SUBJECT-MATTER INDEX FOR DRY-KILN OPERATORS

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Filing of information for future reference requires some sort of an index. Subject-matter designations for library indexing are not detailed enough to cover the range of subjects involved in the seasoning of wood. Therefore, an index has been developed to fit the needs of this Laboratory. It has worked reasonably well over a period of years and may prove useful to dry-kiln operators, foresters, and others collecting reference information on the seasoning of wood. The principal features of this index that are of interest to dry-kiln operators are included in the following numerical index. Only the first three numbers are indexed. Dry-kiln operators and others interested in using the index can expand it for fourth and fifth numbers as needed.

¹Maintained at Madison, Wis., in cooperation with the University of Wisconsin

Report No. 1975 Agriculture-Madison
0. General
   0-1 Miscellaneous
   0-2 Orders and Instructions
   0-3 Directories
   0-4 Patents
   0-5 Education

1. Mechanical Properties
   1-0 General
   1-1 Strength Values, kinds of tests, species
   1-2 After Drying, temperature effects
   1-3 During Drying, moisture effects
   1-4 Influenced by and Affecting, steam bending, chemicals, kiln drying, etc.

2. Physical Properties
   2-0 General
   2-1 Structure
      2-1-0 General
      2-1-1 Fiber, normal, abnormal
      2-1-2 Effect of fiber arrangement upon drying rate, shrinkage, surface checks, warp, workability, etc.
   2-2 Durability, wearing properties, weathering
   2-3 Thermal Constants
      2-3-1 Conductivity
      2-3-2 Thermal expansion
      2-3-3 Inflammability
      2-3-4 Specific heat
   2-4 Specific Gravity, Weight, and Density
      2-4-1 Weight, bouyancy
      2-4-2 Specific gravity statistics, density of wood, formulas, etc.
      2-4-3 Influenced by decay, drying methods, growth, shrinkage, etc.
   2-5 Hygroscopicity, Absorption, Equilibrium Moisture Content
      2-5-1 Theory, heat of absorption, hysteresis, etc.
      2-5-2 Fiber saturation point, definition, methods of measurement
      2-5-3 Equilibrium moisture content, definition, methods of measurement, affected by treatment, instrument for controlling, etc.
      2-5-4 Absorption of moisture, during rail shipments, sapwood and heartwood, etc.

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2-6 Moisture Movement, Rate, Constants, Moisture Gradient
   2-6-0 General
   2-6-1 Bibliography
   2-6-2 Theory of moisture movement
   2-6-3 Diffusivity, constants, effect of temperature, species, sapwood and heartwood, calculation of drying time, etc.
   2-6-4 Moisture gradients, influenced by drying conditions, etc.

2-7 Shrinkage and Warping
   2-7-0 General
   2-7-1 Types and species, normal wood, abnormal wood, longitudinal, radial, tangential, volumetric, influence on warp
   2-7-2 Formula for calculating
   2-7-3 Shrinkage, moisture relation
   2-7-4 Shrinkage results, footage reduction, casehardening, checks, honeycomb, splits, warp
   2-7-5 Shrinkage and warp affected by chemicals, drying conditions, sapwood and heartwood, steaming, etc.

2-8 Identification of Wood

2-9 Electrical Properties
   2-9-0 General
   2-9-1 Capacity, resistance
   2-9-2 Dielectric constants, resistance values, species
   2-9-3 Influenced by extractives, moisture, temperature, etc.

2-10 Color
   2-10-0 General
   2-10-1 Influenced by stain, mold, chemical, drying conditions, extractives, steaming, weathering, etc.

