



SMARTH SPECIALISATION WORKSHOP, April 7th 2016

Innovative activities in CBD and Intech-les in the field of smart buildings and wood chain

dr. Bruno Dujič

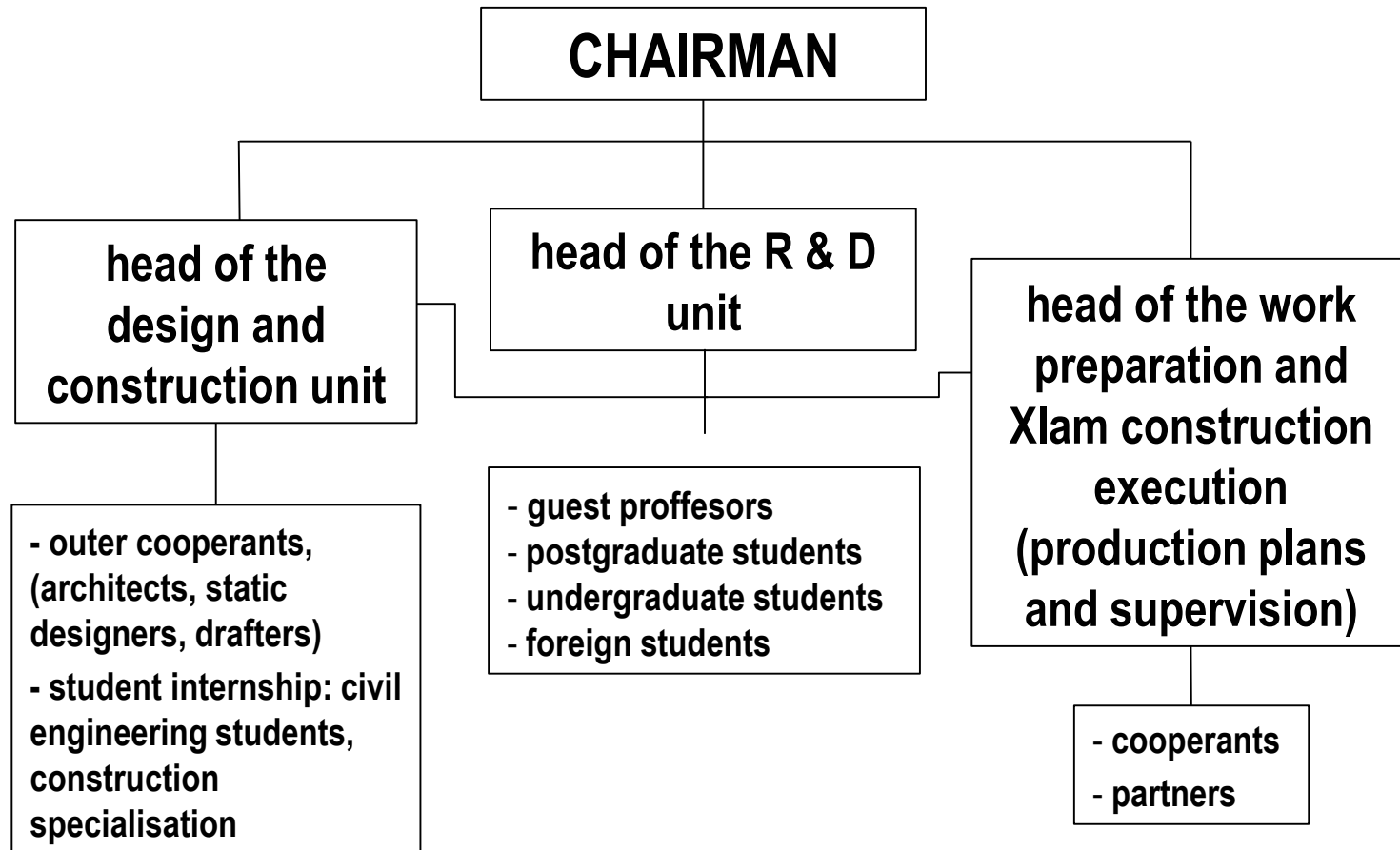
CBD d.o.o. Contemporary Building Design
Intech-les d.o.o.

CBD = Contemporary Building Design

- Established in 2006 due to the market's and industry's need of design and construction knowledge of timber structures on seismically active areas.
- The founder of the company dr. Bruno Dujič (2001 PhD in seismic design of timber structures) was employed at the University of Ljubljana, Faculty of Civil and Geodetic engineering, Chair for Materials and Constructions until 2009.
- Led the research projects on the seismic resistance of several types of timber structures / systems.



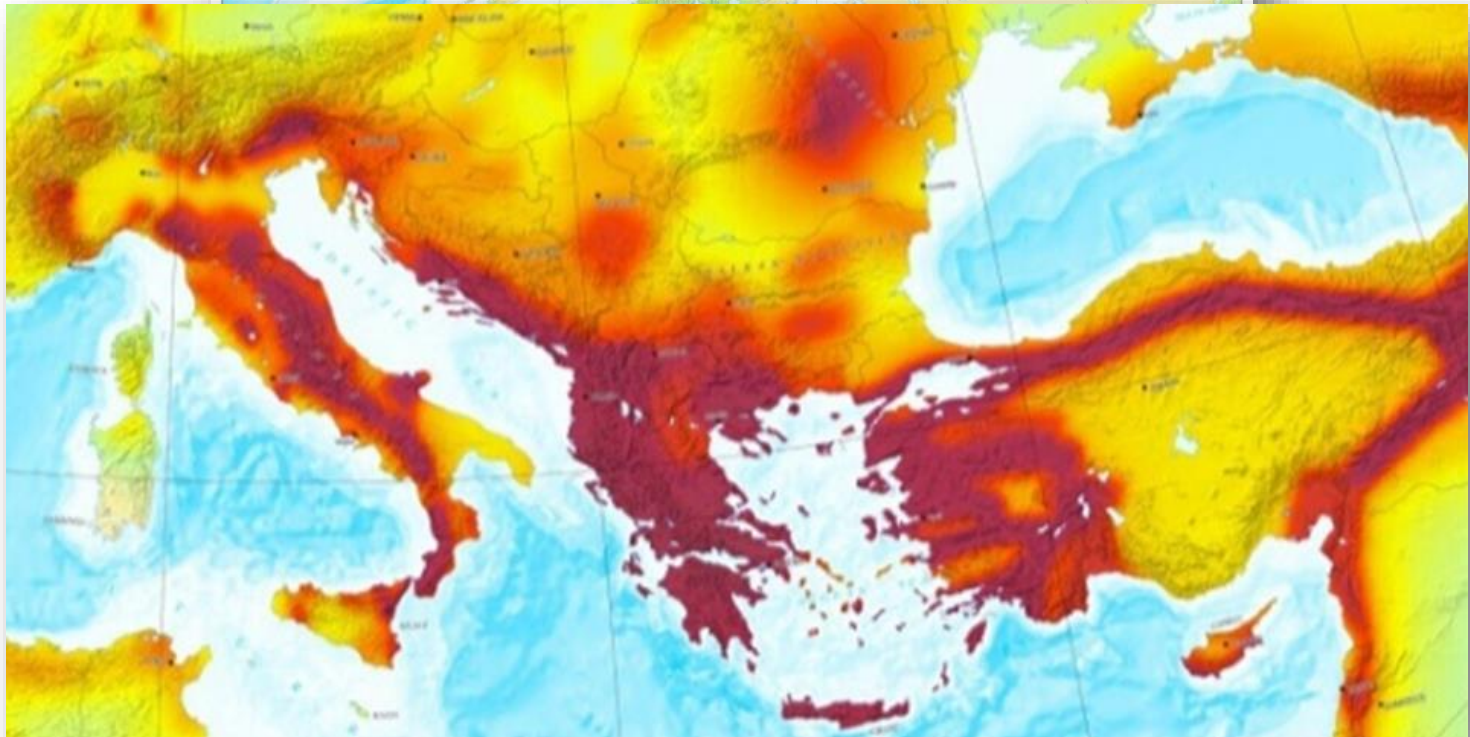
CBD company structure



Company size and structure of the employees

- Micro or small enterprise with a yearly turnover around 1,5 mio €
- Headquarter in Celje (between Univ. of Ljubljana and Univ. of Maribor)
- The main design biro in research department in Ljubljana
- 8 employees
- Employee education:
 - 2 PhD
 - 3 Masters of civil engineering, of which 2 currently on PhD studies
 - 2 Bachelor of civil engineering
 - 1 carpenter
 - coworkers: student trainees

