

Seismic Fortification Intensity Evaluation by a Cost-Benefits Analysis – Case Study of Three Bridges

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Abstract. A case study on evaluation of seismic fortification intensity by cost-benefit analysis is presented in this paper. Three bridges designed with intensities VI, VII and VIII are modeled and their seismic responses are calculated by push-over approach, and the damage indices are estimated by a stiffness degradation model. The vulnerability matrices are built from a set of probability density functions and the damage results. In seismic risk cost assessments of the bridges, both direct and indirect losses are taken into account by ratios to the original construction costs. The fortification intensity is evaluated from the minimum sum of the original cost and seismic risk cost in bridge life-cycle. The result shows that the most effective intensities at three sites with different hazards are close to those with exceeding probability 10 % in 50 years, except intensity VIII is little bit better at a site in intensity VII zone.