

High-Strength Reinforcing Bars (HSRBs) and TMS 402: A First Study on Grade 80 Bars

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Abstract:

In the United States, the adoption of high-strength non-prestressed reinforcement was initiated by the reinforced concrete industry. The adoption of high-strength steel was motivated by several factors, including the ability to gain member strength and reduce steel congestion, construction costs, and building carbon footprint. The goal of this paper is to perform a first study on the effects of TMS 402 provisions on the use of Grade 80 steel and examine if material savings can result from this usage. It is shown that material cost reductions on the order of 25% can be achieved with Grade 80 bars, with reductions in the carbon footprint up to 33%. Overall, the use of Grade 80 bars results in less steel with associated weight and cost savings. Furthermore, this research study shows that Grade 80 steel can improve the flexural and axial load capacities of tension-controlled masonry members, but this effect diminishes in the compression-control region. Provisions on member deflections are generally met by Grade 80-reinforced members, but the reduced flexural reinforcement requires some attention to ensure adequate crack control. Results of this study can be used to create the necessary momentum for incorporating Grade 80 steel in the TMS 402 provisions.

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