Empirical Analytical Modelling of Average Bond Stress and Anchorage of Tensile Bars in Reinforced Concrete

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Abstract : The design specifications for calculating development and lapped splice lengths of reinforcement in concrete are derived from a conventional empirical modelling approach that correlates experimental test data using a single mathematical equation. This paper describes part of a recently completed experimental research program to assess the effects of different structural parameters on the development length requirements of modern high strength steel reinforcing bars, including the case of lapped splices in large-scale reinforced concrete members. The normalized average bond stresses for the different variations of anchorage lengths are assessed according to the general form of a typical empirical analytical model of bond and anchorage. Improved analytical modelling equations are developed in the paper that better correlate the normalized bond strength parameters with the structural parameters of an empirical model of bond and anchorage.