Timber Structure, Properties, Conversion and Use

Timber Structure, Properties, Conversion and Use

H.E. Desch (Deceased)

Revised by

J.M. Dinwoodie

OBE, BSc(For), MTech, PhD, DSc

Building Research Establishment

Seventh Edition

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Contents

<i>Preface to the Seventh Edition</i>	xi	4 Molecular Structure	37
1 Introduction	1	4.1 Principal chemical constituents	37
1.1 Consumption of timber	1	4.1.1 Cellulose	37
1.2 The tree	1	4.1.2 Hemicelluloses	40
1.3 Classification of trees	2	4.1.3 Lignin	40
1.4 Nomenclature of timbers	3	4.2 The microfibril	40
Reference	5	4.3 The cell wall	41
		4.4 Mineral content	42
		4.5 Extractives	42
		4.6 Acidity	43
		References	43
Part 1 STRUCTURE OF WOOD	7		
2 Gross Structure	9	5 Variability in Structure	44
2.1 The tree	9	5.1 Genetical causes of variability	44
2.2 Growth of the tree	9	5.2 Systematic sources of variability	44
2.3 Growth rings	10	5.3 Environmental influences	45
2.4 Sapwood and heartwood	10	5.4 Variability due to presence of natural defects	47
2.5 Knots	14	5.4.1 Compression wood	47
References	14	5.4.2 Tension wood	48
		5.4.3 Pith flecks	50
3 Cellular Structure	15	5.4.4 Bark pockets	50
3.1 Differentiation and types of cells	15	5.4.5 Resin streaks (or pitch streaks)	50
3.2 Softwoods	17	5.4.6 Pitch pockets, seams or shakes	51
3.2.1 Conducting and supporting cells	17	5.4.7 Gum veins	51
3.2.2 Storage cells	19	5.4.8 Strawberry mark	52
3.2.3 Resin-producing cells	21	5.4.9 Mineral streaks	52
3.2.4 Variability in cellular features between species	22	5.4.10 Compression creases, kinks and natural compression failures	53
3.3 Hardwoods	27	5.4.11 Brittleheart	54
3.3.1 Types of cells	27	References	55
3.3.2 Conducting cells	27		
3.3.3 Supporting cells	31	6 Identification of Timbers	56
3.3.4 Storage cells	32	6.1 Use of gross characteristics	56
3.3.5 Deposits	34	6.2 Identification of hardwoods using a hand lens	56
3.3.6 Resin canals or gum ducts	35		
3.3.7 Latex tubes	36		
References	36		

6.3	Identification using a microscope	57	9.3	Equilibrium moisture content	87
6.3.1	Slide preparation	57	9.4	Shrinkage	89
6.3.2	Microscopic examination	60	9.5	Movement	91
6.4	Keys to assist identification	61	9.6	Dimensional stabilisation	94
6.4.1	Dichotomous keys	61	References		95
6.4.2	Multiple entry keys	62			
6.4.3	Computer-aided wood identification	65			
6.5	Cross-checking of identification	65	10	Other Physical Properties of Wood	96
References		65			
Part 2	PROPERTIES OF WOOD – INFLUENCE OF STRUCTURE	67			
7	Appearance of Wood	69	10.1	Thermal properties of wood	96
7.1	Texture	69	10.1.1	Thermal conductivity	96
7.2	Figure	69	10.1.2	Specific heat capacity	96
7.2.1	Grain	69	10.1.3	Linear thermal expansion	97
7.2.2	Growth rings	73	10.1.4	Heat (calorific) value	97
7.2.3	Knots	74	10.1.5	Reaction of wood to heat	98
7.2.4	Rays	74	10.1.6	Reaction of wood to fire	98
7.3	Colour	74	10.2	Electrical conductivity	100
7.4	Lustre	75	10.3	Acoustic properties of wood	100
			10.3.1	Sound production	100
			10.3.2	Sound reduction	101
			References		101
8	Density of Wood	77			
8.1	Definition of density	77	11	Strength, Elasticity and Toughness of Wood	102
8.2	Determination of density	77			
8.2.1	Using a dry measure of volume	77	11.1	Introduction	102
8.2.2	Using volume displacement	77	11.2	General principles	102
8.3	Variation in density of wood	78	11.3	Determining the strength and elastic properties	104
8.4	Practical significance of density	80	11.3.1	Sample size	104
Reference		80	11.3.2	Test methods	105
9	Moisture in Wood	81	11.4	Strength and elastic properties, and toughness	109
9.1	Amount and location of moisture	81	11.4.1	From small clear specimens	109
9.2	Determination of moisture content	83	11.4.2	From structural-sized specimens	112
9.2.1	Oven-dry method	83	11.4.3	Reaction to stress under different modes of loading	112
9.2.2	Distillation method	84			
9.2.3	Moisture meters	85			

