



## January 2011 Newsletter

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I had no trouble finding gaps of this size



One of our readers was injured by this 29mm gap

### GAPS IN A PROMINENT DECK IN CANBERRA

## Gaps in Decking

In early 2005 I was sent a set of plans to quote the materials for a prominent deck at Canberra. As I looked at these plans I thought that this deck should not be built as originally drawn. I must say that the aesthetics were stunning but, from architectural intent to working drawings and specification, there were a number of issues.

The main problem I saw was that the design utilized wide unseasoned decking laid with a gap. After seasoning the gaps had to well exceed that which is considered safe for the public. I wrote to the engineers and offered my assistance to make this high profile deck a success but, unfortunately, it was ignored.

In 2009 I was visiting Canberra and decided to see how the deck had performed and of course, the mathematics are so basic that it had to fail the disability code and it had by a long way. I had no trouble finding gaps of 24mm. I thought about whether I should say something to the asset owner, (is that what a duty of care would demand) but then against my better judgment decided that no one would listen or care.

Unfortunately, one of our newsletter readers contacted me recently to say that he, or more accurately his bike, had found an even wider gap. Over the handlebars he went, stitches to the face and damage to his back.

Tragically no one would talk to me at the design stage when all that was needed was a few simple changes to make the deck meet basic safety standards. Now there is a very real danger that the asset owner will be forced to talk to a solicitor acting for our reader. I have seen enough pain in my life and would do all that is in my power to prevent anyone experiencing it unnecessarily. If you are designing a deck please talk to us. Even if you have no intention of specifying our Deckwood I will gladly guide you through the maze of delivering a safe, if not as long and attractive deck that ages gracefully.

**Maximum Gaps:** Clauses from codes relating to gaps that you need to consider when designing decks are:

Part 13 of Austroads (which quotes from the Disability Code) section 2.1.4 which covers drainage and grated areas. These can only have a maximum opening of 13mm wide and 150 long to prevent entrapment of wheel chairs and walking sticks; and,

Part 14 of Austroads section 8.5.1, grooves (and presumably even more so with gaps) are not to exceed 12mm when parallel to travel. Refer table 8-1

So if you are building a deck you need to aim for a gap no bigger than 12 to 13mm. How do you do this with unseasoned timber?

**First:** Set your target gap

**Second:** Nominate your species. Spotted Gum and Ironbark are excellent decking timbers and shrink only 6%. If you just say something vague like F14 hardwood durability class 1 or 2, you can be dealing with up to 12% shrinkage! We do not recommend specifying Blackbutt which is very commonly done in NSW.

**Third:** Deduct your expected shrinkage from the target gap and that is your laying gap This is a problem if you have a minus figure! You may have to adjust the decking width or be forced to use seasoned material.

**Fourth:** Ensure the builders straighten the boards as they lay them. A piece of 150x50 decking 4.0m long can have spring of 18mm. This plays havoc with your gaps.

As a rule of thumb do not go above 145mm wide unseasoned decking. If you lay without a gap your expected shrinkage with spotted gum is 9mm. That leaves you 3mm tolerance for spring or for areas where the boards are undersize. You will never make an ex 200 wide unseasoned decking, even with lower shrinkage species, fully comply with the code.

**Inappropriate Footwear:** A 12mm gap and 4mm Stiletto heels do not mix (yes, it does happen). In consultation with a Brisbane architect we supplied a deck for a university campus club where it was expected that high heels would be regularly worn. In that case we used 70x35 Deckwood laid without a gap. The expected gap (shrinkage) was 4.2mm. This has been a success.

**Seasoned or unseasoned:** If you want a narrow gap (3mm say) with a wide board it simply has to be seasoned but in practice the majority of decking does not need a narrow gap and so can be unseasoned. The difference between seasoned and unseasoned is more expense, more delays, usually poorly specified, not available from anything thicker than ex 50mm and most importantly lots and lots and lots of green house gasses. There should always be heart-searching before specifying KD on anything over ex 25mm. When specifying wider boards remember the width to thickness requirements.

## Links

Width to thickness ratios (2009 Newsletter) Scroll down to "How to avoid cupped decking"  
[http://www.outdoorstructures.com.au/timber\\_newsletters.php#technote](http://www.outdoorstructures.com.au/timber_newsletters.php#technote)

## Case History - Noah's Ark in Hong Kong

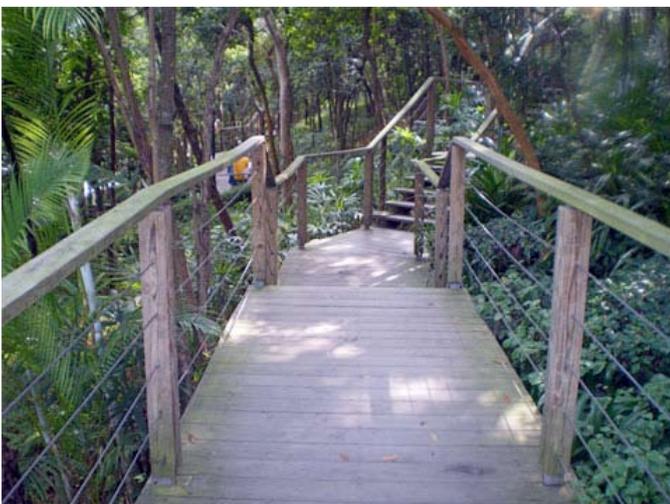


Reconstruction of Noah's Ark in the New Territories of Hong Kong

To the theologically minded, you might have thought the Noah and his ark came to rest on the top of Mt Ararat. But here it is in Hong Kong! Don't worry, it is only a theme park built around a replica based on the sizes given in Genesis. This modern Noah used fiberglass for his ark and fencing instead of gopher wood. But adjoining the ark, at Ma Wan Nature Garden, and part of the overall project, is a timber boardwalk built at the same time. In late 2005 We met with a representative of the developer and were asked to price the supply of that boardwalk.

