

Exploring the Physical Environment and Building Features in Earthquake Disaster Areas

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Abstract : Earthquake is an unpredictable natural disaster and intensive earthquakes have caused serious impacts on social-economic system, environmental and social resilience. Conventional ways to mitigate earthquake disaster are to enhance building codes and advance structural engineering measures. However, earthquake-induced ground damage such as liquefaction, land subsidence, landslide happen on places nearby earthquake prone or poor soil condition areas. Therefore, this study uses spatial statistical analysis to explore the spatial pattern of damaged buildings. Afterwards, principle components analysis (PCA) is applied to categorize the similar features in different kinds of clustered patterns. The results show that serious landslide prone area, close to fault, vegetated ground surface and mudslide prone area are common in those highly damaged buildings. In addition, the oldest building might not be directly referred to the most vulnerable one. In fact, it seems that buildings built between 1974 and 1989 become more fragile during the earthquake. The incorporation of both spatial statistical analyses and PCA can provide more accurate information to subsidize retrofit programs to enhance earthquake resistance in particular areas.

Keywords : earthquake disaster, spatial statistic analysis, principle components analysis (pca), clustered patterns

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