

OUTDOOR STRUCTURES

Outlasts and outperforms

June 2013 Newsletter

Written by Ted Stubbersfield
For Infrastruxion Pty Ltd

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When I was a young man back in 1970 (a long time ago) I spent a lot of time travelling on British Rail but sadly just after magnificent trains like Gresley's "Flying Scotsman", (pictured above) were taken out of service. When I did the run it was on a boring diesel. Still, there is nothing like standing on a platform and hearing the announcement, "The next train is the express train to London, stand clear of the edge". Then a train flies through the station at near 100 MPH (160 km/hr). And it was still being done on timber

sleepers! I have also travelled 300 km/hr on the Eurostar but that was on concrete sleepers. Surely the change to concrete sleepers that we see throughout the state has to be progress, "just like old technology steam, let's get rid of old technology timber and replace it with the latest that the scientists can devise". Sound good but consider, a hardwood sleeper in Queensland is believed to cost \$60 whereas a concrete sleeper is apparently in the order of \$600. Reasonable value if it lasts more than 10 times longer, but in actual fact, a timber sleeper will take more load cycles with much less ballast than concrete. So which is better? I suppose if you want to travel at 300 km/hr, concrete is best but, in case you had not noticed, we do not have many 300 km/hr trains in Queensland, nor services that run at 160 km/hr either. Timber sleepers are so reliable that 93% of sleepers in the US are still timber. For Queensland the big issue is timber supply.

Why abandon timber? Would it not be best to upgrade the associated technology? All that has changed since Stephenson's "Rocket" is that a spike has been replaced with a screw. If you spent another \$20 on the hardwood sleeper and sorted out the same issues that have existed for 200 years you would radically extend the already good life. But the jump is not from \$60 to \$80, which is a lot of money considering the quantity involved but from \$60 to \$600. By putting the timber up on free draining ballast a much longer life was achieved but the next jumps to improve longevity further simply weren't made. The figures involved in replacing timber with concrete are staggering, almost enough for Campbell Newman to bring the state back to a Triple A credit rating. But timber has an image problem though in this case it is not deserved.

Reference for US sleeper usage and an discussion of various options <http://www.railway-technology.com/features/feature92105>

What about bridges. I find people will not even consider a timber bridge and invariably they will cite past experience. Unfortunately their reluctance in this application, unlike sleepers, is very reasonable as often timber bridges have performed very poorly. Consider the following images



These bridges are made with pine. Now pine can be made durable with the correct treatment but these bridges are made with timber treated to H3 (external above ground). The low cost and inadequate abutment has meant that soil comes onto the timber turning it into a H5 application (external in ground) and the life is immediately halved - degrade where there is ground contact is shown in the right hand image on the top row. The pine burns easily and nail plates are forced out. When the plate has been forced out only 2 mm their holding power has reduced by half. I looked at making a low price bridge like this years ago but the wise heads at Pryda wrote to me saying that they would not certify the plates when used externally. So we were forced to keep with our more expensive but very sound designs but it meant we were never going to be the lowest tenderer. After all, the purchaser got brownie points for making a saving and maintenance costs were moved to a different department.



But it does not have to be that way. In Europe there are bridges that are hundreds of years old, for example the Chapel Bridge a covered wooden footbridge across the Reuss River in Lucerne Switzerland. It dates back to 1333. In Australia, despite our very high UV, covered bridges have not captured our imagination, they should have done. So what can you do if you are prepared to do things well but without putting a roof on it? You should be able to aim for at least 75 years, and now even 100 years as the upper level if you do things very well. 75 years is the rating given to certain style of timber bridge in the US against the design life of 50 years for steel and concrete. (They were rated for longer but were found not to perform as claimed whereas the timber was upgraded).