2-11 Moisture Content of Wood
   2-11-0 General
   2-11-1 Green moisture content, species
   2-11-2 Maximum influenced by specific gravity
   2-11-3 Air-dry and kiln-dry moisture content
   2-11-4 Use requirements
   2-11-5 Moisture specifications

2-12 Moisture Determination Methods
   2-12-0 General
   2-12-1 Oven Drying
   2-12-2 Electrical resistance, capacity, commercial moisture meters, etc.
   2-12-3 Distillation
   2-12-4 Chemical
   2-12-5 Other methods, dew point, hygrometer, relative humidity

2-13 Sound Properties

2-14 Properties Affecting Uses

2-15 Porosity

2-16 Urea-Plasticized Wood

2-17 Vibration Characteristics
3. Chemistry of Wood
   3-0 General
   3-1 Sugars
   3-2 Resins
   3-3 Tannins
   3-4 Fuel Values

4. Industrial Investigations
   4-0 General
   4-1 Manufacturers, equipment, sawmills, woodworking machinery, etc.
   4-2 Markets and Utilization
   4-3 Production, Consumption, Prices, etc.
   4-4 Transportation
   4-5 Grading Rules

5. Air Drying
   5-0 General
      5-0-1 Air drying and kiln drying compared
      5-0-2 Bibliography
      5-0-3 Specifications
      5-0-4 Statistics, costs, degrade, drying time, moisture content, etc.
   5-1 Apparatus
      5-1-1 Dip tanks, steaming chambers, etc.
      5-1-2 Stacking methods
      5-1-3 Yarding equipment
   5-2 Methods
      5-2-1 Survey of practices
      5-2-2 Effects upon checks, degrade, time, warp, etc.
      5-2-3 Piling lumber, dimension, timbers, bowling pins, etc.
      5-2-4 Sanitation
      5-2-5 Special, air drying on kiln trucks, girdling, coating, etc.
      5-2-6 Yard layout

6. Kiln Drying
   6-0 General
      6-0-1 Survey of commercial kilns and practices
      6-0-2 Kiln drying and air drying compared
      6-0-3 Development, bibliography
      6-0-4 Companies and engineers
      6-0-5 Specifications for kiln drying, moisture content, casehardening, etc.
6-1 Apparatus
6-1-0 General
6-1-1 Dry kilns, makes, types, operation, types compared, etc.
6-1-2 Green end and cooling sheds, pit covers
6-1-3 Circulation, methods of creating - blowers, fans, aspirators, steam sprays, dampers, chimneys, etc.
6-1-4 Radiation, steam coils, heat exchangers
6-1-5 Air conditioning measurement and control, temperature, relative humidity, equilibrium moisture content, tables, charts, etc.
6-1-6 Mechanism of drying air, condensation, ventilation
6-1-7 Veneer driers
6-1-8 Lumber handling equipment and auxiliary apparatus, kiln trucks, bunks, stickers, stackers, transfers, balances, gas masks, ovens, etc.

6-2 Methods
6-2-1 Theory, way wood dries, casehardening, checks, collapse, part-time operation, etc.
6-2-2 Schedules, aircraft, species, treated wood, etc.
6-2-3 Forms and items, lumber, dimension, timbers, logs, bowling pins, gunstocks, handles, cooperage, etc.
6-2-4 Dimension stock
6-2-5 Piling

6-3 Effect of Kiln Methods on
6-3-1 Degrade, checks, collapse, honeycomb, warp, stain, etc.
6-3-2 Strength

6-4 Kiln Design and Engineering Problems
6-4-0 General
6-4-1 Furnace-type kilns
6-4-2 Kiln walls, roofs, foundations
6-4-3 Steam-coil design, heat-exchanger design
6-4-4 Ventilation
6-4-5 Circulation (kiln aerodynamics)
6-4-6 Heat requirements
6-4-7 Equipment depreciation
6-4-8 Condensation problems

6-5 Testing and Inspecting Drying Equipment
6-5-0 General
6-5-1 Commercial kiln installation
6-5-2 Calibration of kiln and laboratory equipment

7. Chemical Pretreatments (for checking control)

7-0 General
7-0-1 Kiln drying and air drying treated wood, compared
7-0-2 Development, bibliography
7-0-3 Companies and engineers
7-0-4 Specifications, moisture content, casehardening, etc.
7-0-5 Statistics, costs, degrade, drying time
7-1 Apparatus
7-2 Processes
   7-2-1 Theory of checking control by chemicals, shrinkage, species, degrade, schedules, etc.
   7-2-2 Treating and drying
   7-2-3 Forms and items, cooperage, bowling pins, lumber, dimension, dimension stock, etc.
7-3 Chemical Seasoning Agents
7-4 Effect of Methods on Wood
   7-4-1 Degrade, checks, collapse, honeycomb, color, etc.
   7-4-2 Strength
   7-4-3 Penetration
   7-4-4 Physical properties
   7-4-5 Decay and termite resistance
   7-4-6 Corrosion