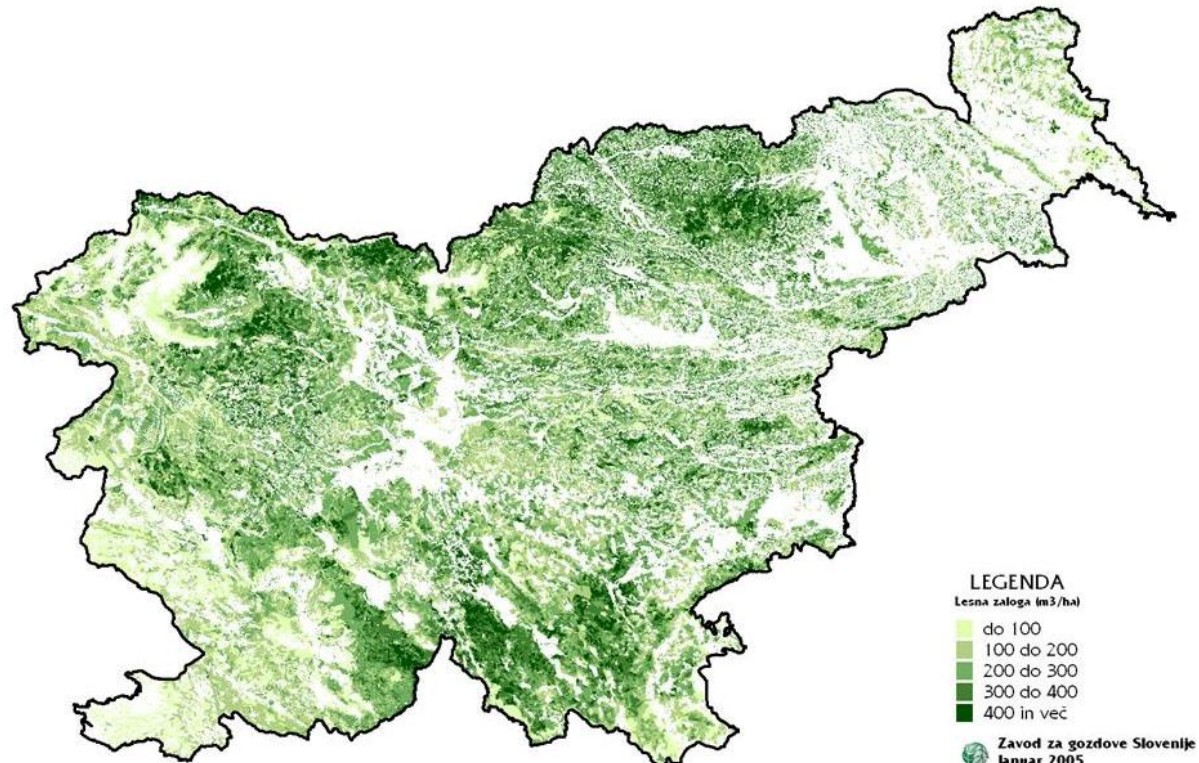
Earthquakes in Europe



Forests as basis for development of the wood processing industry

Slovenia is the third most wooded country in EU, with 1,2 million ha of forests - around 60 % of Slovenian territory.

The growing stock of Slovenian forests is more than 300 million m³.



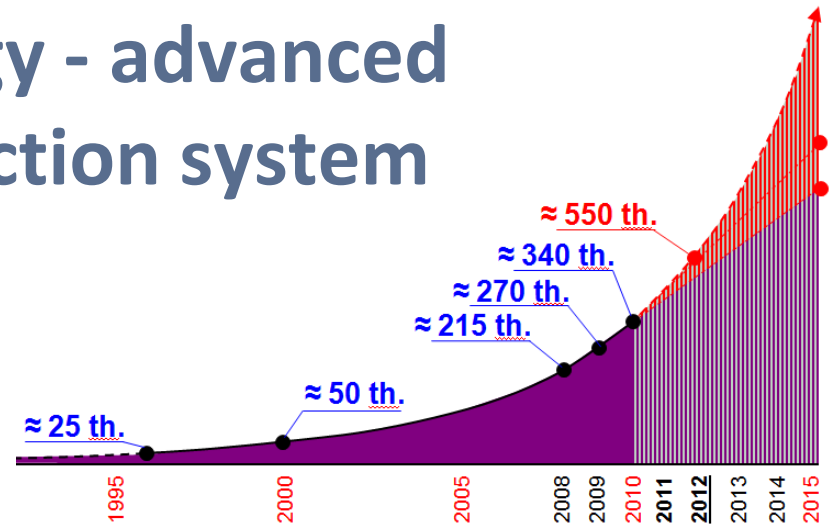


SLOVENIA

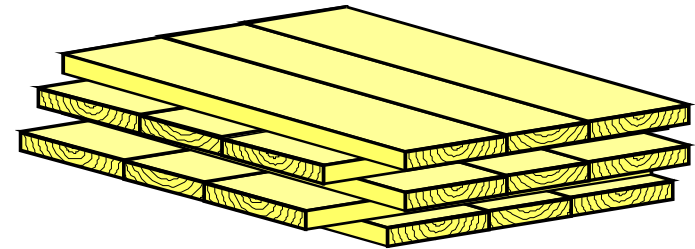
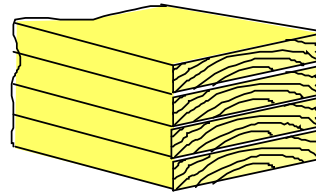
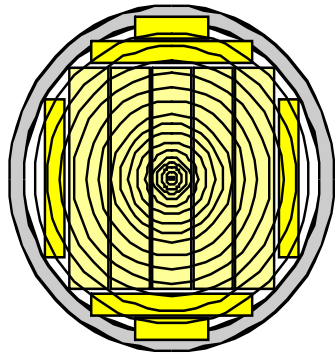
Wood processing and furniture industry

- **920 companies**
- **10.000 employees**
- **Total annual revenue 1 billion EUR**
- **Exports more than 50%**
- **Strong export orientation on EU markets – over 86%**
- **Exist trend of new growth!**

XLam technology - advanced timber construction system



Author: Prof. Dr. Gerhard Schickhofer, TU Graz



GL = Glue-Lam

XL = Cross-Lam (CLT)



XLam technology for multi-storey timber buildings



2006
3 storey
SOFIE project,
Ivalsa, IT



2007
7 storey
SOFIE project,
Ivalsa, IT



2009
8 storey
STADHAUS, Waugh Thistleton
Arch., GB



TREND ...



