

XAMK SAVONLINNA

TESTING, DEVELOPMENT AND RESEARCH LABORATORY FOR WOOD AND HYBRID CONSTRUCTION:

LABORATORY SERVICES

- Research and development
- Product testing
- Chemical and material testing
- Prototyping and testing
- Technology and material demonstrations
- Workshops and seminars
- For more information: www.xamk.fi/puura-2023



We are looking for partners to develop wood and hybrid intermediate floors!



Photo: A view of the wood and hybrid construction laboratory in Savonlinna, Finland



WE ARE LOOKING FOR PARTNERS TO DEVELOP WOOD AND HYBRID INTERMEDIATE FLOORS:

We are looking for partners not only from manufacturers of intermediate floors, but also from designers and other experts in the field!

Project schedule:

The first preliminary workshop for the project has been held on 26-27 September 2022. During autumn 2022, the partners and the exact content of the project will be identified. The project will start on 1.9.2023. The duration is approximately 3 years and the budget is approximately €1.5 million.

The project involves:

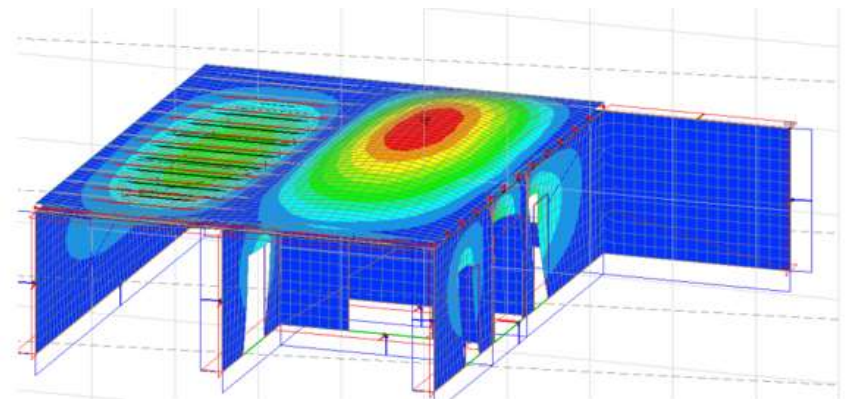
South-Eastern Finland University of Applied Sciences (XAMK), Tampere University (TAU), Karelia University of Applied Sciences, Turku University of Applied Sciences, Natural Resources Institute Finland (LUKE).

Project objectives:

- To develop the design of timber and hybrid intermediate floors
- To provide information and solutions for the reform of design methods
- Implement field measurements and interviews of about 100 apartments (20 wooden houses) in sites less than 10 years old and under construction
- Implement real-life tests and measurements in a laboratory with different types of structural solutions
- Compile data from intermediate floors by studying on the vibration and acoustic characteristics of the measurements to provide information for more accurate sizing of intermediate floors
- Develop new optimized materials and low-carbon structural solutions
- Develop measurement techniques and long-term monitoring
- Promote the circular economy and the use of different recycled materials
- Identify, through modelling, all the causes of the differences between the designed and the actual vibration characteristics
- Produce a performance and carbon footprint comparison of tested structural solutions

Background to the project:

- Existing wood floor solutions do not achieve as long spans as concrete and steel structures
- Current national vibration criteria for wood floors (9 Hz or 0.5 mm*) combined with current simplified sizing methods in reality leads to oversized floors (cost!).
- In Europe, the criteria are different and with the EC5 renewal, national criteria will be revised (e.g. design criteria and quality level criteria for low frequency floors).
- Finland has the strictest sound requirements in Europe, especially at low frequencies
- Field measurements of completed sites have achieved significantly better vibration values compared to calculated values!
- Current design methods do not take into account, for example, the effect of joint stiffness, surrounding structures, mass placement, connector structures or surface structures, which are estimated to have a significant effect on the difference between the field measurements and the calculated value.



9. Fundamental frequency of room C with non-load bearing structures and surface plate of floor structure
Lähde: Ideastructura Oy

By joining us, you will get the best expertise to support your product development work!

