Stainless Steel for Construction Applications

REBAR

THE CORROSION PROBLEM IN CONSTRUCTION INFRASTRUCTURE

The "1998 Report Card on America's Infrastructure," compiled by the American Society of Civil Engineers, awards a D-minus and C-minus, respectively, to the condition of the nation's roads and bridges. America's infrastructure is not making the grade, notwithstanding the continual replacement, renovation and rehabilitation of roads, highways and bridges. This ongoing infrastructure repair is accomplished by digging deep, particularly into the pockets of taxpayers.

Frequently the culprit that triggers the need for repair can be traced to such a familiar sight on roads and bridges that it's taken for granted **. . . rust or corrosion**. Corrosion in general is a public policy issue and not just in the infrastructure. Corrosion costs the U.S. more than $300 billion every year, but $100 billion of that waste could be avoided with increased use of corrosion-resistant materials, improvements in corrosion-prevention practices, and investments in corrosion related research.

Nowhere is the corrosion problem more evident than in our bridge and highway systems. It is unsightly, jeopardizes safety, and replacement often becomes necessary in less than half the projected 50 to 75 year design life of a project.

In many cases chemical agents such as chlorides used in road salts attack the underpinning metal rebars making them vulnerable to corrosion. Marine and high pollution environments also lead to chemical reactions causing corrosion. Rust, once formed on metal, multiplies the volume of the original material. This expansion causes spalling of concrete, leading to even more widespread corrosion.

Expensive approaches to protecting metals that intrinsically have poor resistance to corrosion have met with only limited success. Epoxy coatings, galvanizing, cathodic protection and other methods have not fulfilled their promise. This is particularly true in high road salt usage and in coastal areas or other high chloride and moisture laden environments.

Stainless steels, naturally corrosion resistant, provide the ideal solution to the rust problem. The addition of chromium imparts corrosion-resistant qualities to stainless steels. Chromium, combined with oxygen, forms a thin invisible chromium-oxide protective film on the surface that repels attacks from corrosive agents. Corrosion-resistant stainless steels extend the life of a construction project in most environments to 100 years.

TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY

This legislation, signed into law on June 9, 1998, offers about 40 percent more federal highway funding over the next six years. Included in the legislation is a first-ever $108 million dollar earmark for an innovative bridge research and construction program. Its focus is on bridge design and the use of corrosion resistant materials like stainless steel. For information on applying for grant money available under the program, contact the U.S. Department of Transportation in Washington, D.C., your state Department of Transportation, or your Member of Congress.

WHY STAINLESS STEELS

Upgrading to more corrosion resistant construction materials like stainless steel is one cost effective approach to the rust problem. Compared to other construction materials, stainless steels have many unique properties that are advantageous not only from a corrosion standpoint, but from a strength and safety viewpoint as well.

Stainless steels are fire and heat resistant, impact and shock loading resistant, can withstand deformation, and require little or no maintenance. Stainless steel's ease of fabrication, installation, weldability and ductility make it an ideal material for many construction applications.

LIFE CYCLE COSTING ADVANTAGES

Life cycle costing techniques and analysis allow the design engineer and materials specifier to consider the true cost of a project over its useful life. Using upgraded, more costly materials at the very start of a project oftentimes can be justified by pointing to the savings accrued over the project's life. Reduced maintenance, inspection and repair costs result from initially upgrading material.

The Specialty Steel Industry of North America (SSINA) has available a free computer program and manual on Life Cycle Costing calculations. This easy-to-use program compares the cost of materials over the life of a project, factoring in replacement and repair costs, downtime, lost man-hours and other variables. Contact SSINA for a free diskette and manual.

