

Static analysis of horizontally curved bridge decks supported by flexible multi-girders

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Abstract

A static analysis using a combination of finite difference method and a semi-inverse solution of Levy-type is proposed to analyse a horizontally curved bridge deck supported by flexible multi-girders. The deck slab is idealized as a curved plate, orthotropic or isotropic, simply supported along the two radial edges and longitudinally by a number of girders whose flexural and torsional properties are known. The analysis thus takes into account the bending and torsional stiffnesses of the girders at each support location. The proposed method has also been extended to solve multi-span continuous curved decks by using the method of consistent deformations. The method is computerized to readily analyse a particular curved deck. The accuracy of the proposed method has been verified and numerous decks have been analysed to study the influence of various parameters on girder internal forces.