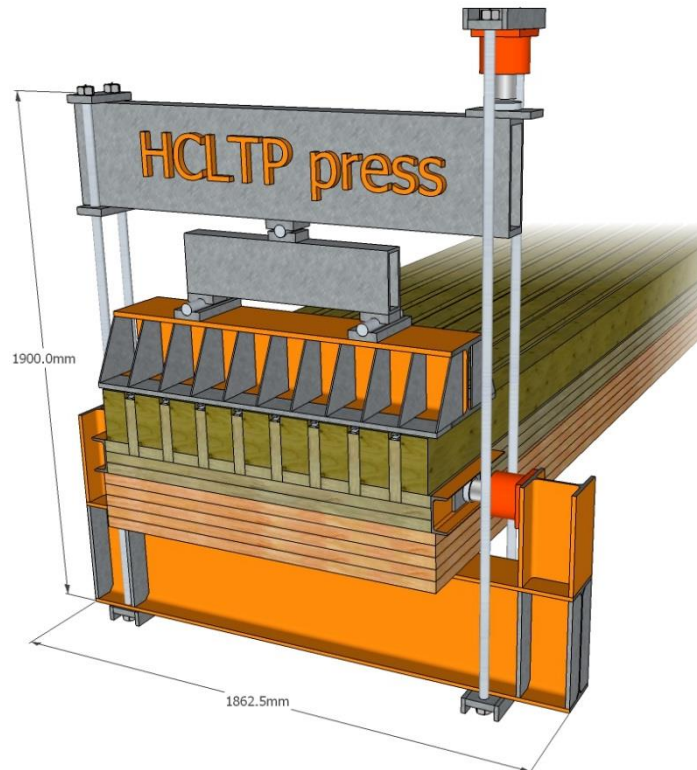
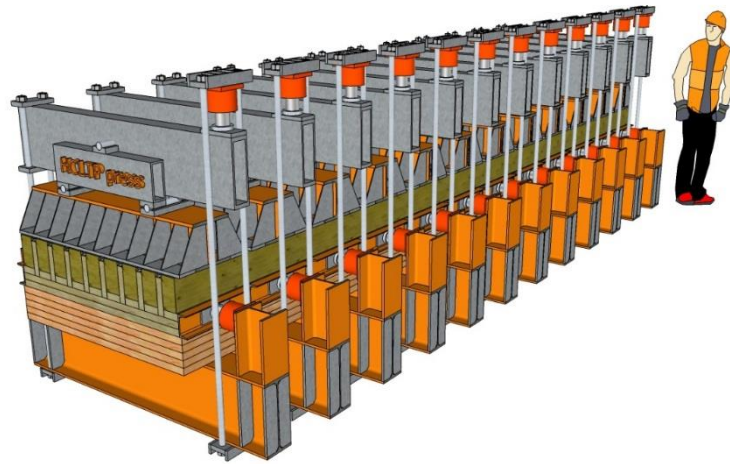
New technologies in timber constructions – XLam ribbed plate

**New hybrid cross laminated timber panels with ribs
a lower timber consumption and better mechanical
properties**

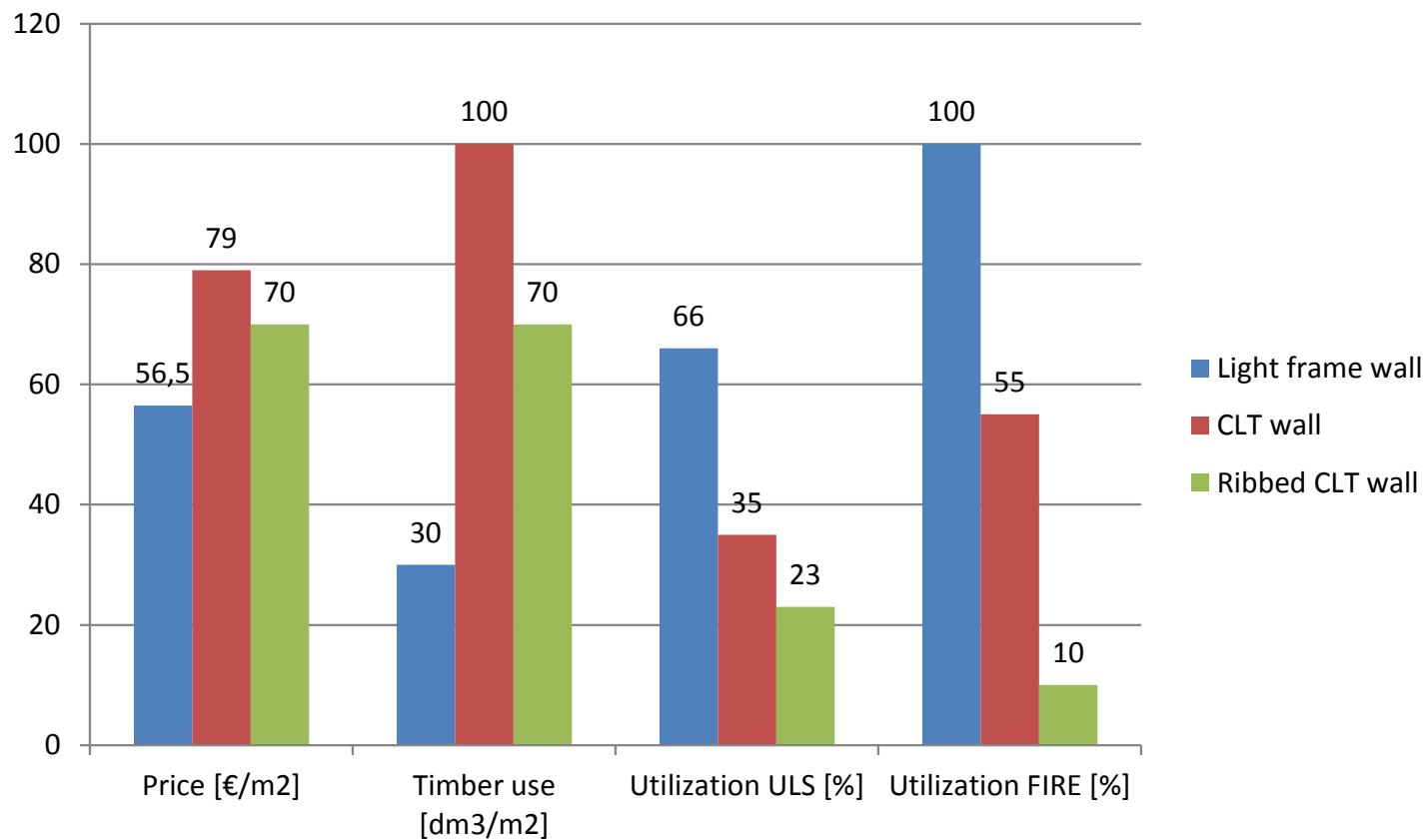


**EU patent and
EU project**

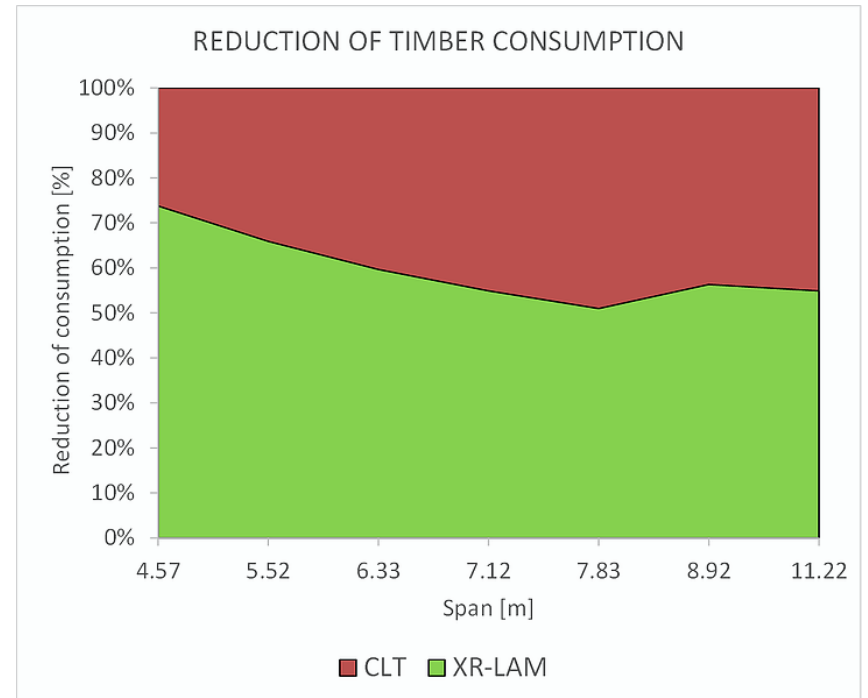
Development of new HCLTP press for XLam ribbed walls and plates