As I looked at the drawings again, unfortunately, there were major issues. Concrete, steel and glass are more what you would associate with Hong Kong so it is not a surprise. The foundations were, in our opinion, over designed with heavy galvanized T sections 150x150x10 at close centres. What was actually built appeared to be heavier still, UC (200mm I think). Galvanised steel corrodes in contact with the ground and the steel should have had (and was specified to have in the drawings we were shown) a corrosion resistant paint applied. It was not done. There was no obvious corrosion at the ground line yet but it must happen.

There was room for substantial legitimate savings with the foundations but they certainly will not fail in a hurry. The problem was the superstructure, which we considered to be under-designed, especially for Hong



Associated boardwalk in shade



Same boardwalk in full sun

Kong's climate. It was built from CCA pine (no environmental issues in Hong Kong) on 50mm joists with small 10 gauge screws holding the decking down.

I advised the executive that they really needed to look at building some certainty into the superstructure and that there would be no net increase in cost if the deck was upgraded and the foundations downgraded. I realized that we were not communicating as my comments about "How long will it last" would always be deflected by his "how much will it cost". Of course the order went to someone who would supply what was drawn without question and, I suggest, understanding.

I visited Hong Kong in November for my 60th birthday and decided to have a look at how the boardwalk was performing. The park was opened in July 2007 so what we witnessed was probably no more than three and one half years old. As I walked on the deck I thought I would have to eat humble pie (yet again) because the deck was in excellent order but then I walked out of the shade into the large areas of the deck in full sun. There the deck was behaving as we had advised with early degrade starting to occur. In a few years the deck will look very sad indeed.



Protruding Screw is very dangerous

This project reminded me of the extreme challenges in designing and building timber structures that are situated in full sun. There is no forgiveness of errors. But when the structure is under shade you can "get away with" less than best practice. To its credit this deck, does not have a kerb which will trap leaf litter so remains relatively clean which is a great help.

The image above from the same boardwalk shows how critical attention to detail is. The screw on the step is very close to the end and so has split the stringer and worked its way out about 10mm. Imagine the financial repercussions if a wealthy American tourist trips on that, falls down the steps and breaks a hip? An over designed foundation is worth nothing then. The success of these structures always depends on getting a myriad of small details correct. The drawings we saw had a very reasonable and safe detail with galvanized brackets on a steel stringer with screws going into the step from underneath. Perhaps plans were not followed. There has to be a lesson in this.

## Links

Noah's Ark Theme Park: <http://www.noahsark.com.hk/eng/aboutus3.php>

## Japanese Bridge Brochure

The brochure for our authentically styled Japanese Bridge is now available complete with Japanese translation on the back. OSA's Japanese styled bridge was developed after considerable research into traditional designs. By combining authentic styles with the most durable hardwoods grown in Australia, an exceptionally durable bridge is achieved.

Each bridge is a one off structure to suit a specific location so the owner's preferences can usually be accommodated. To be more authentic, some domestic owners will require steps, but where the public have access a version without steps is available.

### Japanese Bridge Brochure:

<http://www.outdoorstructures.com.au/pdf/bridge-japanese-series-10.pdf>

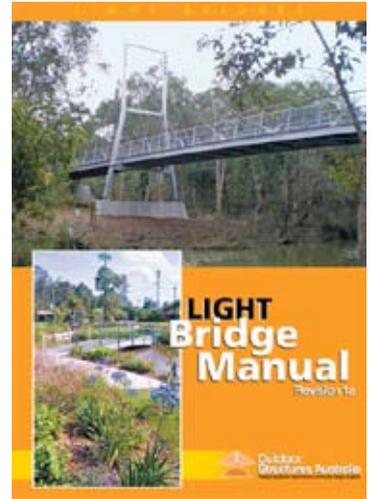


## **Light Bridge Manual Revision**

A couple of months ago we undertook a minor revision of the light Bridge Manual. Discard your old copy and print out a new version. We hope to do major revision next year.

### **Light Bridge Manual:**

<http://www.outdoorstructures.com.au/pdf/light-bridge-manual-1a-10.pdf>



## **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 newsletter](#). Refer to the May OSA Newsletter when assessing the suitability of quotes.

See our [Steel Bridge Quotation Request Form](#) and our [Timber Bridge Quotation Request Form](#)

### Steel Bridge Quotation Request Form

[http://www.outdoorstructures.com.au/bridge\\_request.php?Mode=st](http://www.outdoorstructures.com.au/bridge_request.php?Mode=st)

### Timber Bridge Quotation Request Form

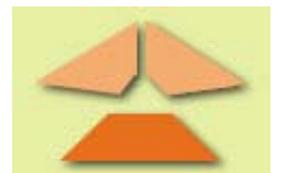
[http://www.outdoorstructures.com.au/bridge\\_request.php](http://www.outdoorstructures.com.au/bridge_request.php)

Regards

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