

WG3 – Robustness of systems

An important aspect for the assessment of the life cycle performance of timber structures is the **interaction of structural components in structural systems**.

System effects in timber structures are pronounced because of **multiscale spatial variability of environmental exposures** and **material properties**.

Existing numerical methods used to **assess the reliability of timber structures** need to be evaluated for their possible application to timber systems, and **simplified approaches** suitable for day-to-day engineering purposes must be identified.

Furthermore, consensus on the **general characteristics of timber systems regarding redundancy and robustness** has not yet been established.

WG3 – focus points

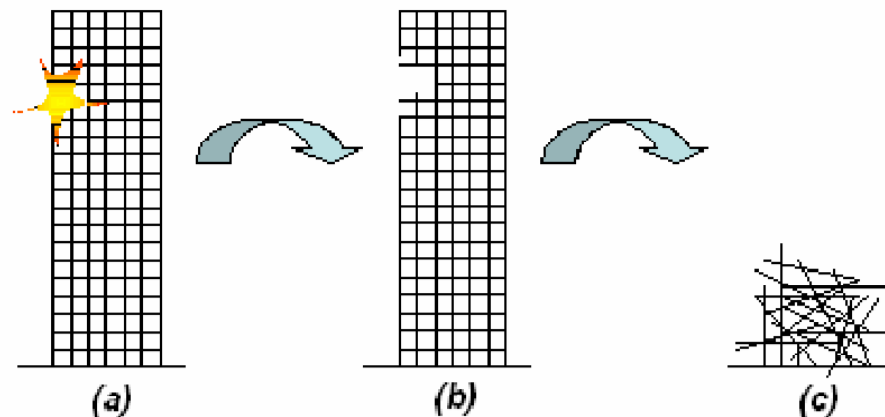
1. Reliability of timber systems:

- Roof trusses / Roof elements / Glued laminated beams / solid timber structures / ...
- Spatial dependence for material strength parameters / loads
- Reliability of systems / risk assessment

WG3 – focus points

2. Robustness of timber structures:

- Characterisation of timber structures with respect to robustness
- Reliability / risk based requirements related to consequences of direct failure consequences and follow-up consequences
- Consensus on the characteristics of timber systems regarding redundancy and robustness
- Development of simplified approaches for assessment of robustness, suitable for day-to-day engineering purposes – how to increase robustness of timber structures?



WG3 (from Eindhoven Oct 2007)

Reliability of timber structures

- Structure modeled by elements (structural elements, joints, ...)
- Behavior of elements after failure (ductile / brittle)
- Spatial distribution of strength & stiffness
- Benchmark study: PMC timber + modeling by systems
 - Norwegian example: glulam frames
 - Austrian bridges

Robustness

- Examples of structures where robustness has been investigated
- Identification of key elements
 - Benchmark examples: identify key elements

WG3 – presentations

- Poul Henning Kirkegaard (Denmark)
A Probabilistic Approach for Robustness Evaluation of Timber Structures
- Ludovic Fulop (Finland)
Robustness evaluation of failed timber structures
- Gerard Canisius (UK)
The JCSS Expert Task Group and the Document on Robustness of Structures
- Markus Sandomeer (Switzerland)
Representing the spatial distribution of strength related timber material properties by means of hierarchical modelling