Building Systems in Timber and Earth

Compendium

December 2025 Edition

Lehm Ton Erde, Blumer Lehmann and gbd, three pioneers in sustainable construction, pool their expertise in Lehmit. Together we develop new solutions in earth and timber which make net zero a reality.

A Joint Venture of:

gbd

Blumer Lehmann

LEHM TON ERDE

Content P.

Advantages of Earth and Timber

Structural Performance and Fire Protection

Timber is ideal for taking tensile and compressive forces.
Earth carries compressive forces and protects the timber from charring.
This enables particularly slender and material-efficient cross-sections and build-ups.

Hygrothermal Comfort

The mass of the earth leads to thermal inertia in the building elements, which ensures summer heat protection.
In addition, the open-pored natural materials regulate indoor humidity.
This allows building low-tec building systems.

Sound Insulation and Acoustics

Earth adds mass to lightweight timber structures and enables excellent sound insulation.
Hybrid and structured surfaces also create pleasant room acoustics.

Precise Prefabrication

Earth-timber elements are produced independent of weather conditions and are quickly assembled on site using proven timber connections.
The result is short construction times and high quality.

Ecological Impact

Minimal Embodied Energy

Earth is made from excavated material that is turned into building material instead of waste.
Timber is the only renewable structural material.
Both natural materials can be processed without energy-intensive procedures and therefore with low primary energy demand.

CO_2 Storage

One cubic metre of timber binds roughly one tonne of CO_2 during the growth of the trees in the forest and stores it in the timber for the entire lifetime of the building.
Earth replaces emission-intensive building materials and avoids dumping of excavation material.

