



MMFX 2 (ASTM A1035/AASHTO MP 18) Steel Advantages for Use in Bridge Structures

USE OF MMFX 2 STEEL FOR BRIDGES LOCATED IN HIGH SEISMIC ZONES

Design Guide for Use of ASTM A1035 High-Strength Reinforcement in Concrete Bridge Elements with Consideration of Seismic Performance H. Russell, S. K. Ghosh, M. Saiidi - August 2011 has been published to supplement the findings of **Design of Concrete Structures Using High-Strength Steel Reinforcement** National Cooperative Highway Research Program - NCHRP Report 679 – B. Shahrooz, R. Miller, K. Harries, H. Russell – April, 2011. This study used both the NCHRP report and sponsored research projects to evaluate the applicability and the maximum strength of MMFX 2 Steel reinforcement that may be used in the design of different bridge structural members in Seismic Zones 3 and 4. A brief summary of the findings of this report are shown in the table below.

Use of MMFX 2's higher strength and corrosion resistance presents the opportunity to optimize the structural design of bridges, minimizing materials and reinforcing steel congestion, and provide long service life to structures located in high seismic zones.

Maximum Tensile Strength of ASTM A1035 Reinforcement for Use in Design

Yield Strength, ksi	Foundations			Columns/Walls		Decks	Beams/Girders		
	Abutments	Piles	Pile Caps	Vertical	Confinement	Top and Bottom	Tension	Compression	Shear
Seismic (Zones 3 and 4)									
100	X	X	X	N ⁽²⁾	X	X	X	X	X
75				N ⁽²⁾					
60	X ⁽³⁾	X ⁽³⁾	X ⁽³⁾	N ⁽²⁾	X ⁽³⁾			X ⁽¹⁾	

(1) Yield strength limited to of 60 ksi for shear-friction calculations.

(2) Not recommended.

(3) Yield strength of transverse reinforcement limited to 60 ksi for shear strength computations.

Use of MMFX 2 Steel for Corrosion Protection of Structures

In addition to the strength advantage of MMFX 2 Steel (ASTM A1035/AASHTO MP 18) rebars, corrosion-resistant MMFX 2 rebars are ideal for structural members and systems exposed to, or in direct contact with, corrosive environments, such as: marine environment, de-icing salts, foundation systems in high water tables, or corrosive soil conditions. MMFX 2 rebars have been successfully used in the following applications for corrosion protection: bridge decks and beams, foundation piles and systems, pavement dowel and tie bars, diaphragm walls, marine structures and seawalls. Structural systems reinforced with MMFX 2 rebars have been shown to achieve design service lives in excess of 75 years, as noted in publications such as the following: **The Use of Corrosion Resistant Reinforcement as a Sustainable Technology for Bridge Deck Construction** - TRB Annual Meeting 2010 Paper #10-2214 – January 2010 – A. Moruza, S. Sharp

Conclusion:

MMFX 2 (ASTM A1035/AASHTO MP 18) rebar's unique combination of strength and corrosion-resistance properties provides engineers the opportunity to design more economical, durable, and safer structures.