

Assessment of all wide span Timber Structures owned by the City Munich

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Summary

Following the Bad Reichenhall ice-arena collapse, the Chair of Timber Structures and Building Construction at the Technische Universität München conducted a large-scale project to assess the structural reliability of all 152 wide-span timber structures under the responsibility of the City of Munich.

The paper presents the chosen approach and gives recommendations on how to assess wide-span timber structures as well as on intervals of future evaluations to maintain a designated level of safety. The concept of a Building Book will be introduced. The paper will conclude with a discussion of the observed types of failure, causes for failure and accountabilities for failures, referring to our database of 214 failed timber structures.

Keywords: timber; wide-span structures; structural reliability; assessment; rehabilitation; failures; failure mechanisms

1. Introduction

The objective of the project was to assess the structural reliability of all 152 wide span timber structures under the responsibility of the City of Munich. The assessment of the current state of these structures should result in specifications on potential necessary reinforcement/repair measures as well as the preparation of procedures and intervals for future assessments. This information, combined with further essential structural information, was collected in a Building Book to enable a quick and reliable overview of the structure and its current condition. This approach should secure the designated safety level and its future adherence.

All expertises, accomplished in collaboration with five check engineers, were evaluated against the background of possible failure mechanisms. Structures exhibiting a failure were included into our database of 214 failed timber structures. An evaluation of this database will be given in Chapter 3.

2. Assessment of the Structural Reliability of Timber Structures

2.1 Initial Situation

Prompted by the events in winter 2006, the City of Munich decided to systematically assess the structural reliability of all structures under its responsibility, starting with timber structures. With the objectives to keep the impact on the owner and the users of the building as low as possible, to satisfy the right of continuance while still maintaining the required level of safety, our Chair was asked to categorize the structures into priorities, to prepare a guideline for the assessment of these