New technologies in timber constructions – XLam ribbed wall



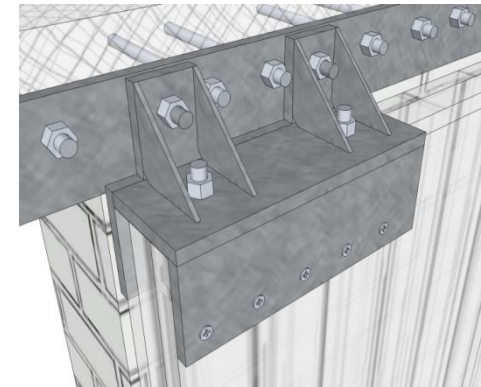
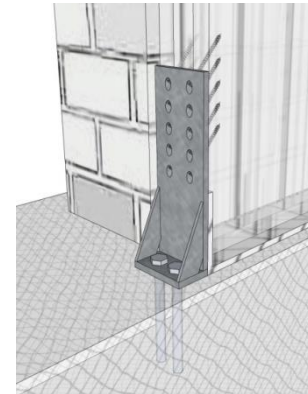
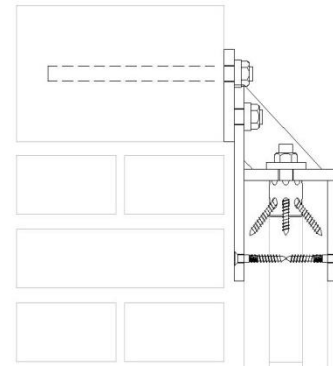
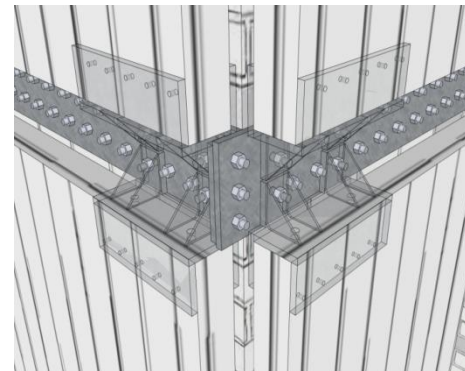
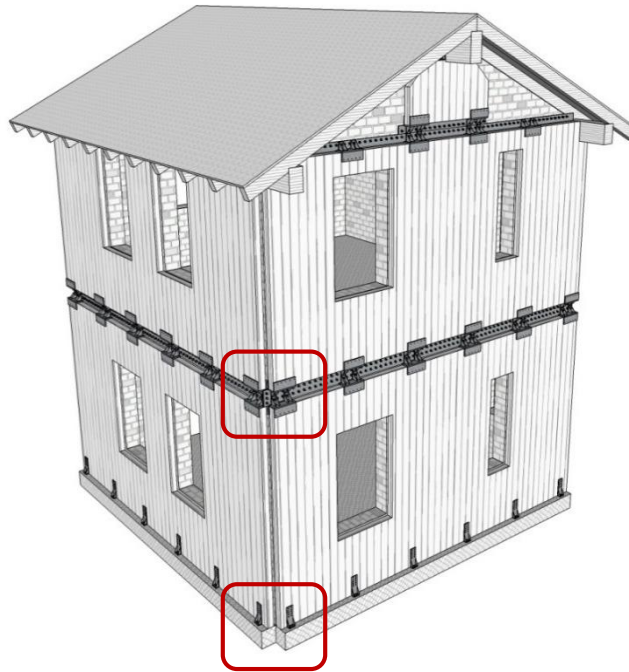
Optimization of wooden cross-section



Energy renovation of existing buildings



Innovation with XLam panels – seismic strengthening with XLam jacket or XLam inner box



Seismic strengthening with possibility of upgrade of existing building

Universal building retrofitting system that solves both seismic and energy problems of older classical buildings.





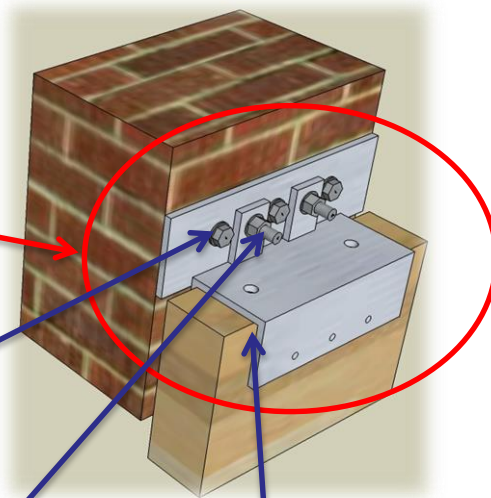
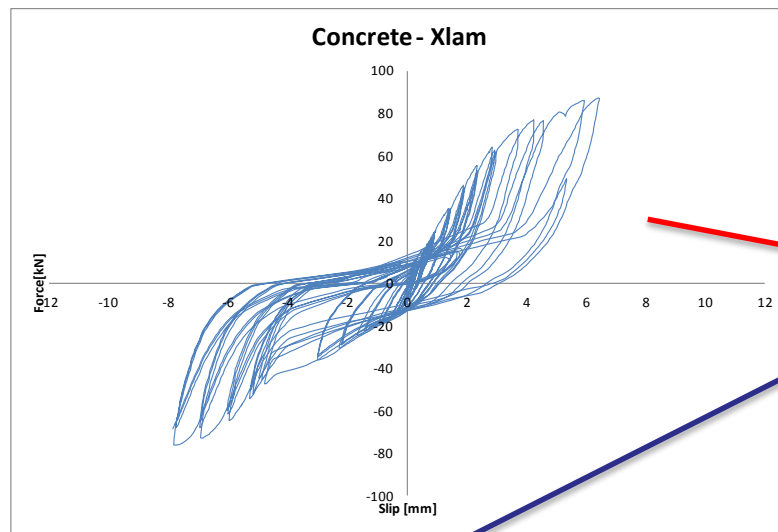
4 weeks, 156 tests

