BEST PRACTICE TIMBER DRYING

MAINTAINING OPTIMUM QUALITY

by

Ian Upton

Presentation Format
(Softwood Perspective)

1. Discuss My Best Practice System
2. Photos of Interest
3. View Practical Examples
4. Questions
“THE KILNS HAVE RUINED THE WOOD AGAIN!”

*It does not have to be this way*

*Best Practice is the answer*

---

**What is Best Practice?**

**Liked Definition**

“A technique or methodology that, through experience and research, has proven to reliably lead to a desired result”

**Disliked Definition**

"An industry accepted way of doing something that works”

*Restricts Constant Improvement!*
Why form a Best Practice System?

- Operate 10 kilns (LT, ACT, HT & UHT)
- Dry many products and several species
- High drying quality at minimal cost
- Kilns of varying features - 3 manufacturers
- Use over 100 drying schedules

17mm Appearance Grade
Structural Grade

CCA Treated Product
ACQ Treated Decking

200x75 Heartwood 2 outs
Highly Resinous Pinaster

Common Problems in Kiln Drying

- MC Control
- Unstable product
- Surface checking
- Internal checking
- Twist
- Kiln stain
- Reduction of drying time
- Ambient conditions affecting MC and distortion
- Mixing product of varying properties together
Why is Drying Difficult?

1. Drying Philosophy
2. Drying Knowledge
3. Drying System

Drying Philosophy

• A reason exists for all drying results

• Every part of the process is important

• Solve one part of the puzzle at a time

• Timber reacts to ambient conditions
Drying Philosophy

• Combine drying techniques
• Prevent drying problem
  - Don’t fix them
• Do not follow others, try something different

Drying Knowledge

Available from many sources
Drying Knowledge

- Use available Knowledge and reason for ourselves

- Researchers provide parts of the Drying puzzle

Turn Theory into Practice
People will talk Kiln Drying

Drying System

- Use Drying Philosophy and Knowledge to perform Drying Trials (to find out what works)
- Document drying techniques that work
- Easy to follow format
- Work through the problems & keep solving parts of the drying puzzle.
- Keep adding to documentation
PRACTICAL EXAMPLE

MC Conformance

Requirement- MC range is 8% to 15%

“Will this charge be dry?”
Determine Contributing Factors

1. Timber Density
2. Kiln Drying
3. Reconditioning / High Humidity
4. EMC

Solve the Problems

Individually Solve the Problems
Every part of process is important
Effects of Density

Install a reliable density measuring system

Use this information to design kiln charges

Sorting the product reduces

• Drying time
• Distortion
• MC variability

Density Sorting
MC Variation within the Kiln

- Baffling
- Endpoint
- Outlet control
- Zonal control
- EP logic to prevent over or under drying

Baffling
Baffling

In-kiln MC Measuring System
Reconditioning / High Humidity

Problems
- Control Moisture Uptake
- Wet core from kiln drying
- Charge may be over dry
- Racks are of varying MC

Know the Wood Temperature

- Allow adequate cooling
- Temp’ in the centre and top of stack
Control RH & Timber Temperature

1. Migration of core moisture
2. Moisture uptake in the case

Stepped Schedule
Effects from EMC

Monitor EMC - Recorded Hourly

EMC 2006
Monitor MC at Planer Mill

MOISTURE CONTENT DISTRIBUTION

MC at Time of Grading

KILN DRIED ROUGH SAWN

USE THIS TABLE FOR AMBIENT MC TESTS OF RACKS
Must Document Information

Too much too remember without a Best Practice System to follow

Documentation Required

- Training Manual
- Quality Instructions
- Schedule Selection Instructions
- Charge sheet
- MC analysis information
WEEK ONE
Why Dry Timber & MC testing

Objective:
1. Understand the structure of wood and the factors that affect dryness in wood to the highest quality in an effective and safe manner.
2. Develop skills to accurately measure for moisture content.
3. Know the process of using moisture and MC analyzers properly to test the moisture content of wood to ensure accurate readings.

