Creep loss variation in prestressed concrete beams

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Abstract: Stresses due to permanent loading in prestressed concrete beams induce variable creep losses along bonded tendons. The main factors characterizing this variation are outlined and the corresponding effect on mid-span deflection is investigated for several cable profiles commonly used in simply supported concrete beams. Simplified formulae for evaluating maximum deflection taking account of the consequences of creep loss variation are proposed. This study analytically evaluates the creep loss variation along prestressed concrete beams and assesses its influence on deflection. The results have shown that the absolute range of variation can be as high as 20.0%. Furthermore, neglecting the creep loss variation along simply supported prestressed concrete beams could cause the total deflection due to dead loads and prestressing force including creep losses to be underestimated by 15%.