

November 2010 Newsletter

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The Key to Understanding Timber Treatment

Timber Treatment “101”

This month’s newsletter is a timber treatment special. “What is in it for me” you may ask? I will be presenting information that may be different to the understanding that many have about the preservative treatment of timber. Treatment can be a very complicated subject, so do not hesitate to talk to us if you have further questions that need answering.

The Treatment process

Understand the image above and you understand the strength and limitations of timber treatment. What you see is the end of a powerpole which has been treated with a dye to differentiate the sapwood from the truewood. If you had a hand magnifier and looked at the structure of the wood you would see that the sapwood is porous and that the pores in the heartwood are filled with gums and resins etc. To treat that pole you dry it for at least 4-6 weeks to remove some free moisture, place it in an autoclave, draw a high vacuum and the porous sapwood empties of air, flood the autoclave with treatment solution and the vacuum inside the wood very quickly draws the preservative into the sapwood. Finally top off with some pressure.

Even with the further application of as much vacuum and pressure as you can, and pumping for days on end, the solution will still not pass from the sapwood through to the heartwood.

Envelope Protection

With the pole in the lead image above, it doesn't matter that you cannot penetrate the truewood with the preservative as there is a complete circle or "envelope" of preservative encasing the heartwood. If you do not put any cuts or holes through the treated sapwood the pole is "preserved". Durability through preservation is only achievable on a practical basis in natural rounds with at least a 12mm sapwood envelope.



The areas in red are the only portions that will be treated

Sawn Timber

The image above shows a pack of bollards waiting treatment. If you look carefully you will see that I have blocked in the sapwood with red. This is the only part of that pack that will be treated. It might be 5% of the total volume. It doesn't matter if you treat the timber to H3, H4, H5 or even H6. It has no effect on the remaining 95% of the timber. If that timber was simply missing it would still meet AS2082 (Timber, Hardwood, Visually Stress Graded).

To understand how little treatment can mean on sawn timber. I can take a piece of Blackbutt (durability 2 in ground and in our opinion at the lower end of the group) without any sapwood, paint on some treatment chemical with a brush to colour it and I can still call it H5. I can then take it to a planer and dress off the external colouring and I can still call it H5! It is not the equal of a piece of Spotted Gum or Iron Bark with minimal sapwood treated to H3 (even though AS 5604 says it is).

A specification that says "F14 hardwood treated to H5" is quite meaningless as a specification. The key is to define the species correctly so the untreated 95% in this case (rarely is sapwood more than 15%) of the timber has suitable natural durability. Best practice in design and construction is still essential. That is the value of our Deckwood and Joistwood specification and systems.

The difference between the two types of treatment (envelope on rounds and partial treatment of sawn) is that Blackbutt with an envelope protection has proven to be an acceptable powerpole whereas treated sawn Blackbutt was never a good decking for a variety of reasons.



Graveyard trial to test efficacy of treatment



These playground posts cannot be H5 with CCA.
(H5 in ACQ is not readily available)

Why H3 and not H5 for extra protection

The amount of chemical needed to reach different levels was determined by establishing graveyard plots in various locations around Australia, of timber treated with different levels of chemicals, The amount of decay was measured over an extended period of time. In an aboveground application the decay hazard is lower and so there is no need for extra chemical in the sapwood. We should instead be reducing our chemical usage whenever possible

When you ask for H5, in practice it can only be met in hardwood in Queensland with CCA. Now who is going to accept CCA these days for human contact? (Treatment to H5 with the alternatives is theoretically possible but not easily commercially available). Sometimes you have to do a “work around”. The playground illustrated has handrail posts that go into the ground, a H5 (CCA) application which you cannot do. Our work around was to use Durability 1 in ground timber and measured the required diameter under the sapwood i.e. a 200mm post became a 225mm post’.



Untreated heart in pine extending full width



Heart has decayed leaving outer treated sapwood

Treatment and pine

Pine has exactly the same issues as hardwood. The outer sapwood band treats well and easily but you cannot treat the heart. The image on the left (again treated with a dye shows the untreated heart in a pine bollard. This bollard has been incised, that is, it has gone through a machine that puts thousands of small slits or pockets in the face. These pockets fill with chemical and allow penetration into the heartwood (sort of). The process was a failure as we needed 10mm penetration for H4 but the supplier only incises to 3mm to suit H3.