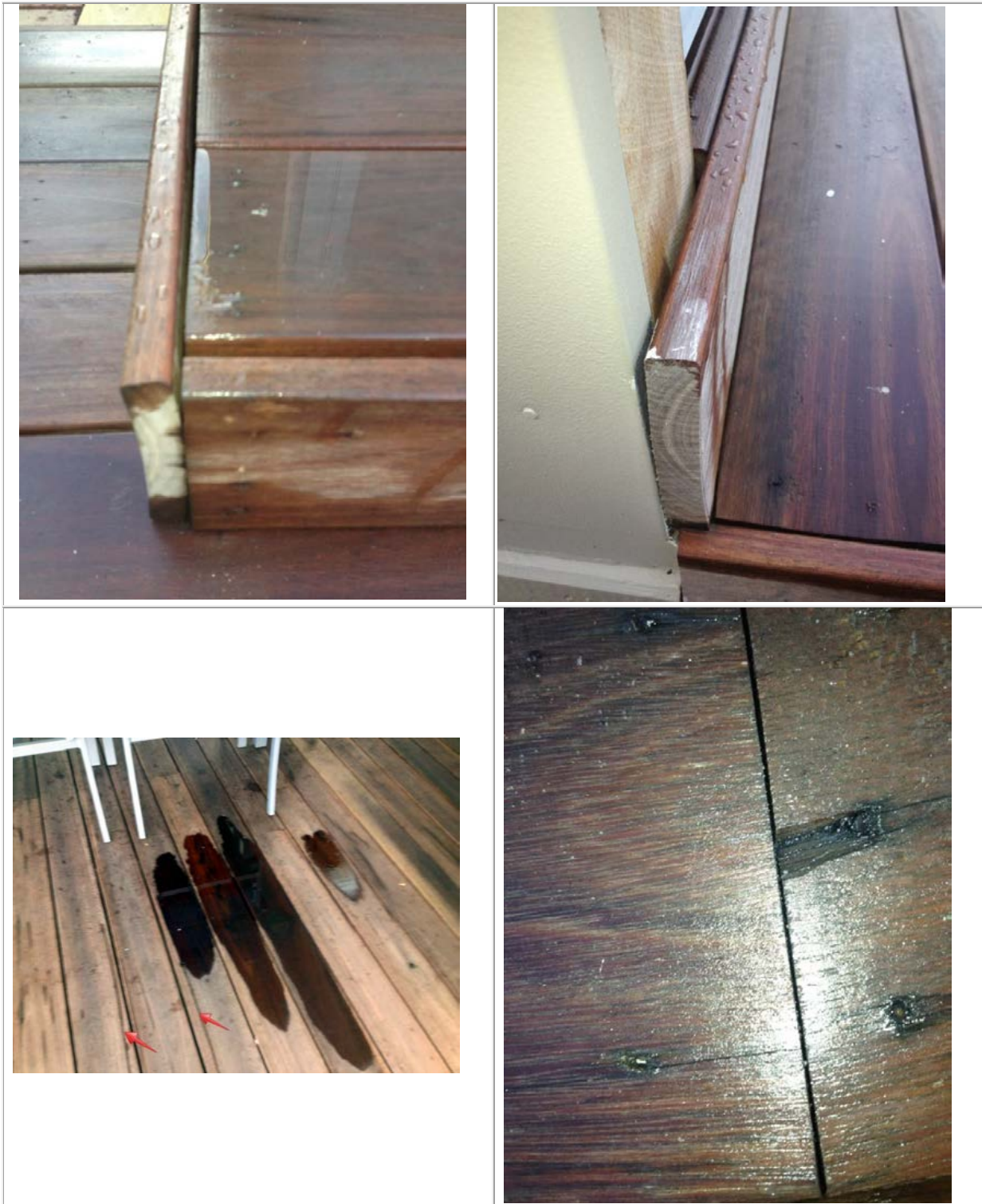


But like railway sleepers no-one says, "We know how much it costs to do a bridge badly with timber, and we know how much it costs to do it with steel or concrete, but how much does it cost to do it well with timber". Now here is an example - We quoted \$150,000 for a 50 x 3.0 m long bikeway assembled bridge superstructure built on log girders to replace a similar 100 year old bridge washed away during

the 2011 floods or about \$1,000 per m^2 . With installation it would not have gone above \$1700 m^2 . Make no mistake, this would have been a very good bridge. Concrete was used instead and the reported installed price was \$5,560 per m^2 . Is there a balance in between? I believe so. A 100 year life timber bridge would have come in at about \$2500 to \$3000 per m^2 installed.

