

# Multi family house Unterhub, Zollikerberg

2021

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In the apartment buildings on the lower right bank of Lake Zurich, the benefits of TS3 technology and timber construction are both tangible and visible: This construction method allows for flexible room layouts and continuous wooden ceilings that extend from the interior to the exterior without the need for complex cantilevered slab connections.

## The Project

The above-ground structure is a timber construction consisting of wooden columns and cross-laminated timber panels connected using TS3 technology. Timber Structures 3.0 technology, or TS3 for short, is a method that enables the creation of large-scale timber structures—without the joists traditionally required. TS3 connects glued-laminated timber panels rigidly to one another via their end faces. This allows for floor slabs that extend from the warm interior into the cold exterior. These details were evaluated and optimized using isothermal calculations. For planning details such as the connection of windows to the ceiling, it is advantageous that building physics and structural solutions come from a single source.

## The Construction Method

The TS3 connection using joint grouting enables the construction of beam-free timber frame structures with slender, point-supported panels. By activating the secondary load-bearing direction, the same types of floors can be built using wood. Due to wood's low thermal conductivity, there is no need for complex cantilevered slab connections. The CLT panel can simply extend from the interior to the exterior. The concrete stairwell stiffens the building.

## The Challenge

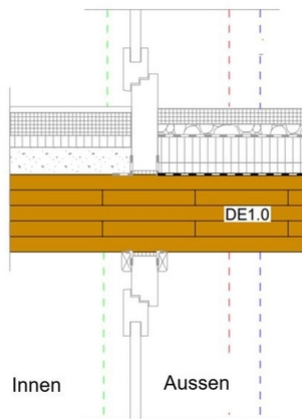
The stairwell is constructed of monolithic concrete without decoupling measures at the stair runs and landings and without impact sound-insulating flooring. The floor slabs attached to the stairwell were installed with acoustic decoupling, and a cladding shell was installed on the apartment side.



TS3 construction during the construction phase



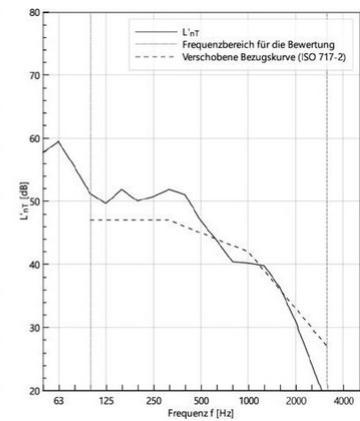
TS3 assembly in its finished state



Detail of continuous slab. Floor construction with 70 mm fill, 30 mm impact sound insulation, and 60 mm subfloor

Frequenz f Hz	L' <sub>tot</sub> Terzband dB
50	57.7
63	59.5
80	55.6
100	51.3
125	49.7
160	51.9
200	50.1
250	50.8
315	51.9
400	51.1
500	46.9
630	43.8
800	40.4
1000	40.2
1250	39.8
1600	36.3
2000	30.9
2500	24.3
3150	≤ 17.3
4000	≤ 11.8
5000	≤ 11.1

≤ bei diesem Messergebnis wurde die Messgrenze erreicht



This floor construction achieves a rated impact sound level of L'<sub>tot</sub>=45 dB in accordance with ISO 717-2

### Construction Data

- OSB 15 mm 690 m<sup>2</sup>
- DSP 27 mm 980 m<sup>2</sup>
- C24 (lumber) 58 m<sup>3</sup>
- GL24h 30 m<sup>3</sup>
- TS3-CLT (200 mm) 343 m<sup>3</sup> (1720 m<sup>2</sup>)
- CLT (various thicknesses) 33 m<sup>3</sup>
- TS3 joint 520 m<sup>1</sup>

### Services of Timbatec

- SIA Phase 31 Preliminary design
- SIA Phase 32 Construction project
- SIA Phase 41 Tendering and comparison of offers
- SIA Phase 51 Construction project
- SIA Phase 52 Execution
- Technical planning for fire protection
- Technical planning for building physics
- Noise Assessment
- Energy certification
- Building acoustics measurements
- Quality assurance for building physics
- Summer heat protection

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### Photography

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