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THE FINITE STRIP METHOD IN BRIDGE ENGINEERING

The book is intended to provide a basic understanding of the theory of the method and also to serve as a user's guide. Research experience at the University of Dundee has been drawn on. The analysis of a simply supported beam is presented, followed by the conventional finite-strip procedure for plates and box girders. The two higher-order finite-strip procedures are described. The relevant stiffness and force matrices for conventional and higher-order finite strips are presented in explicit form. A flexibility approach is developed, with which it is possible to simulate the detailed features of intermediate supports and stiffening members. Finite strip analysis is applied to bridges of circular and skew planform and fixed-end bridges. A section is devoted to the analysis of plate and box structures other than bridges. The effects of cracking in multibeam concrete decks and in reinforced concrete multicellular bridges cast in situ on the load distribution behaviour of the corresponding bridge types are investigated and recommendations are given for effective finite strip simulation of these bridge types. The flexibility approach for indeterminate structures is applied to multispan concrete box bridges. Effective ways of simulating constructional features of intermediate supports and stiffening diaphragms are suggested. Examples are given. Application of finite strip procedure to steel box girder bridges is explained. A two-step approximate scheme is proposed for the analysis of cable-stayed bridges. Details of two finite-strip programs (FISBOB2 and FISAN1) for box girder bridges are summarised. /TRRL/

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