SPECIALTY STEEL INDUSTRY OF NORTH AMERICA

3050 K Street, N.W.
Washington, D.C. 20007
TEL: (202) 342-8630 or (800) 982-0355
FAX: (202) 342-8451
http://www.ssina.com

Advantages of Stainless Steel Rebar

Durable and Self-Healing to Abrasions and Handling Damage

Weldable

No Field Pre-Treatments Necessary

Shock and Seismic Load Resistant

Fire and Heat Resistant

Cost Competitive with other systems over full Life Cycle Cost

Superior Corrosion Resistance

Wide Material Selection

Superior Strength Levels

Outstanding Ductility at High Strength Levels

Long Shelf and Service Life

Minimum Maintenance

Low Magnetic Permeability

Resistance to Chloride and Moist Environments

Alloys Resistant to Localized Corrosion Mechanisms

APPLICATIONS FOR STAINLESS STEEL CONSTRUCTION PRODUCTS

Concrete Reinforcement

Parapet Anchors and Tie Downs

Wall Anchors

Rock Bolts and Anchors

Concrete Anchors

Screens

Studding and Fasteners

Rebar Spirals for Pilings

Mesh

Post Tensioning Strands

Cages

STAINLESS ALLOY DESIGNATIONS

304L	317L/M
304LN	XM-19(Nitronic 50)
316LN	318(Duplex 2205)

LITERATURE REFERENCES for the Behavior of Stainless Steel in Concrete in Chloride Environments

1. Stainless Steel in Concrete State of the Art Report, European Federation of Corrosion Publications No.18.

2. Report No. FHWA-RD-96-085, Contract No. DTF H61-93-C-00027, Corrosion Resistant Reinforcement for Concrete Components.

TECHNICAL CONTACTS

BERNARD H. NEUHART

766 Huntingdon Drive
Niskayuna, New York 12309
Tel-518-372-7443
Fax-518-372-7443
e-mail: karobene@aol.com

BRIAN LESLIE

c/o SSINA
3050 K Street, N.W.
Washington, D.C. 20007
Tel-202-342-8630
Fax-202-342-8631
e-mail: ssina@colshan .com

REBAR CAPABILITIES

Contact the following North American Producers

Al Tech Specialty Steel (800-735-5661)
Atlas Specialty Steels (905-735-5661)
Republic Engineered Steels (330-837-6240)
Talley Metals (803-335-7540)

HOW TO ORDER

Please specify the following:

Grade
Size
Strength Level Required
No. of Pieces
Length (Random or CTL)
Specifications
Corrosion Testing and Corrosion Environment

ASTM AND OTHER GOVERNING SPECIFICATIONS

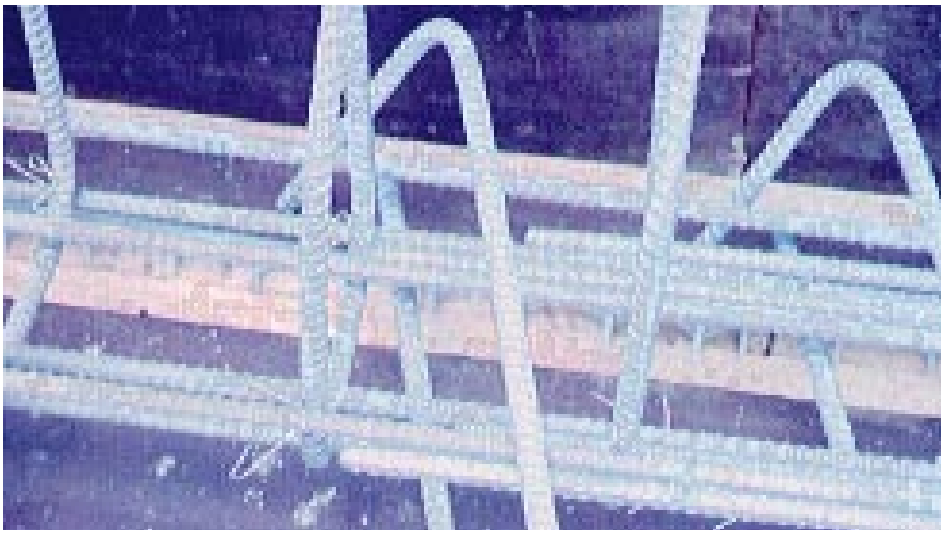
ASTM A-955M-96 for Deformed and Plain Stainless Bar for Concrete Reinforcement

Canadian Standard Can/CSA G30. 18-M92

British Standard 6744 and BS 6105 (Fasteners and Studs)

ASTM Related Stainless Product Specifications A-276, A-479, and A-182 for Stainless Steel Bar

ASTM A 484M, A-564, A-700, A-416, A-342



Stainless Steel The Value Option®

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