Formulations of Water-borne Adhesive based on Ternary blends of Latexes

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Abstract:

The generally accepted definition n of an adhesive is any material used for holding any two surfaces together. Three different polymer latexes derived from natural rubber (NR), acrylic (AC) and vinyl acetate/Veova (VA/Ve) copolymer emulsions were blended using the principle of simplex lattice design to yield ten compositions. The blends were then used in formulating correspondence number of water-based adhesive each of which was used in making two sets of single-lap adhesive joints for comparative curing under sun and under oven temperature condition respectively. Bond strengths of the cured joints were determined using an improved set up and from the results that were obtained, it was observed that the bond strengths for joints cured under sun condition were higher than for those under oven- dry condition for all the cases where real values were determined. There were few cases on both sides of the conditions of drying for which the set up was inadequate to reduce measurable reading but with the pattern shown in the results, it seem reasonable to conclude that the sun cured adhesive joint based on the blend derived from Nr, Ac and VA/Ve blends in the ratio of 1/6:2/3:1/6, respectively, which corresponds to equivalent formulation of oven-cured joint with the highest measurable value of bond strength, is the strongest among all the formulations. This blend was thus regarded as "optimum blend". Comparison of the bond strength measured from adhesive joint based on the optimum blend with similar value from adhesive joint prepared from a popular commercial wood based adhesive (Top Bond) in Nigeria was made interestingly, it was observed that the value of the bond strength from the prepared adhesive was higher and more promising. It is thus suggested that sun-curing conditions are more suitable and better recommended than oven-curing conditions for curing the tested adhesives.

Keywords: Adhesive, Ternary blends, Latexes, Simplex lattice design, bond strength, adhesive joints.

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