World Academy of Science, Engineering and Technology
International Journal of Materials and Metallurgical Engineering
Vol:10, No:09, 2016

Effects of Heat Treatment on the Elastic Constants of Cedar Wood

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Abstract : Effects of heat treatment on the elastic constants of cedar wood (Cedrus libani) were investigated. Specimens were exposed to heat under atmospheric pressure at four different temperatures (120, 150, 180, 210 °C) and three different time levels (2, 5, 8 hours). Three Young's modulus (EL, ER, ET) and six Poisson ratios (μLR, μLT, μRL, μRT, μTL, μTR) were determined from compression test using bi-axial extensometer at constant moisture content (12 %). Three shear modulus were determined using ultrasound. Six shear wave velocities propagating along the principal axes of anisotropy were measured using EPOCH 650 ultrasonic flaw detector with 1 MHz transverse transducers. The properties of the samples tested were significantly affected by heat treatment by different degree. As a result, softer treatments yielded some amount of increase in Young modulus and shear modulus values, but increase of time and temperature resulted in significant decrease for both values. Poisson ratios seemed insensitive to heat treatment.

Keywords : cedar wood, elastic constants, heat treatment, ultrasound
Conference Title : ICWSE 2016 : International Conference on Wood Science and Engineering
Conference Location : London, United Kingdom
Conference Dates : September 29-30, 2016