

OUTDOOR STRUCTURES

Outlasts and outperforms

September 2013 Newsletter

Written by Ted Stubbersfield

For Infrastrucxion Pty Ltd

[Warning about Garo Garo \(Pacific Tallowwood\)](#)

[Book on Timber Grading](#)

[Case History Showing Unsuitable Decking](#)

[Timber Design Awards](#)

[Powerpoints by Ted](#)

[Books by Ted](#)

[Consultancy Services by Ted Stubbersfield](#)

[Bridge Quotes](#)

[Warning about Pacific Tallowwood](#)

Dear Reader



The image above shows Garo Garo marketed as Pacific tallowwood after 4 years in north Queensland!

I have previously advised downloading the excellent publication by DAFF and written by Gary Hopewell, **Construction Timbers in Queensland**. This two volume publication is noted as a primary-referenced document in the Queensland variations to the Building Code of Australia (BCA, Australian Building Codes Board) under the **Queensland Building Act 1975**. This document has had an important revision so you should delete/archive the old version and reload the 2013 update. The address is <http://www.daff.qld.gov.au/forestry/using-wood-and-its-benefits/construction-timbers-in-queensland>

The changes include

1. Mastixiodendron pachyclados (Trade Name, garo garo, origin PNG) Pacific Tallowwood(Marketing Name)

Natural durability ratings:

- Above-ground (4)
- In-ground 4

Note: Previously published as (2) and 2 (above- and in-ground respectively) after Eddowes, P (1977) Commercial Timbers of Papua New Guinea.

There have been some large decks built from Pacific tallowwood that have failed in a short time which caused the review of the New Guinea data. Tallowwood on the other hand is one of Australia’s finest timbers as it is dense, durable and strong. It is a durability Class 1 timber both in and above ground. A kiln dried piece of tallowwood, suitable for decking, is rated as F34 By calling something "Pacific tallowwood" could immediately bring up the connotations of all that is good about tallowwood. But call it by its common trade name, garo garo, and you get an entirely different picture. This is how they compared before the downgrade in durability and density.

trade name	Botanical name	Kg at 12° MC	Hardness	Strength group	Joint Group	In Ground Durability	Above Ground Durability	Shrinkage	Lycius Susceptible	Termite Resistant
Tallowwood	<i>Eucalyptus microcorys</i>	1010	Very hard	S2	J 1	1	1		Yes	Yes
Garo Garo ¹	<i>Mastixiodendron pachyclados</i>	700-935	Hard	S4	J 3	2	2 [#]	High	?	No
Comparison of tallowwood ² with Pacific tallowwood in 2006 # Provisional rating										

Considering what is available from Australia, no one should have ever considered using this imported timber even based on the original figures. The density has now also been downgrade to 660 to 860 kg m2 but a density of between 565 to 800 kg m2 is only suitable for flooring, not decking. This should immediately raise a question, How does the same species timber suddenly change its density to a lesser value than before? apparently our friends in PNG have reassessed the original data. Despite the down grade on durability and

density (and surprisingly an upgrade in strength), I rung around mid-August and easily found companies selling this material here in Australia! Of course this timber will end up on someone's deck, because it is/will be cheap!

To be blunt, if you are not getting your decking and decking advice from us, where are you getting it from? You can trust our guides and you can trust our product but do you want to forge your own path when such product is out there being represented as suitable. Now Tallowwood has a disadvantage in that it is getting hard to get, but why not do the job even better and use our Deckwood in spotted gum. Here is a comparison between tallowwood and spotted gum. http://www.outdoorstructures.com.au/pdf/spottedgum_advantage.pdf

[Book on Timber Grading is progressing](#)

Over my short break I added another 35 pages to my book on timber grading. I am about 5 images short of completing it. Hopefully it will put the fear of the Good Lord into those people who insist on only specifying their timber using Australian Standards without a long list of qualifications. If you just specify F17 decking you can receive Garo Garo in its unseasoned form, and F27 when seasoned. We can help you on a consultancy basis write a specification that is meaningful. Here is a reminder of why you would do this. http://www.outdoorstructures.com.au/pdf/osa_newsletter_01_13.pdf

Your problem is getting it enforced.

The next section of this newsletter is a modified extract from one of the case studies the book.

[Case History Showing Unsuitable Decking](#)

When the extension to an existing boardwalk was being built (location withheld for the purpose of the newsletter), someone said to me, "Ted, they are using brush box for the decking." "They would not be that silly" I thought, but the asset owner needed to be warned if it was correct so I went to check. Fortunately they weren't, though I have seen this substitution occur. The timber was in fact red ironbark, a royal species, very similar in colour to brush box but, despite that, it was as totally unfit for service as if it had actually been brush box. When I was photographing this deck I met someone who claimed to be from the construction company doing an inspection. He told me the timber was F27, which red ironbark in Structural Grade 1 will achieve. I advised the timber was not to grade and he simply walked off. We will grade this deck as claiming to be F27 or Structural Grade 1.