11.5	Factors influencing the strength and elasticity (stiffness) of wood	117	12.2	Primary conversion equipment	134
11.5.1	Density (including ring width and ratio of early wood to late wood)	118	12.2.1	Circular saws	135
11.5.2	Angle of the grain	119	12.2.2	Bandsaws	136
11.5.3	Knots	120	12.2.3	Frame saws	136
11.5.4	Other anatomical features	121	12.2.4	Chipper canters	136
11.5.5	Moisture content	121	12.3	Conversion of hardwood logs	137
11.5.6	Temperature	122	12.4	Conversion of softwood logs	137
11.5.7	Time	122	12.5	Computer-aided log conversion	142
11.5.8	Defects	125	12.6	Conversion factors	143
11.6	Factors influencing the toughness of wood	125	12.7	Defects	143
11.6.1	Density	126	References		143
11.6.2	Angle of the grain	126	13	Seasoning of Wood	144
11.6.3	Knots	126	13.1	Principles of seasoning	144
11.6.4	Other anatomical features	126	13.2	Air seasoning	145
11.6.5	Moisture content	126	13.3	Kiln seasoning	148
11.6.6	Temperature	126	13.3.1	Construction of kilns	152
11.6.7	Defects	126	13.3.2	Types of kilns	152
11.7	Derivation of basic stresses from small clear test specimens	127	13.3.3	Kiln operation	153
References		128	13.4	Solar kilns	155
			13.5	Radio frequency drying of wood	155
			13.6	Seasoning defects	156
			13.6.1	Types of warping	156
			13.6.2	Types of rupture of the wood tissue	156
			Reference		158
Part 3	PROCESSING OF TIMBER – HOW TO CUT IT UP, DRY AND GRADE IT	129	14	Machining of Wood and Board Materials	159
12	Log Conversion	131	14.1	General principles	159
12.1	Restrictions on conversion	131	14.2	Machining equipment	160
12.1.1	Shape of the log	131	14.2.1	Circular saws	160
12.1.2	Growth stresses	131	14.2.2	Bandsaws (narrow)	160
12.1.3	Possible exclusion of sapwood	133	14.2.3	Planers, routers and spindle moulders	160
12.1.4	Possible exclusion of juvenile wood	134	14.2.4	Sanders	161
			14.3	Dust	161
			14.3.1	Dust levels and requirements	161
			14.3.2	Health problems associated with wood processing	162
			References		163

15 Timber Grading and Grade Stresses 164

15.1	Introduction	164
15.2	Grading of softwoods	164
15.2.1	Appearance grading based on a 'visual defects' system	164
15.2.2	Stress grading	166
15.2.3	Strength classes	169
15.3	Grade stresses for softwoods	170
15.4	Grading of hardwoods	173
15.4.1	Appearance grading based on 'visual defects' or 'cutting' systems	173
15.4.2	Stress grading of hardwoods	177
15.4.3	Strength classes	177
15.5	Grade stresses for hardwoods	177
	References	177

Part 4 UTILISATION OF TIMBER – HOW, WHY AND WHERE IS IT USED? 179

16 Utilisation of Timber 181

16.1	Choice of timber	181
16.1.1	Selection of species	181
16.1.2	Specification of timber	182
16.2	Joining together of timber parts	183
16.2.1	Adhesives	183
16.2.2	Joint design using adhesives	188
16.2.3	Joint design using metal connectors	191
16.3	Examples of timber utilisation	195
16.3.1	Timber in construction	195
16.3.2	Timber in marine work	203

16.3.3	Timber in transportation	204
16.3.4	Timber in packaging	205
16.3.5	Timber in mining	205
16.3.6	Timber for transmission poles	206
16.3.7	Timber in furniture	206
16.3.8	Timber in sports goods	207
16.3.9	Timber in musical instruments	209
	References	209

17 Manufactured Wood Products and their Applications 211

17.1	Introduction	211
17.2	Enhancement with plastics	211
17.2.1	Impregnated and compressed wood	211
17.2.2	Wood-plastic composite	212
17.3	'Engineered structural timber'	212
17.3.1	Laminated veneer lumber (LVL)	213
17.3.2	Parallel strand lumber (PSL)	213
17.3.3	Laminated strand lumber (LSL)	213
17.3.4	'Scrimber'	214
17.4	Board materials (wood-panel products)	214
17.4.1	Plywood	215
17.4.2	Chipboard (particleboard)	218
17.4.3	OSB (Oriented strand board)	223
17.4.4	Cement bonded particleboard (CBPB)	223
17.4.5	Fibreboard	224
17.5	Comparative performance of board materials	227
	References	228

