

Ted Stubbersfield

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Dear Reader

[A Reminder about Sleepers](#)



I was out photographing a few jobs with a friend when he spotted, in the distance, what he thought was some of my work. On having a close look I was appalled at what was provided, installed and accepted. The barrier in the top two images are of

that fence. Now, I do not know what was specified but I do know what was supplied - landscaping sleepers. This is a product that has no specification other than one reasonable edge and one reasonable face and it is arguable that what we see here even had that. The bottom two images of the four above are substandard sleepers substituted for my bollards.

The problem is that common sizes for landscaping, 200x50, 200x75 and 200x100 are also the sizes that landscaping sleepers are made in and they are probably a third of the price of structural timber of suitable quality. It is not surprising then that sleepers get used even often flaunting a reasonable specification. So how do you avoid this substitution? Well a suitable specification helps, here are two examples of specifications for bollards or fence posts:

125x125 or (200x100) spotted gum, ironbark or tallowwood, sapwood treated to H3 with ACQ or Tanalith E (CCA not acceptable) free of heart. Grade is Structural Grade 2 for all species. Inspect each piece to ensure defect is placed in ground. Mark base with lumber crayon before processing and make available for inspection prior to processing

NOTE: I do not recommend 200x75 or 150x150 for bollards - ask me why.

300x300 spotted gum, ironbark or tallowwood, sapwood treated to H3 with ACQ or Tanalith E (CCA not acceptable) . Grade is Structural Grade 2 for all species. Inspect each piece to ensure defect is placed in ground. Mark base with lumber crayon before processing and make available for inspection prior to processing. 300x300 is to have two expansion grooves per side which are to be formed within one week of milling.

NOTE: These species are automatically H5 if there is less than 20% sapwood which there will be.

The point is that the word "sleeper" should not be used by a design professional unless it is a recycled railway sleeper and then the grade has to be nominated.

How to Measure End Splits



The image to the left shows sleeper grade material used as rails and where the ends are badly split. So how do you assess end splits?

Firstly, to be officially called a "split", the split has to go from one face to another. If it is just on the one face it would be termed a check. The allowance for checks are so large you might as well ignore them when they are at the end.

But if the splits do go from one face to another the amount is limited from 100 to 150 mm depending on the grade. But that is the total

aggregate of all the splits on one end. these pieces have up to six splits so at most they should be only 25mm long. Of course, when grading timber you have to use some common sense. If the timber has a 150mm split but you know you are going to trim it back 100 mm you would pass the timber as fit for purpose

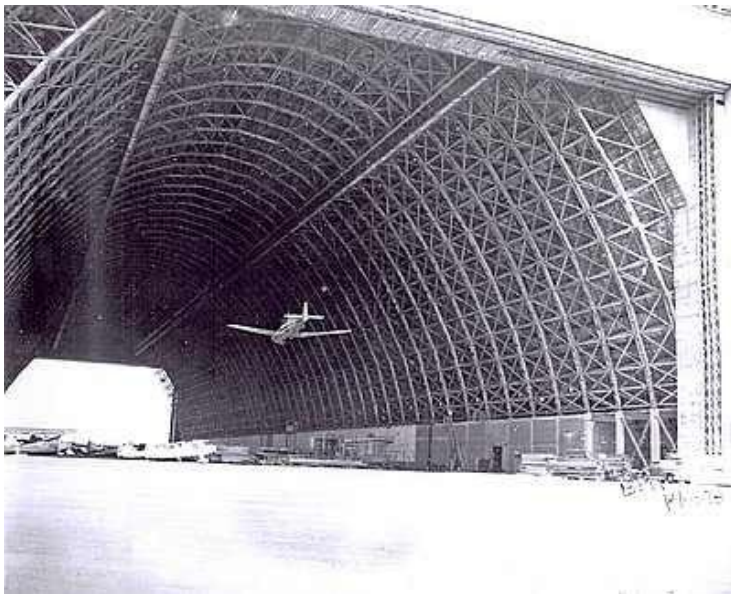
.World's Largest Timber Structure

There has been a lot of fanfare about [the 10 story building built of cross laminated timber in Melbourne](#). While it is significant, it is not the height that is remarkable , it is the fact that it is a multi residential timber building without a sprinkler system that is remarkable. We have largely forgotten how over 70 years ago we were building massive timber structures. This section is a reminder of what we did.

