DynaTTB
Dynamic Response of Tall Timber Buildings under Service Load

Minutes – Meeting 3 Skype

When: 24th of March 2020 09:30-11:30 and 13:00-15:00

Where: Via Skype (The meeting had to be changed to a webbased format due to travel restrictions as a consequence of the Corona virus outbreak in Europe)

Aim of the meeting

Presentation of results from each partner modelling and/or measurements. Short update on; Reporting, Publications, Meetings and Decisions

Agenda

Part 1

09.30 CET Start and welcome to the meeting
09.45-10.15 NTNU results + questions
10.15-10.45 Uni Exeter results + questions
10.45-11.15 Uni Ljubljana results + questions
11.15-11.30 WP 5 – dissemination and final results

Part 2

13.00-13.30 InnoRenew results + questions
13.30-14.00 CSTB results + questions
14.00-14.30 LNU + RISE results + questions
14.30-15.00 Short discussions on results, joint publications and update of time-plan

Part 1 – 09:30-11:30

1. Welcome and start of the meeting

Marie welcomed everyone to this web based meeting that was necessary due to travel restrictions that made it impossible to have the meeting in Paris. Marie also gave a short presentation about the aim of the meeting, the agenda, the time plan and milestones for the project.

2. Presentation of results – Part 1

NTNU

Plenty of data from ambient vibration monitoring have been recorded with accelerometers installed on the top of Mjöstårnet in Norge. Saule presented an analysis of some of the data and extracted some eigenfrequencies and damping values. An anemometer is also placed on the top of the building.

NTNU master students, supervised by Haris, have performed forced vibration tests on timber floors, with out of plane excitation from impact hammer, shaker and activated students. They compared the performance with results from FE-models. Haris planned to do similar tests on CLT plates, both in-plane and out-of-plane.

Kjell pointed out the importance of modelling the foundations when comparing to modal testing results. He also mentioned some planned static energy dissipation tests on common connections.

University of Exeter

Vincent started by presenting the measurement set-up for the testing and described the installation procedures at the Yoker building. Vincent and Alex presented the Yoker building, the shaking-tests performed, and the results analysed so far. The measurements were performed with 2 tri-axis sensors on the first floor (measuring in the plane directions), 4 one-axis on floor 2 to 5 and 11 one-axis on the floor 6 in the hallway of the building. The presentation includes a lot of results from the measurement campaign with mode shapes, eigenfrequencies and damping.

University of Ljubljana

A detailed model of the Yoker building has been developed in ANSYS with shell-elements representing the CLT plates. The CLT elements are connected through fixed connections. Blaž presented updated numerical results compared to the FVT measurements done by Uni Exeter. The changed parameters are shear modulus and modulus of elasticity of the material and the amount of live load in the building. He has compared the mode shapes using MAC values and the eigenfrequencies of the lowest eigen modes. The importance of modelling the foundations was pointed out. Model updating and comparison to test data will continue.

2. Presentation of results – Part 2

Innorenew CoE

Iztok updated the status on the testing of CLT connections with dowels where tests using variable loads are planned in Germany. The tests are based on using also cycles with lower load levels before going over to the standard protocol for measuring energy dissipation for earthquake loads. There will now be delays in the testing due to travel restrictions following the Corona outbreak. Iztok also presented the FEM model in SAP 2000 for the Flower Valley project in Ljubljana. The building project is halted at the moment due to the discussions between builder and clients.

CSTB

The forced vibration tests of the Treed-IT building in December 2019 were described. These measurements were performed before its completion (no internal walls above floor 6). Some results were presented and more results can be found in the CSTB report in the OneDrive folder. Simultaneously to the acquisition of accelerations, some LVDTs were also used during the tests to measure the local beam/column displacements. Preliminary, a dependency to the amplitude of the response can be noticed mainly on the viscous damping ratio and slightly on the first natural frequency of the building. Manuel presented the FE-model build on ANSYS, some numerical results and started to compare them to the test data to change the FE-model. The foundation has also been

included in this model. The next set of measurements, with the building fully completed, will be planned as soon as the Tree-It building site opens again. These measurements will show the contribution of the partition walls on the damping.

LNU + RISE

A preliminary FE-model of Eken building in Mariestad that will be tested later by Exeter's team is created in MSC Nastran. Andreas showed the status of the model and some early results. When planning for FVT, Andreas notified that the Effective Independence method is useful to pick good positions for the accelerometers.

