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Biocontaminant exposure when remediating leaky buildings

Recent BRANZ research has shown that, where leaky buildings are being remediated, workers are exposed to a cloud of complex, allergenic, carcinogenic and toxic biocontaminants as they strip the cladding and remove mould-contaminated materials. Especially concerning is the dangerously high concentrations of the very toxic mould *Stachybotrys* in the cloud generated during deconstruction or demolition. The particularly hazardous period is when removing mould-contaminated materials, but workers must be alert to the cleanliness of the site throughout the whole process.

To reduce exposure to these biocontaminants, contractors **must** be familiar and vigilant with health and safety procedures. After consultation with leaky building remediation specialists Prendos and Alexander and Co, BRANZ recommends the following procedures where mould contamination has been identified or is expected:

- Contamination, decontamination and safe zones should be established.
- Where possible, internal linings and external joinery should remain in place until mould decontamination is completed, by working from the outside, removing cladding and then contaminated material.
- If this is not possible, internal air barriers with depressurisation of internal contaminated zones is required to maintain other internal safe zones.
- Overalls, safety boots, gloves, helmets, eye protection and respirators (personal protective equipment or PPE) must be worn by all those in contaminated zones during cladding removal and mould removal work to reduce the level of exposure to potential harmful spores and dust. Mould should be removed before it is able to dry.
- Spores and mycotoxins are likely to stick to workers' hair and the unprotected areas of their faces. A clean decontamination area is required for removal of PPE and washing. On-site basins are a minimum requirement to provide for washing **before** leaving this zone and entering safe zones or leaving the site.
- On highly contaminated sites, specialist advice must be sought, and on-site showers may have to be provided.
- Good practices of overall removal, glove removal and hand washing must be in place during breaks and after work. Hands and faces must be washed before eating.
- Disposable overalls should be used and should be disposed of on site after use or at the end of each day. Disposable gloves are to be used and disposed of after each use. Safety boots are to remain on site at the end of the day to minimise spore and mycotoxin transfer to vehicles and homes. Alternatively, boots should be thoroughly cleaned before removing them from the site. Helmets, respirators and eye protection must be cleaned after each use with particular care to wipe the inside of respirators and eye protection with disposable wet wipes.

- Breaks, especially meal breaks, must be taken within safe zones and must not be taken within the building where cladding is being removed or adjacent to stored or transported contaminated materials (such as the skip).
- Clean site sheds or separate approved areas such as a garage must be provided.
- Material contaminated with mould must be bagged before being placed in skips. Do not break these bags or disturb contaminated waste by dumping heavy waste on top.
- Truck drivers and others tasked with removing skip bins full of contaminated materials should also wear protective clothing or respirators when loading and unloading.

Indoor concentrations of biocontaminants may remain high once the remediation is complete, so before handing the building back to its occupants, it should be thoroughly cleaned to eliminate dust and debris containing biocontaminants that remain within the building. It should then be tested for non-viable spore counts and be recleaned if necessary before reoccupation.

These recommendations reflect current industry best practice and may be modified once wider research and consultation has been carried out.

T & G flooring – cracking or wide open joints

Tongue and groove flooring boards that are finished with polyurethane or installed with the board joints glued together may exhibit severe cracking or widening of every third or fourth board joint when the boards shrink after installation or coating. The reason for this is the adhesive affect of the glue and the polyurethane that holds the boards together up to a point where the stress in the timber as it dries out is too great for the bond. The stress is released every third or fourth board or where there is a weakness in a board resulting in a wide crack or open joint. Where boards are not adhered together, the shrinkage that occurs is taken up by every joint, which moderates the effect.

Shrinkage of floor boards usually occurs as a result of:

- the boards not being dry enough for the space when installed
- exposure to sunlight from nearby windows
- an existing floors dries out after the installation of floor insulation or a damp-proof ground cover membrane or the space is heated better.

Brick veneer open perpends and rodents

A recent call to the BRANZ Helpline related to a mouse infestation within the wall framing where the pests had got in through the open perpends (to provide drainage and a ventilation opening) of the brick veneer cladding. NZS 4210:2001 *Masonry construction: Materials and workmanship* specifies a joint width of 10 mm plus or minus 3 mm for mortar joints in masonry, while E2/AS1 specifies a minimum open joint height of 75 mm and a ventilation requirement of 1000 mm^2 clear opening for every metre of wall length. As evidenced by the call to the Helpline, mice are able to enter an open perpend that is 10–13 mm wide (NZS 4210 requires vermin proofing where joints are wider than 13 mm).

