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## Study of Building Seismic Risk Evaluation Method Based on Response Analysis to Support Seismic Disaster Prevention measures

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Building damage evaluation methods based on damage rate curves are effective for determining seismic risk distributions and total damage for each local government or for each earthquake based on nationwide seismic hazard information, distribution of buildings, etc. On the other hand, in order to progress from nationwide macro seismic risk evaluation to the establishment of specific seismic disaster prevention strategies by local governments and to the development of practical disaster prevention and disaster reduction activities by local governments and local residents, it is considered that building damage evaluation methods that are capable of visualizing detailed seismic risk information for building units in local areas such as wards are necessary.

To evaluate damage to building units, it is necessary to consider the following points.

?The building damage greatly depends on the ground amplification properties, so it must be possible to take into consideration the frequency properties of the seismic motions (ground frequency properties) and the building frequency properties.

?It must be possible to appropriately reflect the elastic plastic properties (reduction in stiffness, increase in damping due to hysteretic damping) up to collapse of the building.

?It must be possible to comprehensively explain to a certain extent building damage from past earthquakes.

Taking the above into consideration, the outline of a damage evaluation method was demonstrated based on seismic response calculations, as a seismic risk evaluation method for specific scenario earthquakes, with the objective of supporting effective and rational seismic disaster prevention measures by local governments and local residents. Using this method a study was carried out in which building damage was calculated from the Niigata-Ken Chuetsu Earthquake (2004) based on individual building data for Nagaoka City and Ojiya City, and the calculated damage was compared with the actual damage, and tasks for the future were identified.

**Keywords:** Seismic Risk Evaluation, Building Damage Evaluation, Response Spectra, Seismic Response Calculation, Ground Amplification Spectrum Evaluation Method