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スパイラルワインディング法による円筒形LVLの製造（第3報）†
繊維傾斜を持つLVLのバットジョイントの性質*1

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Manufacture of Cylindrical LVL by Spiral-Winding Method III.†
Relationships between tensile strength, veneer grain angle, and butt joint interval in LVL*1

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The relationships between veneer grain angles, distance between end butt joints in the adjacent veneer layers (butt joint interval), and tensile strengths of LVL were investigated. These are fundamental factors for the design of the cylindrical LVL (C-LVL). Rotary cut veneer of sugi (*Cryptomeria japonica*) and akamatsu (*Pinus densiflora*) was used. 4 or 8-ply flat LVL with interlocked (10 and 45 degrees) or parallel (0, 10, 45 and 90 degrees) veneer grain was manufactured using 2.4 mm or 1.4 mm thick veneers. Butt joint intervals of the LVL specimens were varied from 0 to 65 mm. The 8-ply specimens were prepared to investigate the effects of interlocked laminations on tensile strength. In addition, flat LVL specimens were manufactured using stitched sugi veneer tapes to simulate a C-LVL shell, and tested in tension. The results are as follows:

1) When the butt joint interval was more than 12 times veneer thickness in sugi and 15 times in akamatsu, the tensile strength of 4-ply LVL was not affected by the butt joints of veneer.

2) The interlocked-grain structure in the alternate layers of LVL also prevented decrease in the tensile strength, which is almost the same effect in the tensile Young's modulus from our previous study.

3) Interlocked-grain structure of veneer layers has no effect on the section of the face ply adjacent to a butt joint of the next layer.

4) The relationships between butt joint interval and tensile strength of LVL are determined by the ratio of the tensile strength and shear strength of the veneer laminae.

5) Intersecting portions of adjacent layers of the wall of a C-LVL shell will be reinforced in its peripheral region and are therefore not critical to the strength of C-LVL.

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