- 14 upgrade setups
- 2 strengthening setups
- 8 glass-timber setups

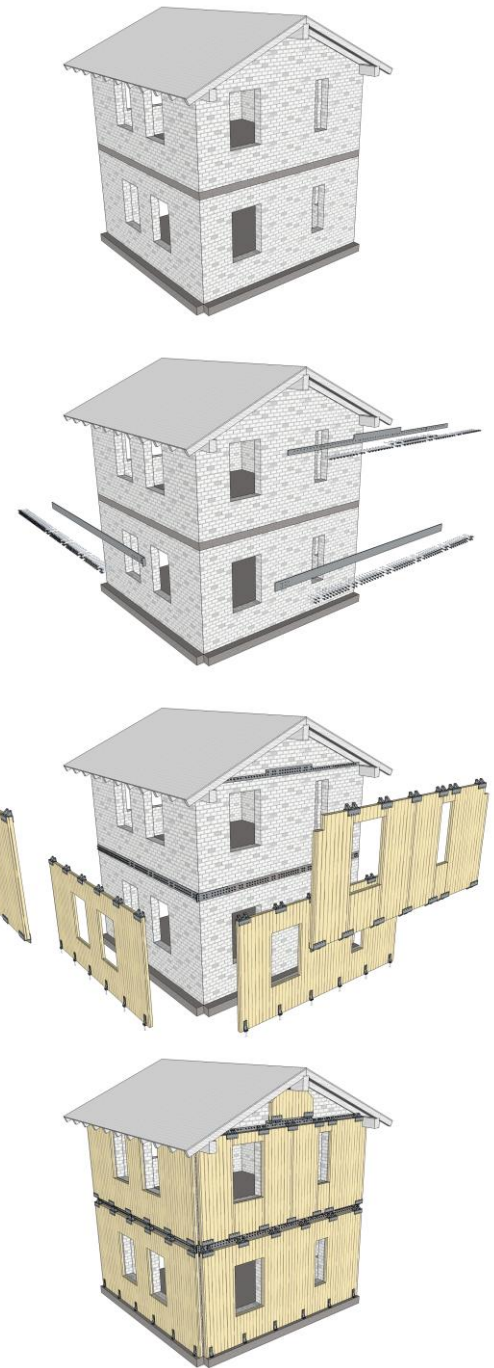
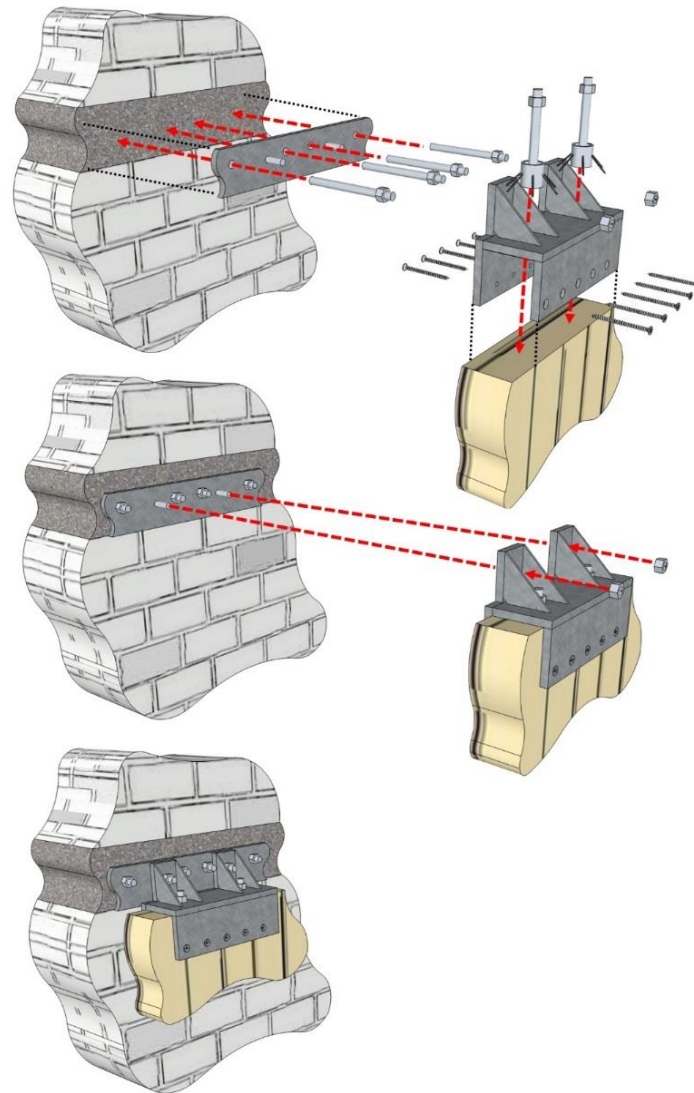
Seismic tests of unstrengthen and strengthen specimens with Xlam jacket



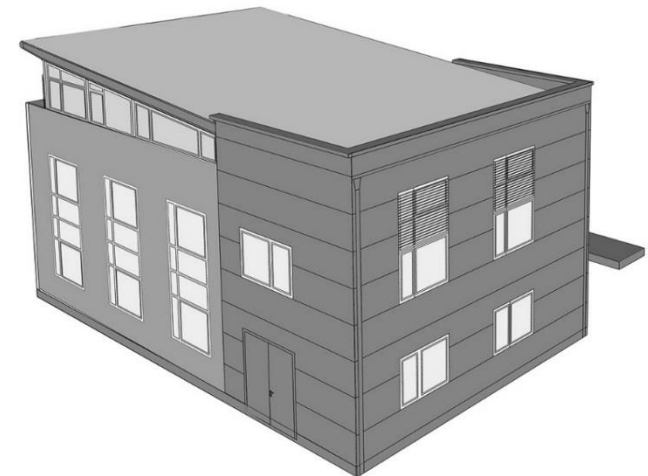
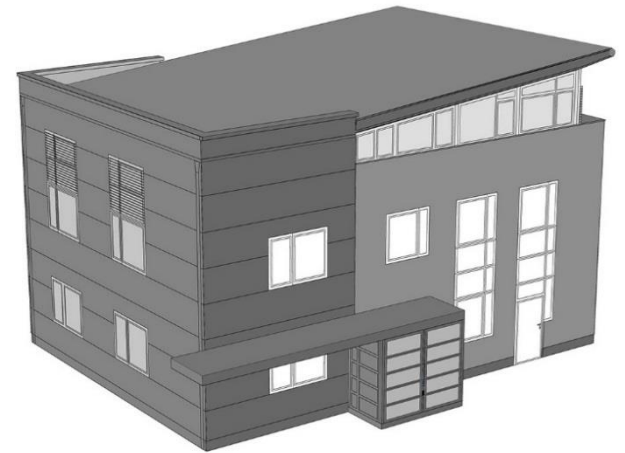
Seismic strengthening – innovation is in connections and details



