Polyurethane (PU) adhesives were prepared from the reaction of polycaprolactone (PCL) polyols based on palm kernel oil based polyesteramide (PPKO) with an aromatic and cycloaliphatic diisocyanate. Four different formulations of PU adhesives were prepared by varying the NCO : OH ratio, in order to investigate the effects of NCO : OH ratios on adhesion strength. The adhesive strength of metal-metal bonding both in dry and hydrothermal ageing was determined by single lap shear joint testing. The resistance to hydrolysis of the PU adhesives was determined by performing water absorption tests. The water absorption test samples suggested that the durability of the adhesives correlated to lower water absorption due to higher NCO content. The correlation between the crosslinking of the PU network and adhesive strength was also studied by performing swelling tests. The higher NCO content showed that, the higher crosslink density of PUs led to higher cohesion and adhesion strengths. PU1.7 showed optimal properties in terms of durability and resistance to hydrolysis, whereas PU2.0 revealed deterioration in durability and resistance to hydrolysis due to the presence of greater micro-voids content in the PU2.0 matrix. (C) 2014 Wiley Periodicals, Inc.