



Modal Vibration Testing of an Innovative Timber Structure

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Timber-Concrete Composite

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Summary:

This research paper deals with the evaluation of the dynamic modal vibration tests conducted on an innovative timber structure, the ETH House of Natural Resources. The building serves as a demonstrator of several innovative structural systems and technologies relating to timber. The main load-bearing structure comprises a posttensioned timber frame, which was subjected to modal vibration tests, firstly in the laboratory and, subsequently on the construction site. In this paper, the modal characteristics (eigenfrequencies, damping ratios and mode shapes), obtained from the laboratory testing campaign are presented. The modal vibration data is evaluated using polynomial and subspace identification techniques. The obtained results reveal that the structure exhibits pure translational, beam and column modes, as well as mixed beam-column modes. The bottom connection of the columns delivers significant influence on the modal characteristics, whereas the level of post-tensioning force yields no substantial influence in the modal characteristics obtained from low amplitude modal vibration tests.

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