

Checking your wall ties in accordance with BRE specifications and the problem this can cause

Wall ties are a very important part of your structure. They allow your property to :-

1. Have a cavity (which stops damp transferring through to the inside)
2. Allow point load of pressure to be transferred over a larger surface area (internal and external brickwork)
3. Reduce wind suction in gale conditions.

If your wall ties have rusted and expanded, or there is just a shortage of ties in your property, this can cause :-

1. Lifting of mortar bed (where the ties have rusted and expanded, pushing the mortar).

Tests have shown that the rate of corrosion of the protective coating is more rapid in the damp outer leaf than in the drier inner leaf. Average zinc loss in the outer leaf of 15g/m^2 compares with 6g/m^2 in the inner leaf giving, in the case of a wire tie, a predicted life in the outer leaf of 12-26 years compared with 43 years in the inner leaf.

In 1979 it was predicted that 50% of the wall ties in pre-1939 properties could have failed. There are no statistics for bitumen coated ties, but flaking by underfilm corrosion at pin holes in the coating appears to occur at a rate comparable to zinc coating.

It is quite clear that deterioration of the coating is faster in a damp wall without consideration to outside factors such as chemical additives to mortar, marine salts and industrial atmospheric pollution. If cavity wall insulation restricts the drying of a wall by preventing evaporation, this could also contribute.

Once the steel of the wall tie is exposed to air and oxygen, the all too familiar rusting cycle begins. The rate of corrosion will be governed by site conditions but, in severely exposed locations, the life of the twist tie could be reduced to 10 years.

The loss, by corrosion of the wall tie, is one problem but the other consideration is the rust lamination that can cause the volume of the steel to increase to four times its original thickness. The effect of this is to cause splitting at mortar courses and the lifting of the outer leaf of the cavity wall without necessarily affecting the inner leaf. The result is instability, with the affected wall moving out of plumb.

2. Vertical cracks in brickwork (especially under windows)
3. Belly appearing in walls
4. Cavity widths getting larger the higher you check

It must be stressed that wall tie failure or cracking of the outer leaf of a domestic property is rarely an immediate threat to the safety of the occupants. This risk is greater to pedestrians and adjacent property and measures must be taken to restrict access to the risk areas if severe wall tie failure is diagnosed.

Wind suction in gale conditions is the normal cause of collapse of outer leaf walls with the gable top being the most vulnerable area. Attention should be given to narrow unreturned walls such as those between openings, and to the very large areas of walling such as gables. With the increase in a wall height by rust lamination of wall ties, it is possible that the load bearing characteristics of a structure may change. The outer leaf of a wall may become load bearing with the resulting distortion of a roof structure.

The installation of wall ties in an existing property may be needed to :-

- Stabilise a cavity wall damaged by corrosion of vertical steel twist ties
- Stabilise a cavity wall rendered unsafe by the loss of wire ties by corrosion
- Increase the number of wall ties in a cavity walls constructed with insufficient ties
- Tie back existing cladding walls to concrete, steel or timber frame structures
- Stabilise two parallel single-leaf walls with space between not exceeding 25mm, tied together with solid mortar, where leaves are separating.
- Tie new walls or bulging walls back to existing cross walls
- Tie walls either side of cuts made for insertion of openings or movement joints

Much of the information above has been extracted from Building Research Establishment publications, and your attention should be particularly directed to Digest 329 (revised 1993), Information Papers IP6/86, IP12/90, IP13/90 and Current Paper 3/81.

This information, given in good faith, on this website is based on experience and usage of the products.

All recommendations and suggestions are made without prejudice since the conditions of use are beyond our control.

All goods are sold in accordance with our conditions of sale, copies of which are available on request.

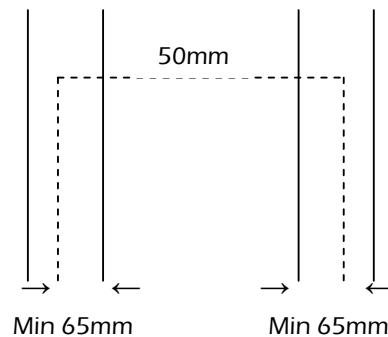
With our latest systems, the repair of these problems is very quick and easy to apply.

