RAMMED EARTH: A MATERIAL FOR THE FUTURE?

Invited professor: Roger Boltshauser

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Staircase Rauch house, Schlins, Roger Boltshauser

ATELIER ROGER BOLTSHAUSER AT EPFL ENAC
Over the course time, rammed earth as a building material has been increasingly superseded by industrially produced materials. During this semester, based on a specific design we will explore the as yet untapped potential of rammed earth construction in prefabrication. We believe that it has particular potential when it comes to structurally and energy optimised hybrid structures, which we want to develop in cooperation with the construction industry and with qualified specialists such as Martin Rauch, Jürg Conzett and the construction physicist Ryzard Gorajek.

Construction trench Rauch house, Schlins, Roger Boltshauser
Over the millennia, building with clay was practised and developed in many different ways: clay as a building material is available almost anywhere in the world, and the raw material can be processed using tools or machines without incurring major expenses. To this day, a majority of people live in rammed earth houses! Given the rapid global changes over the last century and the accompanying technical possibilities of raw materials and energy production, the building material earth was increasingly supplanted by industrially produced materials.

Mosque, Djenne

Musgum mud hud, Cameroon
A new awareness of and a new way of thinking about our use of finite resources increasingly bring the material rammed earth to the forefront. Industries are thus looking for new processing methods and products that involve unfired clay that would both satisfy the needs of ecological construction and are compatible with today’s building processes and the associated requirement for prefabrication. This requirement forms the basis of our semester:

Are we able to use unfired rammed earth to produce a standardised, industrially optimised product without adversely affecting the ecological value of this building material? What new characteristics can rammed earth develop in the form of prefabricated hybrid structures with other materials?

Design with climate, as a factor is something that concerns us not only on a structural level, but also generally in the development of spatial arrangements and in urban development settlements. In parallel with the design and development of construction systems, with sustainable construction in mind we will always take into account the consumption of grey energy. In addition to environmental and economic issues, we will examine the extent to which the aesthetics of rammed earth in combination with other materials can be enhanced or strengthened.
Roman wall detail, Tivoli

Facade mock-up Ozeanium Zoo Basel, Basel, Roger Boltshauser
Hybrid structures with rammed earth, Roger Boltshauser
Photomontage, Philipp Schärer
The developed hybrid rammed earth will be implemented in a spatial context at four building sites in Lausanne and their spatial and structural potential will be examined. By looking at urban development, construction, materials and sustainability as a whole, we will create a project that brings all these factors together and places them in relation to one another.

The building sites differ with regard to spatial arrangement and are shaped by landscape, urban, topographical and historical features. We will be dealing with the following building sites:

1. Museum and function room for the Roman settlement on Lake Geneva
2. Restaurant in the Botanical Garden
3. “Dolce Vita” with bar and dance club
4. Market Hall with integrated underground station at Place de la Riponne
MUSEUM AND FUNCTION ROOM FOR THE ROMAN SETTLEMENT ON LAKE GENEVA

We are planning to develop a function room and a temporary exhibition space for the exchange and transfer of knowledge for the Musée Romain de Lausanne-Vidy by the Roman settlement structures on Lake Geneva.
RESTAURANT IN THE BOTANICAL GARDEN

The Botanical Garden in Lausanne is in an outstanding location between the city and Lake Geneva. A new catering concept will allow the extraordinary topography, the magnificent trees of the garden and the large park to be utilised and experienced more extensively.
“DOLCE VITA” WITH BAR AND DANCE CLUB

The existing building of the legendary Rock Club “Dolce Vita” in the bend of the busy Rue Dr. Cesar-Roux is to be replaced. The steep topography typical of Lausanne and the otherwise undeveloped hillside is an ideal place for urban cultural development, in this case a bar with a dance club.
MARKET HALL WITH INTEGRATED UNDERGROUND STATION AT PLACE DE LA RIPONNE

The sparse forecourt of the Palais de Rumine is marked by a traffic thoroughfare and access to parking garage whose entrance faces the square. In view of the restructuring of the “Musée cantonal des Beaux Arts” and the resulting reorganisation of the Palais de Rumine, the potential of this urban square is to be redefined.
INTRODUCTION TO URBAN DEVELOPMENT

The very challenging locations in Lausanne, which are also of interest from an urban development viewpoint, were assessed and selected in cooperation with Doris Wälchli, a Lausanne-based architect. Doris Wälchli has in-depth knowledge of Lausanne, and she is an outstanding architect. She will introduce the different locations as well as urban development in Lausanne in general, and she will also attend the final critical discussions.

Old city drawing of Lausanne 1642
SUPPORT THROUGHOUT THE SEMESTER FROM MARTIN RAUCH, JÜRG CONZETT AND RYSZARD GORAJEK

You will be accompanied throughout the semester by the professor as well as the rammed earth construction pioneer Martin Rauch, the engineer Jürg Conzett and the construction physicist Ryszard Gorajek. At the beginning of the semester, the experts will give an input presentation, and they will also take part in the interim and final critical discussions.

Martin Rauch will support us throughout the semester with his deep knowledge of rammed earth construction. He is one of the most important rammed earth construction specialists today with more than twenty years of experience in clay construction, and he will be a very valuable interlocutor for us.

Jürg Conzett, one of the leading structural engineers in Switzerland and himself an experienced lecturer (1985–2009 HTW Chur, 2011 Graduate School of Design, Harvard), will support us with his expertise in the development of the mixing systems and their constructive potential.

The construction physicist Ryszard Gorajek will give us an understanding of construction with climate as a factor. Our design work is not only about developing a sustainable construction method that takes into account grey energy, it is also about design with climate as a factor: location, orientation and compactness of volume as well as the comfort provided by a good indoor climate are very important for us.
Traversinersteg, Via Mala, Jürg Conzett

Ricola herb centre, Laufen, Herzog & de Meuron architects
The company Keller Ziegeleien AG from Pfungen (ZH) is along with other industry companies an important partner. They own a majority of the rammed earth pits in Switzerland and (since the building material is currently only processed in its fired form) are on the lookout for ways of utilising unfired rammed earth as a material, especially in prefabrication.
As part of a lecture series accompanying our designs, we will expand our knowledge of rammed earth construction every week. The focus of the lectures is on the building material’s various methods of application as well as its history and its different applications around the world.
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Ricola Herb Centre
Laufen, Herzog & de Meuron architects

Swiss Ornithological Institute
Sempach, :mlzd architects

Facade Mock-up Ozeanium Zoo Basel
Basel, Roger Boltshauser

Etoscha House
Basel, Peter Stiner Architekt