

カラマツ成熟材部から採材したラミナの特性と製品の 強度等級別製造シミュレーション

高梨 隆也 *1, 山田 実歩 *2,5, 松本 和茂 *3, 渡辺 誠二 *4, 大橋 義徳 *1,
石原 亘 *1, 植松 武是 *5

Properties of laminae of mature wood of Japanese larch and stress grade simulation of glulam and CLT

Ryuya TAKANASHI, Miho YAMADA, Kazushige MATSUMOTO, Seiji WATANABE,
Yoshinori OHASHI, Wataru ISHIHARA and Takeyoshi UEMATSU

木材学会誌, 68(2), 88-96 (2022).
Mokuzai Gakkaishi, 68(2), 88-96 (2022).

Key words : Young's modulus, twist warp, rough sawn thickness, jointed laminae, high stress grade
キーワード : ヤング係数, ねじれ, 製材厚さ, 縦継ぎラミナ, 高強度等級

カラマツの成熟材部から採材されるラミナの材料特性を検証することを目的とし、末口径20cm以上の原木から採材したラミナ原板（従来ラミナ）および、末口径26cm以上の原木の成熟材部から採材したラミナ原板（側取りラミナ）の縦振動ヤング係数およびねじれの計測を行った。また、製材厚さおよび横切り回数と縦継ぎラミナの製造歩留まりの関係を調べたほか、集成材およびCLTで製造可能な強度等級のシミュレーションを行った。側取りラミナは従来ラミナに比べ縦振動ヤング係数は高く、ねじれは小さかった。厚さ30mmの縦継ぎラミナの製造時、側取りラミナでは原板の製材厚さを35mm、横切り回数を原板1枚に対して1回としたとき歩留まりが最大となった。側取りラミナでは集成材で対称異等級構成E150-F435、CLTでMx120およびS120の強度等級が実現可能であった。

Material properties of laminae sawn from mature parts of large diameter logs of Japanese larch (*Larix kaempferi*), such as Young's modulus obtained by the longitudinal vibration method and twist warp, were investigated. These laminae were sawn from Japanese larch logs from Hokkaido, Japan, and had small end diameters of 20 cm or more (≥ 20 -cm logs) and 26 cm or more (≥ 26 -cm logs). Laminae from ≥ 26 -cm logs were sawn from mature wood parts of trucks. Subsequently, the effects of the rough sawn size and crosscut frequency on yield in the production of jointed laminae were examined. Additionally, simulations of stress grades capable of manufacturing glulam and cross laminated timber (CLT) were conducted. Laminae from ≥ 26 -cm logs had higher Young's modulus and smaller twist warp than those from ≥ 20 -cm logs. In this study, the yield in the production of a 30-mm-thick jointed laminae was maximized when the rough sawn thickness was 35 mm and crosscut frequency was once for each rough sawn lamina. The possible stress grade of glulam made of laminae from ≥ 26 -cm logs was as high as E150-F435 in symmetrical mixed-grade according to the Japanese Agricultural Standards for glulam. The major stress grades of CLT made of laminae from ≥ 26 -cm logs corresponded to Mx120 and S120 according to the Japanese Agricultural Standards for CLT. The laminae from mature wood parts of the Japanese larch have the potential to improve yields in the manufacturing of jointed laminae and produce high stress grade glulam and CLT.

*1 技術部生産技術グループ, *2 札幌市都市局建築指導課, *3 企業支援部研究調整グループ,
*4 企業支援部, *5 北海学園大学工学部建築学科