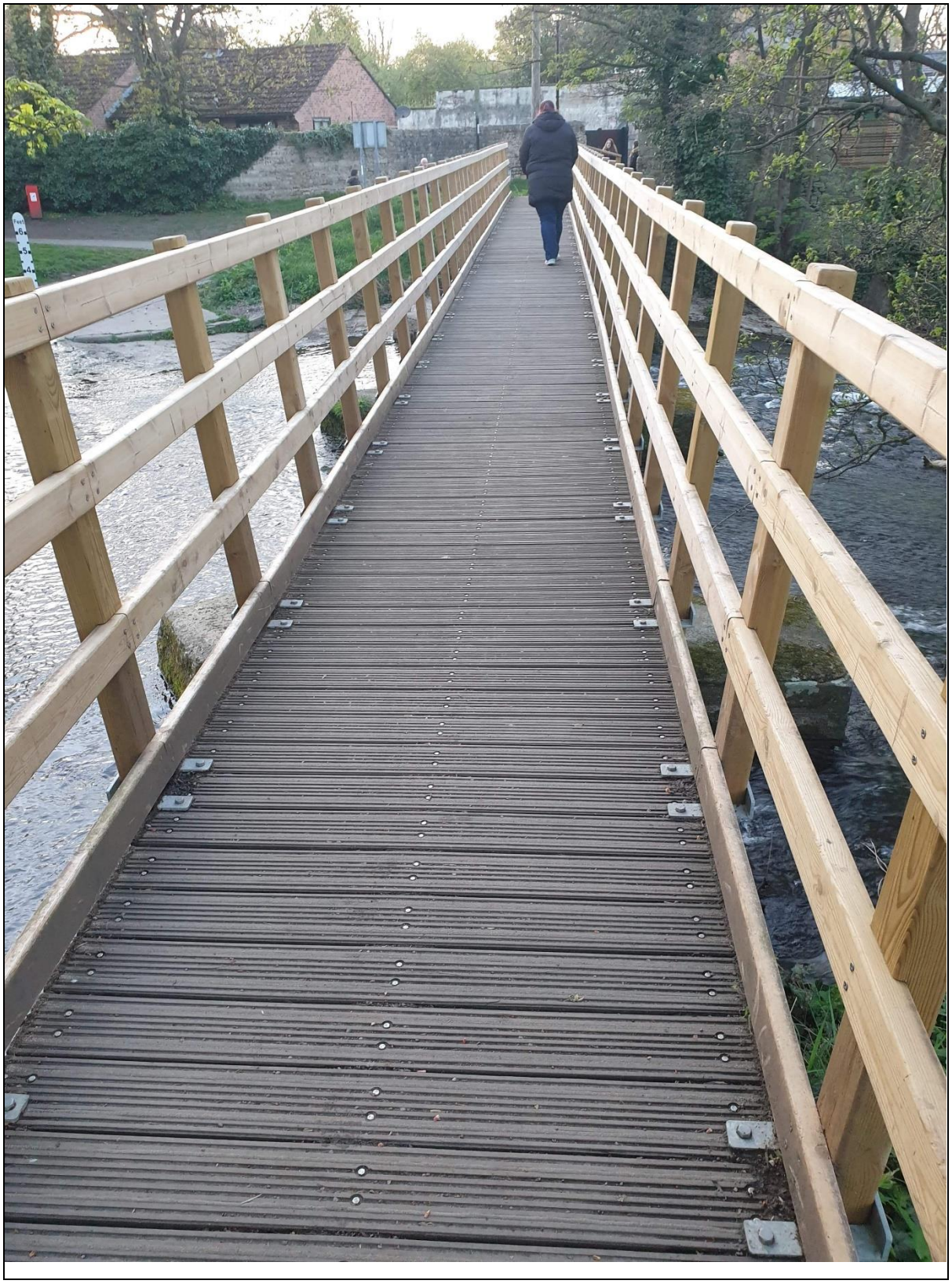
Ted's News
July 2021

The Olympics of Materials

Recently I caught up with my friend Henri Bailleres, formerly Team Leader and Principal Research Scientist at the Queensland Government's Forest Products Innovation's Salisbury facilities and now Product Development Manager at Hyne. Discussion got around to Brisbane hosting the 2032 Olympic Games. We considered who were the pick of the pick among the athletes and he thought it was those who competed in the decathlon. Sure some athletes could run 100 metres in under 10 seconds and that is usually the limit of it unless they compete in the 200 metres as well. A decathlete is unlikely to achieve sub 10 seconds but still competes at a high level, but not in one sport, but in ten!

His point was that timber was was not a record beating sprinter but more like a decathlete. Whatever property you should choose there is always something that performed better than timber but, overall, it performed very credibly in whatever property you choose. Just as the winner of the Olympic decathlon is unofficially called "the world's best athlete", timber should be called "the world's best material".