8. Special Drying Methods
   8-0 General
   8-1 Boring Hole Through Center of Logs
   8-2 Steaming Followed by Kiln Drying
   8-3 Ozone Drying Process
   8-4 Centrifugal Force
   8-5 Daytime Drying
   8-6 Vacuum Drying
   8-7 Heating and Cooling
   8-8 Freezing
   8-9 Superheated Steam
   8-10 High-Frequency Dielectric and Electric Heating
   8-11 Drying by Hydrophilic Solvent Extraction
   8-12 Infrared Drying
   8-13 Boiling in Oil
   8-14 Vapor Drying

9. Decay and Stain
   9-0 General
   9-1 Influenced by Seasoning Conditions, floods, etc.
   9-2 Methods of Control, fungicide, steaming, kiln drying, etc.
   9-3 Insects

10. Preservation
    10-0 General
    10-1 Preservation of Fuel, sawdust, shavings, etc.
11. Statistical Methods
   11-0 General
   11-1 Bibliography
   11-2 Statistical Tables, Charts, etc.
   11-3 Statistical Quality Control

12. Glues
   12-0 General
   12-1 Apparatus
   12-2 Processes
   12-3 Products
   12-4 Influence of Glue on Machine Knives
   12-5 Nail Gluing

13. Boxes, Containers, Crates
   13-0 General

14. Coatings and Wood Finishes
   14-0 General
   14-1 Influence of Coatings, moisture regain and loss, degrade, etc.
   14-2 End Coatings
      14-2-0 General
      14-2-1 Formulas
      14-2-2 Efficiency and physical property data

15. Storage
   15-0 General
   15-1 Apparatus
      15-1-0 General
      15-1-1 Conditioning rooms
      15-1-2 Storage sheds
   15-2 Piling Methods
      15-2-1 Door stock
      15-2-2 Flooring
      15-2-3 Furniture
      15-2-4 Logs
      15-2-5 Lumber
      15-2-6 Panels
      15-2-7 Timbers
15-3 Location
- 15-3-1 At factories
- 15-3-2 At mills
- 15-3-3 At retail and wholesale yards
- 15-3-4 By building contractors
- 15-3-5 In transit

15-4 Influence of Storage
- 15-4-1 Casehardening
- 15-4-2 Checks
- 15-4-3 Checks and splits due to freezing
- 15-4-4 Degrade
- 15-4-5 End splits
- 15-4-6 Honeycomb
- 15-4-7 Moisture content specifications
- 15-4-8 Moisture content values and end gradient

16. Constructions and Engineering Problems (Not Dry Kilns)

16-0 General

16-1 Condensation
- 16-1-0 General
- 16-1-1 Buildings
- 16-1-2 Basements
- 16-1-3 Building paper
- 16-1-4 Chimneys
- 16-1-5 Floors
- 16-1-6 Humidification and air conditioning
- 16-1-7 Lockers and cold storage
- 16-1-8 Painting
- 16-1-9 Plaster
- 16-1-10 Shingles and roofs
- 16-1-11 Siding
- 16-1-12 Trailers
- 16-1-13 Ventilation
- 16-1-14 Walls and attics
- 16-1-15 Weather strips
- 16-1-16 Window sash and frames
- 16-1-17 Containers

16-2 Construction
- 16-2-0 General

16-3 Manufacturing
- 16-3-1 Influenced by checks, splits, extractives, stains, shrinkage, swelling, warp, species, etc.

16-3-2 Forms and items, boats, boxes, furniture, handles, sporting goods, shoe heels, bowling pins, etc.

17. Forestry

17-0 General

17-1 Logging

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