



Vibration Techniques for Structural Evaluation of Wood Floor Systems

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Abstract

The primary means of inspecting buildings and other structures is to evaluate each structure member individually. This is a time consuming process that is expensive; particularly if sheathing or other covering materials must be removed to access the structural members. The objective of this study was to determine if transverse vibration methods could be used to effectively assess the structural integrity of wood floors as component systems. A total of 22 wood floor systems (constructed with solid sawn wood joists), including 14 laboratory-built floor sections and 8 in-place floors in

historic buildings, were tested. Both free and forced transverse vibration methods were used to determine the natural frequency, damping ratio, and stiffness of wood floor systems constructed in laboratory settings. A forced vibration method was applied to in-place floor systems to assess their stiffness and structural integrity. The results shown that deterioration in wood floor systems can be identified by measuring damped natural frequency of those floors. The forced vibration method used in this research holds promise as an inspection tool.

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