

EFFECT OF ELEVATED TEMPERATURE ON BOND BEHAVIOUR OF HIGH MODULUS CFRP/STEEL DOUBLE-STRAP JOINTS

Ahmed Al-Shawaf, Riyadh Al-Mahaidi and Xiao-Ling Zhao

Department of Civil Engineering, Monash University, Victoria 3800, Australia

Abstract

This paper investigates and provides experimental evidence of the bond characteristics between CFRP and steel plates under elevated temperature exposures. A series of tensile tests was carried out on CFRP/steel plates specimens joined together in double-lap shear joints and subjected to a range of environmental temperatures between 20°C up to 60°C which would be usually encountered in civil infrastructure applications. High modulus (640 GPa) unidirectional carbon fibre plies were used in wet lay-up fabrication method to strengthen the composite matrix. Three different epoxy resins were used for the fabrication of the CFRP/steel specimens. The objective of the current experimental work is to determine the ultimate strength, failure patterns, elongation development and lap-shear stress and slip variation under those exposures. This will help in enhancing the competency of using CFRP in retrofitting steel structures at high-temperature environments, usually experienced in civil construction applications.