

# BUILDER'S MATE

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## SHRINKAGE CONTROL JOINTS IN CONCRETE FLOOR SLABS

**Concrete shrinks as it dries. About 50% of the shrinkage happens within the first 4 months after placing, but concrete will continue to shrink for at least 12 months, depending on drying conditions.**

A floor slab is restrained by the ground on which it is built, by friction and by the keying effect of various foundations. When the shrinkage is restrained, the slab goes into tension, and cracking can occur at a weak point, such as an internal corner. The bigger the slab, the more shrinkage and the more restraint – and a bigger problem! Reinforcement helps, but only so far.

As this shrinkage occurs, damage to floor slabs can be prevented by observing maximum slab and bay sizes using concrete slab shrinkage control joints and (where required under NZS 3604 *Timber framed buildings* clause 7.5.1) concrete slab free

joints to minimise the potential for cracking. For slabs near the maximum size, it's also important to use correct mixing ratios and to control mix properties (particularly slump) so that shrinkage is kept to a minimum.

NZS 3604 clause 7.5.1 states that the maximum dimension of a slab-on-ground floor is 24 m either way between free joints, or between free joints and the slab edge. This allows a slab to be a maximum of 24 x 24 m. (Note that the 24 m is a slab edge dimension, not a diagonal dimension.)



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Inside:

## INDUSTRY NEWS

### LBP licensing

From 1 March 2012, building practitioners must be licensed in order to carry out or supervise work on homes and small to medium-sized apartment buildings that is critical to the integrity of the building.

Licensing classes are Design 1, 2 and 3, Site 1, 2 and 3, Carpentry, External Plastering, Roofing, and Bricklaying and Blocklaying. A licence for Foundations is expected to be open in 2010.

A streamlined application process for qualified people under the Licensed Building Practitioner (LBP) scheme started on 15 February 2010. Other streamlining measures start in April, including a single Site and a single Design licence. See [www.dbh.govt.nz/lbp](http://www.dbh.govt.nz/lbp) for more information.

## HAMMER 'N' NAILS

THE CONCRETE MUST HAVE BEEN TOO WET. MY FLOAT SANK!



Continued from previous page

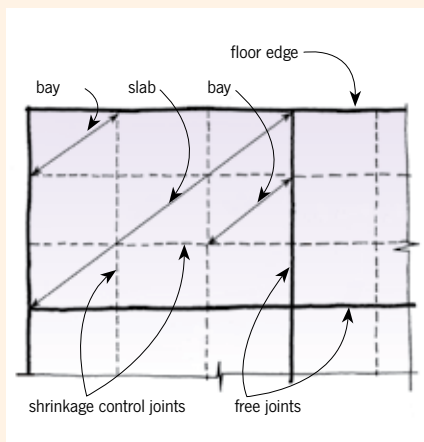
Section 7.5 of NZS 3604 sets out the maximum spacing for shrinkage control joints in slabs for different types of reinforcing. It also sets out limits for the length-to-width ratio of the bays between control or free joints and the edge of the floor.

### Some definitions

Because the terms used in NZS 3604 can be confusing, the terms used in this article are defined as follows:

- Slab: an area of concrete floor bordered by the floor edge and/or free joints.
- Bay: an area of concrete floor bordered by shrinkage control joints, the slab edge and/or a free joint.
- Free joint (concrete slab free joint from NZS 3604): a construction joint where no reinforcement passes through the joint linking both sides of the concrete slab and the vertical faces of the joint are not in bonded contact with each other.
- Concrete slab shrinkage control joint (from NZS 3604): A line along which the horizontal strength of a slab is deliberately reduced so that any

shrinkage in the slab will result in a crack forming along that line. Under NZS 3604, shrinkage control joints (if formed by saw cutting) must be done no later than 24 hours after pouring for ambient temperatures above 20°C and no later than 48 hours for average ambient temperatures below 20°C.



Terms related to concrete floors.