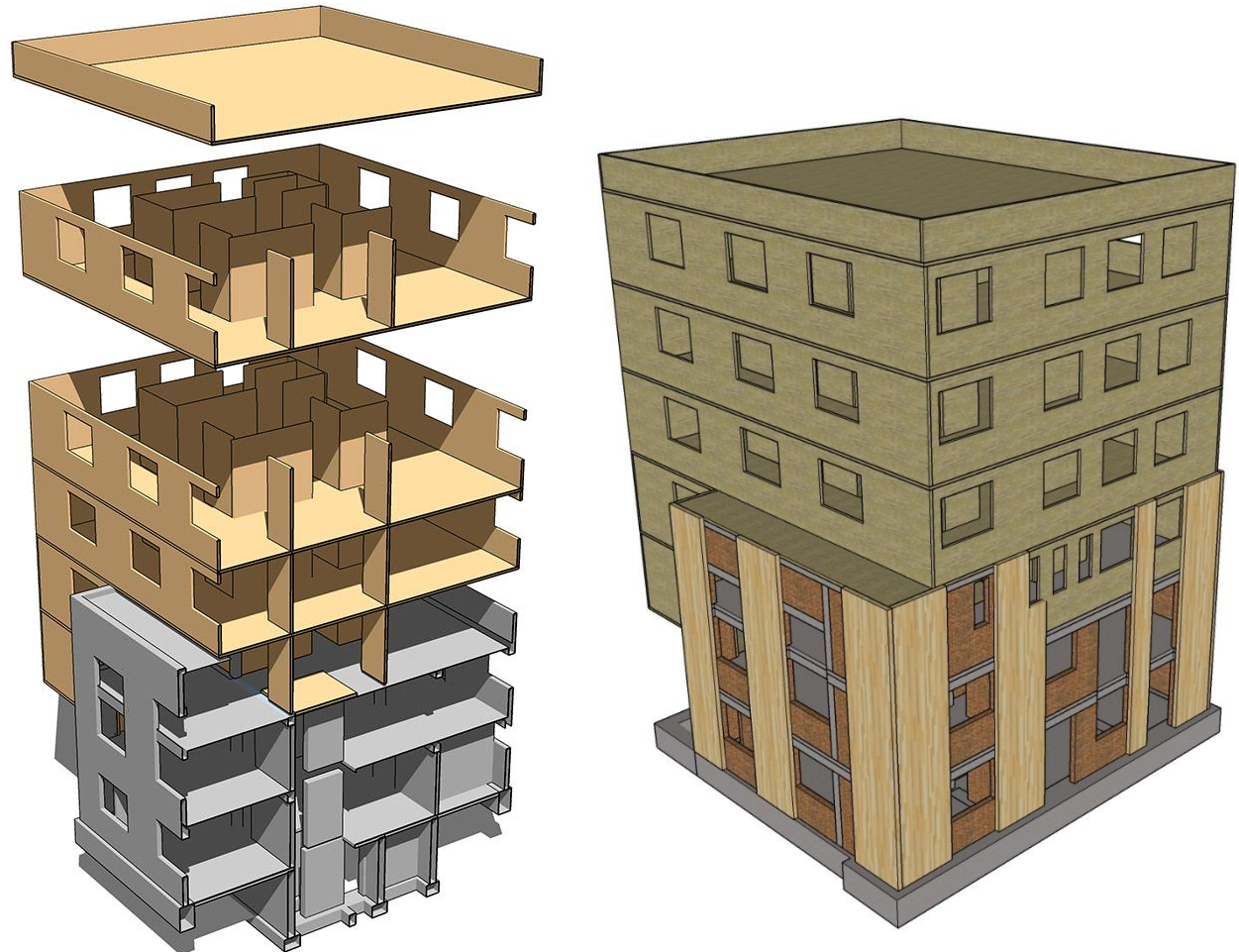
XLam jacket – assembling technic



Example – seismic strengthening, energetic renovation and upgrade of an office building in Ljubljana



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Example – multifunctional modular sport hall



alfanatura

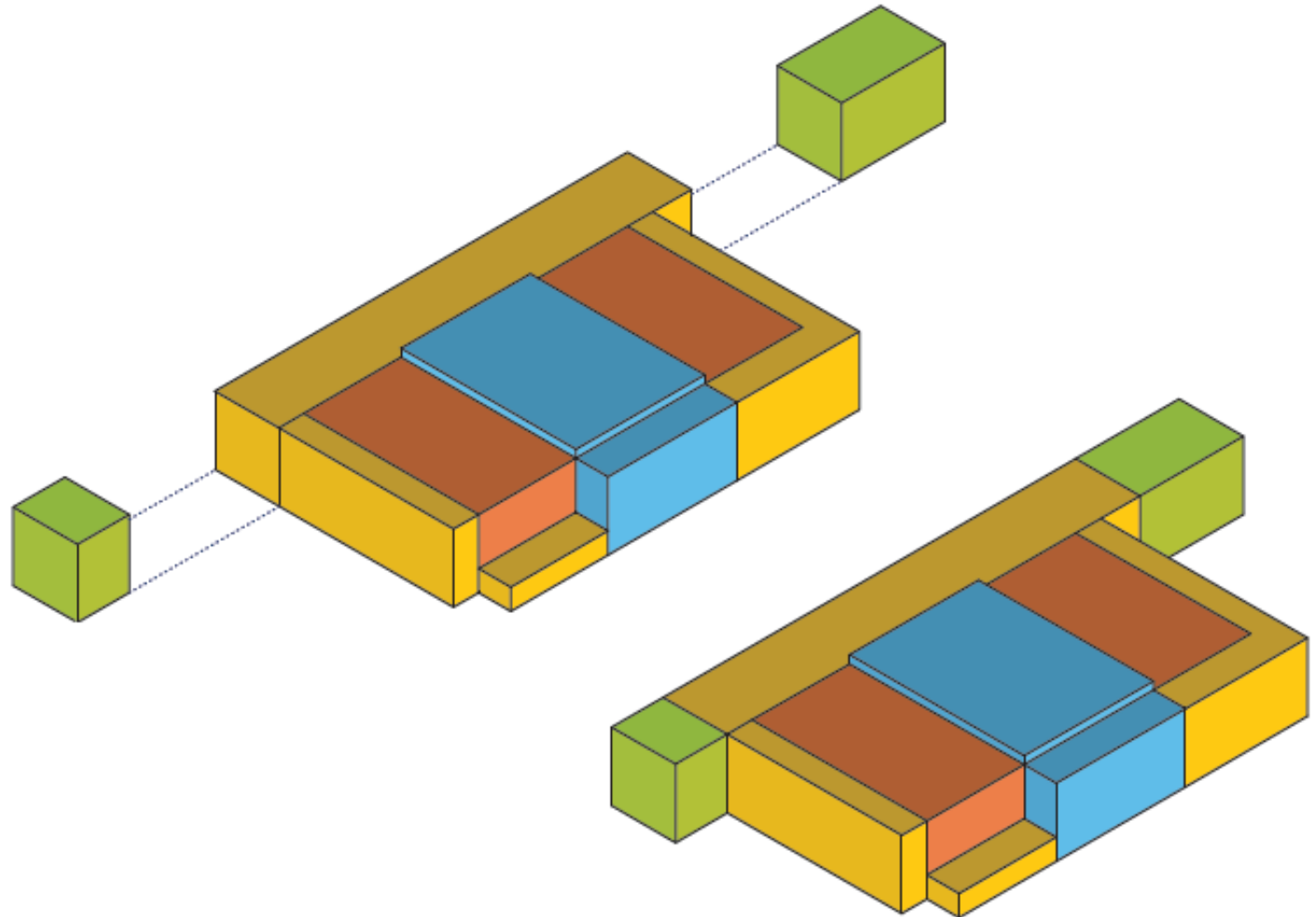
Example – multifunctional modular sport hall



