

Time-Dependent Behaviour of Reinforced Concrete Beams under Sustained and Repeated Loading

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Abstract : The current study aims to highlight the loading characteristics impact on the time evolution (focusing particularly on long term effects) of the deformation of realized reinforced concrete beams. Namely the tension stiffening code provisions (i.e. within Eurocode 2) are reviewed with a clear intention to reassess their operational value and predicting capacity. In what follows the experimental programme adopted along with some preliminary findings and numerical modelling attempts are presented. For a range of long slender reinforced concrete simply supported beams (4200 mm) constant static sustained and repeated cyclic loadings were applied mapping the time evolution of deformation. All experiments were carried out at the Heavy Structures Lab of the University of Leeds. During tests the mid-span deflection, creep coefficient and shrinkage strains were monitored for duration of 90 days. The obtained results are set against the values predicted by Eurocode 2 and the tools within an FE commercial package (i.e. Midas FEA) to yield that existing knowledge and practise is at times over-conservative.

Keywords : Eurocode2, midas fea, repeated, sustained loading.

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