

Ted's News

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The following insightful article was contributed by guest author, Herb Kuhn, Managing Director Simpson Strong-Tie Australia. Over recent months I have had a lot to say about corroding fasteners but Herb's addition to the debate is that you must also consider 'ductility'. Herb has been very helpful as I put my next book together, *Timber Joints*, actually many people from across the industry and academia have been very helpful.

CHOOSING THE CORRECT DECKING FASTENERS

Part 1 of 2

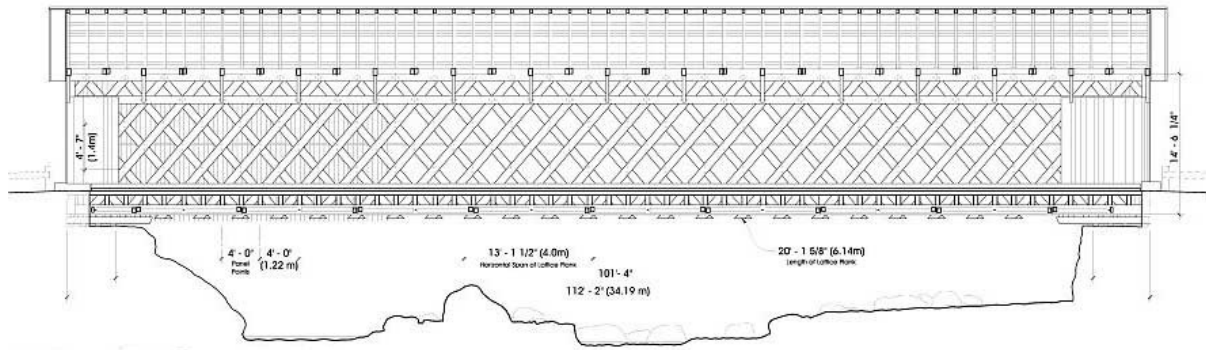
As we continue to spend more time in the outdoors and more houses have the "extra outdoor room" we expect the decking that we lay to last and perform the same as our internal floors. There are many decisions to be made that can affect the long term performance and look of decking. The use of screws to fasten down decking has become more popular due to the fact that timber decking moves with heat and cold, moisture and dry. Nails will allow the decking to move as it does and typically nails allow them to do this as they are carbon steel. This constant movement can, over time, mean that the nail wriggles out of the joist and that may leave the head of the nail exposed. You can hammer it down again, however more movement will see the nail heads come up again.

Screws will have a better hold in the joist and this will restrict the timber movement, however screws are case hardened. This hardening process makes the screw tougher, however bending from side to side can cause work hardening and possibly breakage. Hardwood timber is a living growing thing and the movement caused by moisture and temperature means that if we prefer to use screws because they hold better, then we need to look for fasteners that move with it, or are ductile. We agree that hardened carbon steel is not very ductile so we now recommend stainless steel for all hardwood decking applications. It is an alloy and the make up of the stainless screw is that it can be bent in different directions without breaking and this is a better long term fastener for exposed decking that needs to deal with the elements.

Corrosion performance is definitely one consideration and proximity to swimming pools and the ocean should automatically direct us to use stainless steel as opposed to plated steel screws. However ductility should be of equal consideration if we are looking for a long lasting deck structure. A hardwood deck that is fully exposed to the rain and direct sun will expand with the rain and shrink with the dry, it will dry out without humidity and swell with it and all of this creates movement of the decking boards. Keeping the decking well oiled will reduce the affect that these conditions have on the timber, however the use of stainless steel screws has a significant benefit in ensuring that the fastener does not break with the movement of the decking.

Thank you Herb. There is more from Herb next month when he gives good advice about ductility of screws used with steel joists. While this is not a paid advertisement, it is worth looking at the connectors that Simpson Strong-Tie have available. Their range is at least double that of most connector suppliers. [Here is a link to their connector page on their website](#)

Covered Bridges and the Birth of American Engineering



A fascinating and fortunately free publication about covered bridges has been released by the National Parks Service in the US. This book examines the development of wood trusses and covered bridge construction, profiles the pioneering craftsmen and engineers involved, explores the function of trusses in covered bridges, and looks at the preservation and future of these distinctly American bridges. The editors have collaborated with some of the leading historians and engineers of historic covered bridges in the country to produce this volume.

[Download the medium resolution book here - 52 meg](#)

[Download the high resolution book here - 75 meg](#)

For some reason I cannot explain, Australia has obstinately refused to cover its timber bridges despite the compelling case to do so. Here is an image of the only covered bridge I know of in Australia. We were heavily involved with this job which is situated in Sandgate, Queensland.



