



Time-Dependent Behavior of Cross-Laminated Timber

<https://research.thinkwood.com/en/permalink/catalogue1111>

Author: Pirvu, Ciprian
Organization: FPI Innovations
Year of Publication: 2014
Country of Publication: Canada
Format: Report
Material: CLT (Cross-Laminated Timber)
Topic: Mechanical Properties
Keywords: Creep
Duration of Load
Time Dependent Behavior
Stiffness
Deflection
Language: English
Research Status: Complete

Summary:

Cross laminated timber (CLT) panels were manufactured and tested to assess their time dependent behaviour. This study is intended to help guide the development of an appropriate test method and acceptance criteria to account for duration of load and creep effects in the design of structures using CLT.

Nine CLT panels of different qualities and using different wood species combinations were manufactured at a pre-commercial pilot plant out of local wood species. The CLT panels manufactured in this study were pressed at about 54% lower pressure than the minimum vertical pressure specified by the adhesive manufacturer due to a limitation of the press, so the CLT panels are viewed as a simulated defective sample, which may occur in a production environment due to material- or process-related issues.

ASTM D6815-09 provides specifications for evaluation of duration of load and creep effects of wood and wood-based products. The standard was designed to accommodate wood products that can be easily sampled, handled, and tested under load for minimum 90 days and up to 120 days. The standard requires a minimum sample size of 28 specimens. Because of its large dimensions, CLT products are not feasible for experiments requiring such large sample sizes. However, the findings of this study revealed potential for some of the acceptance criteria in ASTM D6815-09 to be applied to CLT products. The CLT billets in this study were assessed in accordance to the creep rate, fractional deflection, and creep recovery criteria in ASTM D6815-09 standard. All CLT billets tested in this study showed (1) decreasing creep rates after 90/120 days of loading, (2) fractional deflections less than 2.0 after 90-day loading, and (3) higher creep recovery than 20% after 30 days of unloading, as required by ASTM D6815-09. A single replicate billet was used per CLT configuration instead of the minimum sample size required by the standard which may have an effect on the findings.

Online Access: Free

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