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Development of a Method to Predict the Bending Strength of Lumber without Regard to Species using X-ray Images[1]

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ABSTRACT

Several models have been developed for predicting bending strength of lumber using X-rays, but most require species-specific classifications. However, the classification is very difficult because logs or cants can arrive without leaves or bark. This study was carried out to develop an alternative bending strength prediction model that does not lose precision when the species is unknown. The study proposes an Equivalent Density Model (EDM), in which a cross-section is quantified as equivalent density. Because the relationship between density and strength of small clear specimens is not affected by species, the EDM was expected to correlate to strength regardless of species. This model predicted the modulus of rupture in two species with R^2 = 0.73, although the two were mixed. Therefore, it may be possible to predict bending strength using X-rays without classifying lumber by species.

Keywords : *Knot depth ratio, X-ray, Equivalent Density Model, Species independence*

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