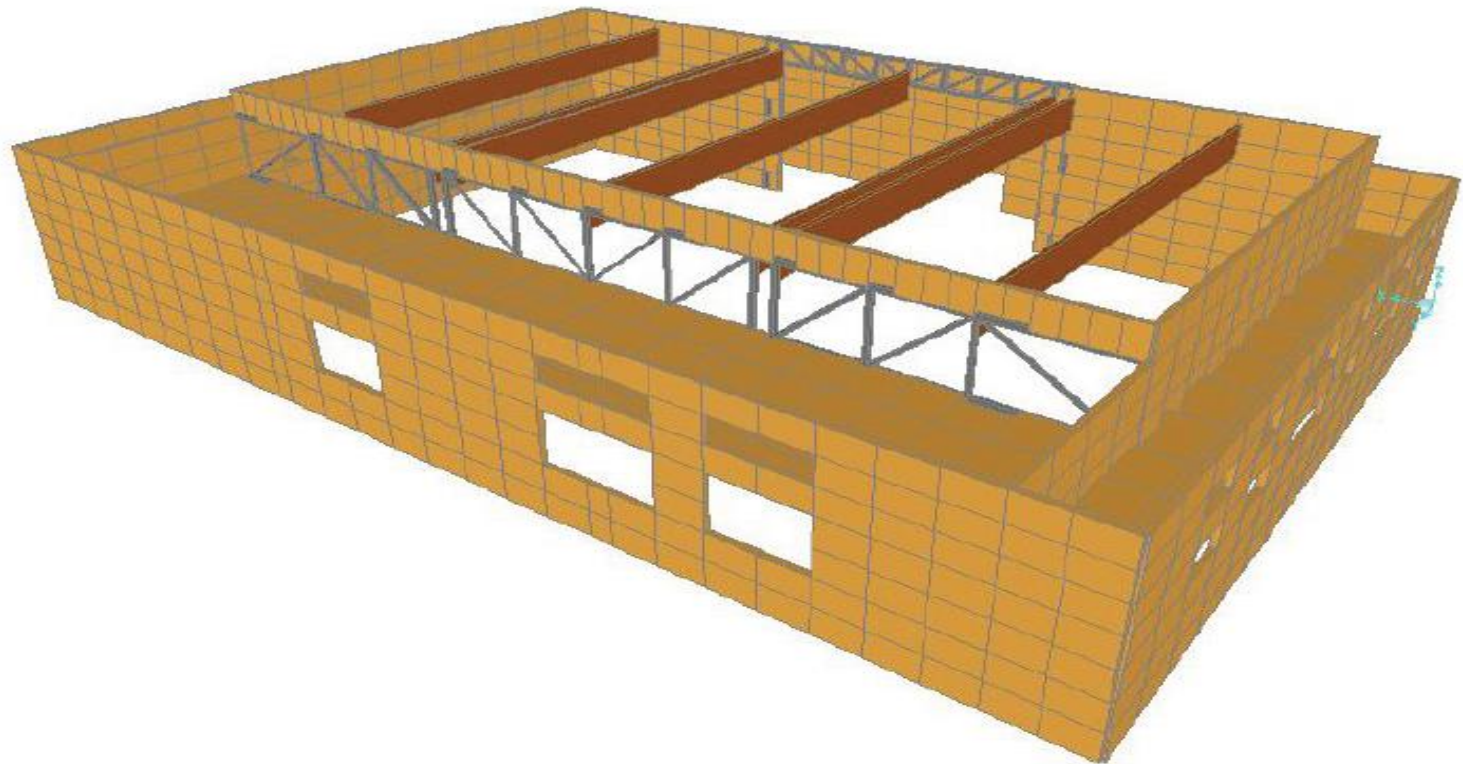
anSPORT

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Example – multifunctional modular sport hall



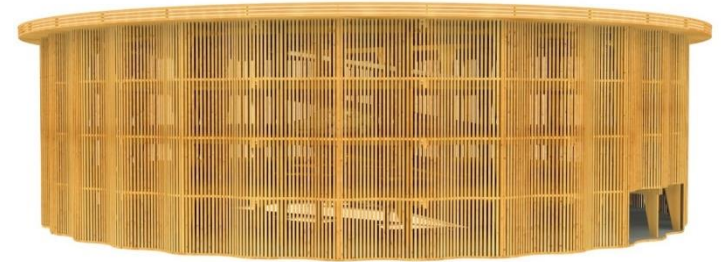
Example – multifunctional modular sport hall



Sustainable wooden parking garage

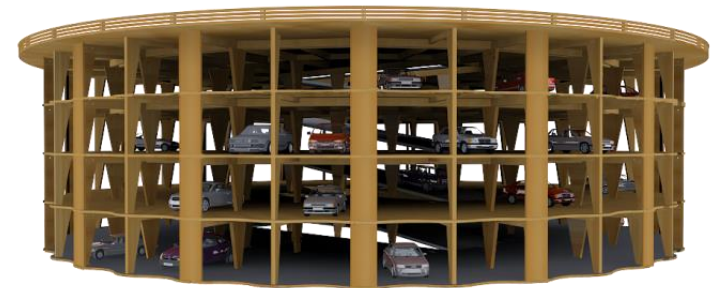
Concept

- 3 basic shapes
- 1 to 5 floors
- 46 to 488 parking spots
- 7000 € per parking space

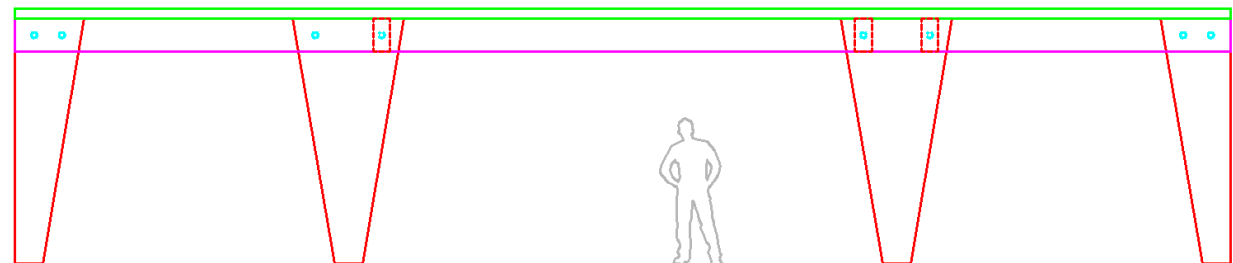
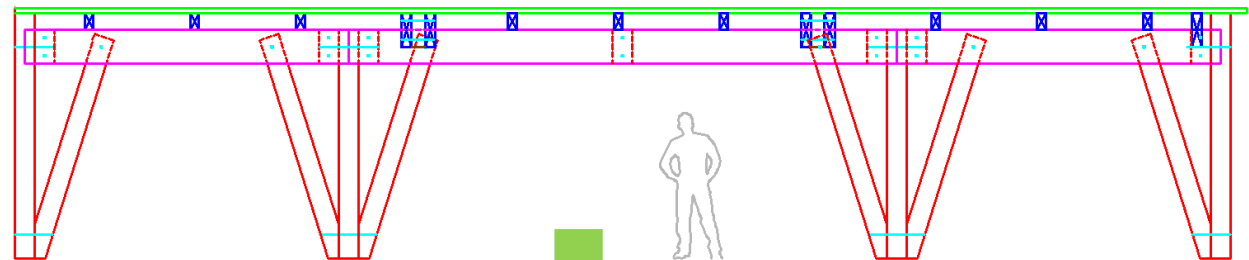
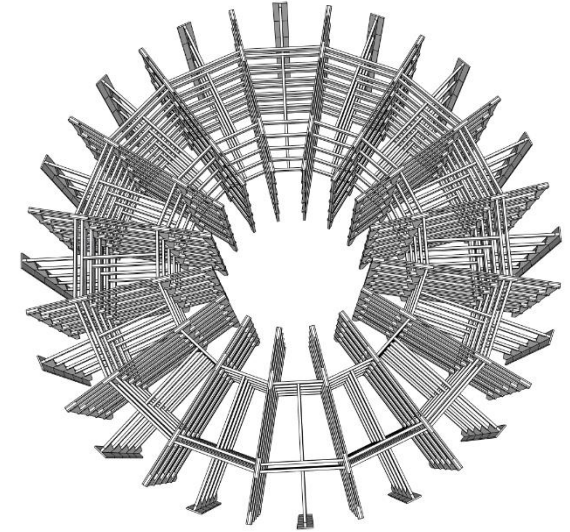
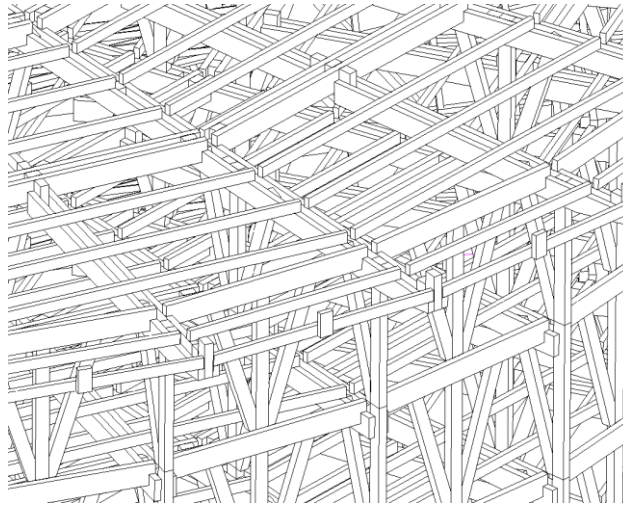


