Building Services

Framework

February 2011

PALMERSTON NORTH CITY COUNCIL

Manawatu District Council

Welcome to 2011, I hope you all enjoyed a well earned break with family over the Christmas period.

It was with great sadness that one of our team, Warren Cummerfield passed away in early January. Warren was well respected within the building industry, our thoughts go out to his family.

It is with regret that Geoff Cockery has left Palmerston North City Council to take up a role with the Christchurch City Council to lead their inspection team. Our loss is Christchurch's gain. I will be the Acting Head of Building Services until this position is filled. This position has been advertised on the internet. Bryan Clark is now the Team Leader for the building team based at Manawatu District Council.

Media reports are indicating a down turn in the building activity, and from all accounts it is not likely to recover for quite sometime. The down turn could have an effect on the way we deliver our service. If we thought 2010 was tough, I believe 2011 is going to be even tougher.

There is a lot of information flowing out of the Department of Building and Housing, information from the Building Act review, licensing regime, determinations, multiproof consenting, simple housing design just to name a few. It is a must view site at **www.dbh.govt.nz**

We will be having our third BCA accreditation review carried out in April by IANZ. This review is a health check on all our processes and procedures and to ensure we are resourced right.

In ending if there is any issues that we can be of help please feel free to touch base with me.

Chris Henry

HEAD OF BUILDING SERVICES

Contents

Construction moisture in concrete subfloors

It is common practice in new buildings to install floor coverings over concrete floors. Flooring failures attributed to excess moisture in concrete are a common occurrence and, because of the fast-track nature of a lot of today's construction projects, the installation may be rushed and failure can occur. It's important to know what to ask for and how to test whether the concrete is dry before flooring is installed.

Excess moisture in the concrete beneath floor coverings can create mould colonies that can affect people's health long before the mould can be seen or smelt. Reactions can range from headaches and asthma attacks to more subtle effects including concentration difficulties and chronic fatigue syndrome.

Introduction to concrete subfloors

Concrete is an ancient material that can last for thousands of years and floor coverings installed correctly on concrete floors can yield a lasting and durable wearing surface.

Firstly, using the right terminology is helpful because words like "drying" and "curing" are often misused.

The "28 day cure" is the approximate time a 100 mm slab takes to cure, and is often mistakenly used as a guideline to install floor coverings. After 28 days, the concrete is not dry because "curing" and "drying" are not the same.

"Curing" is the chemical reaction that bonds the ingredients (cement powder, sand, aggregate and water) together to make concrete. "Drying" refers to the evaporation of the excess water from the concrete after the curing period.

How long to dry?

The drying time before slabs are ready to receive floor coverings depends on atmospheric conditions and mix design. A 100 mm thick slab allowed to dry from only one side typically requires four months to achieve a relative humidity of 75 percent, although in New Zealand it can take even longer. The drying process only begins once the building is weathertight and the slab needs to evaporate about two thirds of the water in the mix before floor coverings can be safely installed.

A concrete floor slab on or below grade intended to receive floor coverings requires a damp- proof membrane (DPM) to be installed below the slab.

Why does moisture cause floors to fail?

Often in new buildings the flooring is installed before the concrete has completely dried. Then, when the building is occupied and the interior conditioned air is dry, the floor covering blocks the movement of excess moisture that migrates upward through the slab. In older buildings, a missing DPM or external sources such as leaks, exterior ground levels, or unusual amounts of ground water, can cause moisture to pass through a slab.

When to test and why?

The short answer is, it is prudent to test for moisture levels in concrete slabs when installing floor coverings especially in new buildings. Standards AS/NZS 2455 and AS/NZS 1884, floor covering manufacturers and adhesive producers recommend testing concrete slabs for moisture, regardless of age or elevation.

To say "it looks dry", "it feels dry" or "it smells dry" isn't enough. Taping a plastic mat to the floor is also an inaccurate indicator. The electronic meters that test for moisture in concrete yield only a spot test, which isn't a sound basis for a decision to install flooring.

New Zealand and Australian Flooring Standards require concrete floors to have a relative humidity level of no more than 75 percent before floor coverings can be installed. Anything over this can compromise the product or installation, not to mention void all warrantees.

For more information refer to NZ Flooring Industry Standards AS/NZS 2455 and AS/NZS 1884, New Zealand Building Code Clause E2 External Moisture, E2 AS1 and BRANZ Bulletins 330 and 515.

Solutions

The good news is that there are reliable testing methods available to help you determine when the concrete is sufficiently dry for the installation of floor coverings.

