Ultimate strength of longitudinally stiffened I-girder webs subjected to combined patch loading and bending

Carlos Graciano*, Euro Casanova

Departamento de Mecánica, Universidad Simón Bolívar, Apdo. 89000, Caracas 1080-A, Venezuela

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Abstract

A numerical study is performed to investigate the ultimate strength of I-girder webs subjected to the combined action of patch loading and bending moment. The study was conducted by means of nonlinear finite element analysis. Initial geometrical imperfections, plastic material behaviour and large deflection effects were considered in the model. The finite element model was validated against experimental results taken from the literature. A parametric study was carried out in order to investigate the influence of the magnitude of the bending moment and the relative location of the stiffener on the ultimate strength to patch loading. Furthermore, diagrams showing the interaction between the aforementioned parameters are presented.

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1. Introduction

In general, slender I-girders webs are used in bridge construction. During erection by incremental launching, bridge girders (box and plate) are subjected to a combination