RAIN PENETRATION IN CLAY BRICKWORK WALLS

The outer leaf of Masonry construction is not watertight!

Since approximately 1930 house construction changed from predominantly solid wall structures to Cavity walls. Solid walls, by the nature of masonry, would allow moisture to eventually percolate through and cause dampness especially in areas of the Country subject to severe exposure to wind driven rain.

The change to cavity wall construction allowed water, finding its way through the outer leaf, to run freely down the inside of the outer leaf and be re-directed outwards via weep-holes further down the wall.

Many instances of water penetration appear after heavy rainfall soon after completion of a dwelling. Often the first thought is that ' the bricks are leaking' and they must be faulty.

Brick types vary considerably in their physical properties depending on the type of clay used and method of manufacture. During long periods of wind-driven rainfall, the brickwork becomes saturated, directing excess water down the outer face. Mortar, being more porous than the masonry unit, will absorb large volumes of water which then enter the cavity. Other contributing factors can speed up the ingress of water though this area.

When it comes to specifying one of the many types of bricks available, NO distinction should be made as to which is best for the purpose of keeping water out because the weakness in a brick wall is the interface between the brick and the mortar joint. For this reason, it is important to ensure that a good quality of workmanship is employed at all times.

The bond between brick and mortar is very important.
Mortar acts as a 'glue' and space filler. It makes up about 18% of the area of the brickwork and careful gauging of the sand/cement is needed. The correct designation of mortar should be specified according to durability requirements and masonry unit being used. If the mix is cement rich, the structure is less flexible to thermal and moisture movement and cracks can form. Cracks provide a speedy route for water to penetrate into the cavity. This is worsened if the bricks haven't been laid on a full bed of mortar with fully filled perpend joints! Too little cement, however, makes the mortar even more porous.

REASONS WHY WATER MAY BRIDGE THE CAVITY

Cavities are now being used as the easiest way to fulfil more stringent insulation regulations and extreme care must be taken during the construction of cavity walling if it is going to be shared with materials that can breach the gap. It could, in effect, act as a bridge for water to cross to the inner leaf.

Cavity insulation-
Partial Fill-. Ideally there should be a free cavity of at least 50mm. If cavity insulation is intended, provision should be made to maintain this space. 'Batts' of insulation material are fixed to the inner leaf and if they come adrift and stick out slightly during construction, any debris falling onto them bridges the cavity creating a path for water to cross.

Full Fill Injected- Install as late in the building programme as possible. Ensure injection at the correct centres. Qualified insulation contractors only should undertake this.

TECHNICAL INFORMATION SHEET 7

Full Fill Fibre Batts- Read the fixing instructions before commencing. Build the outer leaf first and strike joints flush inside the cavity. Batts must be closely butted both vertically and horizontally and at closures. Stagger vertical joints. Batts must be kept free from mortar droppings. **Do not** push batts into cavities.

Wall ties- Wall ties are sandwiched within the mortar joints of each leaf and span the cavity gap to tie the structure together. Without these the walls may buckle in strong wind. If they are placed sloping downwards toward the inner leaf, water passing through the brickwork may travel down them causing damp spots on the inner wall.

Cavity trays- Omitting the stop ends to cavity trays or the lack of trays altogether can cause rain penetration problems around openings such as windows, doors and meter cupboards etc. In a very sheltered location the omission of these may never be apparent but they are a regulatory requirement.

Mortar joints- All joints should be FULLY filled with mortar. Tipping and tailing the cross-joints should be avoided. Recessed joints are not advisable except in very sheltered areas. Mortar should be compacted with a 'jointing' tool before it has completely set.

Masonry- Masonry should not be allowed to project into the cavity. Half bricks cut on site can project and catch mortar droppings as work progresses above. These droppings can eventually bridge the cavity and allow water to migrate across.

Design Features- Certain design features can test the vulnerability of brickwork to its limit. Large expanses of glass can direct copious amount of water run-off onto the brickwork below. Lack of adequate roof overhangs, faulty guttering, inadequate projecting throated window sill features and poor chimney construction are common faults.

Weep-holes- Blocked weep-holes (openings in the perpends) or none having been incorporated in the first place can cause a build up of water in the cavity trays over openings. They often get blocked with debris. There are stipulations in the Code of Practice as to how many and where they should be incorporated.

Single leaf structures- Garages and porches do not have to be built to the same requirements as houses and it is not surprising that after heavy rainfall, puddles appear inside! Rightly or wrongly there is no proviso in any Building Regulations that garages must be built to provide a cavity construction , as they are not deemed dwelling areas.

The local Building Authority can advise on wind and rain exposure factors for your area. The design of any structure should involve this.
It is widely thought that climate change is already with us and instances of wind driven rain are more prevalent at certain times of year. Cold and snowy winters have given way to heavy rain and flooding!

BS5628: Code of Practice for the use of Masonry and BS8000: Workmanship on Building Sites should be adhered to in respect of good building practice. The NHBC Standards provide an easy to read guide to these regulations.

Ibstocks' **Guide to Good Practice** is available to download from the Internet. For further advice contact **Ibstock's Design & Technical Helpline on 0844 800 4576**

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