The floor covering industry of New Zealand's standards recognise the Hair Hygrometer for testing moisture in concrete. This method captures the vapour emissions from the top of the concrete as the concrete is drying out.

In-situ probes are the latest technology, effectively measuring moisture inside the concrete slab, and are quickly being recognised by flooring manufacturers throughout the world as useful measuring tools in addition to Hygrometers.

Barriers and handrails

Measuring the height of fall from a deck

Building Code Clause F4 (Safety from Falling), in F4.3.1, states:

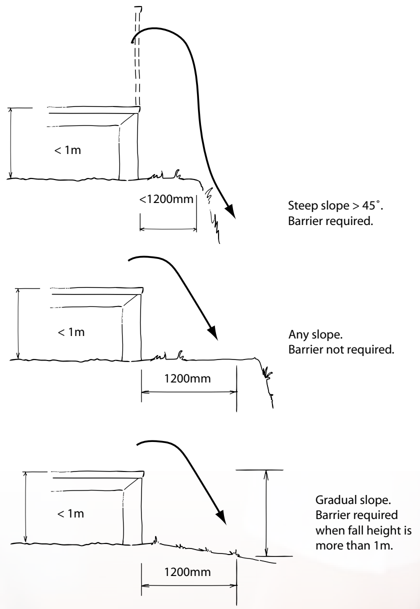
The need for a barrier when someone could fall vertically 1 metre or more is quite clear in Clause F4. If a deck or patio is 1.5 metres above a flat lawn, then the height someone could fall is obviously 1.5 metres. A 'fall' need not be vertical, though. One dictionary definition of 'to fall' is 'to descend rapidly from a higher to a lower level'. Fatal mountain climbing falls unfortunately occur from time to time, but many of them are not vertical falls. A slope of 45° is steep enough for someone to tumble down and injure them-selves (stairs in a house typically have a slope of about 40°).

A court decision some time ago (Judge MA Frater, DC Gisborne, 29 May 1998) dealt with a situation where there was a cliff with a platform at the top, 800 mm above a small retaining wall and set back about 1 metre from it.

The recent determination decision on 'safety from falling'

Determination No. 2008/81 considered the situation where a proposed low deck, 500 mm high, would be close to a steep rock retaining wall. If there was no barrier on the deck, the determination concluded the deck needed to be 1200 mm from the face of the wall to protect people from falling off the deck and tumbling down the wall.

SAFETY FROM FALLING



The need for a barrier on a low deck

Determination No. 2008/81 has made clear that the horizontal distance to a steep slope must be considered when deciding the need for a barrier on a deck. In light of this determination, where the ground slopes gradually away from a deck a reasonable approach is to measure the height of fall at a distance of 1200 mm out from the deck.

Building consents for low decks

A low deck may not need a building consent. Schedule 1 of the Building Act lists the building work not needing a consent. Included is 'the construction or alteration of any platform, bridge, or the like from which it is not possible for a person to fall more than 1 m even if it collapses'. In most cases, therefore, if a deck does not need a barrier, it will not need a consent. Of course, a low deck is still a 'building' and its construction must comply with the Building Code.

Handrail heights on stairs and landings

The Acceptable Solution D1/AS1 says that Clause D1 requires handrails on all stairs. Handrails must be 'positioned between 900 and 1000 mm above the pitchline'. The pitchline is defined as 'the line joining the leading edge or nosings of successive stair treads'. The Acceptable Solution F4/AS1 (Table 1) requires barrier heights in buildings other than housing to be 900 mm on stairs and ramps, and 1100 mm elsewhere. Thus the barrier height on a landing, other than in housing, must be 1100 mm.

HANDRAILS MOUNTED ON THE TOP OF STAIR BARRIER.