Width to Thickness Ratio - An Old Bridge Revisited



Some years ago I sold the log footbridge illustrated above to the Brisbane City Council. At the time we discussed the width to thickness ratio of the decking. One authority said the ratio was not to exceed 3 to 1 e.g. 105x35 mm. I looked them in the eye and said I was not having trouble with 145x35 which is 4.14 to 1 which was then completely true. I was milling the timber sourced from the Lockyer Valley in our own mill and was not having issues. Later we closed the mill and started sourcing timber billets from a wide variety of locations in Queensland and then the trouble started. I had two claims against 145x35 so I dropped it from the range and now recommend a ratio of 3.5 to 1.

I had always wondered if I had misled my clients so, when I had the opportunity to check it out after many years I was a little worried that the deck might have been cupped. The deck was perfectly straight without a hint of cupping. None of us now have the ability to control where timber is sourced from to such a fine degree so my recommendation is still 3.5 to 1. That means that 120x35 and 145x45 are in and 145x35 and 195x45 are out.

Corroding Galvanised Joist Hanger - New Guidelines



The corroding galvanised joist hanger in a timber deck was photographed at the student village at the University of Southern Queensland. It is not particularly old and not a high hazard area. It illustrates the wisdom behind Timber Queensland and the different nail plate manufacturers agreed position in 2016 on where to use stainless and where to use galvanised connectors. You can read this in Timber Queensland's *Technical Data Sheet 35, Corrosion Resistance of Metal Connectors*. This guide identifies different corrosion zones:

- Sea spray zone (less than 1 km from a surf coast, 100 m from bayside areas)

- Coastal zone (1 – 10 km from surf coast, or 1 km from bayside)
- Industrial zone (close to complexes emitting corrosive gasses)
- Special Hazard (e.g. enclosed swimming pools where stainless may even corrode and beyond the scope of the data sheet)
- Low hazard zone (anywhere outside the four areas listed above)

This is then broken down into 3 exposure conditions

- Enclosed (within a **closed** roof, floor and wall cavity)
- Sheltered (subject to wind-blown salt but not washed with rain, e.g. open garages and sub-floors)
- Exposed (experiencing both weather and rain, e.g. decks and pergolas).

In all exposed allocations in the four areas covered by the guide, 316 grade stainless is required (or else specially prepared plates) meaning the above joist hanger should have been stainless. For the sheltered applications, an area not differentiated by some recommendations prior to 2016, a standard Z275 (275 grammes of galvanising per m²) can only be used in the Low Hazard Zone, other applications require either stainless (Seaspray Zone) or the addition of soft seal paint (Coastal and Industrial). Where there is little risk of corrosion such as in an enclosed and **sealed** roof area Z275 can be used even in a Seaspray Zone. Further, these recommendations are for *non treated* timber and those treated with waterborne preservatives can require additional paint protection on top of heavier galvanising which, for simplicity, basically forces you to stainless.

If you do not have the latest recommendations avail yourself of them from your plate supplier or read Timber Queensland Technical Data Sheet #35 'Corrosion Resistance of Metal connectors' for complete details.

Three New Wood Solutions Technical Guides



Wood Solutions are continuing the roll out of very high quality technical guides in the EXPAN series with another three having been just released. The EXPAN guides are based on the results of years of research by the Structural Timber Innovation Company (STIC), a unique collaboration between Australian and New Zealand commercial and academic partners to create innovative structural timber solutions. The EXPAN Technical Design Guides are available for free download from WoodSolutions.com.au.

Timber Rivet Connection: The aim of the Design Guide #34 is to provide an aid for engineers for designing timber rivet connections in structural seasoned wood products including seasoned sawn timber, glulam and laminated veneer lumber (LVL).

Floor Diaphragms in Timber Buildings: The first part of the Design Guide #35 presents the terminology, concept and design of timber diaphragms with their connections to the lateral load-resisting system (LLRS). The second part reviews

a design example of a timber–concrete diaphragm and its connections to the LLRS. The diaphragm is subjected to the wind load applied perpendicular to its long side.

Engineered Wood and Fabrication Specification: The last Design Guide from this series, #36, provides a summary of fabrication and installation specifications of engineered wood products, i.e. laminated veneer lumber (LVL) and glulam. It provides recommendations for different steps of the timber structure supply chain, including storage, handling and transportation, erection and assembly. It includes insect and mould preventions and moisture design considerations.



For more information about this article, please contact:

Eileen Newbury
National Marketing and Communications Manager
Forest and Wood Products Australia Ltd

eileen.newbury@fwpa.com.au

M: 0419 313 163

Guest speaker at Brandon & Associates Symposium



On the 16th of this month I was a guest speaker at the annual symposium held by Brandon and Associates held in Chinchilla, Queensland. Brandons are Queensland's largest rural based consulting engineering firm, operating across South-West and Central Queensland. The positive feedback was that it filled the "gap between theory and practical". Apparently I scored 4.78 out of 5 and was the rated the best speaker over the two days. Call me if you would like your own Ted Talk - CPD points can be earned.

Need a Timber Consultant or Expert Witness?

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

Design - I can provide detailed technical drawings and advice.

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.

Reports - I have authored many books on timber and can prepare a report to meet your needs.

[Here is a link to my CV.](#)