

A Perspective Study on Resilience against Hazards for Near-Fault Bridges

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Abstract

The bridge resilience is the ability of a bridge exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, defined by the United Nations Office for Disaster Risk Reduction (2007). This definition encapsulates the possibility of structural damage, the issue of resuming normal functionality and the important of the recovery time. In the past decade, NCREE focused on several researches related to these items and a few results were obtained and applied to practical seismic design/retrofit of bridges. Now we intend to extend the researches to seismic hazards, mitigation methods and disaster relief for near-fault bridges.

Some shaking table tests of single pier will be proposed to study structural performance of ductile or nonductile design considering instantaneous near fault excitation, serving as basis of series of researches. In addition, case studies on bridges herein subjected to creep ground movement of fault will be introduced for purpose of solution providing. The structural evaluation, retrofitting, inspection and monitoring of bridges are discussed as well. Furthermore, a novel composite bridge for emergency disaster relief is proposed and introduced. Finally, the interactive relationships between earthquake, flood and material deterioration of bridges will be discussed for multiple hazards concern. This presentation is expected to provide a perspective view on enhancing bridge resilience.