



Short communication

Guideline on the assessment of timber structures: Summary

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ABSTRACT

The domain “assessment of existing timber structures” has experienced increased interest and gained application in practice over the past years. The objective of the guideline which is summarized in this short communication is to provide the reader with a collection of applicable assessment methods which have been evaluated by a group of experts against keywords like applicability, expenditure of time/cost, validity of results and possible constraints. Since each method only allows the assessment of certain types of material properties, damages or degradation processes, it becomes necessary to combine different methods in order to derive a full picture of the residual performance of the structure. Against this background, common approaches towards the assessment of timber structures are given.

The results received from an assessment should be incorporated into analytical models. Different approaches towards the modelling and updating of existing structures are presented, including deterministic, semi-probabilistic as well as probabilistic verification methods.

The guideline concludes with a discussion on the present state of the art for the assessment of timber structures. Potential objectives towards an optimization of the methods with respect to a simplified application are defined and necessary developments that finally enable more consistent estimations of the reliability of existing timber structures are highlighted.

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1. Introduction

Within the field of timber construction, the past decades were characterized by significant technical advances and developments, widening the range of application of timber structures in the building sector. This resulted in the fact that timber was increasingly utilized as building material, for e.g. large-span structures. Since such structures are typically part of buildings which are classified into higher consequence classes, this led to a growing importance of the assessment of large-span timber structures. Naturally, this provoked an increased interest of the professional community in assessment methods for existing timber structures.

Therefore, it was decided to form a task group within COST Action E55 with the objective to collect feasible assessment methods and to evaluate each of them with regard to the following objectives.

- What can be determined / what cannot be determined?
- How exact and valid are the results (e.g. degree and size of damage; local/global results)?
- How complex and time consuming is its application (on-site, (non-) destructive)?

- Which combinations of methods are useful to derive a clear picture of the structural integrity of the assessed structure?
- How are the test results related to the properties of interest?

To support the work of the task group, a master thesis was initiated at TUM in the lead-up to the task group meeting with the objective to collect background material and to describe the state of the art of the methods to be evaluated [1]. This preparatory work should function as basis for the discussions between the experts.

The task group decided to publish its results in a guideline “Assessment of Timber Structures” [2]. It should not only present the assessment methods evaluated but also general information on how to approach an assessment (including relevant codes), combinations of methods according to the phase (depth) of assessment and analytical methods to evaluate on the data received. All members of this task group contributed to the guideline within their area of expertise. It was subsequently presented for discussion to all members of COST Action E55 and reviewed by four independent members of the same Action. The following section shall give an overview of the structure and contents of the guideline.

2. Structure and contents of the guideline on the assessment of timber structures

2.1. General

The need for an assessment of an existing structure can be based upon a multitude of reasons. Amongst the most typical are (e.g.

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