A multi-level structural assessment proposal for reinforced concrete bridge deck slabs

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This paper proposes a multi-level assessment strategy for reinforced concrete bridge deck slabs. The strategy is based on the principle of successively improved evaluation in structural assessment. It provides a structured approach to the use of simplified as well as advanced non-linear analysis methods. Such advanced methods have proven great possibilities to achieve better understanding of the structural response and to reveal higher load carrying capacity of existing structures. The proposed methods were used for analysis of (a) previously tested cantilever slab(s) subjected to shear type failure (Vaz Rodrigues, 2007) and two-way slabs subjected to bending failure (Fall et al., 2014), in both cases loaded with concentrated loads. The case studies show that the proposed assessment strategy and analysis methods are feasible and give conservative estimates of the design capacity. Furthermore, the results show that more advanced methods are capable of demonstrating higher load carrying capacity and gives improved understanding of the structural response.

Key words: bridge deck slab, nonlinear FE, multi-level assessment