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# **Light Earth Building**

A Handbook for Building  
with Wood and Earth

Birkhäuser  
Basel

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## Foreword

First published in 1983 under the name “Leichtlembau – alter Baustoff – neue Technik” (Light Earth Building: New Techniques for an Old Building Material), this book arose in conjunction with a renewed interest in earth as an environmentally-friendly building material in the early 1980s and quickly became the first major reference book of its kind.

The intention was to undertake an in-depth study of all the available literature and norms and to systematically examine ways in which walls, floors and roofs could be built using earth and straw. Aside from the lack of building codes, there was little knowledge of the building physics of earth as a building material. The key physical characteristics of earth, e.g. thermal performance, moisture resistance, sound insulation and its reaction to fire, had not been fully quantified. Initial comparative fire performance tests were undertaken to establish that the material has good fire-resistant properties, even with a high straw content. However, expensive thermal insulation testing methods were not possible, and a more pragmatic approach was taken by compiling information that already existed on the material’s thermal conductivity properties. Later sources corroborated these values and they were adopted, following a proposal by the author, in the “Lehmbau Regeln” (the German earth building codes) and in DIN 4108-4 (the German standard governing thermal protection and energy economy in buildings).

While the homogenous, single-leaf light earth wall detailed in the original book has become the signature form of light earth construction, it is just one of a range of different possible applications. In the early 1990s we developed multi-leaf constructions with additional layers of insulation to improve energy economy and comfort levels as well as to meet the requirements of stricter regulations. These were included in the fifth edition of this book. In combination with natural, renewable or recycled thermal insulation materials such as cellulose fibres, it was possible to build sustainable and more energy-efficient constructions using timber and earth. With the introduction of additional layers of insulation, the light earth layer could be made thinner but heavier and more thermally retentive, enabling it to dry out more quickly on site.

In 2013, the seventh edition of this book was published under a new title – “Bauen mit Leichtlehm, Handbuch für das Bauen mit Lehm und Holz” (Building with Light Earth, A Handbook for Building with Earth and Wood) – and with a new organisational structure that better reflects the division in earth building materials and building elements used in the “Lehmbau Regeln”. The book was expanded to include both traditional historical techniques as well as new methods of manually applying straw-clay and heavy light earth mixtures. These were based on the results of a research project in Limburg and numerous practical tests and investigations.

Light earth is used solely in a non-loadbearing capacity as an infill material. In (timber) skeleton frame constructions it presents an alternative to the usual lightweight insulation materials, improving the physical characteristics of the building envelope and the room climate within. This edition of the book contains numerous practical examples of simplified wall constructions using earth and light earth that offer improved material characteristics, for example a very simple design-based means of moisture protection

that obviates the need for a vapour barrier and adhesive sealing tapes of questionable durability and longevity. Timber construction has always had the advantage of having a comparatively slender structure, freeing up more space for the floor plan. Today’s high-strength building materials are hard and in many cases stronger than they actually need to be. They are correspondingly hard to recycle, usually requiring shredding or crushing. Timber and earth constructions, by contrast, are easily adapted and converted to new uses, and the majority of its constituent building materials can be re-used or recycled. Houses made of timber and earth need not be expensive, and there are plenty of opportunities for clients and homeowners to personally contribute through self-building.

The breadth of new projects – family homes, churches, children’s nurseries, schools, buildings for livestock, summerhouses, ateliers for artists and museums – shows both how versatile as well as how commonplace the use of earth as a building material has become. In industrialised nations, building with earth is no longer exotic but a modern, affordable and exceptionally sustainable way of building that also offers new aesthetic possibilities. Alongside the projects that illustrate how prefabricated earth building materials can be used in today’s construction processes, numerous self-built projects reveal how people have discovered the unique possibilities of this building material with their own hands.

This, the eighth edition of this book, expands on techniques of building with light earth without formwork and details new developments in the earth building norms. The project section has been expanded to include projects from English-speaking countries. It was a pleasant surprise to discover that architects and builders around the world – inspired by earlier editions of this book – have been enthusiastically building with straw and earth and in the process have developed techniques and machinery of their own to prepare the material for construction.

I would like to take this opportunity to once again thank all those who provided material for earlier German editions of this book: in particular Peter Breidenbach, Lydie Didier, Andreas Dilthey, Alexandre Douline, Lou Host-Jablonski, Hugo Houben, Franck Lahure, Alain Marcom, Aymone Nicolas, Sophie Popot, Teuvo Ranki, Johannes Riesterer, Ulrich Röhlen, Elias and Eva Rubin, Olivier Scherrer, Manfred Speidel, Juan Trabanino, Mikael Westermarck and Christof Ziegert. For this edition, I would especially like to thank the following people not only for contributing images and information but also for their suggestions and constructive criticism: Vasko Drogiski, James Henderson, Robert Laporte and Paula Baker-Laporte, Sandy Lidell Halliday, Chris Morgan, Florian Primbs, Michael Schauer and last but not least Ute Schauer.

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