Seismic Performance Evaluation Of The Traditional Wooden Buildings Focusing On The Differences In Structural Characteristics

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Many traditional wooden buildings exist in Japan. These are built using traditional construction methods rather than conventional framework construction methods. When evaluating seismic performance of traditional wooden houses using the calculation of lateral load carrying capacity, which is a general seismic diagnosis method, it may not be evaluated properly. The calculation of response and limit strength is used to evaluate the seismic performance of traditional wooden houses. However, evaluation methods for extremely low floor heights or plan have not yet been developed. In this paper, to evaluate the seismic performance of traditional wooden houses by focusing on the differences in plan shape and floor height, and to examine the applicability of the calculation of response and limit strength. The main 2nd floor is a two-story building in which the 2nd floor is used for living, and as the height of the 2nd floor decreases, it is classified as a mezzanine floor or a skipped floor. The 1st floor has two types of floor plan: the street garden type and the entrance type, and one row type and two rows type are set for each. The floor area ratios are 80% and 100% for the main 2nd floor, and 50%, 60%, and 70% for the mezzanine and the skipped floor. The response and limit strength method is a method to predict the seismic response values using the acceleration response spectrum of a building based on the seismic resilience characteristics of each floor of the building, replacing the building with an equivalent single mass system, and examining the safety of the building. The design criterion is an inter story deformation angle of 1/120 rad or less for rare earthquakes, and 1/20 rad or less for very rare earthquakes. In terms of shear capacity, the retained shear capacity increased as the floor area increased. In terms of floor height, the risk of collapse increased as the height of the 1st floor increased, but the 1st floor was less likely to collapse as the height of the 2nd floor increased. As the height of the 2nd floor increases, the 2nd floor is deformed, but the risk of collapse is not higher than that of the 1st floor. The single-row model with 80% floor area ratio deforms significantly when the longitudinal direction exceeds 10 m. The two-row model is more likely to collapse when the floor area increases. In the single-row model with a floor area ratio of 100%, there was almost no change in the response deformation angle, and the two-row model became less likely to collapse as the floor area became larger. With regard to the applicability of response and limit strength method, the retained shear capacity of the 2nd floor may be calculated to be larger for the 2nd floor with a mezzanine or skipped floor than for the main floor. In addition, the results show that the 2nd floor of the skipped floor, which is calculated to have the highest shear capacity, deforms more than the mezzanine floor.