

Remedial Wall Tie

Introduction

During the 1970's, research was conducted into the need for replacement wall ties. The actual durability of the protective zinc or galvanised coatings of the original built in wall ties was studied and this now affects the design and use of wall ties for both new build and replacement. The results of the research was found to be quite beyond any previous expectations:

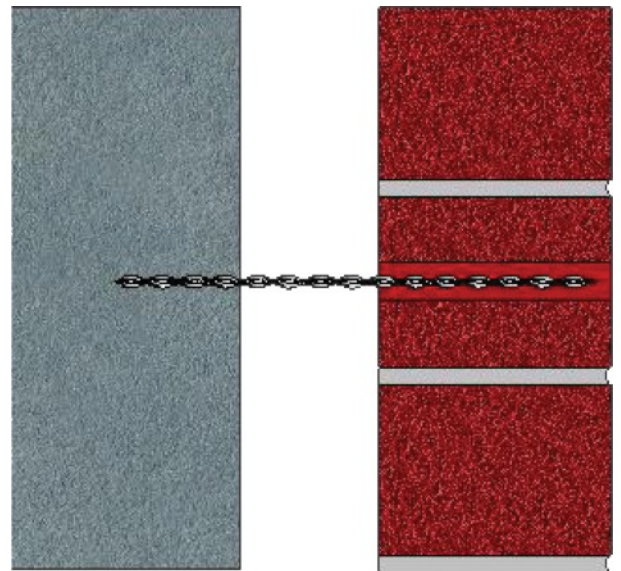
1. Vertical twist ties ("fish tails") were found to have a life expectancy of only 30 years - half of that originally intended.
2. Wire ties ("butterflies") were found to have a service life of only 15 years.
3. Mortar is alkaline, which actually protects and enhances the working life of wall ties
4. A reaction between mortar and the air causes a process called carbonation, which turns the mortar acidic, which then attacks the wall ties.

Early attempts at producing a method for replacing existing wall ties highlighted many of the pitfalls that were to be encountered. The expansion type of tie has been found to induce additional stresses into the masonry - similar to the expansion caused by the existing, rusting wall ties - and were costly to make and fit. The use of heavy section re-bars was soon outlawed because of the need for flexibility to allow the necessary differential horizontal and vertical movement between each leaf. Generally, a connection between each leaf using a bar of 8 mm diameter or above was found to act like mini crowbars and would eventually work themselves loose. The introduction of BSI DD140, BRE Digest 329 and the more recent BRE Digest 401 at last gave guidance for manufacturers and specifiers of remedial wall ties.

The System

The Retro Flex system of wall tie replacement is available in three different diameters of 6 mm, 8 mm and 10 mm. It offers the advantages of a nonexpanding mechanical fixing on the far leaf and a polyester resin or cementitious grout fixing on the near leaf. Proof testing of the far leaf using a Target Load Test Unit can be performed

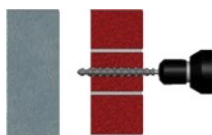
randomly as installation proceeds. Because the fixing method employed does not induce additional stresses into the substrate, Retro Flex can be used in many and varied materials, from poured concrete columns to Aircrete blocks, with satisfactory results and there is no concern to achieve the vital edge distance spacing necessary with any expansion fixing. The design of the Retro Flex remedial tie ensures that any potential for installer error can be minimised. The multiple drip design of each fin allows the Retro Flex to be installed at an angle of up to 25° towards the inner leaf without the possibility of any water transfer across the cavity. It is recommended that each Retro Flex is installed horizontally.



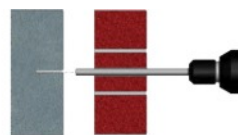
Special Features

- One piece design - no moving parts to lose
- Immediate proof testing of connection
- Multiple drip points to deter water transfer
- Flexible design allows natural building movement
- Fixes through insulation material
- Minimal disfiguration to buildings
- Fixes into all commonly found building materials
- Quick and easy installation

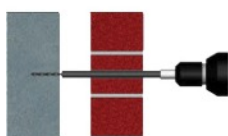
Installation



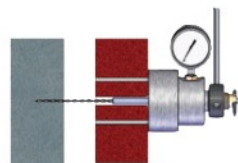
Drill a 10 mm or 12 mm hole through the near leaf using a SDS-plus hammer drill. The hole should be 25 mm from the end of a brick and on its horizontal centre line.



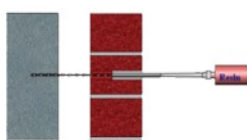
Push the Pilot Drill and Drill Extension through the previously drilled hole and drill a pilot hole into the far leaf. Note: If the far leaf is a soft material, this procedure may be omitted.



Insert the Retro Flex tie into the Power Support tool. Insert the combination through the hole in the near leaf and, using a SDS plus hammer drill, drive the Retro Flex tie into the pilot hole in the far leaf.



Once the Retro Flex tie is installed into the far leaf pilot hole, the holding capability can be checked using a Target Load Test Unit. As a general rule, About 1 kN loading in tension is An adequate bond.



After an acceptable proof test is performed, the near leaf connection is made using Target Polyester Resin or Bond Flex XL Cementitious Grout. The drilled hole may then be colour matched for an excellent finish.

Retro Flex Power Support Tool



The Materials

Retro Flex ties are manufactured from Grade 304 austenitic stainless steel. The 6 mm diameter Retro Flex has a tensile strength in excess of 9.7 kN. The manufacturing process produces very hard fins that are able to cut a thread into the hardest concrete, but maintains a very soft and flexible core. The near leaf fixing can be achieved by the use of Target Polyester Resin material or Bond Flex Cementitious Grout. Bulk mix epoxy resins are not recommended for normal installation, as it has been noted that many of these resins are not reliable due to their accurate mixing requirements. Where there is a need for a fire resistance in excess of 30 minutes, only Bond Flex Cementitious Grout should be Used.

It should also be borne in mind that around all openings - doors and windows - ties should be installed at no more than 300 mm vertical centres and no more than 225 mm from the edge of the opening. BRE Digest 401 gives more Information. If the masonry is so weak or friable that the required proof test load for standard density fixings cannot be achieved, it is quite acceptable to increase the density of fixings to ensure that the overall loading per m² is Achieved. Lowering the installation density below the standard is not Recommended.

Testing

It is recommended that testing is performed in accordance with the requirements of BRE Digest 401. This publication gives a wind zone chart and the various proof test Requirements for different parts of the country in differing situations. Most of the information is in table form, which negates the need for complicated calculations. It must be understood that wall ties are designed as load sharing devices and as such there is no necessity to have a high point loading on any individual tie. Only in exceptional circumstances does the proof test load requirement exceed 1 kN.

Fixing Densities

In general terms, the fixing densities for Retro Flex remedial wall ties would be the same as new build -2.5 per m² or 450 mm vertically and 900 mm horizontally in a domino five pattern. This density would, however, be subject to on site testing to ensure that the required tensile loadings are being achieved.