

Efflorescence and bloom on masonry

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General Information

The appearance of a building is enhanced by good quality bricklaying. After centuries of weathering, clay brickwork still has an attractive appearance. This can only be achieved if emphasis is placed on good detailing at the design stage followed by good workmanship.

Failure to recognise these two items will lead to unsightly brickwork which will not be improved by age and is only partially rectified by the cleaning of the building.

For the best results:

- pay adequate attention in the design stage;
- use factory produced mortar for consistency;
- select the correct factory produced mortar;
- use products supplied by a Mortar Industry Association producer member;
- adhere to good site practices and workmanship.

The main causes of unsightly masonry are:

- constructional blemishes;
- efflorescence;
- bloom.

It is easy to identify constructional blemishes but efflorescence and bloom are often confused.

Constructional Blemishes

The chief cause of this is marking of the bricks with mortar, and this is particularly apparent when a contrasting coloured mortar has been used. Other foreign matter deposited on brickwork during construction will also disfigure it and will probably be difficult to remove.

Another factor that may spoil the appearance of brickwork is the band effect seen on many walls. It can be caused by variations in shades of different brick deliveries. The type of joint can also cause this and it is more pronounced when the joints are ironed.

The ironing of the joint brings laitence to the surface. If the mortar consistence varies then when ironed so does the degree of laitence. The weather and condition of the materials can also affect this problem. The wetter the brickwork and mortar the greater the laitence and hence the lighter the joint.

Bricks and sand (now known as fine aggregate) containing foreign matter, such as pyrites and lignite, can cause staining as weathering proceeds.

Efflorescence

Most building materials contain water soluble salts and with the water used in construction these salts will pass into solution and subsequently reappear at, or near the surface as the building dries out. This form of efflorescence seldom persists unless water is permitted to percolate through the brickwork and it will normally disappear under the effect of rain within a short period of time.

The salts responsible for efflorescence depend on the particular building materials used, although contamination from other sources should not be overlooked.

Bloom

Mortars containing cement can become covered with a thin surface layer of carbonated material, derived from the free lime present in all types of cement mortars. This effect may be seen where non-pigmented mortars are used but as the layer here approximates more closely to the joint colour, it is not usually considered a problem and indeed, is seldom noticed. The effect may be more pronounced where darker shades of pigmented mortars are used.

Research carried out to investigate the relationship between the mortar used, the design of features and the degree of staining, showed that there was negligible difference between the use of lime:sand mortars and non-lime based mortars. Detailing was found to be the overriding factor, correctly detailed masonry exhibited a complete lack of staining thus proving the importance of correct detailing when designing a masonry structure.

Preventative Action

The causes of constructional blemishes, efflorescence and bloom have been discussed, but how are they overcome?

1 Design and plan well

Attention must be paid to design features, especially parapet walls, sills, copings etc. Water must not be allowed to percolate into masonry and keep it in a damp condition.

2 Select the correct mortar

Use a factory produced mortar, supplied by a Mortar Industry Association member, to produce the most durable, defect free result.

3 Site care and workmanship

Water on a building site is both friend and foe. It is necessary to ensure hydration of cement, gypsum etc., but excess can cause many problems such as efflorescence, drying shrinkage, etc.

Builders should cover materials on site both before and after erection. In the case of walling materials, this will help to reduce efflorescence and bloom. Care of materials should lead to good workmanship and this will reduce constructional blemishes.

CARE DURING CONSTRUCTION WILL SAVE MONEY IN THE END.

Remedial Action

Efflorescence, unless caused by permanent dampness, should weather away and does not cause permanent disfigurement. Brushing with a stiff brush when dry is the best method of removal. The removal of construction blemishes and bloom can be effected to some degree by treatment with proprietary materials or diluted hydrochloric acid. Before attempting such remedial work, however, always experiment with a small trial area and consult the brick manufacturer.

ALWAYS OBSERVE FULL HEALTH AND SAFETY PRECAUTIONS AND WEAR GOGGLES AND PROTECTIVE CLOTHING.

References

- BS 5642 Sills and copings. Specification for copings of precast concrete, cast stone, clayware, slate and natural stone
- BS 8221 Code of practice for cleaning and surface repair of buildings
Part 1: Cleaning of natural stones, bricks, terracotta and concrete
Part 2: Surface repair of natural stones, bricks and terracotta
- Ritchie, T: Study of efflorescence produced on ceramic wicks by masonry mortars, *Journal of the American Ceramic Society* 38, 362 - 366

BDA publications:

- Maintenance & Repair Cleaning of clay brickwork
M & R 4.1
- Maintenance & Repair Cleaning of calcium silicate brickwork
M & R 4.3

British Standards are currently being revised in line with European requirements. The new standards are at varying stages of preparation and/or publication, for a full list of British and new European Standards see the MIA data sheet of technical references.



There is a real danger of contact dermatitis or serious burns if skin comes into contact with wet mortar. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly or through saturated clothing wash immediately with soap and water. For eye contact immediately wash out eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water.

The relevant codes of practice, standards and statutory regulations must always be observed.

The information in this data sheet may be freely copied with acknowledgement to the Mortar Industry Association. Current issue numbers of all MIA publications are available from the MIA website.



Mortar Industry Association

Gillingham House 38 - 44 Gillingham Street London SW1V 1HU Tel +44 (0)20 7963 8000 Fax +44 (0)20 7963 8001

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www.mortar.org.uk