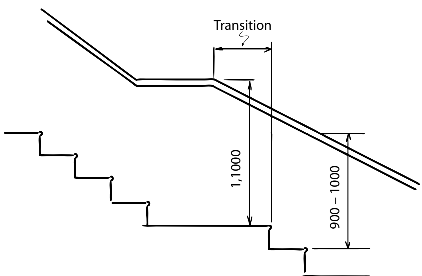
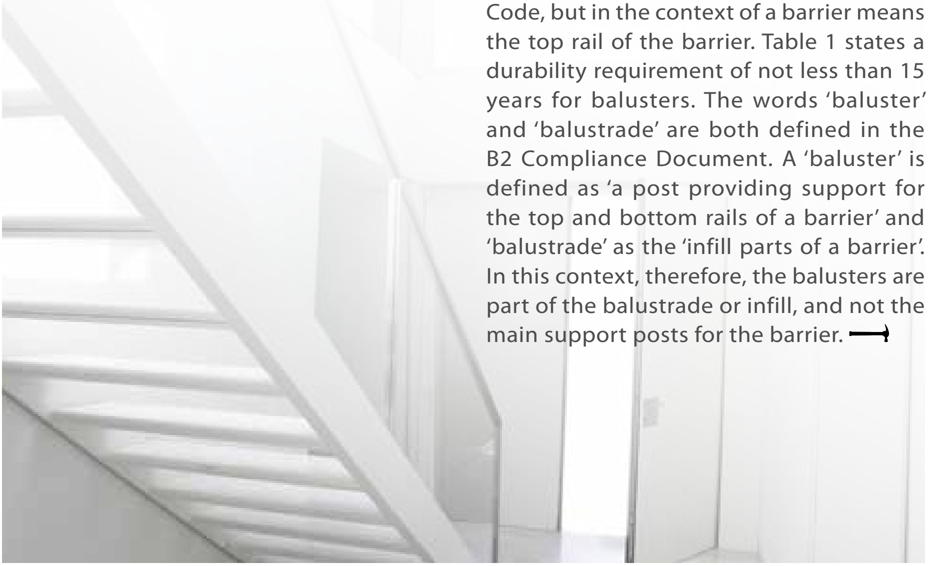


Image courtesy of Department of Building and Housing.

If the stair handrail is fixed on the top of the stair barrier and carried onto the landing barrier, it will be 1100 mm high on the landing. This height is acceptable because the function of a handrail is to provide safety on a stair flight and its height on a landing is not critical. The handrail (and barrier) can rise to the 1100 mm height over a transition zone about 300 mm long, depending on the stair slope.

Barriers and Clause B2 'Durability'

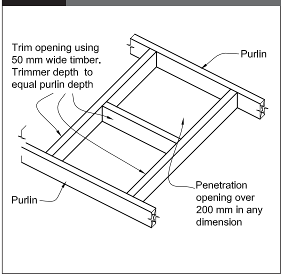
Table 1 of Acceptable Solution B2/AS1 specifies the durability requirements of nominated building elements. Table 1 states that safety barrier support posts and handrails must have a durability requirement of not less than 50 years. A 'handrail' is a defined word in the Building Code, but in the context of a barrier means the top rail of the barrier. Table 1 states a durability requirement of not less than 15 years for balusters. The words 'baluster' and 'balustrade' are both defined in the B2 Compliance Document. A 'baluster' is defined as 'a post providing support for the top and bottom rails of a barrier' and 'balustrade' as the 'infill parts of a barrier'. In this context, therefore, the balusters are part of the balustrade or infill, and not the main support posts for the barrier.



Installing a Fire?

Support for the roof flashing between the flu and the roofing material (where the flu goes through the roof) is important. We have noted that this is not being done well and would like to take the opportunity to remind everyone what we are trying to achieve. The idea is to support the roofing material around the flu (all 4 sides) underneath the area where the flashing is fixed to the roof. This is done so that when people are on the roof to do maintenance, painting or whatever, the roofing won't move and separate from the flashing and cause leaks between the flashing and roof.

Figure 21: **Penetration support**
Paragraphs 8.1.7 a) and 8.4.17

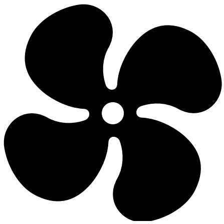


The detail above has been taken from the Building Code Compliance Documents, E2 / AS1 and it shows what is required.

Image courtesy of Department of Building and Housing.

Domestic ventilation systems

Do the many domestic ventilation systems regularly advertised on television meet the Building Code?



Domestic ventilation systems are mechanical ventilation systems with a fan that moves air around a house, flat or apartment. Typically, they draw air from the warmer roof space and force it into the living space below. Delivery of air into the living space creates a slight positive pressure and the air escapes from the building through the openings in or around windows and floors.

Claimed effects of these systems include healthier homes because of reduced internal moisture and less mould, fungi and dust mites.

Building Code Compliance

The Building Code (Clause G4) requires ventilation with outdoor air to maintain air purity. Compliance Documents contain several solutions for achieving this. The main solutions are natural ventilation comprising 5 percent of the floor area in opening devices or mechanical ventilation to achieve an air change in the occupied spaces (such as living areas) every three hours.

