

Study on vibration control method for traditional folk house using CLT bearing panel connected with damper

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Abstract

The old town area of Omihachiman-city, Shiga prefecture, has many Japanese traditional landscapes. Those areas are famous for tourism and film locations, and old wooden houses and townhouses that constitute the landscapes are important resources for the city. However, there are problems that vacant houses increase in these districts, and management of buildings is getting out of order. As a result, in some buildings, the damage due to aging is so prominent that it is apparent from the exterior view (Fig. 1). Therefore, the preservation and reuse of these old folk houses are urgent issues.

In this article, we examine the seismic resistant reinforcement which obtains the damping systems by connecting the building with the CLT (Cross Laminated Timber) bearing panels. It is important to assume that exterior appearances of buildings shouldn't be largely changed, minimize damages on the frame in processing of reinforcement, and maintain the mood of the space where the wooden frame by the conventional construction method can be seen. Therefore, we propose a seismic reinforcement method which incorporates highly rigid CLT panels connected to the structure with dampers in the building. The panels also have usage as exhibiting fixtures (Fig. 2). We verify the effectiveness of the method by numerical analysis and optimize the parameters that are the values of stiffness and mass of the CLT panels, and damping ratio of dampers.



Figure 1: Exterior view of a traditional folk house



Figure 2: Images of interior view (exhibited paintings displayed on CLT panels)