Accelerated treatment preservative testing

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Protocols for H3 outdoor above ground testing

- Termite lab bioassay
  - Usually 6 months
- Termite field trial
  - Usually takes 6-18 months
- Fungal lab bioassay
  - Usually 6 months
- Fungal field trial
  - Usually 5-7 years, even at Innisfail.
- Fungal in-ground stake (H4) trial
  - Usually 1-3 years at Innisfail
Protocols for H3 out door above ground testing

Include reference preservatives (e.g. CCA) at 0.25x, 0.5x and 1x the approved H3 retention.
The first useful results from a field trial arise when the quarter retention of the reference preservative reaches less than 70% mean soundness.

Accelerating H3 decay test methods

- Project supported by FWPA, Arch, Osmose
- Collaborating with Qld DPI&F (Bing testing) and Scion (Rotorua test sites)
- This talk is about the Australian test sites

Accelerate decay by:
- Increasing the proportion of water trapping surfaces.
- Increase the test assembly mass
  - cloths pegs last longer than a large pine block?
- Pre-inoculation with known decay fungi.
- Use previously weathered and aged test frames.
- Painting, can trap moisture if seal is broken.
- Test site selection
  - Field exposure at Innisfail (main site with all tests), Clayton and Rotorua.
  - Accelerated Field Simulators (incubation rooms) at Clayton and Rotorua.
Test timbers and treatments

- 'A' list. Includes 1/4 H3 retentions as they determine when first rego results arise.
  - Water-treated radiata pine
  - High flash kerosene-treated radiata pine (example of an oil treatment)
  - Quarter H3 retention of CCA
  - Quarter H3 retention (0.4% tin) of TBTN (example of preservative that can fail under sunlight)
  - Quarter H3 retention of ACQ (but as quat loading was too high, call it AChQ)
  - Untreated spotted gum heartwood (an example for natural durability testing)
  - Which test will give the most 'realistic' results – same order of failure to others and matches in-service experience?

- 'B' list for the embedded test at Innisfail and Rotorua only. Includes H3 retentions.
  - H3 CCA
  - H3 Tanalith E
  - H3 AChQ
  - H3 copper naphthenate
  - 'H3' copper chromate (not an approved H3 preservative)
  - 'H3' boron (Solubor) (not an approved H3 preservative)
  - H3 azole LOSP

Flat panel test – traditionally used by CSIRO

Test specimens 200 x 75 x 25 mm

Hang at 45° off nails in merbau/spotted gum.
Bottom end in untreated L of non-durable ash eucalypt.
At Innisfail, half were on a new frame, and half on a 5y old frame.
Decking test

Test specimens
300 x 75 x 25 mm.
Will calibrate on-grass deck with deck >1m high.

Ground proximity test

Test specimens
200 x 75 x 25 mm

Newly installed at Clayton

After 1 year at Innisfail
Double layer test

Test specimens
300 x 75 x 25 mm

11 test specimens, 6 bottom row, 5 top row and half overlapping

Embedded test – developed for project

Test specimens 200 x 35 x 35 mm

Increases water-trapping surfaces

Exposed embedded ends if painted
Embedded test

Test specimens 200 x 35 x 35 mm

CSIRO. Rot box test – developed for project

5 layers of test specimens each 200 x 75 x 25 mm

X = untreated pine baits

Maximises water trapping surfaces. Large proportion of untreated wood. Each test specimen surrounded by untreated wood. Large mass so more insulated. But, some miss out on UV exposure, therefore rotate layers at inspections.
Rot box test – some preinoculated with BR (*Gloeophyllum abietinum*) and WR (*Perenniporia tephropora*).

In-ground (H4) test, and ‘Peg test’

Stakes – would they do for H3 prediction as well?

Pegs – inspect by seeing if they break when opened.
% Moisture contents of water-trapping regions in tests at Clayton (Melbourne)

Winter Summer

% Moisture content by layers in Rot Box at Clayton

Five layers of test specimens in rot box

Top layer Layer 2 Layer 3 Layer 4 Bottom layer
Water-treated radiata pine 1 y at Innisfail
8 = sound, 0 = destroyed

Test method

Mean rating

1 y rating in more active tests at Innisfail
8 = sound, 0 = destroyed

Treated wood was radiata pine.
q = quarter H3

(Quarter retention azoles in Rotorua rated 2.8 due to Auckland BR for Inoc embed test)
Model window trial in AFS, 8 year results
TPCV and FWPA project

- 9 months in AFS
- 3 months on roof (during summer)
- Sprinklers in AFS
- 6 windows/type
- Loose fitting glass
  - No caulking
- Total of 138 windows

Variations examined in window trial

<table>
<thead>
<tr>
<th>Preservation formulation</th>
<th>Untreated</th>
<th>Azoles LOSP</th>
<th>TBTN LOSP</th>
<th>Boron</th>
<th>No-Rot rods (bore in F)</th>
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<tbody>
<tr>
<td>Treatment schedule</td>
<td>None</td>
<td>Commercial schedule</td>
<td>Low pressure Boron (7 mins)</td>
<td>Dip (3 mins)</td>
<td>Commercial schedule</td>
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<tr>
<td>Variation</td>
<td>Unt painted</td>
<td>Cream painted</td>
<td>Cream painted</td>
<td>Brown painted</td>
<td>Unt painted</td>
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<td><em>E. regnans</em> (mountain ash)</td>
<td>✓</td>
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<td>✓</td>
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<td><em>E. delegatensis</em> (alpine ash)</td>
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<tr>
<td><em>E. obliqua</em> (messmate)</td>
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<td><em>E. sieberi</em> (silvertop ash)</td>
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<tr>
<td><em>E. obliqua</em> (messmate)</td>
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<td>Ovata spp. (resinoids)</td>
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<tr>
<td><em>T. plicata</em> (western red cedar)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>
Holes with preservative rods, sealed with silicone

Treatment of 1 m long boards, then cut to 270 or 300 mm lengths

Most timber was heartwood.
Regions of decay

In end grain, especially bottom sill

Bottom sills cut in half. Showing decay under beading and glass

Performance of untreated timbers after 8 years
8 = sound, 7 = slight decay, 0 = destroyed

Mean decay rating

<table>
<thead>
<tr>
<th>Timber</th>
<th>Mean Decay Rating</th>
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<tr>
<td>E. regnans</td>
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<tr>
<td>E. regnans sealed</td>
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<tr>
<td>E. delegatensis</td>
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<td>Shorea</td>
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<td>E. obliqua</td>
<td>7</td>
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<tr>
<td>T. plicata</td>
<td>8</td>
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</tbody>
</table>

WRC
Examples of decayed untreated windows

Meranti (Shorea), brown (M4) and white rot Alpine ash

Western red cedar

Azole treated using ‘commercial schedule’ and painted. -60 kPa 10 mins, 50 kPa 15 mins, -85 kPa 20 mins

Mean decay rating

- E. delegatensis
- E. regnans
- E. regnans brown
- E. sieberi
- E. obliqua
- Shorea
**E. regnans** azole treated - various schedules and painted. LPB = -95 kPa 30 mins, 150 kPa 30 mins, -95 kPa 30 mins

![Graph showing mean decay rating for untreated and various azole-treated samples.]

**Azole-treated E. regnans, painted or not**

![Image of different treated samples.]

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Wood Preservation 2009
Boron treated timbers (H1 VPI immunisation) or No-Rot rods, and painted

The full report on the windows should appear on the FWPA website in near future
Thank you