So timber should not be dismissed, but we should be prepared to do it well. Hopefully there is a new timber bridge coming soon.

Can I Help A Damsel in Distress?



I know I am getting old and a little soft, but when I have an upset woman asking "Can I help a damsel in distress" there is only one answer. While I charge you for consultancies I gladly did hers for free. The personal side of her story was almost enough to make me cry too. What she received as a deck and subsequent advice makes me angry. She wants me to share her story with you so you can avoid a similar outcome.

The deck (in Victoria) was 10 x 5 and decked with 136x19 spotted gum. My "client" had planned to coat the decking with one of the leading film forming finishes and, on doing her research read that the timber has to be aged for six months prior to coating. Consequently it went down uncoated. The builder used a nail gun to fasten the decking. After only six weeks the decking was badly cupped and nails started coming out and were dangerous. So she started asking questions and the first thing she was told by the timber supplier was that it was her fault that she did not oil the decking. There is a catch 22 situation for you if the supplier's advice was correct. She was further told that spotted gum is one of the worst timber for cupping. The generous builder told her that if she purchased new merbau decking the builder would relay it for her for free.




The first three images above show troubles with cupping. This is not because spotted gum cups more than other timbers but because the width to thickness ratio of the decking make it inherently unstable. It is simple to work out, divide the width 136 by the thickness 19 and you get 7.15 to 1. Go beyond 3.5 to 1 in decking and you start having trouble when fully weather exposed. The fourth image shows nails that are so fine that you can barely see them. After complaining the builder told the customer "Oh, we always screw down - not sure why we did not", The timber supplier disclaimed all responsibility for the behaviour of the 136x19. (We will not sell you 145x35 unless you sign a statement that you are aware it is not best practice and it is only Victorians that sign them) But disclaiming responsibility is not that simple under new consumer legislation (Refer to Warranties in my Timber Preservation Guide).

If you do not have LifePlus and Tanacoat at the front of your mind when specifying domestic decking, then why not. It was heartache like this caused us to develop a system that can be relied upon. It has all been worked out for you. To avoid problems specify your decking "LifePlus Decking by Outdoor Structures or its licensees installed in accordance with the LifePlus Decking Guide". It can be ordered pre-coated with Tanacoat. If you want to go on your own prepare to be advised by "experts" and companies that do not understand their products or stand by what they sell. If you do not have a copy of my LifePlus Decking Guide it can be purchased for \$22.00. One of the best investments you will make.



Why would you use Tanacoat instead of a premium film forming finish? It firstly comes down to safety. When we tested the slip resistance of these finishes they were little short of lethal when wet and used on a dressed surface. The other reason is that they were much easier to maintain, The coating does not have to be sanded between coats,

Stainless Steel Bollards

Sample from range of stainless bollards now manufactured by Infrastruxion		
		
<p>Bolt down and in ground round bollards</p>	<p>Bolt down and in ground square and rectangular bollards</p>	<p>Bolt down and in ground triangular bollards</p>



Typical stainless steel bollard with base showing crevice corrosion

Infrastrucxion make the best timber bollards and traffic barriers in the country. Of course there is no shortage of companies who attempt to copy, including manufacturers of stainless bollards. I look at some of their attempts and think, "I would not do it that way". So we thought, what is involved with a timber producer making a stainless steel bollard? What did we know about stainless? Very little but I had been observing the performance of stainless in landscaping for years, but more importantly I knew where to get the answers.

We looked at bollards together and the examples we saw did not, in the opinion of those who advised us represent very best practice with stainless. Their advice was the same as that which had already seemed fairly obvious to me which was:

- Bollards generally were not polished to a high enough finish. Most were to a 320 grit finish or level 4. Tarnishing can occur.
- 304 grade was being used in situations that were clearly a 316 application
- Where pipes were fitted into bases, they were frequently welded from underneath (to save polishing the weld) leaving the opportunity for crevice corrosion on the top

Of course, doing it differently adds cost. We are now introducing our range of stainless steel bollards.

