LONDON FO GUANG SHAN TEMPLE, MARGARET STREET, LONDON

2.0 METHOD STATEMENT: FOR BRICK AND STONE CLEANING

2.1 SCOPE OF WORK

The work described relates to the exposed external brickwork of the property, including rubbed brick arches and existing stone steps.

2.2 CONSERVATION PHILOSOPHY

The intention is not to aim for a "brand new appearance", but to repair what is damaged, worn or faulty, and to provide it with a finish consistent with a high standard of regular care which should be maintained in the future.

2.3 RECORDING THE WORK

The contractor, or his sub-contractor, shall make a photographic and written record of all work done and materials used, and keep a log of the tradesmen engaged on the work.

2.4 REMOVAL

There must be a presumption against the removal of any item from site without the written approval of the Architect.

2.5 ACCESS AND H&S

Scaffolding and scaffolding towers will be provided by the Main Contractor, but the sub-contractor should provide ladders, trestles, staging and props as necessary for access and temporary support in the specified work areas. All scaffold pole ends to be covered to protect the building from rust staining.

The sub-contractor is to make himself fully aware of all the main contractor's preliminaries with particular reference to Health and Safety and protective clothing must be worn.

3.0 BACKGROUND

3.1 CLEANING BRICKWORK:

One of the principal benefits of using clay facing bricks is that brickwork usually requires little maintenance over the course of its life. However, occasions will occur when the brickwork needs to cleaned, due to age, exposure to pollutants, water or other factors that have caused soiling or decay. This Method Statement therefore seeks to cover typical guidance on how to clean clay brickwork and remove the most common types of stains that might occur on both old and new brickwork.

The information provided here is intended as outline guidance only and we highly recommend consulting a brick cleaning expert, especially for stains that are extensive or hard to identify, as the

method of cleaning depends on the nature of the stain, age, and type of the brick. Samples and test areas

to be inspected and signed off by the architect are always an essential requirement before full cleaning. Great care should be taken in particular when working with historic brickwork.

4.0 TYPES OF STAINING AND CLEANING SOLUTIONS

4.1 DIRT AND GRIME:

Over time, and particularly in urban areas, airborne soot, dust, and dirt will naturally build up on brickwork, depending on the location of the building. This is natural and tends not to cause decay and damage to the brickwork, but may impact the look and aesthetic presentation of the building.

How to clean dirty brickwork:

The contractor should use a detergent solution, applied to the brickwork using a nylon brush. Never use a wire brush or metal tools to clean, as this can damage the brick firing face. Furthermore, the contractor should avoid cleaning brickwork in very cold conditions, as the wet brickwork will freeze, which many cause damage.

High pressure washing is never recommended for brickwork. Despite bricks being highly durable when fired and constructed correctly, brick surfaces and mortar joints can be irreparably damaged under high pressure, leaving the brickwork vulnerable to water penetration and frost attack.

If an historical building with older and potentially important brickwork is to be cleaned, then a survey should be carried out by a specialist brickwork cleaning contractor, (such as PAYE, Daedalus, DBR, Stonewest, Cliveden Conservation), to avoid damage and samples provided for architect inspection and approval.

4.2 EFFLORESCENCE:

What is efflorescence?

Efflorescence is one of the most common types of brick stain. It presents as a white powdery 'bloom' or mark. The white staining is the result of the formation of soluble salts on the surface of clay bricks, following saturation.

All clay bricks contain soluble salts, but when water comes into contact with the brick, it dissolves the salt. Once the brick then dries again, this dissolved salt is drawn to the surface and appears as a white, crystalline powder. The amount of efflorescence that appears on the surface depends on many factors, including the type of salt, crystal shape, the pore structure of the brick, and the ambient temperature in the surrounding environment.

How to prevent efflorescence:

Efflorescence will only happen when bricks become wet, whether in storage or during the construction process. This is why it is absolutely essential to protect materials in storage and protect partially built walls during construction.

How to clean efflorescence from brickwork:

Efflorescence is generally a harmless and temporary effect that should fade with time once the salts have disappeared.

It is possible to aid this process by very gently spraying the walls to simulate rain, but high-pressure hoses should not be used, as this will further saturate the brickwork, resulting in more salts coming to the surface of the brick. If the brickwork is a natural internal finish, you can apply a damp sponge, rinsing frequently in clean water, to minimise the appearance of the stain.

4.3 LIME STAINING:

What is lime staining?

Lime staining, or lime leaching, happens when an excess water flows through mortar. The water dissolves calcium hydroxide (free lime) which is then deposited onto the brick face. The calcium hydroxide then reacts with carbon dioxide in the air, producing a hard crystalline formation of calcium carbonate.

Although lime staining is a white stain like efflorescence, its cause and therefore treatment is very different. Lime leaching characteristically forms in a dribbling pattern from holes or fine cracks between the brick-and-mortar joints. Lime staining commonly comes from mortar joints, or concrete and cast stone elements, such as floor slabs built into brickwork.

