Seasoning of Timber

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What is seasoning?

- Removal of water from wood
- Moisture content of timber is in equilibrium with the atmospheric moisture

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Advantages of seasoning

- Dimensional stability
- Fungi, bacteria and moulds cannot survive
- Improves penetration of preservative
- Smooth finish after machining
- Glues better

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Advantages of seasoning contd…..

- Improves the performance of finishes
- Improves the strength
- Lighter weight
- Improves insulation
- Resists insect attacks

Therefore you can produce a
HIGH QUALITY product

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Kiln drying (KD) process

A controlled process that uses fans, blowers and steam to control

- humidity
- temperature

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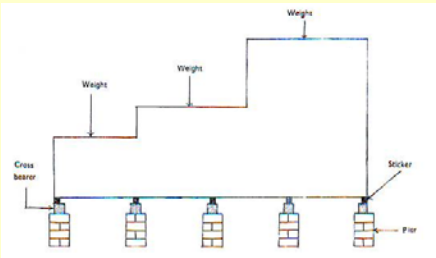
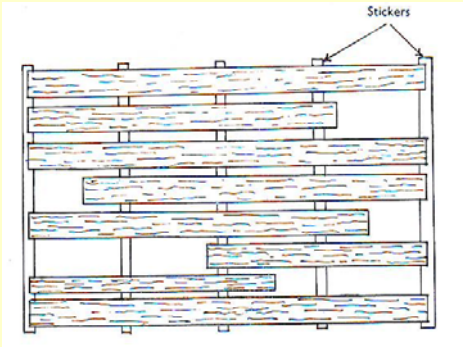
Kiln stacking





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Important factors in kiln drying

- Fast movement of air
- High temperature
- Low relative humidity

Thus the kiln must be provided with

- Air circulation
- Heating arrangement
- Humidification

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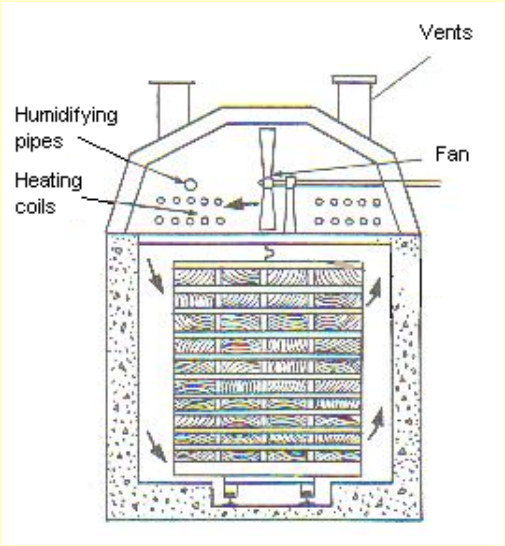
A kiln



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Moisture content (MC)

$$MC = \frac{\text{Weight of water}}{\text{weight of wood substance}} \text{ X } 100\ \%$$

$$MC = \frac{\text{Wet weight} - \text{Dry weight}}{\text{Dry weight}} \text{ X } 100\ \%$$

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Equilibrium moisture content (EMC)

Ideal condition

- Timber MC is in equilibrium with immediate environment (No movements)
- Required MC of timber varies with different purposes

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Relative Humidity (RH)

RH shows how much moisture the air can hold compared to how much it does hold

Saturated air – 100% RH

Temperature ↑ RH ↓

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Defects incur in the drying process

- Shrinkage – not uniform in all directions
- Checks –At the ends on the surface
- Case hardening – due to uneven drying and shrinkage
- Collapse – surface unevenness
- Distortion of cross section (Diamond)
- Hollow horning or honey combing
- Ring failures
- End splits
- Box heat splits

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Defects incur in the drying process

This type of costly splitting can be eliminated with controlled kiln drying

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How to eliminate defects?

- By regulating the temperature and humidity of the circulating air
- Required conditions can be achieved by applying correct KD Schedule

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KD Schedule for seasoning of timber

Schedule I

Moisture content of timber	Temperature		Relative humidity
	Wet	Dry	
Green	52	44	62
60%	55	45	55
40%	60	46	44
30%	65	48	39
20%	68	48	33.5

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KD Schedule for seasoning of timber

Schedule II

Moisture content of timber	Temperature		Relative humidity
	Wet	Dry	
Green	45	40	72
60%	47	40	64
40%	49	40	56
30%	53	40	44
20%	58	40	32.5

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KD Schedule for seasoning of timber

Schedule III

Moisture content of timber	Temperature		Relative humidity
	Wet	Dry	
Green	42	38	76
60%	45	40	72
40%	47	40	64
35%	49	40	56
30%	51	40	50
25%	53	40	44
20%	55	40	39

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Selecting the drying schedule

Factors to consider

- Species
- Thickness (to some extent the thickness)
- Permissible drying degrades
- Intended use of timber

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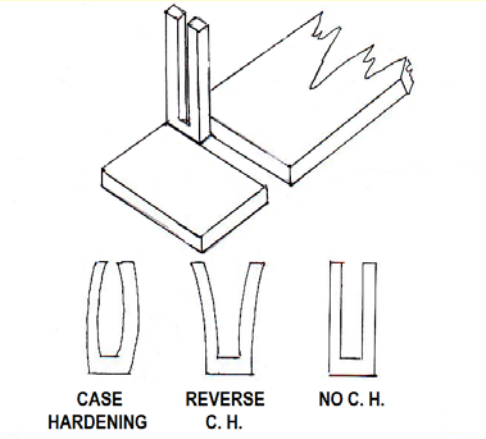
Prong test

This is carried out after seasoning to determine whether there are any stresses



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Conditioning treatment

The final step in kiln drying

- To relieve the drying process and tension set (Case hardening) that are present at the end of kiln drying and equalizing

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Cost incur in operating a kiln

- Capital requirement
- Cost of energy
- Labour
- Maintenance
- Insurance / risk
- Environmental impact
- Product degradation

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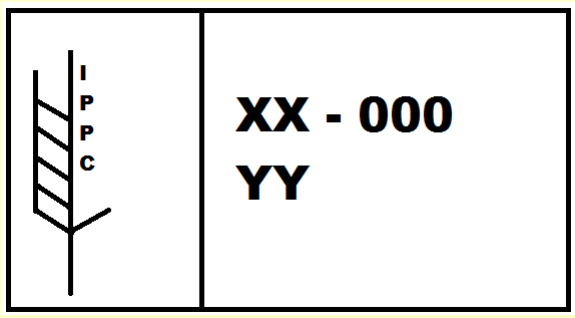
Heat treatment certification



If specified required temperature is achieved in the kiln, it can be used for heat treatment against insect attacks as well

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