Because domestic ventilation systems draw air from the roof space, they are not directly drawing air from outside. Hence, they cannot be used to comply with the Building Code ventilation provisions. However, Building Code compliance is not generally an issue because domestic ventilation systems are installed in addition to opening windows.

Considerations

Installing domestic ventilation systems needs special care. The roof space must be clean and dry, as any animal waste, pathogens, allergens, mould and fungi in the roof space may be ventilated into the living space of the house. It is important to check for leaks in the roof space, as these may contribute to fungal and bacterial growth.

Well-sealed shower penetrations prevent water damage

Repairs to walls and floors as a result of water damage from showers cost building owners and the insurance industry millions of dollars each year.

Building Code Clause E3 Internal Moisture requires that water splash is prevented from getting behind linings and into concealed spaces.

The solution in the associated Compliance Document E3/AS1 is to seal the joints around baths, basins, tubs and sinks so that water does not get into hidden building elements and damage them. One area requiring particular attention by designers and builders is where penetrations are made through the waterproof lining of showers.

Because showers are subject to very significant water splash, penetrations in shower linings require particularly effective waterproofing. Showers range from proprietary single piece acrylic units to on-site constructed tiled-lined showers.

The penetrations for shower taps or mixing valves, roses or flexible hoses should be waterproofed with a proprietary system, or sealant compatible with all adjacent building elements. The diagram opposite shows how this could be done using sealant or a proprietary flange system around the penetration. No matter what system is used, the waterproofing must allow for easy access when replacing tap washers, ceramic disks and o-rings.

Examples for waterproofing through shower walls

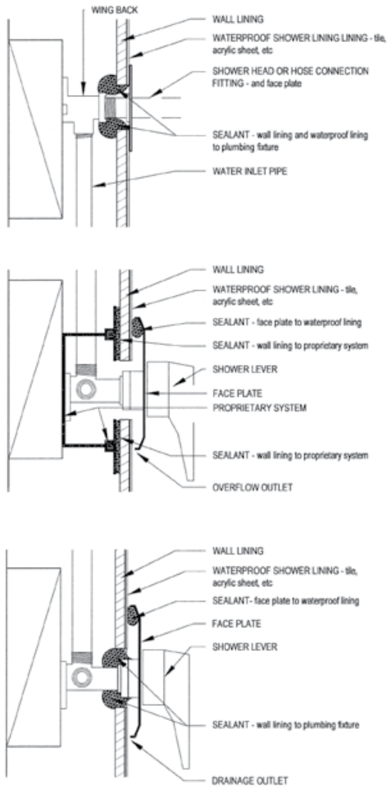


Image courtesy of Department of Building and Housing.

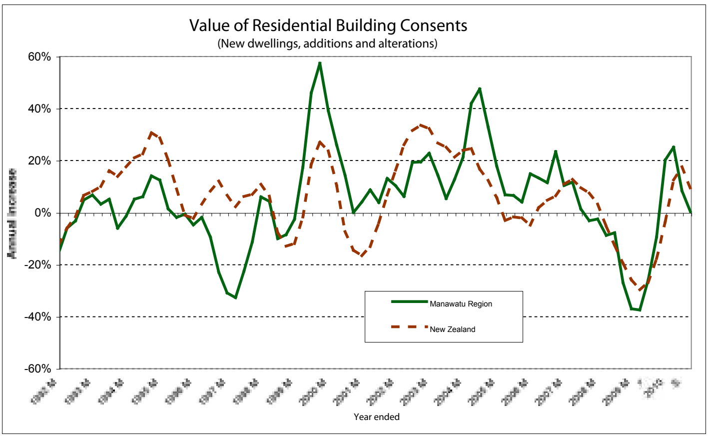
Building Consents

The value of consents approved for new building work in the Manawatu region in the December quarter was $32.3 million, a 25% decline from the December 2009 quarter (national consent values declined by 10% over the same period). The total consent values approved for the year to December 2010 were $189 million, only slightly above the low of $184 million in the year to December 2008. The Manawatu region was quick to recover from the 2008 recession but experienced an earlier decline in growth compared with national trends. Consents for residential building in the Manawatu region were down by 28% in the December quarter while consents for non-residential building were down by 20% (national consent values declined by 14% and 4% respectively).

