

# A revival in rammed-earth construction

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Detail of the Rauch House completed in 2008 in Austria. Credit: Beat Bühler

Through an exhibition and two semester-long courses, EPFL is paying tribute to a forgotten art: that of making buildings out of earth. The aim is to demonstrate how this age-old technique can still play a role in contemporary architecture.

When Zurich-based architect Roger Boltshauser talks about using [earth](#) as a building material, his passion is contagious. He believes there is

enormous research potential in this area, both in engineering and architecture. There is much to discover about how earth can be used in construction and as a load-bearing material, particularly when it comes to the rammed-earth method, which involves compressing earth into a frame or mould. This [technique](#) was adopted around Europe despite not being particularly popular with the Romans. In the Mediterranean region, the first traces of rammed earth appear in Hannibal's fortifications, while in Asia, the tradition dates back to before 2,000 BC.

This year, Boltshauser was invited by EPFL's architecture department to give two semesters of courses on this type of construction. He is also organizing the new Archizoom exhibition on the technique, "Pisé: tradition and potential," which will be on display from 20 March until 24 June 2017. We interviewed him to find out more.

## **What makes rammed earth different from other construction techniques?**

The technique uses earth, so it goes without saying that it is extremely sustainable. The environmental impact is minimal, as the earth is extracted directly on the building site. Earth also has some other interesting properties: it is a natural humidity regulator; it acts as a barrier for noise and cell-phone signals; and it has the right consistency to be extremely weather-resistant. So, from an ecological standpoint, earth has some really compelling qualities, even if it is thought of as an archaic and rustic material. We just have to rediscover its potential.

## **Why is it that the rammed-earth method has all but disappeared from construction?**

During the Industrial Revolution, earth became associated with poverty; it was for the lower classes, unlike newer [materials](#) such as concrete,

steel and bricks. The techniques for building with earth were complex and time-consuming, as each block of earth has to dry out before the next one can be placed on top of it. A lot of the know-how about this method has now died out. There is, however, a long tradition of building with this technique in Europe, especially in the Rhône-Alpes region of France. In the 17th century, the method was particularly prevalent there and influenced other places like Switzerland, although that's all been forgotten. The situation has changed now: earth has become a noble [building material](#) that is now costly and not very widespread.

## **Are there any recent buildings where this technique was used?**

Ricola's Maison des Plantes in Laufen, near Basel, is one interesting example. It was built in 2014 by Herzog & de Meuron, who used an innovative manufacturing process. The earth components were prefabricated in a factory, reducing the construction time to that of a normal house. However, the building still contained concrete. The most radical example is the Rauch House, built in Austria in 2008. Martin Rauch was the pioneer in reviving the rammed-earth technique. He was the creator and I was the architect. The house clearly shows that it's possible to construct a contemporary building with several floors using earth – not only as the raw material but as the load-bearing material as well. It's an important achievement. Other projects are under way in Switzerland; architects are developing and passing on their know-how. With every building, they try to go that little bit further and add something new to this construction technique.

## **What research have you carried out with the first-year Master's students here at EPFL?**

In the first semester, we tried to develop the rammed-earth technique,

using Lausanne as a case study. We looked at ways of prefabricating the earth blocks in order to make the method more accessible. The students also tested hybrid systems that combine earth with concrete, steel, or wood, and even invented new systems with new materials. There's still so much to discover! It's an extremely educational subject, as the students really have to think outside the box. We also looked at ways of [building](#) houses that use earth as the main load-bearing material. To develop our ideas, we got help from two engineers, Jürg Conzett and Corentin Fivet [a professor in the Smart Living Lab in Fribourg]. This semester, the students will have to design a pavilion on the historical Sittertal site in St. Gallen. The site has a great tradition of rammed-earth construction. The best idea will be built over the summer with the students, in cooperation with Sitterwerk, a local association at St. Gallen that brings together artists, craftspeople, and researchers.

Provided by Ecole Polytechnique Federale de Lausanne

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