

Determination of Elastic Constants for Scots Pine Grown in Turkey Using Ultrasound

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Abstract : This study investigated elastic constants of scots pine (*Pinus sylvestris* L.) grown in Turkey by means of ultrasonic waves. Three Young's modulus, three shear modulus and six Poisson ratios were determined at constant moisture content (12 %). Three longitudinal and six shear wave velocities propagating along the principal axes of anisotropy, and additionally, three quasi-shear wave velocities at 45° with respect to the principal axes of anisotropy were measured using EPOCH 650 ultrasonic flaw detector. The measured average longitudinal wave velocities for the sapwood in L, R, T directions were 4795, 1713 and 1117 m/s, respectively. The measured average shear wave velocities ranged from 682 to 1382 m/s. The measured quasi-shear wave velocities varied between 642 and 1280 m/s. The calculated average modulus of elasticity values for the sapwood in L, R, T directions were 11913, 1565 and 663 N/mm², respectively. The calculated shear modulus in LR, LT and RT planes were 1031, 541, 415 N/mm². Comparing with available literature, the predicted elastic constants are acceptable.

Keywords : elastic constants, prediction, Scots pine, ultrasound

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