

Ted's News

April 2017

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[Did I See the Monstrosity in Barcaldine?](#)



Recently I spent a few days in Longreach, 12 hours driving from Gatton. My hosts asked, "Did I see the monstrosity in Barcaldine?" I knew what they meant, the Tree of Knowledge Memorial. I replied that to me it was beautiful. I suppose we all recognise good functionality but beauty really is in the eye of the beholder. This particular structure is extremely well executed and a credit to all involved. The details of the memorial are included in my book *Architectural Timber Battens*.

Just a tip - some local wag left a nut and washer on the ground under the memorial which led to a frantic search to determine which of the hanging 125x125 pieces was about ready to impale a tourist. After a major inspection job they find out that all the nuts were in place. Using a characteristic nut (like a Glenlock) would be worth doing. It would spoil the local's fun though.

[How Not to Install a Post](#)



In my book *The Seven Deadly Sins of External Timber Design* I have a section about how to insert a hardwood post in the ground - it is different to pine. Frankly, I never addressed the one thing I thought it would ever be necessary to address. That is, be careful where you actually put the post. Power poles in the middle of the road are a common feature of Longreach. I am told the tourists go around the outside and the locals go on the inside. Inattentive or inebriated locals and tourists may choose a different path.

Sons of Gwalia Headframe Restoration Options

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This month I had hoped to bring you a report of a prefabricated library built in the Solomon Islands by my good friend Dr. Dan Tingley. The building utilises large dimension timber and is probably the best library in that nation. Hopefully I can bring you this story next month. Instead, Dan helped me by providing a copy of the proposal by Timber Restoration Systems for the restoration of the Sons of Gwalia headrig near Leonora in Western Australia which is built from Douglas Fir (Oregon). Below I have condensed and reformatted the report. I mentioned this historic structure a few months back when [I wrote about the 100 year life achieved by non durable timber in a dry climate.](#)



The problem that led to the need for restoration

Fungi are the most common form of wood deterioration but, to become active, they need favourable conditions which are:

- moderate temperature (between 5C and 50C)
- oxygen (above 21%), and;
- moisture content of approximately 20% or greater

The environment around Leonora has limited rainfall which, more than anything, explains why so many elements in the old structure made with low durability untreated Douglas fir are still in good condition. In these environments, dew, rather than rain, can become the primary cause of decay and degradation as it condenses around metal fasteners localising moisture content to above 20% (into the decay zone). Decay or loss of specific gravity is usually found in these locations and this is the case with the Gwalia headrig.

Another cause of degrade to the structure is due to corrosion of the bolts leading to ferric ions from rusting metal fasteners migrating into the wood. This in turn leads to embrittlement of the lignin in the wood which in time results in the wood shrinking away from the metal fastener causing the structure to become loose and sloppy. Fortunately, the sons of Gwalia mine is in an

area where there is low embedded corrosion which explains why the black steel fasteners have also lasted a long time.

After 100 years of exposure both these forms of attack have taken their toll and the historic structure needs to be restored. A previous study indicated that 56 members needed to be replaced.

Restoration options



The primary objective of the restoration is to recreate a structure that has been in existence for over a hundred years. The first option was to disassemble and reconstruct the structure with 50% of the elements being replaced with new karri (more than previously assessed). The second option is to disassemble the old structure and rebuild using all new pressure treated douglas fir (100 year life), sourced from the same location as it was originally found in Oregon. Another option (2A) involves utilizing douglas fir for the replacement elements instead of karri. The cost increase to use douglas fir versus karri is 3% and not a factor in the total scope of the job.

The total cost of Option One for the dismantlement and reconstruction with new karri elements would be \$699,258. The total cost of this option with douglas fir replacement elements is \$723,646. The total cost of a greenfield approach is \$611,933 which includes only new treated Douglas Fir elements. See summary table below of the various option costs.