Firstly, to replace your old ties, follow this quick and easy guide :-

1. Measure the cavity (or check your reveals in the window or doorway). Each brick is 112mm wide, therefore your cavity is the full measurement of your reveal = 224mm. Once you know your cavity width, add a minimum of 130mm to indicate the size of tie you need, i.e.

Cavity width	50mm
Embedment (Depth in Bricks)	130mm (65mm each side)
Minimum size of tie is	180mm

A standard tie of 200mm is, therefore, sufficient.



2. Refer to our spacing chart for your position to install new ties.
3. Choice of remedial tie needed

A) PAM One-Fix Neoprene Tie PN11

This tie is made from stainless steel and brass with neoprene expansion to reduce the amount of pressure applied to the brickwork and will give you the required life span.



Ties are tested and are well over the minimum strength needed, as follows :

BRE minimum pull out required	1.25Kn
PAM PN11 Ties in common brickwork pull out	2.0Kn

PAM PN11 Ties take approximately 4 seconds to fix and cannot be fixed wrong due to our unique torque nut.

Using an 11mm bit, inclining the drill slightly upwards, drill a hole through the brick until you reach the cavity. With the tip of the bit touching the inner leaf, the depth gauge should then be set to 70mm. If the inner leaf is blockwork, the hammer action should be turned off. Drill the inner leaf.

Check the cavity width at regular intervals to ensure it remains constant.

Using a cordless drill (we recommend a 14.4V), put the setting tool into the chuck.

Set the clutch / torque to $\frac{3}{4}$ strength.

Put the tie into the end of the setting tool.

Push to back of hole, making sure you have friction going through the hole in the outer leaf. If not, pre-expand the tie first.

At a medium speed, activate drill.

When clutch operates, tie is set.

B] PAM Brass Expansion Tie PB10

This tie is used when you require extra pull out strength but are fixed the same way as PAM PN11 ties using a 10mm drill bit.



Ties are tested and are well over the minimum strength needed, as follows :

BRE minimum pull out required	1.25Kn
PAM PB10 Brass Ties	3.0 – 3.5Kn

Extra pull out could be needed when the cavity is over 100mm or going higher than first floor, or in exposed areas.

C] PAM Resin Tie – PR12

This tie is installed into a pre-mix poly or epoxy resin with our helicoidal tie again made from stainless steel.

This tie could be used where soft or loose blockwork, brickwork, hollow blocks, engineering bricks or you do not want any pressure applied to the brickwork.

Using an 12mm bit, inclining the drill slightly upwards, drill a hole through the brick until you reach the cavity. With the tip of the bit touching the inner leaf, the depth gauge should then be set to 70mm. If the inner leaf is blockwork, the hammer action should be turned off. Drill the inner leaf.

Check the cavity width at regular intervals to ensure it remains constant.

IMPORTANT - Thoroughly blow out ALL the dust from the drill holes.

Set up the resin injection system.

Gradually pressurize the cartridge until the material passes through the mixing nozzle. Stop pressurizing and allow the material to flow until an even colour is obtained. Insert the nozzle in the base of the inner leaf hole and activate the trigger, withdrawing the nozzle as the hole fills. Once the hole is filled, press the pressure primer at the end of the resin gun.

Insert the wall tie, ensuring it is pushed fully into the hole in the inner leaf.

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Insert the wall tie, ensuring it is pushed fully into the hole in the outer brickwork.

Once the hole is filled, wipe off excess material.

When all wall ties have been inserted, any resin remaining in the cartridge can be saved. Remove the used mixer nozzle, take off the fixing nut, wipe all threads clean, refit the nut and discard the nozzle.

N.B. Once the material has started to extrude from the nozzle, overpressuring the system will not increase the flow but can cause leakage from the rear of the cartridge.