An Interesting Handrail from the UK



A friend sent me pictures of a footbridge close to her home in Ripon in North Yorkshire. It had some good points that are worth discussing. I never built a bridge with the handrails sloping outward before, inwards yes, for bikeways but never outwards. But it makes sense as we are wider at the hips and chest than at the feet so this arrangement makes an otherwise narrow bridge effectively wider. They gained a bit extra width by also letting the upper rails into posts. Note also that otherwise flat surfaces have become water shedding, an important detail too often ignored. Overall, I think this style of rail it is a detail worth utilising. But there are a few things to consider to improve it.

Notice firstly that there is a very firm connection back to the bearer. That handrail is not going anywhere. But what about the gap between the rails? I have built plenty of bridges with gaps as wide as these rails but I would not do it now and would keep the gap down to 125 mm. This means you need to keep the bridge above the Q100 due to debris build-up on the rails with the narrower gap. (It could also be especially strengthened if that can't be done, frangible rails have their own problems and are a solution of last resort). Look also at the bracket holding the post to the deck, in my opinion this is a trip hazard. I would have put the bracket under the decking. In reality, the bearer is deep enough simply to use two bolts. Notice also the screws are in a straight line in both the decking and the handrail. They should be staggered so as not to split the timber.

Unfortunately, this will only ever be a footbridge! I have seen situations where councils want to upgrade a footpath to a bikeway and they have the obstacle of an existing narrow footbridge. A tidal flow bikeway i.e., servicing children going to and from school needs a 2.0 m path minimum. On a bike bridge, the handrails need a top rail that is offset 150 mm. This means that a footbridge that can be upgraded to a bikeway needs a clear width of 2.3 m minimum. Ideally this is the narrowest footbridge that should be installed as it leaves your future options open.

A Not So Interesting Handrail from Australia

Compare this handrail from Australia to the one above. The 75 mm kerb on a 75 mm spacer is what we would have had if wheelchair compliance was needed, that is a good point. The posts slope outwards too, at least in the centre. The difference between this and the UK bridge is that these were not meant to! The posts are not connected to the bearer. The post is only fastened to a cleat under the decking and further I consider the bolt is too close to the end of the decking anyway. Eight diameters are necessary and our practice was to add an extra 50 mm to allow for weathering which means a 12mm bolt should be a minimum of 100 mm from the edge and ideally 150 mm. The overhang of the decking is excessive which has allowed the decking to move and take the handrail post with it. Our practice was to allow 150 mm maximum overhang unless the end could be hidden under a kerb and then we only went to 200 mm.

In my opinion, pine sleepers do not make good bridge decking. It can be very hard to obtain sleepers that have no more than 20% of untreated heartwood as is required to be code compliant. And that is just the start of the problems. I strongly recommend that pine sleepers be incised but that is not an easy ask. But the decking could have been given a fighting chance by fastening from underneath.

This image shows what can happen when you fasten from the top through poorly treated sapwood or completely untreated heartwood of pine. Fastening from underneath solves all of this.

It is not hard to excel at handrails. Here is an example of some of my earlier work. The post is bolted to the joist and a cross transom keeping it rigid and the overhang is no more than 150 mm. (and not a piece of pine in sight.)

Want to know more about commercial rails, I have a guide on the subject. It is only $22.00
Want to know more about rails on bridges, I have a guide on the subject. It is only $55.00
Want to know more about treatment of pine I have a guide on that subject too. It is only $55.00.

Footbridge Fundamentals

Here I am delivering the topic *How to avoid problems with footbridges and bikeways* at a footbridge fundamentals course. The course covers the fundamentals of what to look for in the design, why a thorough specification at the tender process is important, what to look for when inspecting the structures and lessons learned from several case studies Participants go through my design checklist line by line and explain with hundreds of images why each line has to be attended to. Phone me on 0414 770 261 to arrange a session or email. It is presented either a full day or two half days.

Content of bridge fundamentals course
Grading hardwood
How to avoid problems with footbridges and bikeways
Doing the inspection

Case histories
Lessons from London Millennium bridge
Berrinba Wetlands
3 bridges closer to my home
Sundry horror images

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I have over 40 years' experience in the industry and can assist you with many of your timber needs.

Inspection – I can assess timber products on their performance, fitness for purpose or cause of failure. I also examine whether best practice was used in design and construction. I have recently completed inspections on boardwalks, bollards, support beams and external timber furniture.
Grading - Quite literally, I have written the book on the subject. Recent experience has shown that up to 30% of timber supplied may not be to grade.
Design - I can provide detailed technical drawings and advice. I can also review already prepared drawings.
Reports - I have authored many books on timber and can prepare a report providing recommendations and practical instructions on to how to rectify issues.

Please note as I am now employed a Senior Timber Consultant with the firm BCRC all large and complex consultancies and requirements for an expert witness will be handled in conjunction with them. Existing consulting arrangements remain unchanged and I am also available to assist on small projects. For more information see www.bcrc.com.au

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