

**FOREST UTILISATION - 1**  
**LECTURE NOTES FOR FOREST RANGERS**  
**TAMILNADU FOREST ACADEMY**



**COMPILED  
BY  
A.JAINALAUDEEN**



## INDEX

<b>S.No</b>	<b>Content</b>	<b>Page No</b>
<b>1</b>	<b>WOOD HARVESTING</b>	<b>1</b>
	1.1 Basic logging hand tools and attachments	1
	1.1.1 Power chain saw and attachments	1
	1.1.2 Felling of trees	3
	1.1.3 Crosscutting, delimbingetc	22
	1.2 Off road transportation	24
	1.2.1 Ground skidding	24
	1.2.2 Use of tractor	24
	1.2.3 Dragging	28
	1.2.4 Winches	29
	1.2.5 Aerial transport	30
	1.3 Major transportation	34
	1.3.1 loading devices	34
	1.3.2 Surface transportation	34
	1.3.3 Water transportation	34
	1.4 Logging planning	36
	1.5 Timber depot management	42
<b>2</b>	<b>WOOD TECNOLOGY</b>	<b>64</b>
	2.1 Gross features of wood	64
	2.1.1 Pith , Heartwood , Sap wood	64
	2.1.2 Bark , Early wood , Late wood , Growth rings	67
	2.2 Minute Structures of wood	71
	2.2.1 Tracheids , Fibres , and Vessels	71
	2.2.2 Parenchyma , Rays and Resin canals	74
	2.3 General properties : Colour , Fluorescence , Lusture , Odour ,Weight , Hardiness , Grain , Texture , and Figure	82
	2.4 Identification of timber with key	92
	2.5 Properties of wood , Defects , Abnormalities	149
	2.5.1 physical properties of wood	149
	2.5.2 Mechanical properties of wood	150
	2.5.3 Factors influencing strength properties of wood	155
	2.5.4 Suitability indices and their use	156
	2.5.5 Safe working stresses and their valuation	157
	2.5.6 Testing and evaluation of timber products	157
	2.5.7 Classification of defects in wood and their influence on utilization charctaristics	158

<b>S.No</b>	<b>Content</b>	<b>Page No</b>
	2.5.8 Measurement and evaluation of defects	165
	2.6 Wood Seasoning	166
	2.6.1 Introduction	166
	2.6.2 Object , need and importance of seasoning	167
	2.6.3 Air seasoning	167
	2.6.4 Kiln seasoning	171
	2.6.5 Special method of seasoning	173
	2.6.6 Schedule of classification of timber	174
	2.6.7 Design of seasoning kiln	174
	2.6.8 Air – drying shed and solar kiln	177
	2.7 Wood preservation	180
	2.7.1 Need of wood preservation	180
	2.7.2 Natural durability of timber and wood destroying agencies	181
	2.7 3 Types of wood preservatives, their characteristics , composition and properties	184
	2.7.4 Preparation of material for treatment	186
	2.7.5 Method of wood preservation	187
	2.7 6 Factors affecting penetration of preservatives	189
	2.7.7 Properties of treated wood	189
	2.7.8 Testing of wood preserves	190
	2.7.9 Treatment of timber for different uses	199
<b>3</b>	<b>WOOD BASED INDUSTRIES</b>	201
	3.1 A panoramic view of forest based industries in India	201
	3.2 Demand and supply position of raw material for wood based Industries	201
	3.3 Indian tree species whose timbers are suitable for different wood bases industries	206
	3.3.1 Plywood , Fibre board, particle board, Improved wood – specification of raw material for such industries	211
	3.3.2 Properties and use of ply wood fibre board, particle board	223
	3.3.3 Sandal wood Katha, Aqar wood	224
	3.3.4 Wood substitution	230
	3.4 Cellulose and paper industry	233
	3.4.1 Demand and supply situation of raw material for paper and cellulose industry	233
	3.4.2 Manufacture of paper ( only the out line)	233

<b>S.No</b>	<b>Content</b>	<b>Page No</b>
	3.4.3 Manufacture of rayon (only the out line)	235
<b>4</b>	<b>SAW MILLING</b>	237
	4.1 Types of saws, saw mill machinery	237
	4.2 Design and layout of saw mills and wood work shop	243
	4.3 Wood working	245
	4.4 Saw mill rules	264
<b>5</b>	<b>Grading of timber and timber products</b> Commercial grading , stress grading, existing Indian standards for Grading	267
<b>6</b>	<b>Suitability of Indian timber</b>	268
	6.1 Packing cases	270
	6.2 Sports goods , musical Instruments	271
	6.3 Agricultural implements	274
	6.4 Furniture industry	275
	6.5 Coach building and Sleeper industry	276