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Mechanical performance of cold-curing epoxy adhesives after different mixing and curing procedures

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Abstract

This paper presents strength, stiffness, and porosity characteristics of commercially available cold-curing epoxy adhesives for structural engineering applications in the field of externally bonded and/or near-surface mounted composite strip reinforcements. Depending on specific requirements, accelerated curing of the adhesive under high temperatures might be necessary. Experimental investigations aimed at assessing the possible differences in strength and stiffness between samples cured at elevated temperatures for a defined time span and the ones cured at room temperature. It could be demonstrated that for the same specimen age, nominal tensile strength and stiffness are lower after an initial accelerated curing process at elevated temperatures. Furthermore, it could be shown that the specimens after an accelerated curing at elevated temperatures exhibited an increased porosity. The development of a numerical code for image analysis allowed a detailed inspection of several fracture surfaces and subsequently to assess the level of decrease in available cross-section due to an increased overall porosity. Cross-section area losses in the range of 10 to 15% compared to the reference specimens could be deduced. The sub-

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