

RAIN PENETRATION

Prolonged wet and windy conditions bring with them an inevitable increase in reported cases of rain penetration through masonry, usually citing the brick as the cause. This is not the case, but it can be extremely difficult to prove. However there are certain inescapable facts.

Rain penetration occurs on all external masonry walls exposed to the effects of prolonged rainfall driven by strong winds, but causes no problems to the structure where the cavity is properly functioning and dpc's, cavity trays and other safeguards are fitted correctly.

Cavity walling was introduced as a measure to prevent water being transferred to the inner wall surfaces by providing two separate leaves of masonry with a clear air space of at least 50mm between them. Although increased insulation standards have led to the common practice of fully or partially filling the cavity, this does not absolve the builder or installer from complying with the original principle of preventing the passage of water from the outer to the inner leaf.

The main point of ingress into the cavity for wind driven rain is via the joints. Where rain penetration may become a problem, such as a single leaf garage wall on a severely exposed site, filling the joints is essential. BS5628:Part 3 recommends that all joints are fully filled.

Ironically, bricks of low absorbency tend to be associated with rain penetration problems more than highly absorbent products due to an effect comparable to the raincoat/overcoat action. A brick with low water absorption will act like a raincoat, causing water to run off the face onto the more vulnerable joint area and pass through any available open spaces. In the same conditions, a wall built from a brick with relatively high water absorption will soak up a considerable volume of water like an overcoat, reducing the amount being channelled onto the joints. In extremely severe conditions, however, once saturation of the bricks has been reached, both types of brick will behave in the same manner.

It is often found that newly constructed masonry is more vulnerable to rain penetration due to the initial moisture content resulting from its construction. In such cases, it is important to identify the route of entry if at all possible. Where minor temporary effects may exist, it is advisable to postpone any radical action until the masonry has had time to dry out naturally, after which it may well be found that no further occurrences arise.

The use of masonry paint systems and other proprietary external finishes including colourless treatments such as silicone-based water repellents, may increase the resistance to rain penetration. However, the surface treatments may have a limited life-span and could also reduce the rate of evaporation of water from the wall, causing the quantity of water in the wall to actually increase. This would obviously be dependent upon exposure conditions but in extreme cases could be enough to saturate certain types of fired clay units sufficiently for frost damage to take place. Additionally, the application of such treatments may lead to an increased run-off of rainwater, which in turn may increase the wetting of any untreated masonry below and possibly give rise to lichen growth and/or discolouring.

Raking out and re-pointing using an appropriate mortar can prove effective if it appears to be simply a problem of badly filled joints. The incorrect fitting or absence of cavity trays, dpc's and the like, however, will require more painstaking actions, as will problems where cavity insulation is installed.

The Building Research Establishment, Ceram Research and other academic and research bodies confirm the above points and it is interesting to note that in a report by the BRE entitled "Rain Penetration through Masonry Walls - diagnosis and remedial measures", not once is the brick cited as a potential cause.

Look to workmanship and design rather than materials for the cause of this all too frequent, but potentially avoidable, problem.

October 2002

