Cavity Walls

Advantages and Disadvantages of Cavity Walls

Cavity wall construction consists of outer and inner 'leaves' (thin walls approximately 100mm thick) of brick and concrete block respectively, tied together with steel wall ties with a 50- 90mm cavity between them (see Figs 1 & 2). It became common practice in the house building boom of 1920 - 30 and since World War II it has been used almost universally.

Fig 1 – Modern brick / block cavity wall

In more recent times, stainless steel ties have been used to extend durability and plastic wall ties have been developed as an alternative to steel. Victorian and earlier houses generally have 'solid' walls, usually brick 225mm thick with no cavity. Your surveyor will have indicated in his report what type of wall construction is present in your property.

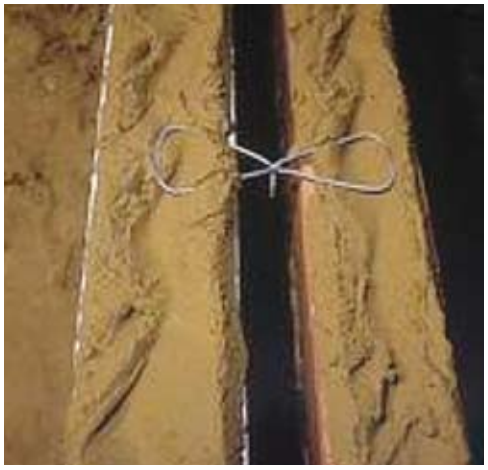

Fig 2 – Wall tie installation

The key advantages of cavity wall construction are:

• Restriction of moisture passing through the wall. The wall works on the principle that water can pass through the porous outer leaf, but then collects on the inside of the outer leaf and runs down to 'weepholes', either at ground level or above windows, where it can escape.

• Better thermal insulation. Both the air gap and the use of thermally-efficient inner leaf concrete blocks increase the thermal insulation of the wall, leading to reduced heat loss. More modern construction in the last 20 years has incorporated insulation in the cavity to enhance the thermal efficiency of the wall. Retrofitted insulation can be installed in earlier, unfilled cavities to increase the wall's thermal performance. Your surveyor's report will indicate if this has been done.

The main disadvantages of cavity wall construction are:

• Corrosion of the wall ties. Steel will corrode if not properly protected. Early wall ties were usually protected with a coat of bituminous paint. From about 1930 ties were covered with a coating of zinc ('galvanised') which gave them better protection, but this is considered substandard by today's standards. Any property built prior to 1981, when the standard of protection was improved, could be subject to premature corrosion of wall ties.

• Dampness caused by careless building practice. Wall ties have little tabs of metal ('drips') in the middle to enable any water which passes into the cavity to fall off them. If, due to poor building practise, mortar is allowed to collect on the tie when the wall is built, this will let water pass along the tie into the inner leaf, causing damp patches to appear on the inside of the wall (see Fig 3).

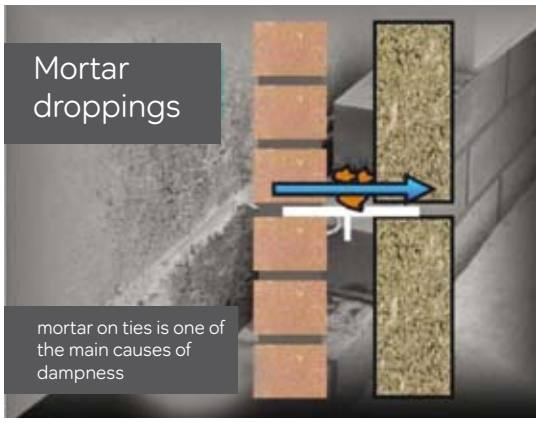

Fig 3 – Mortar dropping causing dampness

Causes of Deterioration

The main cause of deterioration of cavity walls is wall tie corrosion. If inadequately protected, the steel ties will rust due to the presence of air and water in the cavity. The constituents of mortar droppings can accelerate this process. When steel corrodes it will expand up to ten times the thickness of the parent metal. The ends of the wall ties embedded in the outer leaf will lift the bricks above, causing a horizontal crack to appear in the mortar joint (see Fig 4).

Fig 4 – Horizontal cracking in mortar joint

In extreme cases, the outer leaf can become separated from the inner leaf and fall off (see Fig 5). However, it must be stressed that this very rarely leads to any further collapse of the wall, and so there is no immediate threat to the safety of the occupants of the property.

If your surveyor suspects wall tie failure, he will recommend further investigation. If it is then found that a substantial proportion of the wall ties are corroded, consideration must be given to a replacement programme.

Fig 5 –Separation of outer leaf

This will normally consist of drilling holes through the outer leaf and into the inner leaf at specified centres and inserting stainless steel ties (see Fig 6).

A cut away picture showing the stages of remedial treatments. From left to right:

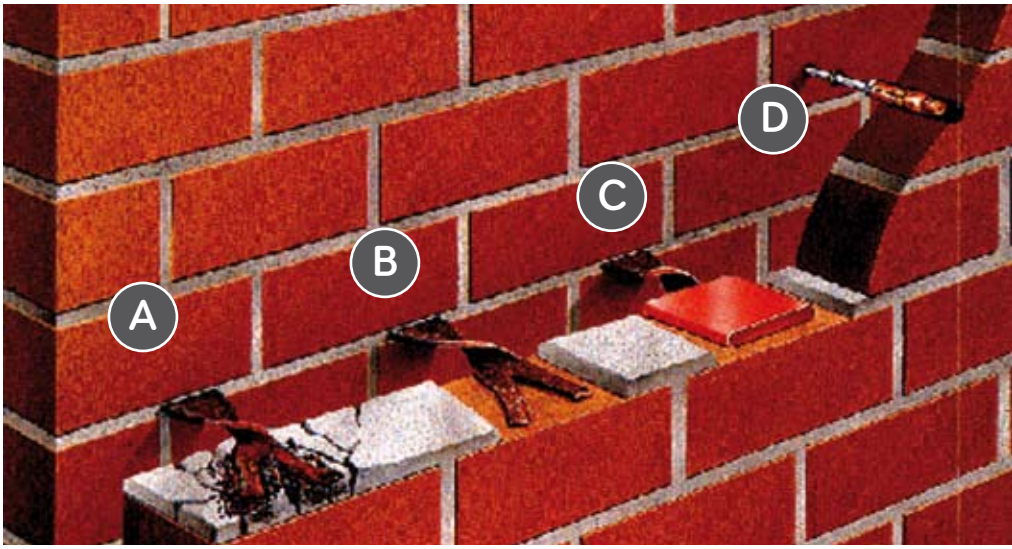

Fig 6 – Installation of replacement wall ties

A - rusted tie.

B - tie cleaned for isolation

C - tie with an isolation sleeve.

D - new expanding tie installed.

After the replacement ties have been fixed the wall can be reinstated or made good and will then be in sound condition.

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