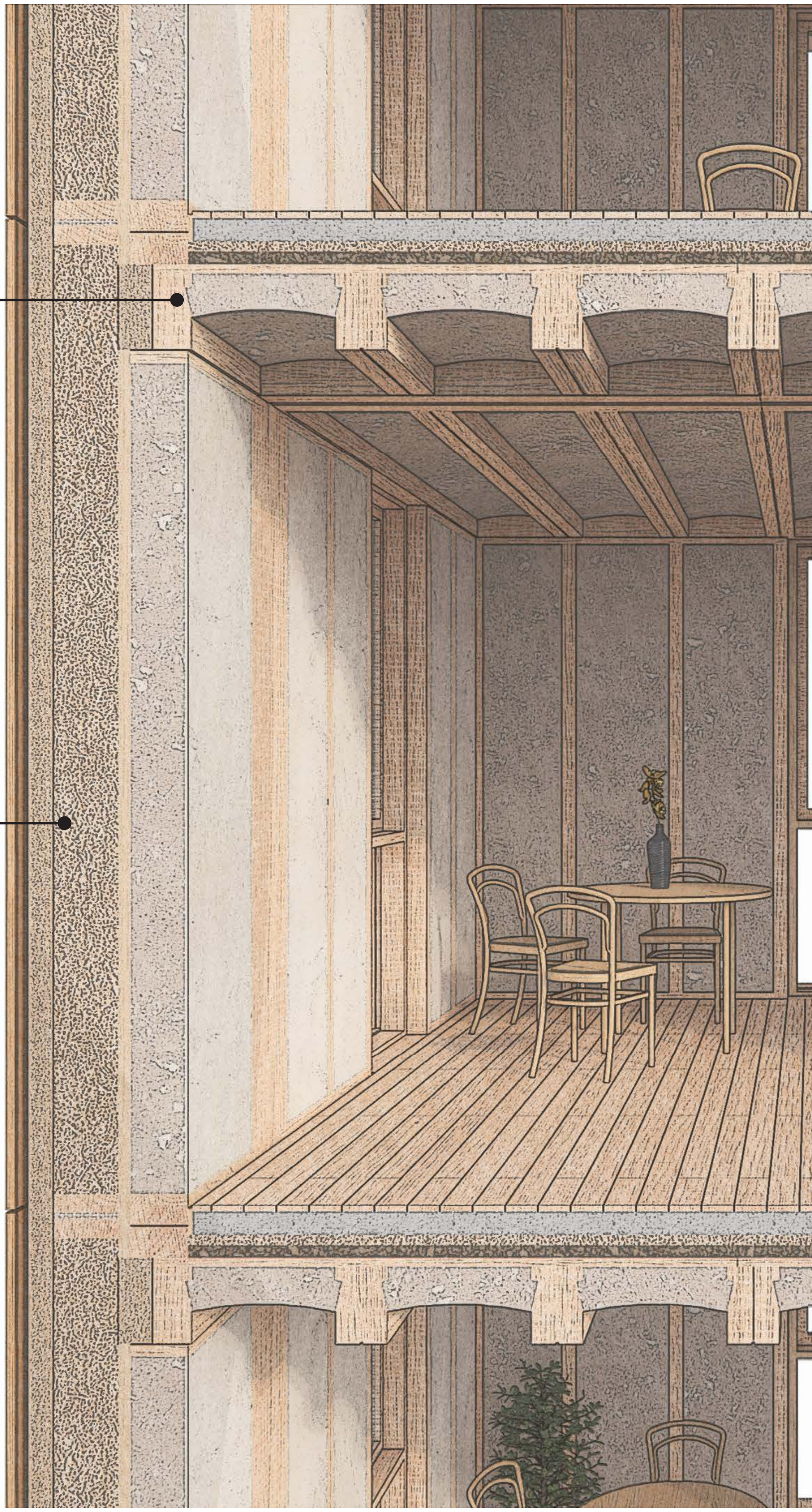
Circular and Easy to Dismantle

Unfired earth can be mixed with water again and reused as a building material.
Timber can be used in a pure form as a sinlge material.
This allows disassembly without hazardous waste and reintegration into sustainable material cycles.

Local Resources and Short Transport Distances

Excavated soil and timber are available regionally.
Transport emissions can be reduced and local value creation is strengthened.

Building with Earth and Timber



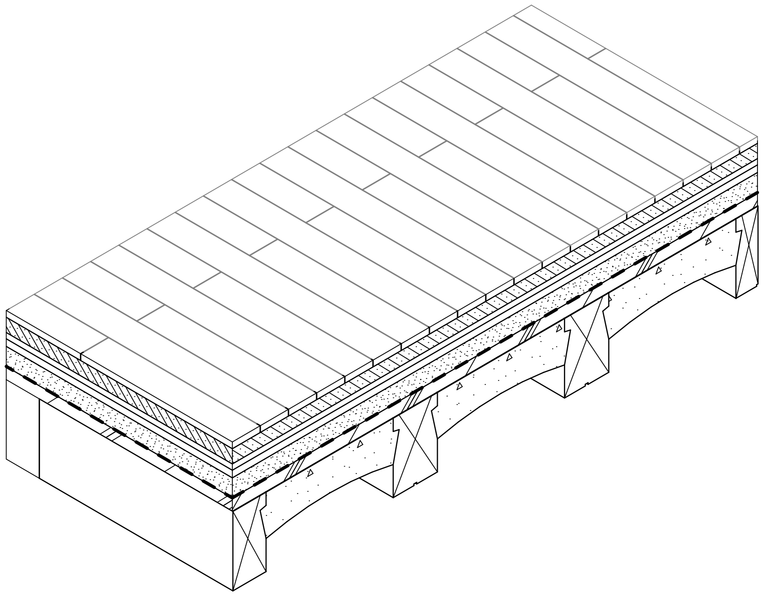
Earth and Timber Slab System

Earth and Timber External Wall System


Earth and Timber Internal Wall System

Earth and Timber Slab System

The first large-scale application of this type of slab system was in the Hortus project in Allschwil near Basel. The building was designed by Herzog & de Meuron and zpf and developed by Senn.
Lehm Ton Erde, together with the project team, developed the production concept for the hybrid structure already in the early planning phases.
Blumer Lehmann and Lehm Ton Erde filled the 810 timber elements with local excavation material on-site in a field factory, covering a total floor space area of 12,500 m².



Exemplary Build-up

Timber floorboards	21 mm
Dry screed	25 - 45mm
Gutex Standard - N	20mm
Isover PS81	30mm
Granular fill	60mm
PE membrane	
Earth-timber slab element	
3-ply panel / diagonal sheathing	42 mm
Beams 80 / 160 x 240	240 mm
Rammed earth vault	120 mm

