



Analysis of Shear Transfer and Gap Opening in Timber–Concrete Composite Members with Notched Connections

<https://research.thinkwood.com/en/permalink/catalogue1399>

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Publisher: Springer Netherlands

Year of Publication: 2017

Country of Publication: Netherlands

Format: Journal Article

Material: Timber-Concrete Composite

Topic: Connections
Mechanical Properties

Keywords: Notched Connections
Analytical Model
Shear Stress
Failure

Language: English

Research Status: Complete

Series: Materials and Structures

ISSN: 1871-6873

Summary:

In timber–concrete composite members with notched connections, the notches act as the shear connections between the timber and the concrete part, and have to carry the shear flow necessary for composite action. The shear transfer through the notches generates shear and tensile stresses in both parts of the composite member, which may lead to brittle failure and to an abrupt collapse of the structure. Although simplified design formulas already exist, some structural aspects are still not clear, and a reliable design model is missing. This paper summarizes current design approaches and presents analytical models to understand the shear-carrying mechanism, to estimate the shear stresses acting in the timber and concrete, and to predict failure. The analysis concentrates on three problems: the shearing-off failure of the timber close to the notch, the shear failure of the concrete, and the influence of the shear flow on the gap opening between the timber and concrete. Parts of the model calculations could be compared to experimental observations. The conclusions of this paper contribute to improving current design approaches.

Online Access: Free

Resource Link

<https://link.springer.com/article/10.1617/s11527-017-1098-3>