Part 5	TIMBER IN SERVICE – WHAT HAPPENS TO WOOD IN SERVICE? – HOW CAN ITS LIFE BE EXTENDED?	231	20.4	Other timber beetles	258
			20.5	Termites	258
			20.6	Marine borers	260
			References		261
18	Degradation of Timber in Service	233	21	Eradication of Fungal and Insect Attack	262
18.1	Introduction	233	21.1	Eradication of fungal decay	263
18.2	Biological degradation	233	21.2	Eradication of insect infestation	266
18.3	Chemical degradation	233	References		270
18.4	Photochemical degradation	234			
18.5	Thermal degradation	235	22	Preservation of Timber	271
18.6	Degradation by fire	235	22.1	General principles	271
18.7	Mechanical degradation	236	22.2	Properties of preservatives	271
References		237	22.3	Testing and approval of preservatives	272
19	Decay and Sap-stain Fungi	238	22.4	Classes of wood preservatives	272
19.1	General principles	238	22.4.1	Tar oil group of preservatives	273
19.2	Wood-rotting fungi	239	22.4.2	Water-borne preservatives	273
19.2.1	Standing tree fungi	240	22.4.3	Organic solvent wood preservatives	274
19.2.2	Log and timber fungi	240	22.4.4	Other preservative types	275
19.2.3	Fungi that attack wood in service	242	22.5	Application of wood preservatives	275
19.3	Sap-stain fungi	246	22.5.1	High pressure/ vacuum processes	276
References		248	22.5.2	Double vacuum process	277
20	Worm in Timber	249	22.5.3	Diffusion with aqueous solutions	277
20.1	Forest and mill-yard pests	249	22.5.4	Immersion treatment	278
20.1.1	Longhorn beetles	249	22.5.5	Brushing, spraying and deluging	278
20.1.2	Pin-hole borers (ambrosia beetles)	250	22.5.6	Hot and cold open-tank process	278
20.2	Pests of seasoning yards	251	22.5.7	Sap displacement method	279
20.2.1	<i>Lyctus</i> or powder-post beetles	251	22.5.8	Treatment with limited resources	279
20.2.2	<i>Bostrychid</i> powder-post beetles	253			
20.3	Pests of well-seasoned wood	254			
20.3.1	Common furniture beetle	254			
20.3.2	Death-watch beetle	255			
20.3.3	House longhorn beetle	257			

22.5.9	Drying of treated timber	279	23.3	Natural finishes for exterior wood	286
22.5.10	Retreatment of cut surfaces	279	23.3.1	Exterior wood stains	286
22.6	Health and safety	280	23.3.2	Varnishes	287
22.7	Properties of treated timber	280	23.3.3	Oils	287
22.7.1	Strength	280	23.3.4	Preservatives	287
22.7.2	Corrosion of metal fasteners and fittings	280	23.4	Finishes for wood floors	287
22.7.3	Surface finishes	280	23.5	Flame-retardant coatings	287
22.8	Validation of treatments	280	References		288
22.9	European standards	281		<i>Selected Bibliography – additional to that listed at the end of most chapters</i>	289
22.10	Flame-retardant solutions	281		<i>Appendix I: List of Botanical Equivalents of Common or Trade Names used in the Text</i>	291
References		282		<i>Appendix II: Table of Conversion Factors</i>	295
23	Wood Finishes	284		<i>Appendix III: Trade Organisations in the UK with Responsibility for Certain Products</i>	296
23.1	Introduction	284		<i>Index</i>	297
23.2	Paint systems	284			
23.2.1	Conventional paints ('general purpose')	285			
23.2.2	Special exterior paints	285			

Preface to the Seventh Edition

Dr H.E. Desch died in 1978 after a lifetime of service devoted to the acquisition and critical appraisal of knowledge on all aspects of timber technology, and to its subsequent dissemination by publication of this text together with its practical application through his consultancy. The first edition of this book was published in 1938 and the first revision in 1947. Since then it has been revised at regular intervals, continuing to fulfil the needs of students in timber technology for an authoritative and comprehensive text on the subject.

Dr Desch was about to embark on the sixth edition when he died, and I was subsequently approached to undertake that revision: this I was pleased to do and the sixth edition was published in 1981. Since then the knowledge of wood science has increased, new European Standards have replaced many British Standards, new grading techniques have become established, and new board materials have appeared on the market, to illustrate but a few of the many changes in wood technology. I was invited in 1993 to again revise the text: in agreeing to accept the challenge, I have again found this to be no light task. Indeed, the amount of new information that has had to be incorporated has resulted in an almost total rewrite of the text. The opportunity has been taken not only to rearrange certain topics to bring these into line with current thinking, but also to widen the scope of the book to cover areas of conversion, machining, and the application of paints and finishes, thereby making the text even more comprehensive; this in line with the many helpful comments received.

