Effect of Thermal Variations on Bond Strength of Fusion-Bonded Epoxy-Coated Bars

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Abstract: Fusion-bonded epoxy coating is extensively used to enhance the corrosion resistance of reinforcing steel. The bond strength between these bars and the concrete is expected to be less than that of the uncoated bars and it may be further impaired due to prolonged exposure to thermal variations. This investigation was conducted to evaluate the effect of thermal variations, simulating the changes in the night to day temperature, on the bond strength of fusion-bonded epoxy-coated steel reinforcement. The pull-out specimens, prepared using bars of two different sizes and two coating thickness, were exposed to thermal cycling. The critical and ultimate bond strength of the fusion-bonded epoxy-coated bars were compared with that of the uncoated bars. The results indicated a reduction in the critical bond strength between concrete and the fusion-bonded coated bars. Furthermore, the difference between the critical bond strength in the coated and uncoated bars decreased with increasing thermal cycles, indicating that thermal variation has a greater effect on bond strength than the coating thickness.