

# Minutes Joint session WG1 TU601, WG3 E55

## Participants:

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Radu Bancila (RB)	TU601 WG1
Goran Turk (GT)	E55 WG3 / TU601 WG1
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Vladimir Rodriguez (VR)	E55 WG3
Inger B Kroon (IBK)	TU601 WG1
Maurice Brunner (MB)	E55 WG3
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Poul H Kirkegaard (PHK)	E55 WG3
Traian Badea (TB)	
Gerhard Fink (GF)	E55 WG3
Rene Steiger (RS)	E55 WG3
Pedro Pahma (PP)	E55 WG3
Jorge Branco (JB)	E55 WG3
Dean Cizmar (DC)	E55 WG3
Krzysztof Cichocki (KC)	TU601 WG1
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Reinhard Brandner (RB)	E55 WG3
Michael H Faber (MHF)	E55 WG3 / TU601 WG1
John D Sørensen (JDS)	E55 WG3 / TU601 WG1

The discussions focused on which factsheets to be prepared and the content of these. Further the status / progress of the work on the planned documents in TU WG1 and E55 WG3 was briefly presented and discussed.

## Discussion of factsheets

The following fact sheets were presented at the workshop and will be finalized for the fact sheet publication:

1. Robustness - Theoretical framework: JDS will distribute a draft. All the members of TU601 WG1 and E55 WG3 are asked to contribute comments.
2. Robustness - Acceptance criteria: ER will continue the work and will circulate a draft of the factsheet for comments.
3. Earthquake and robustness for timber structures: JB will continue the work and circulate a draft. The factsheet should be divided into a general part and timber specific part.
4. System reliability – ductility and redundancy: PHK will prepare the proposal and circulate to the members for comment.
5. Robustness design of timber structures: PD will circulate a draft
6. Robustness ‘experiences’ from failed timber structures: JMA and PD will circulate a draft

The following additional factsheets will be prepared:

7. Explicit and implicit provisions for robustness in Eurocodes: HN and MHF will prepare a draft and circulate
8. Terms, definitions, relations between the terms: GF, RS, ... will draft a proposal and circulate it for comments.

Terms proposed for the new factsheet:

Accidental action	Human error	Serial/parallel systems
Assessment	Key element (primary, secondary)	Statically determinate
Brittle	Maintenance	Strength
Collapse	Not foreseen	Structural integrity
Construction	Progressive collapse	System
Damage	Quality control	Ultimate/serviceability
Degradation	Rational decision making	Unforeseeable
Disproportional collapse	Redundancy	Unforeseen
Ductility	Rigidity	Vulnerability
Exposure	Risk (acceptance)	
Failure	Robustness	

General: the factsheets should be on 6-10 pages. The factsheets can include discussion, also what are still unresolved issues. It should emphasize on the direction about the issue.

There is still a problem to decide in what way the robustness should be defined. We still don't have the experience on certain structures. In addition to the benchmark problems we have in E55 a simple structure (portal frame) could be added. Also an example of the bridge before and after the rehabilitation was discussed. For these examples we don't have time before the factsheets need to be finished. However, they will be part of the future work.

Robustness experience could be expanded to other examples.

The drafts should be circulated before October 10 and the fact sheets finalized before end of October.

## E55 WG3

Status on benchmark examples in the guideline was discussed:

**Norwegian hall:** DC and PHK are working on this problem.

**Austrian bridge:** Portuguese group worked on this, realized it is very robust. Portuguese group worked on traditional timber trusses.

**Solid timber building:** PHK and JDS continue work.

**Old church** from Switzerland (DC): it is statically determinate structure, difficult to discuss robustness. The structure is overdesigned. The research can be done on progressive collapse.

Guideline document: The following aspects were discussed:

- The factsheets will be the main ‘cornerstones’ of the guideline documents.
- Effect of quality control on robustness. PD has prepared a draft for a section on quality control.
- The factsheet on earthquake may be included as a section of the guidelines.

## **TU0601 WG1**

Document: ‘Theoretical framework on structural robustness’. The following aspects were discussed:

- The following factsheets will be the main ‘cornerstones’ of the guideline documents:
  - Robustness - Theoretical framework
  - Robustness - Acceptance criteria
- A draft of a section on 'Glossary' will be prepared by ER.
- A section on 'Reliability of systems – quantifying the robustness' will be added. The fact sheet prepared by COST E55 (PHK and JDS) will be used as basis. GT will prepare the draft of this section.

Minutes: GT / JDS