

BUILDER'S MATE

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CURING CONCRETE

Curing is something you do to freshly poured concrete to stop it drying out too quickly. It is carried out on newly placed concrete to ensure the concrete develops maximum strength and durability. Concrete that has been cured correctly also has less risk of shrinkage and cracking occurring and impermeability will be improved.

The idea of curing is to prevent premature loss of water, which is essential for the complete hydration (chemical hardening) of the cement and maintaining a favourable temperature. If the moisture, humidity and temperature conditions are right, curing will take place naturally, but usually that's not the case, and you need to use specific curing methods.

Concrete is made up of cement, aggregates (coarse and fine) and water. The water combines chemically with the cement (hydration) to bind the aggregates together. Hydration starts soon after the concrete is placed, and the concrete gains approximately 70% of its strength in the first 7 days. Also, all concrete contains more water than is required for hydration, which improves workability and makes placing easier.

The strength, wear resistance and low absorption of the concrete rely on the completeness of this hydration. If the water used in the mix evaporates too fast, there won't be enough moisture for complete hydration, and water-filled voids at the surface of the concrete will dry out instead of being replaced by hydrated cement, leaving the surface of the concrete porous and weak. This means that:

- the design strength of the concrete may not be met
- additional shrinkage and cracking can occur
- moisture may penetrate the completed works, increasing the risk of corrosion of the reinforcing
- surface dusting or efflorescence can occur.

It's important to begin curing as soon as possible after the concrete has been placed. >

INDUSTRY NEWS

2010 Apprentice of the Year

Who will be the 2010 Apprentice of the Year? There are 10 regional competitions for carpentry apprentices, with the national final in Wellington in October.

Entries are open until 30 June 2010 – find out more at www.masterbuilder.org.nz, www.bcito.org.nz or check out the RMB Carters Apprentice of the Year Facebook page.

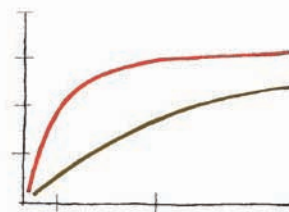


Figure 1. Graph showing the relationship between compressive strength and curing.

HAMMER 'N' NAILS



Win! A Hitachi G23SR 230 mm Grinder

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Inside:

Curing methods

Three ways you can use water to control the rate of moisture release:

- Ponding (placing earth or sand around the perimeter of a flat surface to retain a pond of water on the concrete) – this helps maintain a uniform temperature in the concrete but may cause surface staining.
- Sprinkling (applying a fine spray of water) – this should be continuous, so take care the concrete doesn't dry out if this is carried out at intervals, and make sure the whole area is wetted in windy conditions.
- Using wet coverings (placing hessian or wet sand over the entire area as soon as the concrete is hard enough to prevent surface damage) – make sure the coverings are continuously moist.

Three ways you can control the rate of moisture loss without having to keep the surface wet:

- Covering the concrete with waterproof sheeting material such as polythene – this method is more suitable for complex shapes (like beam/column joints) but the polythene needs to be taped. If used for a slab, the polythene needs to be weighted in place to keep it from blowing away and it limits work that can be done. (Slabs are usually safe to walk over after 24 hours and having the polythene in place will limit this access.)

- Using a liquid membrane curing compound – this is applied (usually by spraying) to the fresh concrete immediately after the surface has been finished, but make sure you read and follow the manufacturer's instructions.
- Leaving formwork in place – you may need to keep it moist by sprinkling, especially during hot dry weather.

How long should curing take?

- For domestic construction (concrete floor slabs, driveways and footpaths that don't require specific design) – at least 3 days.
- For other types of construction – at least 7 days when the mean temperature exceeds 10°C (possibly longer when it's colder).

Always check the project specification in case the designer has specified a longer curing period. The designer may also require a specific method of curing to be used since some liquid-applied systems can contaminate the surface and have a detrimental effect on the adhesion of floor coverings.

Hydration is much slower in colder temperatures. If temperatures are near freezing, protect concrete after placing for at least 2 days using an insulating cover such as polystyrene sheets, sacking or dry sand covered with polythene sheet.

See Bulletin 382 *Curing concrete* for more information.

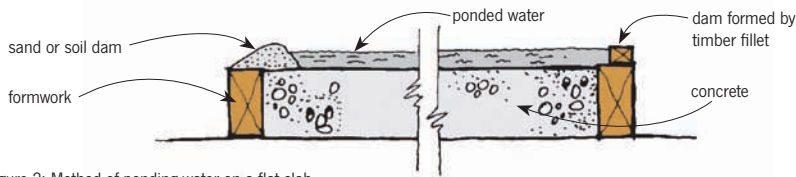


Figure 2: Method of ponding water on a flat slab.

Dribblings from the Old Geezer



Recently, I looked at a 100-year-old cottage on the West Coast with a mate, and it got me thinking. As it sat, the place was uninhabitable and forlorn looking, but looked at from a distance through squinted eyes and fogged up, rose-tinted glasses, there was a cute charm. Yes, the floors sagged away from the chimney and the lean-to at the back needed to go, but the flaking paint and rusting roof still said much about the builders who constructed it. In 1910, the building regulations were less onerous than they are today, yet 100 years later, the wall cladding was still sound, the subfloor framing all looked good and generally the bones of the dwelling were all still OK – a little creaky maybe, but still able to be rejuvenated.

