A Material Model Suitable for NLFEA of Large Reinforced Concrete Structures

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ABSTRACT

In order to utilize non-linear finite element analyses during design of large concrete structures, there is need for a suitable material model for concrete. A fully triaxial empirically based material model has been implemented in a commercial finite element code. For simplicity, full brittleness was assumed, and a fixed, non-orthogonal crack formation algorithm was developed with a maximum of three cracks per integration point. The material model also allows for crack closure. In the accompanying presentation, results from a selection of benchmark analyses will be presented, and the inherent modelling uncertainty will be discussed. Despite the simplicity of the material model, a low modelling uncertainty was achieved. The material model is currently being tested in DIANA.

Key words: Reinforced Concrete, Large Concrete Structures, Modelling Uncertainty, Non-linear Finite Element Analysis, Structural Design.