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Mechanical Properties of Wooden I-beams with Plantation Timber Materials in Hokkaido II.
Long term bending creep property

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Abstract: Bending creep properties of wooden I-beams with Todomatsu (*Abies sachalinensis*) lumber and Karamatsu (*Larix kaempferi*) plywood were examined by load-duration tests at different initial moisture content. Four I-joists of 235 mm depth were fabricated with lumber flanges and plywood webs glued by aqueous vinyl polymer solution isocyanate adhesive. These joists were divided into two pairs of specimens and each pair was conditioned at 20°C and 65% or 85%RH to adjust their initial moisture content. The creep tests for six years were carried out in a laboratory under uncontrolled air conditions. Test results showed that the mid-span deflections of specimens conditioned under 85%RH obviously increased with desorption at the start of loading. Following this immediate creep behavior, the deflections of all specimens fluctuated in response to changes of moisture content so that the deflections decreased in humid summer and increased in dry winter periodically. The deflections and moisture content of specimens conditioned at 85%RH fluctuated considerably more than those conditioned at 65%RH, and the prior conditioning in high humidity affected the creep behavior during the whole test period. The relative creep after 50 years of specimens conditioned at 85%RH was estimated to be greater than that of specimens conditioned at 65%RH. This result showed that wooden I-beams should be kept away from unexpected moisture or high humidity during shipment and application as floor framing to minimize creep deflection.

Keywords: wooden I-beam, bending creep, mechano-sorptive creep, initial moisture content

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