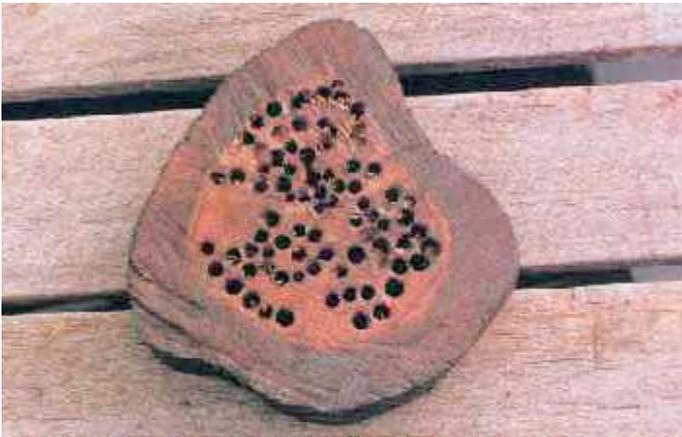
I have not found one pine supplier in Australia that will supply me with pine for bollards when we advise them that we will be sending the timber on to a laboratory for testing to confirm the 10mm penetration. The image on the right shows the unavoidable consequence of not treating the heart. Notice the decay is circular around the inside of the treatment.

H6 Marine

Envelope protection of natural rounds with a double treatment of CCA and pigment emulsified creosote is extraordinarily successful in marine piles. The image on the left is from a marina in NSW. When it was being built the off-cuts from the poles simply dropped in the water. When the owner planned an extension he wondered if the treatment was actually working so a diver was sent down to recover some off-cuts. Marine borers have heavily attacked the heartwood as it was exposed at both ends but did not touch the envelope protection. So, if the pile is embedded deeply and the top is above the high tide mark there no attack.

The second image shows a marine pile that is failing. Firstly, it has the wrong treatment, it was CCA and this is not allowed north of Batemans Bay in NSW. Even if treated correctly it would still have failed as the sapwood was notched and drilled in the tidal zone. The answer is to use a bigger pile that does not need bracing where there can be attack

As for sawn timber, again you cannot treat it to H6 because you cannot get an envelope protection. You must rely on natural durability. The only Australian timber with natural durability in a marine application is Turpentine. On drying, it shrinks 12%, has lower resistance to impact forces, splits, collapses, has a lot of natural feature and in general is a very undesirable timber. (it is, however, a good decking when kiln dried). Specifying sawn timber for a true H6 applications in our opinion is not a wise option. The superstructures of marinas and decks are only a H3 application. Contact us for further information on this.



End attack of pile off-cut after 12 years approx



Envelope protection broken by notch and bolt

A word of caution

The legal requirement in the link below of where you can use CCA does not apply to imported treated timbers. This timber is totally exempt from the requirements of the APVMA (Australian Pesticides and Veterinary Medicines Authority). Be very careful what you are purchasing. Remember also that the levels of chemical can also be much lower.

To be continued next month when we deal with Treatment and Children

Further reading

Where can you use CCA: http://www.outdoorstructures.com.au/pdf/cca_acceptable_usage.pdf

When is a preservative not a preservative: http://www.outdoorstructures.com.au/pdf/osa_newsletter_01_10.pdf

Tanalith E treatment of hardwood: http://www.outdoorstructures.com.au/pdf/tanalith_treatment.pdf



C4 Handrail recently installed near Geraldton

New Design Tool for C4 Bikeway Rail

Our website contains a link to “designers Tools”. There you will find an image, PDF with basic dimensions and AutoCAD dynamic block for a number of our products. We recently added tools for designing with C4 handrail. Simply download the cad file to your computer and it is ready to use. The tools on these pages can save you hours and hours of work.

We can also offer you a full design and certification service for our handrails on your jobs. This includes fully detailing the cabling using with either OSA1 or OSA2 systems. Contact us and outline the scope of work and we can give you a quote for the professional fees and for the kit.

Links

Design tools for C4 handrail: http://www.outdoorstructures.com.au/tpd_cycleway_sys.php

Design tools for OSA stainless cable system: http://www.outdoorstructures.com.au/tpd_stainless_steel_cable.php

More images of the Geraldton Handrail: <http://www.outdoorstructures.com.au/gallery.php?gid=104&SID=2>

Brochure for Japanese Bridge Available Soon

A brochure will soon be available for our Japanese bridges. I expect it will be part of the next newsletter. Do not hesitate to contact us beforehand.



New Japanese Bridges

Bridge Quote Requests

If there is any doubt that OSA make the best kit bridges in the country look at the [Berrinba Wetlands Project](#). Not all bridges are equal. After encountering three bridges in one month that did not meet the Bridge Code I wrote the [May newsletter](#). Refer to the May OSA Newsletter when assessing the suitability of quotes.

See our Steel Bridge Quotation Request Form and our Timber Bridge Quotation Request Form

Steel Bridge Quotation Request Form

http://www.outdoorstructures.com.au/bridge_request.php?Mode=st

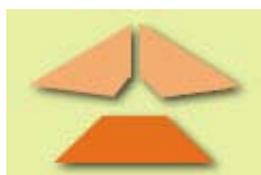
Timber Bridge Quotation Request Form

http://www.outdoorstructures.com.au/bridge_request.php

Regards

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