

Wall Ties - Corrosion

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/m² compares with 6 g/m² in the inner leaf, giving the case of 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 ten 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.

General

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. The 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 wall constructed with insufficient..
- 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 the two 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 in this 'Introduction' 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.

The information, given in good faith, in this manual 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.