So what is the largest timber structure? It all depends what criteria you use to define "largest" as to which one is the winner. Is it height, length, depth or volume. Some contenders are [Metropol Parasol in Seville, Spain](#) and the [Daibutsu-den or Great Buddha Hall of the Todaiji Temple complex](#) in the Nara, Japan. But as far as volume is concerned it would surely be the airship hangars built in the US during WW2.



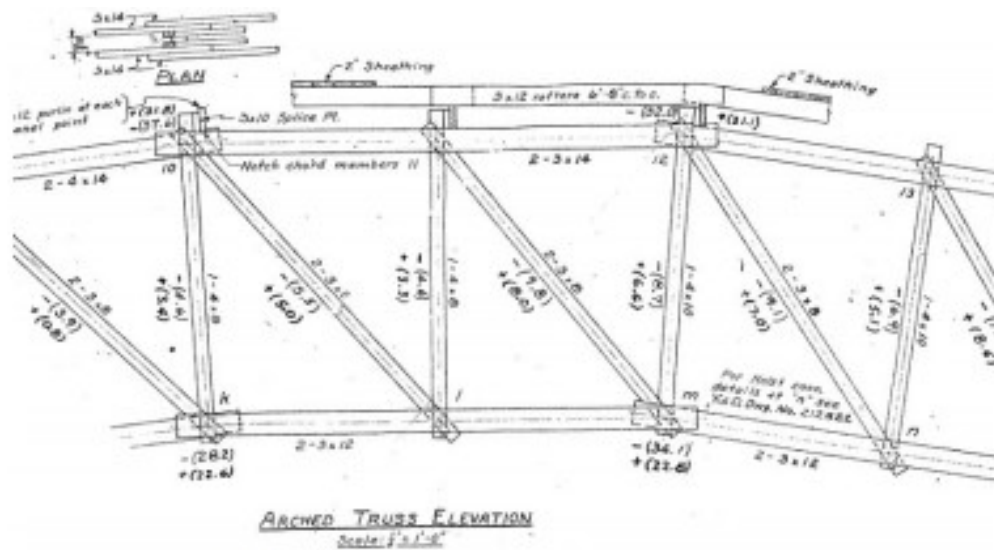
A total of 17 airship hangars were built during the war, each hangar housed 8 airships that were 80 metres long. Because there was a steel shortage during the war, wood was chosen and the resulting hangars were reported to be the largest clear span timber structures built at that time. After the prototype was built, it only took a year to build the remaining seventeen, testimony to timbers versatility. The clear space inside the hangar at Tillamook (now an air museum) is span 90 metres, length 320 metres, and height 53 metres. The front doors are supported off 93m span timber box beams off 71m high concrete columns. [The sister hanger to this at Tillamook was apparently completed in 27 working days. Click here for more pics](#)
[Click here for a detailed report on similar hangars in California.](#)



How do you achieve such large spans? This is building on a scale several times larger than we saw in the ubiquitous WW2 aircraft hangars we used to see in around Australia.



The smaller Australian hangars were built from lineal 100x50 and simply nailed together yet the technology used in them was ground breaking and utilised timber up three times more efficiently than it had been before. The connections had to be much better.



Split rings are manufactured in imperial sizes in diameters of 63mm (2-1/2") and 100mm (4") from hot-rolled carbon steel for use with 13mm (1/2") and 19mm (3/4") diameter bolts respectively. A single split ring insets into both the precut grooves in the wood surface being joined. A tongue and groove split in the ring permits the ring to deform slightly under load so that all contact areas distribute load, and the special wedge shape on both sides of the ring eases insertion and ensures a tight fitting joint when the ring is fully seated in the grooves.



None of us are going to build an airship hangar so is there a use of split rings on smaller structures?

The image above shows the rafters being attached to the posts in my office where they were connected with split rings. The rafters are 250 mm deep which means about 15 mm shrinkage overall. If you used two bolts the holes really should be elongated and that causes all manner of problems. But a single bolt with a split ring solved the shrinkage problem and gave a joint without any clearance.

Note how I have used galvanised split rings. They are only black steel in Tillamook and are corroding but to be fair, it was only meant to be a temporary structure and never intended to end up on a register of heritage listed buildings.

I cannot see that these connectors are available in Australia any longer but they are readily available from the US and Canada .[Here is a link to designing with split rings](#).