

TECHNICAL BULLETIN – TB206

PREPARATION OF CONCRETE FLOORS DAMAGED BY SEISMIC ACTIVITY AND EARTH MOVEMENTS FOR INSTALLATION OF UNDERLAYMENTS AND FLOOR COVERINGS

Date, Monday, 26 November 2018

INTRODUCTION & SCOPE

This bulletin gives some general guidelines for NON-STRUCTURAL repairs to concrete floors which have cracks that result from ground movements.

QUALIFICATIONS

The recommendations in this bulletin are based the following requirements:

- 1) Repairs are recognised to be for cosmetic purposes only and not to reinstate any loss of strength or structural integrity.
- 2) Structural repairs require advice from suitably qualified engineers and also materials certified for this type of repair.
- 3) The cracks must be non-active. Ongoing movement of the crack is likely to result in further development of new cracks away from the repair or re-opening of the old one. Re-cracking as a result of subsequent direct seismic or post earthquake activity is not warranted.
- 4) These types of repairs are not recommended for floors to be used as wear or feature floors due to the potential for the crack(s) telegraphing through.

REPAIR METHODS

There are a number of approaches to cosmetic repairs for cracks in concrete slabs. For larger cracks, one approach is to use a cement based patch mortar, and the other is to use a 'filled' epoxy. For smaller hairline cracks, other 'cover over' methods can be used.

HAIRLINE CRACKS

- 1) On damp or dry floors, before smoothing cements and tile adhesives are installed, smaller hairline cracks can be treated by the application of ARDEX WPM300 Hydroepoxy.
 - a) The WPM300 is applied with a brush to a width of 100mm either side of the crack, and then whilst still liquid, ARDEX Deckweb tape is worked into the moisture barrier with a metal ribbed roller.
 - b) A second coat of the moisture barrier is then applied with a brush over the embedded tape, which is then either left to dry (for priming with ARDEX P82 or ARDEX P9), or sand seeded to create a rough surface for subsequent bonding.
- 2) For tile adhesives and membranes on dry floors, a similar process is done except the Class III flexible membranes are used.
 - a) The first step involves applying a 12mm wide, thin film smear of neutral cure silicone.
 - b) A coat of ARDEX WPM001, WPM002 or WPM155R is applied and the Deckweb matting rolled in.
 - c) A second coat of the membrane is then applied. Once dried the patch can be tiled over or further coatings of membrane applied.

Note: Mainstream smoothing cements are not applied over flexible membranes, the only exception is ARDEX Arditex NA.

LARGER CRACKS

Patch mortars

In this case the cracks are V-notched out to provide some room for the mortar mix in bulk. Typically cracks are V-ed out to around 20mm wide and deep using a bolster and chisel, or a small impact hammer. The crack is then vacuumed to remove debris.



Where the slab is considered dry:

- 1) The crack can be filled with a patch mortar worked into the V-ed out gap. Choices for this mortar include ARDEX A45, ARDEX A46, ARDEX A30 or ARDEX BR340 / BR345.

Where the slab is considered damp:

- 2) Moisture barrier and mortar
 - a) The crack should be coated with two coats of WPM300 at 3m²/litre wet coverage.
 - b) The first coat is allowed to dry for at least 2 hours and the second coat applied. Whilst the second coat is wet, the epoxy has 0.3-0.5mm clean dry sand broadcast over the surface.
 - c) A patch mortar applied to the sanded epoxy. Choices for this mortar include ARDEX A45, ARDEX A46, ARDEX A30 or ARDEX BR340 / BR345.
 - d) The remainder of the subfloor is treated with the moisture barrier system as per Ardex Technical Bulletins TB178 or TB192.
- 3) Moisture resistant mortar can be made using the following formula
 - a) 1 Part mixed ARDEX WPM300 epoxy
1 Part Portland cement
1-1.5 Parts washed dry sand ~0.3mm
1 Part washed dry aggregate 3-8mm or 2-5mm
 - b) The mixed mortar is trowelled into the crack and allowed to dry. Further protection can be obtained by coating the mortar with WPM300 prior to the main application of the moisture barrier as TB178 or 192.

Epoxy stitching I

- 1) This process is intended to hold the sides of the crack in position. It requires a recommendation from a consulting engineer as to the preferred size and spacing of the pins, and the maximum crack width allowed to be stitched.

It should be noted that stitched floors may develop cracks removed by several tens of centimetres from the original crack, if the concrete subsequently moves or it is put under strain.