Facts

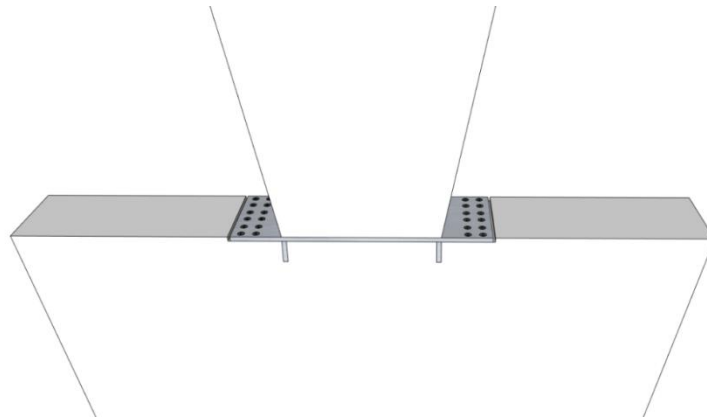
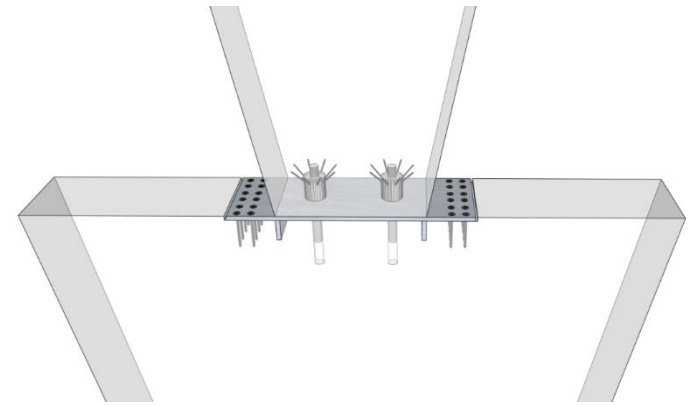
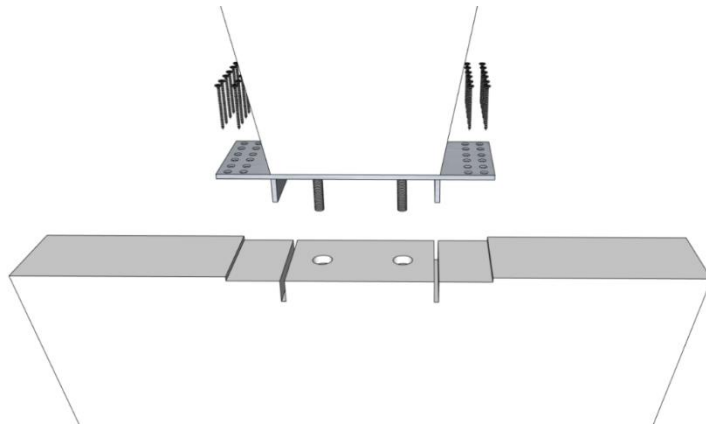
- 13.5 tons/CO2/parking spot
- 5 times lighter than in RC
- lower foundation cost
- deassembly – reassembly
- 1 week/floor



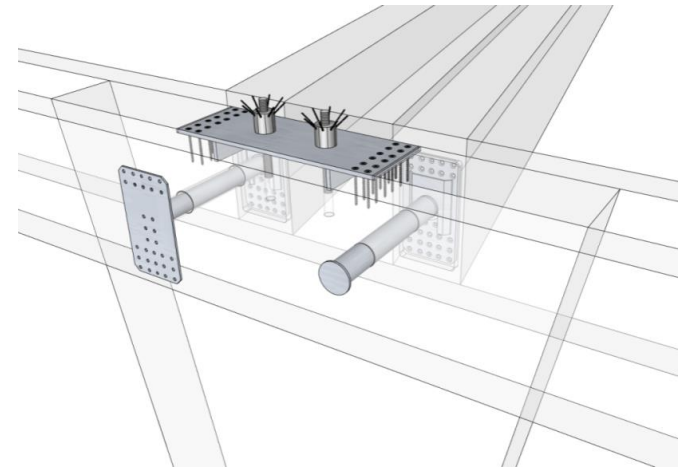
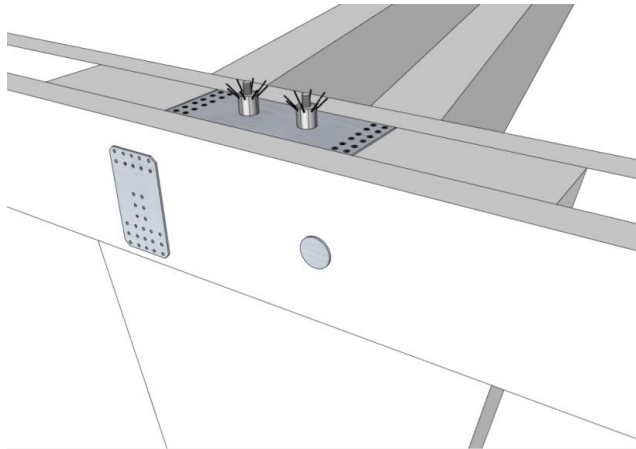
Sustainable wooden parking garage



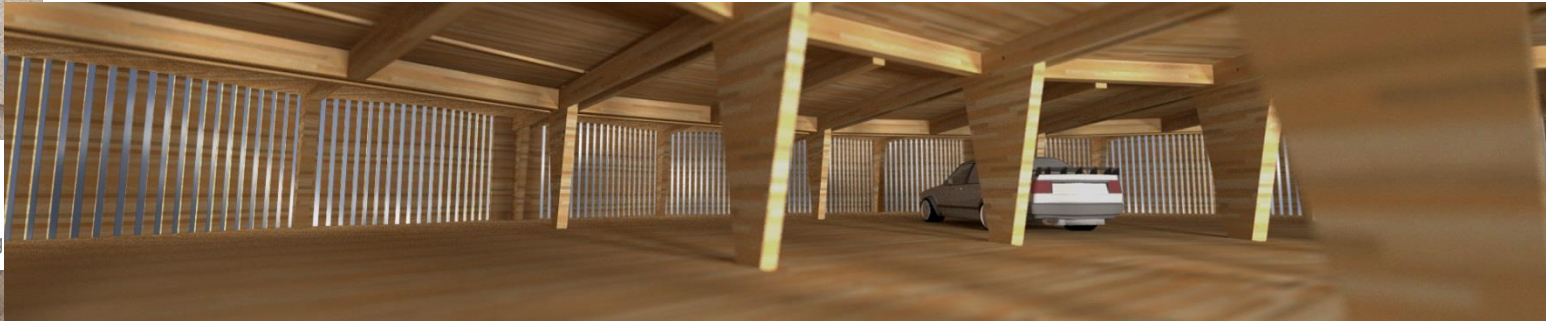
Sustainable wooden parking garage



Sustainable wooden parking garage



Sustainable wooden parking garage



New technologies – sustainable parking garage system PSILOS



New technologies – sustainable playground platform system PSILOS



Thank you for your attention

I FEEL
SLOVENIA