BREAKDOWN OF TENDER SUM	Option 1	Option 2A	Option 2B
Preliminaries	\$ 78,737	\$ 92,070	\$112,100
Deconstruction	\$226,000	\$226,000	\$ 96,000
Reconstruction	\$308,953	\$317,790	\$308,203
Provisional and Monetary Sums: Galvanised Metal Fasteners	\$ 20,000	\$ 20,000	\$ 40,000
Repairs to scarf splice and disconnected brace ends	\$ 2,000	\$ 2,000	
Value of Work	\$635,689	\$657,860	\$556,303
GST	\$ 63,569	\$ 65,786	\$ 55,630
TENDER SUM	\$699,258	\$723,646	\$611,933

The heritage value of retaining some of the old elements is important but that comes with a price as the labor cost in reusing it will overwhelm the cost savings of the wood. It is estimated that it would take an estimated 700 hours of labor to reclaim wood from this structure. The look of old and new wood would be obvious but a judicious reuse of the more robust and attractive elements could preserve the look and feel of the old structure with more new elements allowing less time for disassembly and for reassembly. If in fact the timber materials were not to be saved and a new structure with all new douglas fir would be utilized then the cost of disassembly is much lower.



Should some of the old untreated timbers be reused, Dr. Tingley also recommended diffusing the timbers with sodium borate salt rods to extend their life. The treatment holes can be hidden as much as possible and wood bungs can be installed in the drilled holes so they do not detract from the look of the headframe.

[If I am reading the Leonora Council minutes right, the tender appears to be let to another company for almost double the price quoted by Timber Restoration Systems.](#) And you ever wonder why I thought it was

easier being a consultant and a landlord instead of a business owner!

I'd Give That Landing 5 out of 10



Flying back from some work in Sydney on Qantas I had a particularly rough landing in Brisbane. The two retired headmasters I was sitting next to said, "I would give that landing a 5 out of 10," I reminded them that landings are not graded, they are either Pass or Fail. The remains of a Qantas fail can be seen at the Founders Museum in Longreach. Timber durability is somewhat similar. People think of the numbers 1 to 4 as hard categories and all the species in that group are the same all performing equally, much like a pass or fail landing. It is better to

think of them not as hard values but as a sliding scale. A species might be a durability class 2 in ground but might be very close to being a one or at the other end, a three.

An example is cypress which I always knew to be a durability 1 in ground but is now classed as a durability 2. It's not that it's durability has dropped dramatically over a few years, it always has been hovering on the margin of one and two. I have also seen durability 2 changed to a 3. it would have been hovering at the bottom margin. Now clearly, if the timber is exposed to the weather above ground or in ground, you are not going to get the same performance from all durability class 2 timbers. [In fact one study showed that there could be almost 50% difference in life expectancy](#) between the bottom end of Durability class 2 in ground and the top end. The lesson: do your homework and be aware that when you go beyond the old proven royal species you are taking risks.

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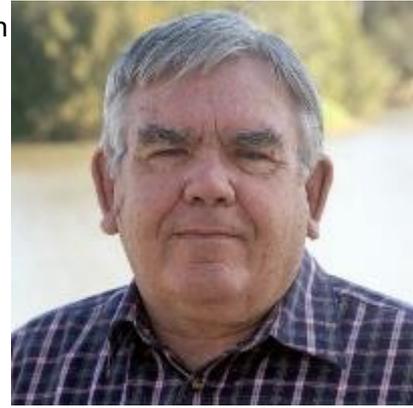
Timber Decks – Designing for Durability,

Utilising Small Diameter Hardwood.

The Seven Deadly Sins of Timber Design.

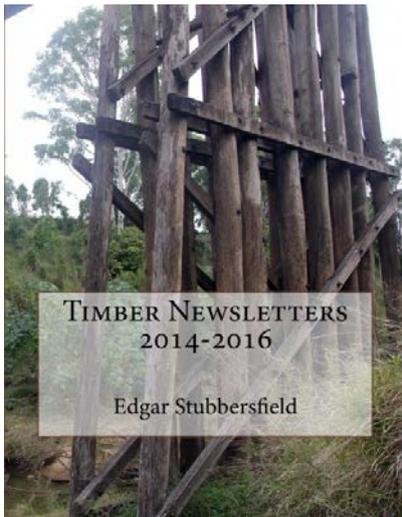
Joints and

Architectural Timber Battens



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