 - a) A number of cuts are placed across the crack at spacings defined by the engineer, large enough and deep enough to take the stitching pins.
 - b) The pins used are typically made from threaded rod at least 6mm in diameter and 50-75mm long.
 - c) Injection of the crack with an epoxy resin; ARDEX RA88, ARDEX RA142, RA144 or RA146 - this process is suitable for flooring applications with smoothing cements.

Injection of the crack with the polyurea-polyurethanes; ARDEX RA54 or ARDEX RA56 - which can be used for applications not involving smoothing cements.

The injection resins are squeezed into the crack and over the pins directly from the gun or using the specialised injection ports.

Alternatively mixed ARDEX EG800F or EG15 epoxy resin is then poured into the slots covering the pins, and can be poured into cracks, though is messy.
 - d) Whilst the resin is still wet, clean dry 0.3-0.5mm broadcast sand spread over the top to provide a bonding key.

Epoxy stitching II

- 2) This is an equivalent process to 4) but uses the ARDEX Rhino Crack Lock repair tendons. These tendons are high tensile strength epoxy-carbon fibre composite strips that replace metal pins.

The installation process is equivalent to that for pins, and requires two holes being drilled for the end anchors, a slot for the strip, and placement at a certain spacing with alternating angling of the tendon oblique to the crack.

When the tendon is placed, the resin is injected around the insert and left to cure.

Epoxy filling

- 3) This process is used to fill cracks without necessarily gouging them out. In this application the repair is **not intended to be structural**.
 - a) ARDEX EG800F or EG15 can be mixed with sand-cement filler to a suitable workability and then trowelled into the crack (the cement is *not* reacted in this case).

ARDEX RA142 can be mixed with a suitable sized coarse sand-aggregate (such as ARDEX A38 aggregate) and trowelled into the crack.
 - b) Whilst still wet clean dry 0.3-0.5mm broadcast sand spread over the top to provide a bonding key.
 - 6) The transparent and amber coloured can also be mixed with coloured filler materials such as ARDEX FG8 grout (cement in grout is *not* reacted), or the colour pack beads for EG15, to provide a degree of colour matching for exposed (internal) concrete substrates.

DECOUPLED SYSTEMS

There are two approaches to this method where the flooring system is decoupled from the subfloor and floats above the damaged substrate.

A38 and A48 Screed

The ARDEX A38 or A48 screed system can be applied in a floating system over a 0.2mm plastic sheet. The engineered screed is applied at minimum thickness of 45mm over the plastic sheet to as a self-supporting screed base.

This screed provides a suitable substrate for ceramic tiles, carpets and resilient coverings (provided finish is smooth enough), smoothing cements or feature floor systems.

UL720 / UL740 Flexbone system

The Flexbone system uses specialised plastic mats with indented keyed surfaces which can be placed as floating or bonded systems on the subfloor, but which uncouple the tiled surface from movement in the subfloor. The systems are installed in accordance with the product data sheet(s) using the recommended tile adhesives.

DS60 System

The ARDEX DS60 system uses a rubberised decoupling matt which is adhered over the subfloor and then covered with ceramic tiles. The system is installed in accordance with the product data sheet(s) using the recommended tile adhesives.

DS40 System

The Ardex DS40 Sound Reduction & Decoupling mat is adhered to dry area subfloors and covered with adhesive fixed ceramic tiles as per TB147.

SUMMARY

Once the cracks have been made good, the subfloor can then be re-covered as required with ceramic tiles, textile floor or resilient coverings and strip timber flooring.

Alternatively, a free-floating system can be installed over cracked floors to isolate the subfloor from the floor coverings.

It needs to be remembered that these systems are not structural repairs for the building and do not add anything to the building's strength and overall integrity.



IMPORTANT

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

DISCLAIMER

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

REASON FOR REVISION - ISSUE

Removal of Ardex B34/B35. Inclusion of BR340, BR345, Crack Lock, UL720 and UL740. Some minor text changes.

DOCUMENT REVIEW REQUIRED

36 months from issue

Technical Services 1800 224 070. email: technicalservices@ardexaustralia.com
Australia <http://www.ardexaustralia.com>

NSW-HO 61 2 9851 9199. **Customer Service and Sales** 1300 788 780 **Sales Fax** 1300 780 102

New Zealand Christ Church 64 3373 6900, Auckland 9636 0005, Wellington 4568 5949

Technical Inquiries NZ 0800 2 ARDEX New Zealand <http://www.ardex.co.nz>

Web: Corporate: <http://www.ardex.com>

