historic to the current types of stainless steel reinforcement most in use, a summary of various corrosion resistance test methods and research presenting the relative performance of various types of corrosion resistant reinforcement compared to stainless steel reinforcement, the cost effectiveness of the use of stainless steel reinforcement as represented by a life cycle costing analysis with commentary on pricing, the specification formats and best practices of primary users, a perspective on the applications of this product and the primary users in North America, a synopsis of the mill material supply situation, and finally an overview of the purpose and summary of the recently released ANSI / CRSI IPG4.1 document "Standard Practice for Stainless Steel Reinforcing Bar Fabrication Facilities".

Keywords: Stainless steel reinforcement, rebar, service life, durability, corrosion resistance, life cycle cost

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