

Serviceability of Fabric-Formed Concrete Structures

Authors : Yadgar Tayfur, Antony Darby, Tim Ibell, Mark Evernden, John Orr

Abstract : Fabric form-work is a technique to cast concrete structures with a great advantage of saving concrete material of up to 40%. This technique is particularly associated with the optimized concrete structures that usually have smaller cross-section dimensions than equivalent prismatic members. However, this can make the structural system produced from these members prone to smaller serviceability safety margins. Therefore, it is very important to understand the serviceability issue of non-prismatic concrete structures. In this paper, an analytical computer-based model to optimize concrete beams and to predict load-deflection behaviour of both prismatic and non-prismatic concrete beams is presented. The model was developed based on the method of sectional analysis and integration of curvatures. Results from the analytical model were compared to load-deflection behaviour of a number of beams with different geometric and material properties from other researchers. The results of the comparison show that the analytical program can accurately predict the load-deflection response of concrete beams with medium reinforcement ratios. However, it over-estimates deflection values for lightly reinforced specimens. Finally, the analytical program acceptably predicted load-deflection behaviour of on-prismatic concrete beams.

Keywords : fabric-formed concrete, continuous beams, optimisation, serviceability

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