You can still have them the way you are used to them but more importantly the option is there for them to be made the way we believe they should be but with what we believe is some very keen pricing. Note that this is not for some stainless of dubious quality out of China but premium steel from Sandvik and fabricated in Australia. Now the stainless manufacturers would probably say "I would not do it that way".

Brochure soon to follow. If you require a special bollard, talk to us.

304 grade. 320 grit polish (For 10 or more bollards)

115 mm OD 3mm tube flat or sloping top, **in ground \$181.34** + GST

115 mm OD 3mm tube flat or sloping top, **bolt down \$247.16** + GST

168 mm OD 3.4mm tube flat or sloping top, **in ground \$235.86 + GST**

168 mm OD 3.4mm tube flat or sloping top, **bolt down \$310.76 + GST**

316 grade. 800 grit polish

115 mm OD 3mm tube flat or sloping top, **in ground \$208.18 + GST**

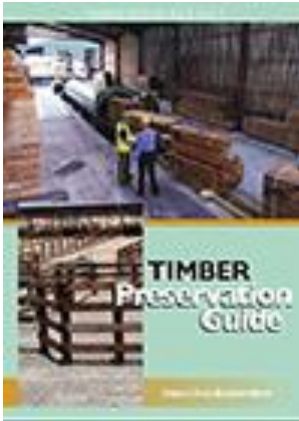
115 mm OD 3mm tube flat or sloping top, **bolt down \$273.86 + GST**

168 mm OD 3.4mm tube flat or sloping top, **in ground \$282.70 + GST**

168 mm OD 3.4mm tube flat or sloping top, **bolt down \$363.21 + GST**

All Product is made to order at this stage. A 50% deposit required with order. Hold downs are included with bolt down bollards.

[Technical Guides Written By Ted](#)



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There are four ways to purchase the Timber Preservation Guide.

Using a Credit Card:

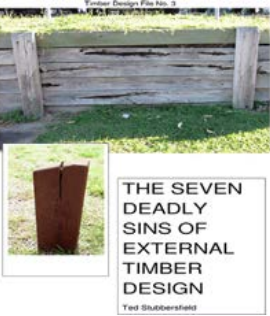

1. As a [Amazon Kindle eBook](#) for US\$33.00
2. As a [Amazon Paperback](#) for US\$33.00 + postage from US.
3. Not a member of Amazon? Purchase from [Createspace Estore](#) for US\$33.00 + postage from US.

Direct Deposit:

4. Paperback posted from Australia for quicker delivery \$37.50 + \$10.00 Express Postage (within Australia). Email edgarstubberson@gmail.com or call 07 5462 5532 and we will advise payment details.

Already purchased a draft? Go to the Dropbox folder and download the latest file. Do not release the file outside of your office. I am only releasing the file to earlier customers.

The Deck and Boardwalk Design Essentials guide has had its final edit and is awaiting the professional formatting. I am fairly well advanced on "Understanding AS2082."

The 7 Deadly Sins of Timber Design	Deck and Boardwalk Design Essentials
	
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All our guides can be seen at http://www.outdoorstructures.com.au/timber_guides.php

Consultancy Services by Ted Stubbersfield

The stories I am now hearing about substandard material and performance are frightening. If you are looking for quality materials and good performance I can work with you from the design stage through to final completion. In our area of expertise, often it is the art that proves more important than the science. Weather exposed structures normally do not fail because of incorrect member size calculations, but because a myriad of small points of detail are not taken care of. to ensure you receive good performance from your next timber project.

As a timber design assistant we offer:

- The provision of high quality technical guides on timber design. (accessed from our website on a pay per view or membership basis)
- The review of professional drawings to identify potential timber design issues that may impact service life
- The preparation of proposed AutoCAD cross sections of structures
- To be a sounding board for ideas
- Lectures and presentations
- The assessment of best practice in construction.

As a grader I can assist with grading for confirmation to a nominated grade but more importantly I can assess whether timber is graded to an appropriate grade. Often these are not the same thing.

Contact me on 07 54625532 or by email (edgarstubbersfield@gmail.com) to discuss how I can be of assistance to your organisation

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

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