Keeping the width of the vertical perpends to 7 mm should limit the potential for rodent entry. However, the minimum clear open ventilation area described above must still be achieved, which may mean open joints at closer than the current 800 mm centres. Installing a rigid underlay or proprietary rigid air barrier to the wall framing will prevent mice (if they get behind the veneer) from getting into the insulation and wall framing cavities.

Stone veneer cladding systems

It has come to BRANZ's attention that there are a number of companies offering cavity-based stone veneer wall cladding systems. These systems typically consist of pre-cut natural or cast stone, which is then applied with mortar or an adhesive over fibre-cement sheet to imitate solid stone veneer.

BRANZ has recently completed Appraisals of two cavity-based stone veneer wall cladding systems using evaluation criteria developed specifically for this type of system. There is no generic information in the NZBC compliance documents for cavity-based stone veneer wall cladding systems with respect to durability and structural performance requirements.

While the durability of the stone elements is relatively easy to address, of greater concern with stone systems that are mortared or glued to fibre-cement sheets is the degradation of the mortar/glue bond and the integrity of the fibre-cement backing over the serviceable life of the cladding system. Failure of either could potentially lead to stone detaching from the wall, causing injury and/or other damage. This could be made worse by mild seismic activity over time.

As a result of the above concerns, BRANZ Appraisal criteria determined that, in order to meet the performance requirements of both NZBC clause B2 *Durability* and clause B1 *Structure* and to minimise the risk of adhesion failure, a means of tying the stone veneer layer to the structural wall frame behind must be designed and evaluated. The BRANZ Appraised systems have stainless steel ties positioned in the mortar layer between the stone and fibre cement. The ties are fixed through the fibre cement and cavity battens to the wall frame behind. The systems were tested as part of the Appraisal process to verify that the integrity of the stone layer is able to be retained in the case of bond or substrate failure.

These systems should also be subjected to E2/VM1 weathertightness testing to verify their ability to meet the performance requirements of NZBC clause E2 *External moisture*.

Determining the extent of the wall component of thermal envelope for houses with attached garages

The January 2013 *Guideline* article on the insulation of a common wall between a garage and a habitable space where that wall forms part of the thermal envelope received a number of comments.

As with most aspects of building, there is usually more than one option to show Building Code clause H1 compliance, and it is our intention to cover these with respect to attached garages in future *Guideline* or *Build* articles.

BRANZ Weathertight Solutions

In Volumes 1, 2, 3 and 4 of the BRANZ Weathertight Solutions series, the flashing upstand/overlap dimensions need to be increased by 25 mm for buildings within the extra high wind zone given in NZS 3604:2011 *Timber-framed buildings*.

BRANZ Bulletin 557 *Timber-framed garages*

Clause 3.2.3 of this bulletin correctly specifies the requirement for slab reinforcing to be tied to foundation wall reinforcing with R10 stirrups at 600 mm centres to meet the requirements of NZS 3604:2011. Unfortunately, this was not reflected in Figure 1. The note at the bottom of the drawing should be amended to read R10 stirrups. See amended Figure 1.

PreFab NZ Conference

PrefabNZ is holding its inaugural conference in on 13–15 March 2013 in New Plymouth. Presenting will be five international speakers and local experts on the theme of collaboration in prefabrication. The conference coincides with the final weeks of the Kiwi Prefab: Cottage to Cutting Edge (www.kiwiprefab.co.nz) exhibition – a prefabricated design and building exhibition at Puke Ariki in New Plymouth.

New BRANZ publications

BRANZ *Building Basics: Building Controls* and Good Practice Guide *Long-run Metal roofing* (2nd edition) are both now available as print copies and epubs.

BRANZ 2013 Seminars: Beyond BRANZFIRE

This full-day workshop series is for fire engineers and building officials currently working in this area and is intended as an introduction to the use of B-RISK software. It is a prerequisite for the advanced user workshop series. For more details, click here.