

Seismic Design of Bridges: Present and Future

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Abstract

A critical overview is provided of current trends in codes for seismic design of bridges, with emphasis on European practice. It is discussed whether the current Eurocode 8-2 provisions are performance-based and what, if anything, is really missing or lagging behind the pertinent state-of-the-art. Two different approaches recently proposed by the author for performance-based design (PBD) of bridges are presented and the feasibility of incorporating them in the next generation of codes, such as the new EC8-2 (currently in the evolution process), is discussed. The first procedure is in line with the exigencies of 'direct DBD' wherein stiffness and subsequently strength of the bridge are determined to satisfy a target displacement profile, with due account of the effect of higher modes. The second procedure is 'deformation-based design' wherein local deformations of dissipating components are an integral part of the design; two versions of this procedure are presented, one for bridges with ductile piers and one for seismically isolated bridges. Both PBD procedures are applied to a code-designed bridge and comparisons are made in terms of feasibility, cost, and performance.