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Title:

Estimation of Human Casualty Risk Potential in Building Damaged and Their Applications for Seismic Protection

Abstract:

The purpose of this research is to reduce human casualties, inclusive of the dead and the injured, in buildings damaged due to earthquakes. First, the paper proposed the estimation method for death toll in a house unit by using a new visualized chart on damage pattern of buildings based upon the fact that a death rate varies according to building damage pattern controlling the volumetric loss of indoor survival space. To progress this idea into the effective seismic reinforcement plan for buildings at the aim of decreasing the casualties in the municipality and governmental unit, the paper introduced the definition of the damage index, which means the numerical scale on the damage degree of individual building, into the damage pattern chart. As a result of these processes we can discuss effective strategy of seismic strengthening houses for reduction of death toll. Second, the paper built the probabilistic model based on binomial distribution capable of estimating the indoor seismic injury risk due to overturned furniture during swaying of building and developed a seismic alert system recognizing automatically the indoor risky space with computer vision as an application of the earthquake early warning.