

Long-term performance of single-lap joints: review, challenges and prospects in civil engineering

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Abstract

Compared with traditional technology, bonding technology is more suitable for civil structure reinforcement because of its cost-efficiency and superior mechanical properties. As one of the simplest forms of adhesive joints, numerous studies have been conducted on the performance of single-lap joints (SLJs). However, research on the long-term performance of SLJs requires better organization and comprehension. This paper aims to investigate the long-term performance and optimization design of SLJs. The main factors influencing the long-term performance of SLJs from both material and component levels are discussed. The moisture diffusion mechanisms of bulk adhesives and the degradation mechanisms of SLJs are explored. Moreover, the optimization design of SLJs focuses on evaluating the overlap length, adhesive layer thicknesses, and changes in adhesives along the overlap length based on available literature. This paper can be employed to improve the shear strength and long-term performance of SLJs and to provide insights into their challenges and prospects.

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