Surface finish



Figure 1. Dressed Finish

Slip resistance of boardwalk decking is discussed in my **Deck and Boardwalk Design Essentials Guide**. The deck also has to meet the requirements of the disability code and it is the responsibility of any grader to point out that regardless of what is written in AS2082 the timber is unfit for purpose. My testing showed that dressed face decking produces a deck where people are highly likely to slip. But acquiring this knowledge is not something that requires

expensive testing in a laboratory, all that will do is give a value to its inadequate performance. Any experienced miller knows this as they would have had trouble with the inner boards of packs of dressed decking slipping out as they delivered to steep sites in the days before webbing straps. This is where the miller should be talking to the specifier and giving firm advice as he has the knowledge to speak authoritatively. This dressed face would be bad enough but the deck is on a slope compounding the problem.

My own practice was to refuse to supply dressed face decking unless it was under a roof. The potential for litigation is just too high. Unfortunately the profile is a copy of my Deckwood. People copying most of the aspects of my profile without understanding what we did led to some very poor timber structures being built. - e.g. see the May 2012 newsletter http://www.outdoorstructures.com.au/pdf/osa_newsletter_05_12.pdf When grading timber you grade a batch of timber. If you are grading timber intended for a set of roof trusses that is reasonable. The standard allows for 5% of the batch to be out by one grade and this is all accommodated in the design software. This approach is also fine when you are grading joists and bearers in a boardwalk but it is not acceptable for grading the decking. **Every** piece must be suitable for its purpose as it is individual boards that can cause injury and litigation.

Untreated sapwood



Figure 2. Untreated sapwood on face

The heartwood of ironbark is Durability Class 1 In Ground which makes it suitable for decking. The sapwood is Durability Class 4 for both In Ground and Above Ground applications. The sapwood of ironbark is basically as durable as the sapwood of pine. As the sapwood is not lyctus susceptible there is no restriction to the amount of sapwood even in Structural Grade 1 so this decking meets AS2082. If it was lyctus susceptible it would be restricted to 1/10th of the cross section and 1/3rd of the width of the

edge on which it occurs.

As far as fitness for purpose is concerned, this sapwood is going to decay and do so fairly quickly. This will leave the surface of those pieces where the sapwood has decayed below the surface of the adjoining boards. At 6 mm difference it represents a trip hazard under the disability code and the boards are unfit for purpose. This is why timber preservation is important even though it may have little effect structurally.

Large Knots



Figure 3. Large knots.

The decking was 120x35 mm. In Structural Grade 1, the largest knot should be more than $1/7^{\text{th}}$ of the face or 17 mm. There were many boards that had knots far in excess of 17 mm. Structural Grade 4 (F14) would only have allowed the knot to be 45 mm. There were many knots far larger than this meaning the timber did not meet any structural grade at all. When grading, only 5% of boards are allowed to be out of grade and then by only one grade. Nothing then should exceed Structural Grade 2 with a

knot not exceeding $1/4$ of the width or 30 mm. This knot virtually covers the whole face and a structural failure of this board is likely.

What is the consequence of a failure? In Queensland a father was holding his newborn baby when he stepped on a deck board that failed. He lost grip of his child who fell 3.6 m on her head onto concrete. These things are foreseeable. Imagine also if someone rides a horse on this. I have seen it happen often enough.

Termite Galleries



Figure 4. Termite activity.

We can see in Figure 4 that the decking screw which is in the centre of some termite damage has just continued to drive deep into the timber. This will allow water to enter the galleries and the damage will continue to get worse. The depth of the termite attack should have been able to have been seen on the edge and it is graded as not want and wane which for Structural Grade 1 is $1/10^{\text{th}}$ of the cross section.

Gum Pocket



Figure 5. Gum pocket.

It is sometimes difficult to identify the defect you are trying to grade. Figure 5 is an example. Is it a gum pocket? There is gum in it. Is it an unsound knot encased in resin where the knot has fallen out? Irrespective of what it is you would grade/measure this as a knot. It is too large for F27 but probably makes F17. Despite being able to give it a grade it is unfit for purpose as this represents a trip hazard with high heels. Further moisture will sit in this hole and the

defect will deteriorate even further.

What is unfair about this type of supply is that you would have expected the usual three quotes were obtained. Those mills that quoted on supplying to grade didn't get the order because they were too expensive. The purchaser doesn't know and quite possibly may not even care that his lowest price has come at the expense of conformity to grade. In the middle of a deep recession in the timber industry failure to secure these large orders put the viability of responsible suppliers at risk.

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 2012 newsletter](#). Refer to it when assessing the suitability of quotes.

[Steel bridge Quotation Request Form](#)

[Timber Bridge Quotation Request Form](#)

More information:

If you have timber road/rail/heritage bridge issues,
we suggest you talk to:
Mr. Dan Tingley
Senior Engineer
Wood Research and Development

Infrastrucxion Pty Ltd

E-Mail: Chris@Infrastrucxion.com
Web: www.outdoorstructures.com.au

Phone: (07) 5462 4255
Fax (07) 5462 4077
Old College Road Gatton, Australia
PO Box 517 Gatton Q 4343
Australia

ABN 90 234 979 738

1760 SW 3rd Street,
Corvallis OR 97333
Office 0011 1 541 752 0188
Fax: 0011 1 541 752 0195
Cell: 04 5957 6314 Or 04 28983328
dant.tingley@gmail.com