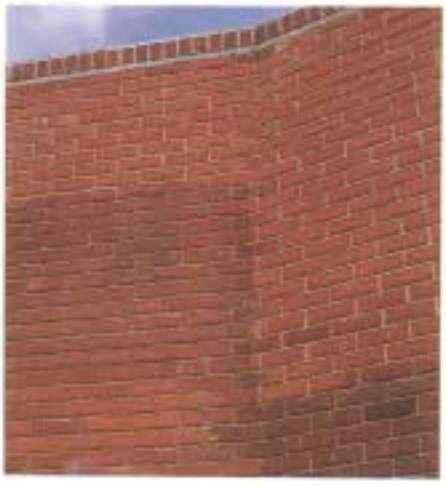
WATER REPELLENT SURFACE TREATMENT – A WORD OF CAUTION

BDA is often consulted about proposals to remedy rain penetration of external brickwork by the application of a silicone-based or similar water repellent treatment. A recent BRE survey of rain penetration through insulated cavity walls found that such treatments were mentioned in 75 (27%) of the returns. In just over a third of these cases it was the sole remedial treatment.

The BDA advises that in some circumstances the use of a water repellent may prove beneficial for a period of time, but recommends caution in their use as the Association is aware of instances where their inappropriate use has led directly to undesirable side effects.

Water repellents function by reducing rain penetration of brickwork through the pores but not, of course, through cracks. Indeed, BS 3862:1969, Silicone-Based Water Repellents for Masonry states "This British Standard specifies performance requirements for silicone-based water repellents which can be applied to masonry, free from cracks exceeding 0.15 mm in width, . . .". The term masonry in this context includes brickwork. It is claimed that modern repellents allow brickwork to 'breathe' by permitting water vapour to pass out through the pores but it must be remembered that the rate of vapour flow will be reduced, and in some circumstances this may be sufficient to cause a build up of moisture and possibly damage to the brickwork by frost attack.

Experience over recent years has led to the recommendation that surface treatments should not be applied to the outer leaf of brick walls in which the cavity is completely filled with insulation and it is prudent to apply this recommendation to the infrequent instances when partial cavity fill is applied to the inner surface of the outside leaf. The consequent build-up of moisture in a leaf of brickwork in which surface drying is inhibited by the repellent on one face, and the insulation on the other, has led to frost failure with some bricks and some manufacturers specifically warn against such practice.



WETTING OF BRICKWORK BY INCREASED RAIN RUN-OFF FROM WATER REPELLENT TREATED PARAPET ABOVE

There has been a report of efflorescence appearing at cracks in the surface repellent, presumably as soluble salts in solution dried out through the cracks. Another report is of brickwork which had remained in good condition for many years, until the cavity was filled with insulation and at the same time a silicone-based anti-graffiti protection was applied to the lower two metres. In the following winter a number of bricks in this area suffered from frost attack. Another case has been observed where a water repellent was applied to a parapet wall through which water penetration was suspected and this led, as might be expected, to an increased run-off of rain water which increased the wetting of the bricks below which then suffered from lichen growth.

Although it is difficult to give scientfically based recommendations to potential users the advice to anyone contemplating the use of such treatment is to examine the materials and details of construction and try, from basic principles, to predict any likely side effects and, armed with this information, to consult the manufacturers of the repellents who must be given all the facts. Such materials do not provide a magic 'cure all' in all cases of water penetration and as with all buiding materials, their limitations as well as their positive qualities must be carefully considered before they are specified.

Finally, an authoritative quote from the Masonry Code of Practice BS 5628:Part 3 . . . 'the use of masonry paint systems and other proprietary external finishes including colourless treatments, eg. silicone based water repellents, may increase the resistance to rain penetration. However, the surface treatments may also reduce the rate of evaporation of water from the wall and, depending upon exposure conditions, the quantity of water in the wall may therefore increase. In extreme cases this may be enough to saturate certain types of fired clay masonry sufficiently for frost damage to take place. Surface treatments also have a limited life.'

REFERENCES

Information Paper IP 2/88
Rain penetration of cavity walls: report on a survey of properties in England and Wales.
M T Pountney, R Maxwell, A J Butler, Building Research Establishment, February 1988.

BS 3826:1969
Specification for Silicone-Based Water Repellents for Masonry

BS 5628:Part 3:1985
Use of Masonry, Materials and Components

VIEW POINT

Design, Buildability and Craftsmanship

If you have any views on brickwork, design, buildability, craftsmanship etc contact Bill Villars, Consultant Editor, Brick Bulletin, 23 Selwyn Avenue, Richmond, Surrey TW9 2HB (Tel 01 940 5803)

FROG UP OR FROG DOWN?

THIS APPARENTLY simple question is asked often enough for this column to attempt a short simple answer for busy designers and builders. In practice, most bricklayers prefer to lay bricks frog down because they believe it to be faster and it certainly uses less mortar.

The shortest answer is : either way providing the resulting brickwork meets the required performance.

The comments below are on the more important requirements and the column concludes with authoritative quotations.

STRENGTH

The quoted compressive strength of a frogged brick is determined by testing it with frogs filled with mortar.

In most housing situations and in brickwork that carries no superimposed loads such as panels in a framed building even bricks with unfilled frogs are likely to be two or three times the required strength. When brickwork is designed by calculations which are based on the stated compressive strength of the brick, the frogs in the brick must be filled if the finished wall is to achieve its design strength. Typically this might be required in multi-storey buildings in which concrete floors are supported by loadbearing brickwork or where concentrated loads from beams are supported by brick walls or piers.

SOUND INSULATION

A wall built from bricks with unfilled frogs will have marginally poorer sound insulation properties and this may be a reason for insisting on filled frogs.

RAIN RESISTANCE

A BRS Digest written in 1954 stated that in tests on solid brick walls laid frog up and down there was no significant difference in the rain resistance of the wall. BDA is not aware of any subsequent evidence which contradicts these findings.

AUTHORITATIVE QUOTES

"**BRICKS WITH FROGS** – Bricks should normally be laid on a full bed of mortar with the frog or larger frog uppermost which should be filled with mortar as the work proceeds." BS 5628:Part 1:1978, cl 8.2 Code of Practice for "**Structural Use of Unreinforced Masonry**"

"**BRICKLAYING** – Unless otherwise specified, frogged bricks should be laid frog up and the frog should be completely filled with mortar. The position and filling of the frogs are important, as both can affect the strength and sound insulation of the wall". BS 5628:Part 3:1985 cl.32.7 Code of Practice for "**Use of Masonry. Materials and Components, Design and Workmanship**".

"**FILLING OF JOINTS AND FROGS** – Single frogged-bricks shall be laid frog uppermost and double-frogged bricks shall be laid with the deeper frog uppermost. All frogs shall be filled with mortar." An explanatory note states "If the designer can permit the bricks to be laid with the frogs downwards, this clause shall be amended". The 1988 SP56 "**Model Specification for Clay and Calcium Silicate Structural Brickwork**" drafted by the Structural Ceramics Advisory Group and published by the Building Materials Division of British Ceramic Research Limited. Obtainable from the Brick Development Association.

"**FROG UP OR FROG-DOWN?** – Bricks must be laid frog-up with all joints filled when maximum strength or weight is required for the brickwork. When neither is the prime requirement, the bricks may be laid frogdown.

If separating walls are required to meet the Building Regulations for Sound insulation, bricks should be laid frog-up to five maximum weight." "**Oxford Clay Fletton Range Technical Information on Brickwork**" published by London Brick, March 1987.

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