

# Rehabilitation of timber structures: novel test method to assess the durability of bonded-in rod connections

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**Abstract** Rehabilitation/restoration systems involving bonded-in rods represent an efficient alternative method for the repair and/or reinforcement of structural timber members. However, in spite of their advantages, their use is still restrained by the lack of knowledge about their long-term performance. In order to correct this situation it is necessary to gain a greater understanding of their durability, creep and fatigue behaviour. However, reliable and realistic accelerated ageing tests do not yet exist, and the application of the existing European or American standards to epoxy bonded products are much too penalising, since they merely impose severe conditions that are not verified in service although these may be suitable for other adhesives. To address these concerns a test procedure to assess long-term behaviour of bonded-in rod connections was developed

with the aim of providing a simple method for the selection of candidate repair system materials for specific applications. The data collected so far using the realistic performance assessment test (RPAT) appears to predict correctly the end-use performance for different adhesives as well as for different timbers.

**Keywords** Timber structures · Epoxy adhesives · Bonded-in rod connections · Durability · Realistic test

## 1 Introduction

Rehabilitation of buildings has an increasing economical and social importance in most European countries. The choice of the method employed is influenced by a number of factors, such as, location, structural requirements, access limitations, fire resistance, aesthetics, cost and the degree of intervention accepted. Current interventions often involve total replacement of the damaged timber by similar elements, instead of their recovery, even when that would be preferable, mostly due to the lack of knowledge of alternatives [1]. Rehabilitation/restoration systems involving structural adhesives represent an efficient method for the repair and/or reinforcement of both new and existing timber members in service classes 1 and 2 [2, 3]. Epoxy adhesives have

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