### Maximum slab and bay sizes for different types of reinforcing.

Reinforcing type	Maximum slab size	Maximum shrinkage control joint spacing	Maximum length-to-width ratio of bay	Maximum length x minimum width of bay
665 mesh	24 x 24 m	6 m	2:1	6 x 3 m
668 mesh	12 x 12 m	5 m <sup>(1)</sup>	1.75:1 <sup>(1)</sup>	5 x 2.85 m
Fibre	24 x 24 m	4 m	1.5:1	4 x 2.7 m
Nil	24 x 24 m	3 m <sup>(2)</sup>	1.3:1	3 x 2.3 m

1. BRANZ recommendation because NZS 3604 does not specify a maximum control joint spacing for fibre-reinforced slabs.

2. In an unreinforced slab, a shrinkage control joint will act as a free joint after cracking has occurred, so for practical purposes, free joints may occur at 3 m spacings.

## Dribblings from the Old Geezer



As an industry, I reckon we are one of the worst when it comes to eating healthily. So many of our workers are big, powerful men doing manual work and, as such, need a lot of fuelling, but often we don't do it responsibly. Years ago, I had a foreman who was sent off each day with a large lunchbox, filled by his loving wife, but every morning smoko he additionally bought two meat pies. This was hundreds of pies per year. As a short-term fix, it worked well, but long term? I'm not so sure.

I have a daughter doing nursing studies, and after doing a cardiac risk assessment, she scored me 4 out of 5 on the bad side of the ledger. I was able to truthfully tell her that I was the healthiest person she knew, having at times gone for decades without having a day off work. Sadly, New Year's morning was to prove her right, me wrong. I'm cheerfully still here to write this but my life and diet has been changed forever. I've had the free helicopter ride, I've given the family a fright.

There is a risk that I will become a campaigning zealot for healthy food, reinforced by going to a pre-season Super 14 rugby game and finding that the only foods sold were punnets of greasy chips and luridly coloured hot dogs. I could almost feel the arteries clogging. I felt like shouting, "Don't do it!" Now, I just have to work out how to have a long life and a good life. Guess what? Pies, chips and burgers aren't in the plan. Come along, too!

Des Molloy

# build



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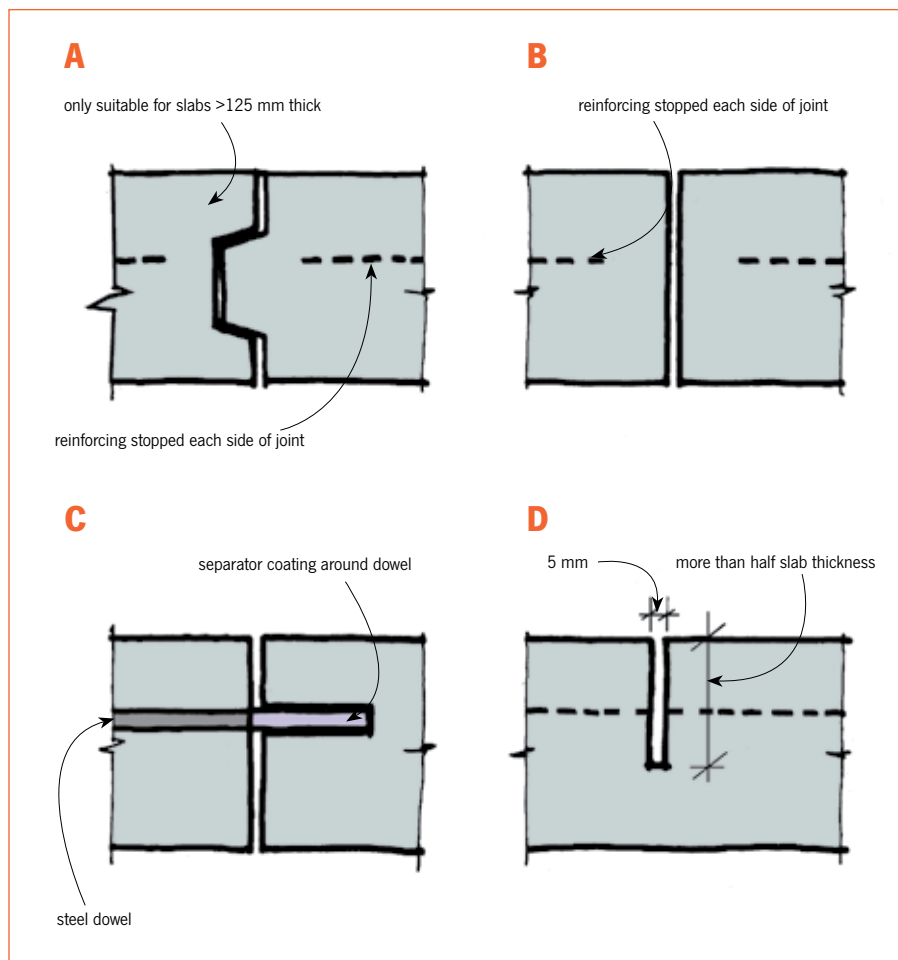
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# Forming free joints in concrete slabs