Pierre presented a new linear and detailed 3D FE-model of the large glulam trussed tested earlier. Modal results were compared to the experimental data and to beam models with different connections models. This will be presented at the Eurodyn conference this year and will be further developed to reduced non-linear models.

3. WP 5 – dissemination and final results

Iztok reminded about the tasks and subtasks of WP5 and was concerned about the due number of 15 published conference paper because of the Corona travel's restrictions. A proposal for the design guideline's/report's table of content were presented and discussed. What should be the focus and who are the readers were some of the main questions that will continue to be discussed, as well as other questions, during a future Skype meeting to be organised by Iztok.

(27)	Iztok will call to a separate skype/teams meeting regarding the design guidline.

4. Short discussions on results, joint publications and update of time-plan

Delays mainly due to the new Coronavirus are noticeable for almost all partner mainly on experimental activities but both in lab and in-situ. Marie will then inform Forest Value and update the time schedule of some activities. The final deliverables seems not to be affected by the delay up to day. If possible, activity focus can be switch to modelling and writing at some extents.

(28)	Milestone M8 – In-situ tests performed will have a changed delivery date to Month 24 due to the Coronavirus outbreak. The main part of the modelling work will then have to be done earlier in the project.

ForestValue requires a mid-term report the 15th of April 2020, Marie will write and distribute this for comments before the deadline. The report includes a short up-date on the project and any changes to the project plan. There is also a reporting part on dissemination regarding number of dissemination activities. There is a wordfile in the OneDrive where such activities should be filled out (OneDrive/DynaTTB_Shared_files/Presentation_papers). ForestValue also wants to know the number of persons employed especially for the project. The number we could fins at the meeting was:

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Post-Docs:	1 (Uni Exeter)
PhD Students:	2 (Uni Ljubljana + NTNU)
Master students:	?
Support or technical staff:	0,3 (Uni Exter)

(29)	Marie write the mid-term report and send out for comments before the deadline.
(30)	All partners report their dissemination activities in the word file on the OneDrive folder (OneDrive/DynaTTB_Shared_files/Presentation_papers

There is a need to discuss more regarding modelling of the buildings. Should we have any common strategy? Kjell will be responsible for setting up such a meeting. One of the milestones was also to set up a survey for connection types. RISE has set up a presentation for collecting information regarding different connection types used in the buildings within the project. Pierre will send out this material for comments.

(31)	Kjell will call for a meeting regarding modelling via Teams/skype.
(32)	Pierre will send out an outline for a survey regarding connection types to all partners.
(33)	Pierre and Marie will write meeting notes and place them in the OneDrive folder. Comments on the notes are thereafter possible for three weeks before the notes will be finalised.

Forthcoming meetings

Next IRL meeting will be in Exeter 22-23th of September 2020, the plan is for two full days. The plan is to have presentations and discussions and visit the new VSimulator.

Discussion points for the meeting:
- Global models of the buildings
- Guide-lines for tall timber buildings that is part of the final dissemination

The meetings thereafter are planned as:
March 2021 in Paris France
September 2021 in X
February 2022 in Skellefteå, Sweden

End of the meeting

Marie concluded the meeting and thanked all participants for a good meeting and fruitful discussions.

Notes:

Pierre Landel, RISE

Marie Johansson, RISE

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Attendance list

Alex Pavic – Uni Exeter,

Anders Rönnquist NTNU,

Andreas Linderholt – LNU,

Blaž Kurent – Innorenew CoE,

Boštjan Brank Uni Ljubljana,

Fabien Garains – Arbonis,

Fernando Pérez - Smith & Wallwork,

Haris Stamatopoulos – NTNU,

Igor Gavrić – Innorenew CoE,

Iztok Šušteršič – Innorenew CoE,

Kjell Arne Malo – NTNU,

Magne A Bjertnæs – SWECO,

Manuel Manthey – CSTB,

Marie Johansson – RISE,

Olivier Flamand – CSTB,

Petter Juell Nåvik – NTNU/Sweco,

Pierre Landel – RISE,

Roberto Crocetti – Moelven,

Rune Groven – The Research Council of Norway,

Saule Tulebekova – NTNU,

Stéphane Hameury – CSTB,

Vincent Ao Wai – Uni Exeter