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## **Use of High-Performance Steel Reinforcing Bars for Concrete Structures**

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**ABSTRACT:** High-Performance steel bars are currently produced commercially and are characterized by their high strength and enhanced corrosion resistance in comparison to conventional Grade 60 steel. This presentation discusses the behavior of one type of commercially available high-performance steel bars known as Micro-Composite Multi-Structural Formable (MMFX) steel. The presentation will briefly review the fundamental characteristics of the MMFX steel bars including their corrosion resistance in comparison to Grade 60 steel. Based on specially designed specimens, the effect of bending the bars on their tensile strength is presented.

The presentation will include the behavior of three full-scale bridge decks tested up to failure. The first and second decks were constructed with the same reinforcement ratio using MMFX and Grade 60 steel, respectively. The third deck was reinforced with MMFX steel using 33 percent less reinforcement ratio in an attempt to utilize the high strength characteristics of the steel.

Based on the research findings a proposed methodology for the design of flexural members reinforced with MMFX steel is presented. The proposed design method is consistent with the ACI 318 approach. The effect of using MMFX steel bars on the shear mode of failure of large-size concrete beams, simulating typical mat foundation of high-rise structures, is also presented.