Preliminary attempts to season *Tectona grandis* using vacuum press drying – possibility of much faster seasoning in sight

By

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Objectives:

To study the drying behaviour of teak under vacuum press drying
Methodology:

Discontinuous vacuum (upto ~ 277 mm Hg – upto 373 mbar)

Equipment: Maspell vacuum dryer (60)

Plain sawn planks

Sample thickness: 1”

Sample length: 2 ‘

Sample width: 6 “

Temp range: 60-90°C
Principle

Wood drying: Waterflow from the core to the surface; Removal of water from surface through evaporation

- Flow rate increases with temp
- Flow rate increases with falling pressure in the drying chamber
- Water evaporation temp decreases with lower pressures
Experimental plan

Combinations of Temp-Vacuum levels for

- MC range: > 30 %
- MC range: < 30 %
- No. of samples – 7
- Comparing reduction % in MCs
Teak

- Moderately refractory to seasoning
- SSG (OD wt-Gvol basis): 0.5-0.62
- FSP: 19 %

- Conventional kiln: Schedule V, 45 to 15 % in 13-15 days
Combinations applied

<table>
<thead>
<tr>
<th>Treat</th>
<th>Temp (°C)</th>
<th>Pressure (mbar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>70</td>
<td>373</td>
</tr>
<tr>
<td>T2</td>
<td>80</td>
<td>913</td>
</tr>
<tr>
<td>T3</td>
<td>90</td>
<td>873</td>
</tr>
</tbody>
</table>
MC Reduction (in %) obtained (T1)
MC Reduction (in %) obtained (T2)
MC Reduction (in %) obtained (T3)
Av MC Red. Above 30 % IMC

3 replicates in T1 and T2

T1 – 4.46 %

T2 – 4.31 %

Non significant p – 0.84
Av MC Red. Below 30 % IMC

4 replicates in T1, T2 and T3

T1 – 3.81 %

T2 – 3.55 %

T3 – 5.77 %

Significant p – 0.0087

T3 > T1 = T2
MC reduction rates
Each combination concluded in 7 hours

Reduction rates (for below 30% range)

T1 – 0.54 % per hour (overall 0.58)
T2 – 0.51 % per hour (overall 0.55)
T3 – 0.82 % per hour (overall 0.75)

Conventional kilns: 0.18 % per hour (as per schedule V)
Conclusions

• 2 to 6 % reduction from various IMC with this method

• 90ºC and 873 mbars combination significantly reduced MC compared to the other two combinations in the below 30 % range

• Much higher MC reduction rates can be achieved by adopting this drying technique for teak
Thanks for your time
Sub 2: water boiling