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In-plane Shear Test of Floor Structure Adapting for the CSTS Using a Cross Laminated Timber

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Abstract

In light of the global environment issues, the authors proposed a building system comprising steel and timber structure (Hereafter referred to as CSTS) and its design method, which consist of rolled section steel and timber. The CSTS is assumed to be mid-rise story building steel structures. This design method use concept of a damage controlled structure with a buckling-restrained brace as a seismic response control member and its analytical model is established based on the available experimental studies. The CSTS is aiming to expand to be used from main structure to floor structure in the building of the non-residential sector and assumed to use materials such as a cross laminated timber for floor structure. This cross laminated timber has a high stiffness and strength because it is joined by multi-layer panels.

In this study, we propose floor structure adapting for the CSTS using cross laminated timber. In-plane shear test of the joint which are consisted of unheaded stud-shear connectors for joint of the CSTS beam and floor structure is conducted. Structural performances of joint of the CSTS beam and floor structure are evaluated. The findings obtained from tests indicate that joint of the CSTS beam and floor structure has a high stiffness and strength.

Keywords: Steel; Timber; Composite structure; Cross laminated timber; In-plane shear test; Reuse.

1 Introduction

Building structure is aiming to the primary goal of extending the service life of the entire structure and a secondary goal of realizing a structure system that enables the structural members to be reused in case the primary goal of longevity cannot be attained due to design, economic, or social factors in Figure 1 [1,2].

In order to address global environmental issues, there is an urgent need for the building structure

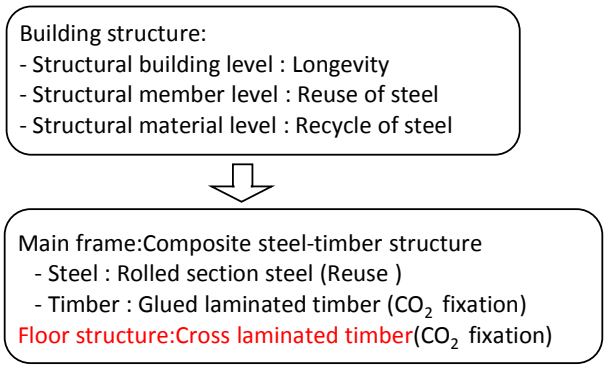

Figure 1. CSTS and environmental burden

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