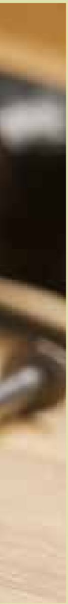
Forthcoming Statistics New Zealand Releases (December data)

Accommodation survey 10 February

Retail sales 14 February



(Source: Statistics New Zealand)

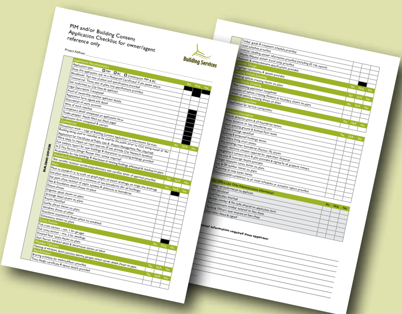


Building Consent Application Forms:

As part of providing correct information for building consent applications the application form is no exception.

Please ensure all relevant sections of the application form have been filled in correctly, in particular the sections on specified systems and the relevant clauses of the Building Code.

Applications may be sent back or turned away from the counter if these areas are not complete, as in many cases the designer or architect are the only one's that know what systems and clauses of the Building Code have been used to design the project.



Disconnecting wet-back water heaters

Explosions have occurred recently because wet-back water heaters were unintentionally reused after the wet-back had been disconnected.

The installation of a wet-back water heater requires a great deal of care and skill to ensure that the heated water can easily circulate, thus preventing a small volume of water from being heated, turning to steam, building up pressure, and exploding.

If a wet-back water heater is ever disconnected, it must never have the pipes to and from the wet-back sealed. Any water that is deliberately or accidentally left in the wet-back can cause an explosion if it is heated.

Ideally, all disconnected wet-back heaters should not have the pipe fitting installed in the pipe ends, sealing the wet-back.

If this is not practicable, a 6 mm hole must be drilled through each plug. This will help to ventilate and dry the inside of the wet-back and will prevent pressure build-up if the wet-back is accidentally heated.

The installation and disconnection of wet-backs should only be undertaken by a qualified and licensed plumber.

Managing Site Waste

The construction industry is beginning to be more environmentally aware in managing waste, so is your waste management plan up to scratch?

Most construction sites produce significant amounts of waste. If allowed to accumulate, this can complicate existing health, safety and environmental hazards or create new ones.

The good news is that the construction industry is becoming more environmentally aware and better at managing waste. Major companies are now commonly working with the New Zealand Green Building Council. Local councils also provide simple waste management plans on their websites. As a result, visible changes are occurring – particularly on commercial construction sites – and trickling down to the residential construction industry.

Workers need to perform tasks with adherence to dust and silt control and noise monitoring. To help, tools and plant are being upgraded to fit the environmental site requirements on noise, vibration, smoke discharge and dust management.

Spill kits prevent leaks and minimise damage to the surrounding environment if a spill of petrol, oil or paint occurs. Large sausage-like objects filled with sand and a kitty litter-like substance are thrown around the area to contain the spill so it can be mopped up.

Developing a waste management plan

A formal waste management system should be implemented on site, and there are lots of things to consider when developing a plan. Check your local council website for specific waste management bylaws.

All waste that leaves the site costs money, so make sure that you always inspect the waste and ask yourself if it can be reduced, reused or recycled.

Designated waste areas

There needs to be a designated area for storing waste. Waste locations must be suitable and established for all contractors to use. These should be segregated where applicable (for example, into controlled and special waste). Adequate waste bins or rubbish chutes need to be close to work areas.

Using skips

Think about how you are going to separate waste for recycling purposes, such as using separate skips for specific material.

If skips are to be placed on roads, permission is required from the local authority. Skips must be suitably cordoned off to protect the public and vehicles and not loaded higher than the sides.

Lowering waste from height

Considering how waste will be lowered to ground level from a height is very important. It should never be thrown down – it should be lowered via hoists or waste chutes.

If lightweight waste is produced, it may need to be bagged and tied to prevent the wind blowing it around the site.

Safety comes first

There are many other safety considerations for waste management. For example:

- Beware of accumulating flammable waste that could create a fire risk.
- Never burn or bury waste on site.
- Dispose of any foodstuffs carefully to avoid attracting vermin and the risk of disease.
- Be aware of waste removal vehicles entering and exiting site.
- Ensure waste compacting units are properly interlocked and guarded.

Cleaning as you go will make the system more effective, and spending 15 minutes at the end of each day can double as a last-minute tidy up while monitoring the waste management system.

In ending if you have a burning issue that you wish to put pen to paper, we would look at including it in one of our next issues.

Please contact either Palmerston North City Council Phone: 06 356 8199 or Manawatu District Council Phone 06 323 0000

Further Information

If you have any questions or require further information please contact

Palmerston North City Council
Phone: 06 356 8199, www.pncc.govt.nz

Manawatu District Council
Phone 06 323 0000, www.mdc.govt.nz