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Effect of Timber Seasoning Practices on Occurrence of Seasoning Defects in Sri Lankan Furniture Manufacturing Industry

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Abstract

Wood is a primary natural raw material used in Sri Lanka's established furniture manufacturing industry for producing value-added products such as tables, chairs, cabinets, and flooring due to its aesthetic appeal, strength, and durability. However, wood is a hygroscopic material, and fluctuations in moisture content (MC) cause dimensional changes that can lead to instability and increased susceptibility to decay, particularly at high MC levels. Timber seasoning is therefore essential to reduce MC to an acceptable range of 8-12% through air seasoning or kiln seasoning under controlled conditions of temperature, relative humidity, and airflow. Improper seasoning practices can result in defects such as checks, splits, and warping, which reduce product quality and economic value. This study evaluated the occurrence of seasoning defects in three commonly used furniture timber species in Sri Lanka, namely teak (*Tectona grandis*), mahogany (*Swietenia macrophylla*), and pine (*Pinus caribaea*), under different seasoning practices. Timber planks measuring 1800×150×25 mm^3 were subjected to five seasoning practices, including air seasoning and four different kiln seasoning methods. Defects were qualitatively assessed through visual inspection to determine the presence or absence of surface and end checks, surface and end splits, and warping defects such as cup and bow. Pearson Chi-square and Likelihood Ratio tests were conducted using Minitab to assess the association between seasoning practices and defect occurrence. The results revealed a significant association between seasoning practice and defect occurrence (Pearson χ^2 (4, N=900)=144.337, p<0.001; Likelihood Ratio χ^2 (4)=157.456, p<0.001), indicating non-independence. The highest defect presence was observed in one kiln practice (31.85%), while air seasoning showed the lowest defect presence (5.22%) and the highest defect absence (30.95%). The findings highlight the strong influence of seasoning practices on defect distribution and emphasize the need for optimized kiln control, standardized seasoning schedules, and improved technical training to enhance timber quality in Sri Lanka's furniture manufacturing industry.

Keywords: *Timber, Moisture content, Wood quality, Timber seasoning, Kiln drying, Air seasoning, Seasoning defects, Furniture industry, Sri Lanka*