

Effect of isocyanate index on shear strength plywood properties using Acacia mangium polyurethane-based adhesive

ABSTRACT

Polyurethane adhesive for wood bonding were prepared from the mixture of Acacia mangium (AM) polyol and 4,4'-methylene diphenyl diisocyanate (pMDI). In this study, Acacia mangium polyurethane (AMPU) adhesives were prepared by polymerization between pMDI and AM polyol. Various NCO/OH ratios of AMPU adhesives were used to fabricate 3-ply plywood from Eucalyptus wryai veneers. The effect of different NCO/OH ratios: 1:4, 1:6, 1:8, 2:0, 2:2, 2:4 and 2:6 on lap shear strength and chemical resistance in cold water, hot water, sulfuric acid solution (pH2) and sodium hydroxide solution (pH12) were studied. The commercial PU adhesives were used for comparison purposes. The results show that PU adhesives prepared from pMDI with AM polyol with NCO/OH ratio at 2.4 have higher lap shear strength and chemical resistance by only showing slight degradation (2-8%) compared to commercial PU wood bonding adhesive.