Imposed Load
Up to 5 kN / m²

Impact Sound Insulation
depending on Ffoor build-up (tested)
$L_{n,w}$ 33-53 dB

Airborne Sound Insulation
depending on floor build-up (tested)
R_w 59-54 dB

Fire Resistance (tested)
REI 60

Thermal Activation
heating & cooling possible

Greenhouse Gas Emissions (KBOB)
19.67 kgCO_2eq / m²

Certifications
Impact Sound, Fire Resistance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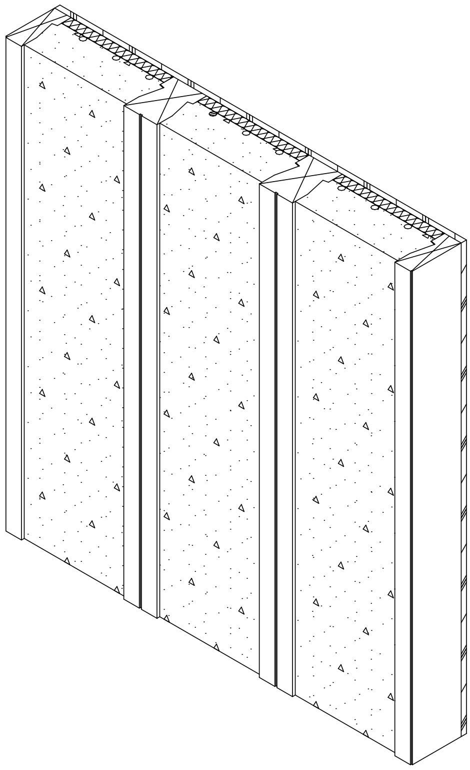
Earth and Timber Internal Wall System

An internal wall made of earth and timber has a positive effect on the indoor climate, meets fire safety requirements and reduces sound transmission from room to room. Additional thermal activation can be integrated, if desired.



Possible Internal Wall Build-up

3-ply board / diagonal sheathing	19 / 27 mm
Optional insulation (foam glass)	35 mm
Optional wall heating	
Timber studs 60 / 120 x 160	160 mm
Rammed earth fillings	120 mm
Optional clay plaster	15 mm

Structural Performance

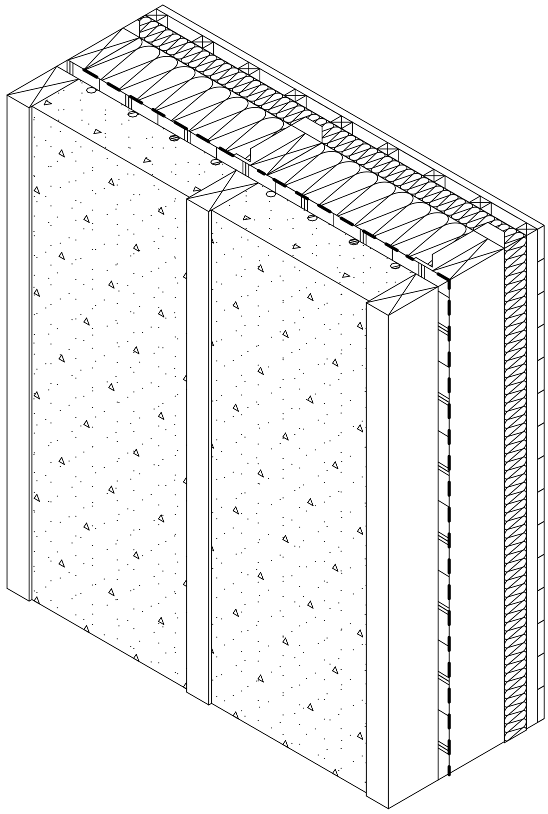
load bearing / non load bearing

Thermal Activation

heating & cooling possible

Earth and Timber Internal Wall System

An external wall made of earth and timber offers the same benefits as an internal earth-timber wall. In addition, it is insulated on the outside and completed with a wide range of possible façade claddings that protect the structure from the weather.



Possible External Wall Build-up

Timber façade, e.g. larch	24 mm
Ventilated cavity	40 mm
Timber substructure	80 mm
Wood fibre insulation board	
Timber studs 60 x 120	120 mm
Isofloc Eco cellulose insulation	
Vapour barrier	
Earth-timber-element	
3-ply board / sheathing	19 / 27 mm
Timber studs 60 x 120	120 mm
Rammed earth fillings	120 mm
Optional clayplaster	15 mm

Structural Performance

load bearing / non load bearing

Thermal Activation

heating & cooling possible

Every constructive act is also a deconstructive act. Building in collaboration with nature. Sustainably, circularly, respectfully.

We advise you early in the development of your sustainable building project in earth and timber. From the initial concept idea, we develop effective and detailed solutions through specialized technical planning.

We offer a sustainable and efficient management of earth's resources, designing and building with regenerative materials.

