

## DURABILITY OF EPOXY ADHESIVES FOR IN-SITU REHABILITATION OF TIMBER STRUCTURES

João Custódio<sup>1</sup>, Helena Cruz<sup>1</sup>, James Broughton<sup>2</sup>

<sup>1</sup>) Laboratório Nacional de Engenharia Civil, Lisboa, Portugal

<sup>2</sup>) Oxford Brookes University, Oxford, United Kingdom

### Abstract

Epoxy adhesives have been used for many years in the rehabilitation of timber structures and are currently the most appropriate adhesive type for in-situ operations. However, since they exhibit excellent initial bonded joint performance when tested in standard climate conditions and they are frequently used inside the structural timber element, there has not been a major concern about their service durability. To address this situation, a study was conducted to evaluate the effect of environmental service conditions on the durability of four commercial two-component structural epoxy adhesives. In addition, the effects that the type of mixing, curing and postcuring conditions, as well as the presence of moisture have on the adhesives viscoelastic properties was also assessed. It was observed that the preparation conditions, cure schedule and moisture have an important effect on the performance of the bulk adhesives. Furthermore, it was found that under ambient conditions there is potential for under-cure or slow progression of cure for the epoxy adhesive products normally used in these applications, which in turn could compromise the durability of a bonded joint if the adhesive is not adequately chosen for the application.

**Keywords:** durability; epoxy adhesives; preparation conditions; moisture; service conditions.