

# Content

<b>Foreword</b>	9
<b>100 Introduction</b>	
110 Earth as a building material	11
120 Earth building methods	12
<i>Solid earth construction – Frame construction</i>	
130 Building with earth – a historical overview	15
140 Building with earth today?	31
150 What possibilities can earth building techniques offer today?	33
160 Building with timber and earth	33
<i>Straw-clay and fibre-clay mixtures – Light earth</i>	
<b>200 Building materials for light earth</b>	
210 Soil and earth	41
<i>Soil formation and deposition – Cohesion – Soil texture – Soil identification – Testing cohesion – Testing slurryability – Sourcing earth for building</i>	
220 Fibres and aggregates for light earth	53
<i>Straw – Woodchip – Mineral lightweight aggregates</i>	
<b>300 Preparation of materials for light earth</b>	
310 Preparation of clay slip	57
<i>Weathering – Soaking – Drying – Mixing by hand – Mixing with an agitator – Mixing with a compulsory mixer – Consistency of the clay slip – Liquifying agent – The addition of lime</i>	
320 Preparing fibres and aggregates	66
<i>Straw – Wooden aggregates</i>	
330 Preparation of the light earth mix	69
<i>Spray method – Dipping method – Mixing in a compulsory mixer – Mixing proportions – Tempering</i>	
340 Organisation of the building site	78
350 Ready-mixed material	80
<b>400 Wet construction</b>	
410 Shuttered walls	81
<i>External walls – Internal walls – Formwork – Formwork systems – Walls with lost formwork – Compacting the light earth mix</i>	
420 Manual application	98
<i>Wattle – Stakes – Earth reels – Laths – Manual application onto lathwork</i>	
430 Floors and ceilings	107
<i>Preparation of the timber construction – Earth reel floors – Compacted earth floors on sliding formwork – Floor infill on permanent formwork – Floor infill on supporting stakes – Suspended lath ceilings</i>	
440 Roof insulation	119
<i>Light earth reels – Compaction behind sliding formwork – Infill behind permanent formwork – Infill on lathwork – Inner lining on lathwork</i>	

450	Light earth in building restoration <i>Panel infill with straw-clay – Panel infill with light earth – Insulating wall lining of external walls – Internal insulation applied to lathwork</i>	124
460	Spray application approaches	131
<b>500</b>	<b>Dry construction</b>	
510	Light earth bricks and blocks <i>Brick-format products</i>	133
520	Light earth panels <i>Panel-format products</i>	135
530	Self-produced bricks and panels <i>Manual manufacture</i>	136
540	Walls <i>Light earth masonry – Panel infill in half-timbered structures – Thermally-insulating internal wall linings – Stacked walls – Partition wall panel elements</i>	142
550	Floors and roof inclines <i>Self-supporting floor slabs – Earth slabs and bricks for floor weighting</i>	151
560	Dry construction <i>Walls – Ceilings and roof spaces</i>	154
<b>600</b>	<b>Aspects of building construction and finishing</b>	
610	Protection of the construction <i>Rising damp and splash water – Weather protection – Airtightness – Wood preservation and surface treatment</i>	159
620	Plasters and paints <i>Preparations</i>	163
630	Two-coat lime renders (inside and outside)	168
640	Earth plasters <i>Earth plasters with sand – Fibre-clay or straw-clay plasters – Two traditional recipes – Paints and wallpapers on earth plasters – Ready-mix mortars – Requirements of earth plaster mortars</i>	169
650	Windows and doors	182
660	Floors	183
670	Internal wall coverings <i>Timber wall panelling – Tiling</i>	184
680	Technical installations and fixings <i>Water installations – Wall chases and anchoring methods</i>	186
<b>700</b>	<b>Planning and costs</b>	
710	Construction period	187
720	Cost and labour <i>Labour – Tips for rationalising the working process – Professional contractors – Self-building</i>	188
730	Building codes and regulations <i>Early earth building norms – Current norms – Planning permission and construction permits – Thermal performance – Building material properties</i>	192
740	Design, specification and construction supervision	197
750	Self-building	197
760	Typical mistakes	198

<b>800</b>	<b>Physical properties</b>	
810	Thermal protection	199
	<i>Thermal insulation – Thermal retention – Heat absorption and dissipation – Surface temperature – Thermal damping</i>	
820	Moisture/drying	209
	<i>Water vapour diffusion resistance factor – Equilibrium moisture content (sorption moisture) – Hygroscopic moisture adsorption and discharge – Moisture transport – Preventing condensation – Construction moisture and drying – Side effects during drying</i>	
830	Fire behaviour	221
	<i>Building material class – Fire resistance class – Classified timber building elements with earth infill</i>	
840	Sound insulation	227
	<i>Airborne sound insulation – Sound insulation of timber joist floors</i>	
850	Airtightness	232
860	Absorption of toxins	232
	<b>Projects</b>	
1	Conversion and extension of a half-timbered house (D)	234
2	New private house with workshop (D)	236
3	Earth building settlement: Domaine de la Terre, L'Isle d'Abeau (F)	240
4	New youth community building (D)	242
5	Barn conversion (D)	244
6	House extension (D)	246
7	Cowshed and barn conversions (F)	249
8	Summerhouse (S)	250
9	Atelier (D)	252
10	Earth house in Maria Rain (A)	256
11	Historical renovation and extension of a listed building (D)	258
12	Historical renovation of a listed building (D)	261
13	Single-family home in Raisio (FIN)	264
14	Littlecroft, demonstration building for a research project (UK)	266
15	Sandberghof community-oriented housing (D)	268
16	Single-family home in Sweden (S)	272
17	Church in Järna (S)	273
18	Guesthouse in New Mexico (USA)	274
19	Prajna Yoga Studio in New Mexico (USA)	276
20	Single-family home in Wisconsin (USA)	278
21	Single-family Home in Carla Bayle (F)	280
22	Twenty houses made of straw light earth (F)	282
23	Conversion of a rural house in Normandy (F)	283
24	House rebuilding in Haiti	284
25	Schap 2011 – Primary school in South Africa (ZA)	286
26	Single-family home in Victoria (AU)	288
27	Private house in Darmstadt (D)	290
28	Single-family home in Kaipara Flats (NZ)	294

## **Appendix**

Sources and reference literature	296
Publications of projects	301
Index	304
Picture credits	308
About the author	309
Glossary	310