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Evaluation of the End Effect Impact on the Torsion Test for Determining the Shear Modulus of a Timber Beam through a Photogrammetry Approach

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Abstract : The timber beam end effect in the torsion test is evaluated using binocular stereo vision system. It is recommended by BS EN 408:2010+A1:2012 to exclude a distance of two to three times of cross-sectional thickness (b) from ends to avoid the end effect; whereas, this study indicates that this distance is not sufficiently far enough to remove this effect in slender cross-sections. The shear modulus of six timber beams with different aspect ratios is determined at the various angles and cross-sections. The result of this experiment shows that the end affected span of each specimen varies depending on their aspect ratios. It is concluded that by increasing the aspect ratio this span will increase. However, by increasing the distance from the ends to the values greater than 6b, the shear modulus trend becomes constant and end effect will be negligible. Moreover, it is concluded that end affected span is preferred to be depth-dependent rather than thickness-dependant.

Keywords : end clamp effect, full-size timber test, shear properties, torsion test, wood engineering
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