Our Expertise

Highly Specialized Competences	Our combined knowledge and experience in earth construction, timber construction, and engineering enables us to identify and implement optimal solutions bridging technology and craftsmanship.
Machine Development	Specially developed machines enable efficient prefabrication of elements and industrial production.
Testing and Certification	We test materials, determine key parameters, and provide certifications for entire components. We research and experiment with earth and timber to achieve reliable solutions and build-ups.
Competent Assistance	With our combined knowledge, we guide your ambitious construction project from the first idea to the finished building in earth and timber.
Customized Solutions	We find the best solution for your project. This can range from the flawless implementation and adaptation of a proven building system to the development of a bespoke solution in earth and timber.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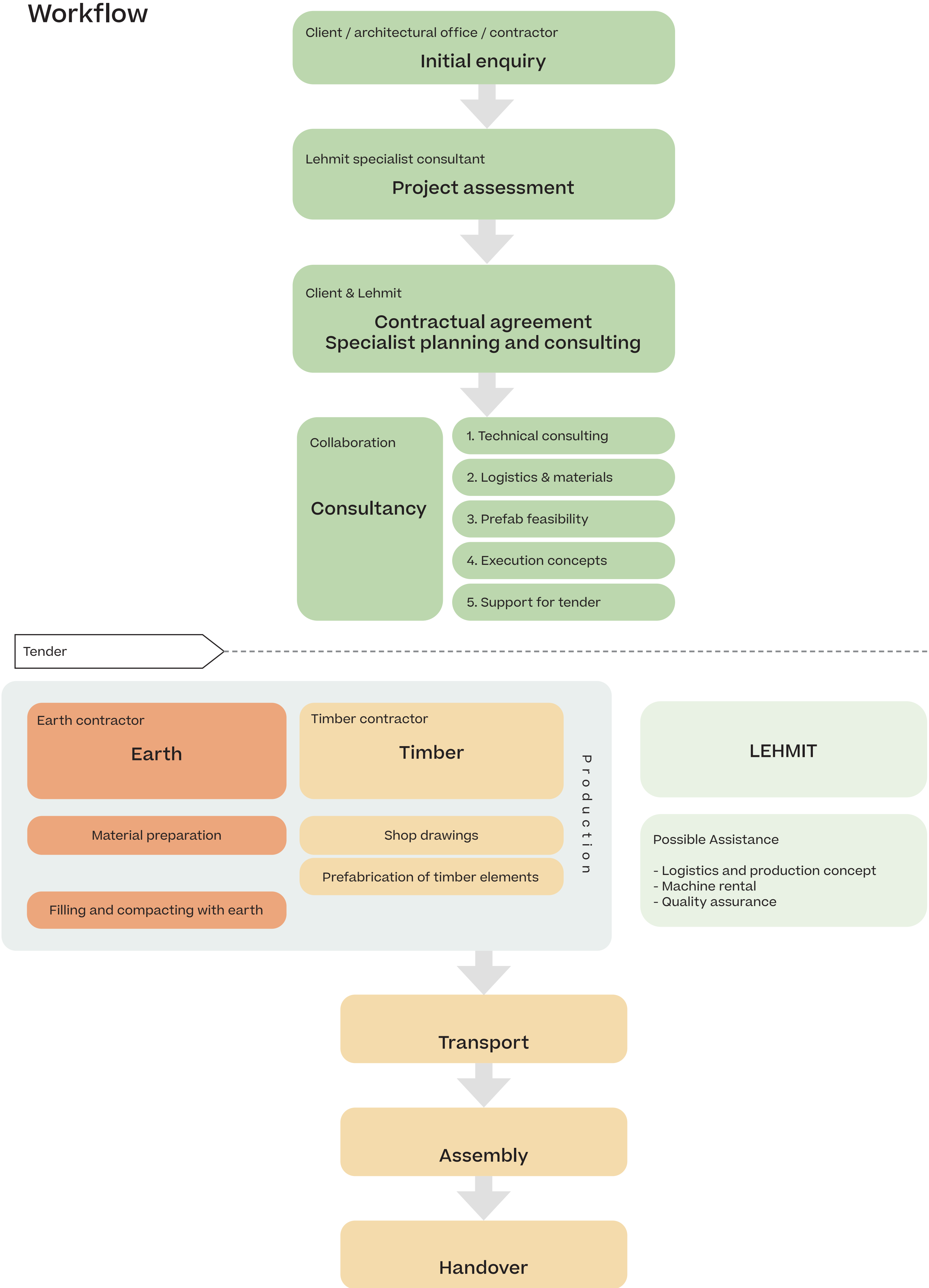
Collaboration Workflow



Get in touch!

We push the limits of sustainable construction in earth and timber.
Lehmit: Experts in earth and timber.

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