If a free joint is formed by separate pours, NZS 3604 requires that the concrete on one side of the free joint is allowed to harden for 16 hours before new concrete can be placed on the other side of the joint. (See the definitions of these terms on the opposite page.)



## Methods of forming free joints

Examples A, B and C above show free joint options that require separate concrete pours. Example D is an alternative method of creating a free joint where the concrete floor is laid in one pour, then the concrete is saw cut to at least one half of the thickness of the floor (making sure the saw cut is deep enough so that any reinforcing passing through the joint is cut through). This method allows the placing of concrete for a complete floor area in one operation. Cutting the concrete must be done no later than 24 hours after pouring for ambient temperatures above 20°C and no later than 48 hours for average ambient temperatures below 20°C.

# TIMBER WALL AND FLOOR FRAMING IN WET AREAS

NZS 3602:2003 *Timber and wood-based products for use in building* is the key reference document for using timber and wood-based products in buildings. It sets out, by building component, the species, grade, moisture range percentage (in service and at installation) and level of preservative treatment required for each application. The standard has no specific treatment requirements for wall and floor framing in wet areas, i.e. the preservative treatment level for wall and floor framing in the tables applies to all wall and floor framing including wet area framing. There is an exception to this in the case of flooring in wet areas (such as laundries, bathrooms, kitchens and toilets) where note 7 to Table 1 requires that plywood or timber flooring be treated to a minimum of H3 where the maintenance of an impervious coating cannot be assured – see E3/AS1.

BRANZ recommended good practice is to use H1.2 boric treated timber for wet area floor joists and wall framing around showers, to provide an additional level of safety if the waterproofing becomes compromised. (Best practice is to use H1.2 boric treated timber for all wet area wall framing.)

## What about flooring materials?

Timber, wood-based and fibre-cement flooring materials are susceptible to moisture absorption, so BRANZ also recommends the following:

- In splash zones – these materials must be sealed or protected with an impervious finish (as defined by E3/AS1) to prevent them absorbing moisture, e.g. integrally waterproof sheet material (PVC), cork tile or sheet sealed with waterproof applied coatings and with sealed joints, or other waterproof applied coatings.
- In showers – these materials must be protected with an impervious finish as defined by E3/AS1. For tiled finishes, this means installation over a waterproofing membrane, the tiles (ceramic or stone) having 6% maximum water absorption, and bedded with an adhesive specified by the tile manufacturer as being suitable for the tiles, substrate material and the environment of use.



# COMPETITION Win!



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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 41, 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 30 April 2010. Details will be posted on the BRANZ Ltd website ([www.branz.co.nz](http://www.branz.co.nz)) and in the next edition of *Builder's Mate* due out on 4 June 2010.



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



### 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 30 April 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 40 competition was Tim McMullen from Dunedin. The mystery picture was a circular saw blade, and the prize was a Bailey's BXS13 Extendable Step Ladder.

# BLOKES on the job

## JOE MCCONELL

Working on a large renovation in Ngaio



### Favourite tool

Impact driver.

### Favourite tip

Check weatherboard set-out (twice).

## GRANT GORDON

Building in Tauranga



### Favourite tool

Nail gun.

### Favourite tip

Don't employ boys.

## DAVID FISHER

Building in Tauranga



### Favourite tool

Nice long level.

### Favourite tip

Use a nice long level.

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