More information on becoming a partner:

Project Manager Juha-Pekka Luukkainen juha-pekka.luukkainen@xamk.fi +358 50 560 4836

Research Engineer Miika Juuti miika.juuti@xamk.fi +358 50 479 6954

Project employee Eetu Pitkonen eetu.pitkonen@xamk.fi +358 50 479 6917

Partnering to develop wood and hybrid intermediate floors

The intermediate floors project aims to implement projects such as:

Field measurements and surveys:

- Field measurements on site for less than 10 years old buildings or for buildings under construction at different stages of construction. Measurements of deflection, vibration, acoustics including airborne sound insulation, step sound insulation, joint sound insulation, (if bare wood parts are visible).
- Comprehensive survey of residents
- Compensation to residents for participating in measurements and surveys
- Possible piloting of continuous measurements

Modelling and FEM simulation of existing and new solutions:

- Consideration and mathematical modelling of factors affecting the performance of intermediate floors
- FEM simulation to support mechanical testing in laboratory tests

Fabrication of test floors and testing of new solutions in the laboratory of wood and hybrid construction:

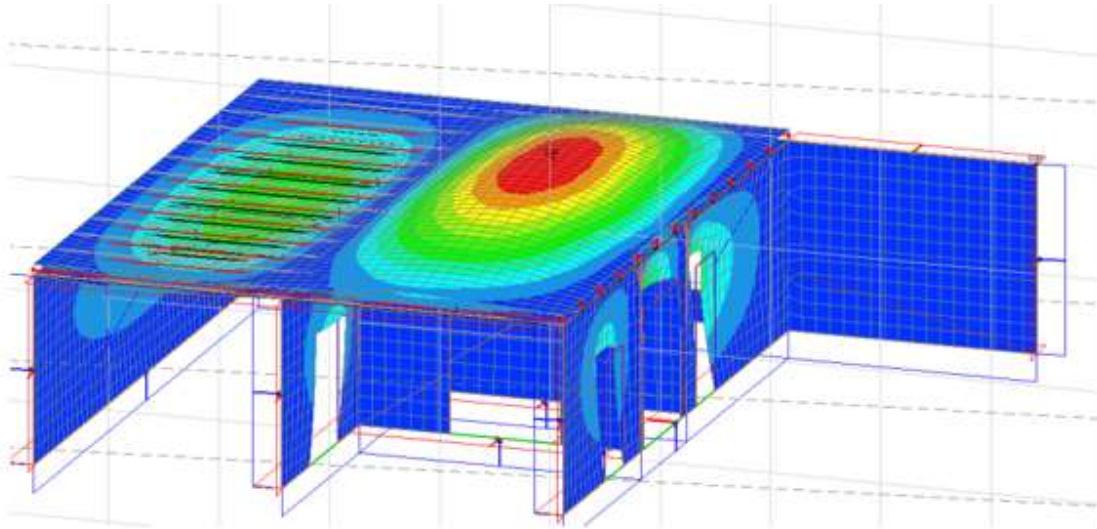
- Individual materials from the company, other building materials from the project
- Testing of the company's mezzanine floor solutions, allowing the company's needs and active involvement in the tests
- FEM simulations and mechanical tests to support your product development work
- 3D laser scanning of deformations for mechanical tests
- Alternative materials, recycled materials
- Material-optimised low-carbon solutions
- Testing of vibration/deflection in single plane and biplane solutions, acoustics where applicable.
- Dynamic, static and long-term loads
- Possibility to test a two-storey 5 m x 6 m pilot room in the laboratory
- Tests on vibration, deflection, acoustics
- Continuity of laboratory testing to support your product development after the end of the project

Calculation tool and recommendations:

- Inclusion of your product in a new type of calculation tool for designers
- Inclusion of your product in the project guidelines for the coordination of design, prefabrication and on site production
- LCA calculation of tested solutions

Reporting and communication

- Comprehensive reports of the taken measures readily available
- Classification and comparison of different solutions
- Use of your brand in public communication of the project
- Use of research data for PhD theses, master theses and engineering theses



9. Fundamental frequency of room C with non-load bearing structures and surface plate of floor structure

Project schedule:

The project will start on 1.9.2023. The duration is approximately 3 years, and the budget is approximately €1.5 million. Cost for the company is €10 000, spread over three years according to the contract.

The project involves:

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