Procedures:
Day 1
1. Trained to interpret how to use the Onsite Alpha device and develop the ability to interpret messages.
2. Demonstrated the operation of the equipment and its method of work.
3. Demonstrated the correct use of the device and its operation in a safe manner.
4. Developed skills to accurately measure for moisture content.

Day 2
1. Trained to use the Onsite Alpha device properly.
2. Demonstrated the operation of the equipment and its method of work.
3. Demonstrated the correct use of the device and its operation in a safe manner.
4. Developed skills to accurately measure for moisture content.

Learning Environment

[Image of a learning environment with a person working on a computer and a workspace with various equipment and documents.]
Accessible Documentation

Procedures & Schedules
Hot Test – prevent re-work

Specific Gravity for moisture meter
Hot test MC

<table>
<thead>
<tr>
<th>Product</th>
<th>AVERAGE</th>
<th>SD</th>
<th>MINS MC</th>
<th>MAX MC</th>
<th>RANGE ABOVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAD 400I, Structural</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>PIN 400I, Structural</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>BAD 800, Structural</td>
<td>8% to 18%</td>
<td>0.5</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>BAD 800, Latte</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>F2F 800I, Structural</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>BAD 25mm</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
<tr>
<td>PIN 25mm</td>
<td>9% to 13%</td>
<td>11</td>
<td>8% to 38%</td>
<td>8% to 68%</td>
<td>16% to 10%</td>
</tr>
</tbody>
</table>

Pre-Cooling times

DO NOT COOL CHARGES DRIED AT > 90°C INSIDE A RECO OR KILN
Reconditioning

To avoid over-drying when cores in the change operation or necessary change of some cores are still wet after the hot test. Equalising must be performed unless cores are demonstrated dry or will be over-dried after forward drying.

In a typical use a 1P/2P/3P temperature 3P schedule. This equates to an ECU of 9%.

Use the same fan speed and fan reversed times as what would be normally used to dry that product.

Drying cores will be decreased to approximately 15% of structural skeleton and similar to appearance grade schedules.

**Reconditioning**

- Reconditioning must not be used for reconditioning, (steel frame).
- The reconditioning times quoted are for charges which are below 1.5% which conforms with the above AMS limits on page 14.
- If the AMS during the Hot Test reveals the charge is over dry (see MC control for average), the length of the normal maximum pickup stage of the reconditioning cycle should be added to the core.

1 hour per 1% MC increase to achieve an 8% MC average during a clear day.

1 hour per 2% MC increase to achieve an 9% MC average during a rainy day.

The above times apply doubling for a SALT Test even to achieve the same MC pickup.

The MAXIMUM maximum central pickup time is 4 HOURS.

**High Humidity Treatment**

If over 8% MC, the rate must be increased as above.

Cold Test

**Ambient MC Requirement**

<table>
<thead>
<tr>
<th>Product</th>
<th>AVERAGE</th>
<th>MIN</th>
<th>MAX</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pole Structural</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>M.E. Structural</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>The MC of all species of Glue &amp; Lathe material is max 8% with 10% over the next</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.E. Lathe</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Sheet/Cut All Round</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Export/Parallels</td>
<td>7% ± 2%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Press/Flat Board</td>
<td>7% ± 2%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Cold/120 (Basic</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Cold/120 (B)</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>Cold/120 (C)</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
<tr>
<td>AC4</td>
<td>7% ± 5%</td>
<td>7%</td>
<td>15%</td>
<td>Negative</td>
</tr>
</tbody>
</table>
Calculate MC at Time of Grading

- Feedback from kiln operators
- Feedback from planer mill
- Encourage by believing “there is always a reason”, then find that reason
Other benefits

- Reduced energy use
- Minimal re-work
- Excellent for training purposes
- Increased Productivity
- Increased customer satisfaction
- Minimised risk
- Reduced costs
- Providing reassurance as to the proven processes
- Clearly defined processes to handle problems

The Greatest Benefit
Consistent Results

- Be Disciplined and follow written instructions
- Do not allow individual interpretation of the written procedures

**The Best Practice process works with all drying problems**
Drying Problems Reduced

• Checking
• Twist of Heartwood
• Distortion
• Rip sawing
• Moisture

Best Practice delivers Best Quality
Questions?