Building Pathology

Principles and Practice

David S. Watt
BSc(Hons), DipArchCons (Leic), MSc, PhD, FSVA, ARICS, IHBC
De Montfort University, Leicester

b

Blackwell
Science

Contents

Preface		ix
Chapter 1	**Introduction**	**1**
	What is building pathology?	1
	Why take a holistic approach to understanding buildings?	2
	The relevance of building pathology	6
	The principles and practice of building pathology	7
	References	8
Chapter 2	**Understanding Buildings**	**9**
	What is a building?	9
	Perceptions of buildings	12
	Classification of buildings	15
	Requirements of buildings	16
	Our expectations of buildings	21
	The way forward	26
	References	26
	Further reading	26
Chapter 3	**Building Performance**	**28**
	Why do buildings stand up?	28
	Building structures	30
	Nature of building materials	32
	Understanding building materials	34
	Sources of building materials	36
	Timber	39
	Plant material	44
	Stone	47
	Ceramics	52
	Binders and concrete	59
	Metals	63
	Glass	69
	Bituminous products	70
	Modern materials	71

	Building services	72
	The building as a whole	77
	Understanding buildings and building performance	80
	Assessing building performance	88
	References	89
	Further reading	91
Chapter 4	**Defects, Damage and Decay**	**94**
	What is a building defect?	94
	Nature of building defects	94
	Causes and effects of defects, damage and decay	98
	Atmospheric and climatic action	102
	Excess moisture	111
	Chemical, physical and biological action	115
	Movement	133
	Fire	135
	Human factors	137
	References	140
	Further reading	142
Chapter 5	**Survey and Assessment**	**145**
	Fault finding	145
	Building inspections and surveys	145
	Assessment of defects	151
	Severity of defects	154
	Prioritising defects and remedial works	155
	Unoccupied buildings and sites	155
	Redundant and ruined buildings	156
	Diagnosis and prognosis of defects	159
	Non-destructive survey techniques	165
	Monitoring defects	172
	References	178
	Further reading	179
Chapter 6	**Remediation in Practice**	**181**
	Putting principles into practice	181
	Earthquake resistant housing in Peru	181
	Stone deterioration by salt action at Walpole St Andrew, Norfolk	185
	Metal corrosion and cathodic protection at the Inigo Jones Gateway, London	188
	Chemical treatment residues at Melton Constable Hall, Norfolk	190

Engineering solution for the leaning tower of Pisa, Italy 194
Understanding user requirements at the Greengate Medical Centre, London 196
Sustainability and adaptive reuse at Norton Park, Edinburgh 199
Acknowledging the detrimental effects of previous repairs at Lincoln Cathedral 205
Bringing a ruin back to life at Houghton-on-the-Hill, Norfolk 208
Managing change within the Willis Corroon Building, Ipswich 212
Lessons to be learned 216
References 216

Chapter 7 Building Management and Aftercare 217
Planning the future 217
What can be done with buildings? 217
Managing buildings and change 220
Limitations of existing buildings 222
Finding the right use for a building 222
Using historic buildings and sites 225
Principles of building repair 227
Principles of building maintenance 230
Principles of preventive conservation 234
Planning for disasters and emergencies 235
Managing unoccupied buildings and sites 237
Health and the built environment 240
Issues of sustainability and sustainable development 246
Buildings for the present and the future 248
References 249
Further reading 251

Appendix A Requirements of Schedule 1 to the Building Regulations 1991 254
Appendix B Hazard Identification Checklist 259
Appendix C Useful Addresses 263

Glossary 269
Index 273