Will our current houses be still standing and desirable in 2110? The Building Code requires structural elements and others that are not easily replaceable (or their condition not able to be monitored) to have an effective life of at least 50 years. Fine, but our claddings are usually able to be readily replaced, so they only need to have a service life of at least 15 years. The worry is, if we are designing and constructing to 'Code minimum', how do we get from the 15 year requirement to the ideal 100 years plus?

I hope that our industry's pride will do it, just as it did when we didn't have rules. Prove me right... please.

Des Molloy

build



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SAVING A BUCK ... AND PAYING THE CONSEQUENCES

Another enlightening story from Graeme Hughes, ex-builder and current *Build* magazine advertising salesperson.

It's been 40 years since I qualified as a top carpentry apprentice and have designed and built a number of homes during this time, so when the need arose for a simple boat port alongside the house, I grabbed the opportunity for some constructive male bonding and suggested to son Richard that we build it together – at the right price, of course. I drew up a plan, got a consent and we started our project.

I worked out the beam sizes – two 300 x 100 mm @ 7 metres – using the BRANZ Lintels and Beams Calculator and did a ring around the timber merchants for prices. The cheapest by far was a timber mill out in the wop-wops, so I ordered them on the spot.

“How would you like to pay for this, sir?” “Just send me the bill,” I said. “Sorry, we require payment in advance.”

Well, to cut a long story (slightly) shorter, they were a lot cheaper, and by this time, my vision of perfect timber beams at a bargain price was firmly set in my mind.

I arranged for delivery on Friday so Richard and I could get on with the job that weekend. We'd had the foundation inspection the previous week and had set the four posts in concrete ready for the beautiful new beams.

Friday afternoon and the truck driver rang when he was almost at my place. I rushed home to assist him getting them off the truck. I got there just as he was reversing into my driveway and congratulated myself on my perfect timing. We had the normal chippie/truckdriver banter for a few moments – then, I inspected my beams.



The 35 mm sag in the beam, the fascia and, of course, the roof. Note the camouflage attempt of trellis for a future climbing rose.

One beam looked great, but the other had a 60 mm crook in it! The other major was that the beams were wet right through – the birds were almost still in them – so they weighed a tonne. (I forgot to ask if they were dry when I ordered them!) In lieu of expletives, this was not good.

I like quality construction – always have, always will – so now what? I'd paid in advance, they had come from a great distance and I had to make it work, so we lifted the beams off the truck onto the lawn ready for the build tomorrow. I figured I could disguise the crook with a packer before I fixed the fascia board – not a thing I would normally want to do.

Two hernia-inducing lifts later – was the camber up or down? – the rest of the weekend was spent putting the connector plates on and getting the

rafters into position. (Every rafter needed to be cut separately because of that damn crook in the beam.) We put on some great looking stainless joist hangers and then the fascia boards, after scribing a packer for the bent beam. A beer finished off the day as we admired our workmanship with pride.

A few weeks later, I was looking at this perfect structure thinking what a great job we had made of it – but then I saw the 35 mm sag in the beam. Only then did I remember what I'd been told 40 years ago. If you use a wet beam, it needs to be propped for a month.

In hindsight, I'd quite happily have paid a little extra from a reputable builder's merchant to guarantee a dry straight beam.

COMPETITION Win!



Here's a close up of part of a tool.
What is it?



A Hitachi G23SR 230 mm Grinder Worth \$329!

This grunty grinder has an alloy gearbox, spindle lock, 3-position side handle and a diamond blade for cutting concrete, stone, plaster and tiles.

All you need to do to win is tell us the name of the mystery tool (above right).

Send us your answer plus your name, address, telephone number and email address on the back of an envelope. Post it (you don't need a stamp) to: Builder's Mate 42, Mystery Tool Competition, FREEPOST BRANZ, Private Bag 50 908, Porirua City 5240. One entry per entrant please.

Don't forget to tell us where you picked up your copy of *Builder's Mate*! The winner will be the first correct entry drawn at 9 am on Friday 2 July 2010. Details will be posted on the BRANZ Ltd website (www.branz.co.nz) and in the next edition of *Builder's Mate* due out on 2 August 2010.

Terms and conditions:

Entry is open to all New Zealand residents except employees and immediate families of BRANZ and The Tool Shed shops. The competition will close on Friday 2 July 2010. The prize is not transferable for cash. The judge's decision is final. No correspondence will be entered into.



BUILDER'S MATE WINNER

The winner of the BM 41 competition was Garth Gallagher from Ashburton. The mystery tool was a sabre saw, and the prize was an Arges rotary hammer/breaker/drill.

Photo: BM 40 competition winner Tim McMullen receives his prize at The Tool Shed Dunedin.



Are we there yet?

The current building control system has been in place since 1992, with a major shake-up in 2004, particularly for weathertightness.

The next BRANZ seminar series, *Are we there yet?* will discuss how far we have come and look at where improvements could still be made.

Join BRANZ at one of 23 venues around New Zealand from 19 July – 27 August 2010.

This seminar is of interest to a wide cross-section of industry, especially builders, designers and building officials.

For more information on the seminar and to register go to:
www.branz.co.nz

www.branz.co.nz
04 237 1170

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Tel: 04 498 5991 or www.standards.co.nz.

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