Improving the accuracy of near-real-time seismic loss estimation using post-earthquake remote sensing images and logistic classification method

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Abstract: With the rapid development of remote sensing technology, satellite or aerial images from the disaster area become available within 24 hours after an earthquake. The collapsed buildings can be easily identified from these images using image recognition (IR) technology. In this work, a framework for near-real-time seismic loss estimation for regional buildings is proposed, which improves the accuracy of nonlinear time-history analysis (THA)-based loss estimations by taking advantages of the results of the IR technology. Specifically, a series of THA are performed for the target regional buildings, thereby generating a number of simulation results. The similarities of those simulation results to the identified collapse scene are measured using both simple counting method and logistic classification method. The solution which bears the strongest similarities will be selected as the optimal one. Several case studies signify that the use of the IR technology and logistic classification method leads to much closer estimations to the actual economic losses.

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