The text is divided into 23 chapters which are ascribed to five parts covering the Structure of Wood; Properties of Wood; Processing of Timber; Utilisation of Timber; and Timber in Service.

In Part 1, the chapters on structure have been updated and revamped. Separate chapters now

deal with structure at the gross, cellular and molecular levels. Variability in structure is comprehensively covered in a further chapter, enlarged not only to deal with aspects previously covered in other chapters, but also to embrace new areas of variability in structure. Identification in structure has been enlarged to include section preparation. Regrettably, there have had to be losses as well as gains: feedback has indicated a much reduced need for timber descriptions and, since this subject is covered in many other handbooks, these have now been deleted.

In Part 2 of the text, the properties of wood are dealt with comprehensively in a set of five chapters, the last of which, on mechanical performance, has been enlarged to cover elastic behaviour, toughness and the use of structural-sized timber for strength tests.

Part 3, dealing with timber processing, covers many new areas not discussed in previous editions. Thus, the conversion of the tree to timber is described in terms of those properties and variables of wood that influence its conversion to usable timber. A second chapter covering the seasoning of timber describes not only traditional air- and kiln-drying, but also deals with solar and high temperature drying. A third chapter contains new information on the machining of timber with emphasis on health and safety. The grading of timber has undergone major changes since the previous revision and these are described: parallel changes have taken place in the derivation of grade stresses (and characteristic values) during this period and this subject is treated in much detail.

Part 4 is concerned with the utilisation of timber and board materials. New boards and structural composites have emerged since the last revision and the chapter on board materials has been extensively updated and enlarged. The British Standards on wood adhesives have been replaced with the new European Standards.

Part 5 is devoted to all aspects of timber in service, commencing with a new and generalised chapter on degradation, followed by a series of specialised chapters on fungal attack, insect attack and their eradication. This part concludes with preventative measures covering preservation and the application of finishes.

In view of this more comprehensive treatment of timber, it is no longer possible for any one individual to write authoritatively on every aspect of timber technology, embracing as it does structure, properties, conversion, utilisation and behaviour in service. Therefore, I am deeply indebted to a number of my colleagues in coming to my assistance and giving so willingly of their own free time to assist in a wide variety of ways, all of which are deeply appreciated.

I am particularly indebted to Mr Roger Berry in charge of the Biodeterioration Section, Building Research Establishment for completely revising Chapters 20 (insects) and 21 (eradication); to Dr Janice Carey of the BRE Biodeterioration Section for the revision of Chapter 19 (fungi); and to Dr Reginald Orsler in charge of the Preservation Section, BRE for the revision of Chapter 22 on the preservation of timber.

Several of my colleagues or former colleagues at BRE have spent many hours of their free time reading my first draft and making the most valuable of comments and suggestions: in particular I would like to thank Keith Maun, Head of the BRE Utilisation Section (Chapters 12 – log conversion, 13 – seasoning and 14 – machining); Clive

Benham (Chapter 15 – grading); Gerald Moore (Chapter 6 – identification); Peter Bonfield (Chapters 9 – moisture, 11 – strength, 16 – utilisation and 18 – degradation); John Boxall (Chapter 23 – finishes); and John Brazier, former Head of Wood Properties section (Chapters 1 – introduction and 3 – cellular structure). I would also like to thank Mr E. van der Strataen for his guidance and valuable comments on the adhesives section of Chapter 16 (utilisation).

My very sincere gratitude is extended to Mrs Sue Phillips, Mrs Margaret Penney, Mrs Hilda Ridgewell and Mrs Jo Mundy for the many hours of their own time spent in word processing my scrawl, and in the subsequent updating of the text following receipt of comments. I am greatly indebted to both Mrs Jo Mundy and Dr Peter Bonfield who, between them, have read the entire draft text in their own time, thus reducing very considerably the number of errors in the published book.

I would also like to express my appreciation to the Chief Executive of BRE, Mr Roger Courtney, for permission to use a considerable number of illustrations from the former Princes Risborough Laboratory, now within the guardianship of the Building Research Establishment.

Lastly, I would like to extend my gratitude and appreciation to my wife, who has been so helpful, patient and understanding over the last nine months and who has spent many hours reading the proofs with me.

Princes Risborough, 1996

J.M.D.