How to clean lime staining off brickwork:

The initial staining that occurs with lime leaching can be removed using water and a brush. However, once the calcium hydroxide has reacted with the air and formed calcium carbonate, this can only be removed by an acid solution.

Propriety brickwork cleaners tend to be formulated from hydrochloric acid, therefore it is essential for the contractor to follow all instructions and take appropriate precautions with all necessary RAMS in place. It is important to pre-wet brickwork before applying the chemical cleaning solution, and only small areas should be treated at a time. It is also advisable to test a small test area before applying widely for architect approval.

4.4 METALLIC STAINING ON BRICKWORK:

What is metallic staining?

Metallic staining on brickwork can be caused by iron, manganese or vanadium.

Iron is a normal, natural part of clay's composition, while manganese may be added as part of the production process. Iron staining happens when compounds of iron are drawn to the surface of the brick as a result of moisture. On the surface, the iron oxidises when in contact with the air and produces a rust-like stain.

Manganese staining is caused by manganese dioxide, used as a colouring agent during manufacturing, that has dissolved in rainwater, construction water, or muriatic acid. It appears as a dark brown or black stain.

Vanadium is a mineral element found in raw clay and is most commonly found in the production of buff-coloured bricks. As a soluble salt, vanadium can be brought to the surface by moisture and appears as a stain that can be yellow or green.

How to clean metallic stains off brickwork:

Iron and manganese staining is best left to weather away naturally. If the process needs to be accelerated, the contractor can remove the stain from the face of mortar joints with a rough file. The contractor can also apply a proprietary brickwork cleaning solution, subject to tests and trials.

Vanadium staining should be treated differently. The contractor should not use a hydrochlroric acid-based cleaning solutions, as this can cause a reaction that makes a permanent dark-coloured stain. If necessary, vanadium stains can be treated with a dilute oxalic solution, but always try a small test in a discreet area to gauge the success of the treatment first.

4.5 PEACOCKING AND PICTURE FRAMING ON BRICKWORK:

Peacocking most commonly appears on blue bricks as an oily-coloured stain on the face of the brick. When the oily stain appears around the edge of the brick, this is known as picture framing. Peacocking and picture framing is caused by brickwork saturation prior to mortar curing, or through the use of excessively wet mortar.

How to clean peacocking and picture framing stains:

Peacocking and picture framing is not harmful to the durability of bricks. The effect will eventually tone down with weathering, but will not weather away completely. Therefore, initial prevention is better than cure. Stored bricks and newly laid brickwork should be kept dry and clean. Freshly laid brickwork is particularly vulnerable in the first three to five days as the mortar cures. Use waterproof sheeting to protect fresh mortar and open cavities to prevent saturation.

4.6 CEMENT AND MORTAR STAINING:

Cement stains on brickwork occur during construction, due to splashes or smearing, or afterwards, when run-off from concrete components leaves a residue on the finished brickwork.

The most common cause is splashes during the bricklaying process, or if mortar joints are brushed before the mortar is fully set. A skilled bricklayer will be able to avoid this as much as possible to prevent excessive cement staining.

How to clean cement stains off brickwork:

When mortar is splashed or dropped onto brickwork during construction, it is usually best to wait for it to harden slightly before removing, so as to avoid smearing the mortar into the face of brick. For larger deposits, remove with wooden tools, rather than metal, to avoid damaging the brickwork.

For mortar and cement smears, removal may be more difficult. The contractor can buy specialist cement cleaning products, but as always it is essential test on a small area first and always follow the manufacturer’s instructions. If in doubt, consulting a brick cleaning contractor is advisable.

4.8 PAINTING STAINING:

Removing paint from brickwork can be very challenging, particularly aerosol paints that are commonly used for graffiti. Facing bricks with a very textured surface, such as handmade bricks, will allow the paint to penetrate further into the surface, making them far harder to clean.

How to clean paint off brickwork:

Because paint is difficult to clean off brickwork, consulting a specialist brick cleaning contractor is always advisable.

The method of cleaning depends on the composition of the paint. For example, an acrylic-based paint will require a different type of paint remover compared to polyurethane or epoxy paints.

If the paint is still fresh applied, soak up as much as possible, being careful not to wipe and further spread the paint. You can then use a solvent on the area before washing with warm water and detergent. Remember to follow any safety instructions on the paint remover or solvent.

If the paint is dry, you can carefully scrape off as much as possible before applying a paint remover, following the manufacturer's instructions. If there are numerous layers of paint, you may need to use different types of paint remove for each layer, depending on the paint type. It is always advisable to test the remover in a small area first, before applying to the rest of the brickwork.

Brick tinting may be required after paint removal to restore the brick to its original colour. Again, consult a brick cleaning specialist for advice on tinting.

4.8 MOSS, ALGAE AND ORGANIC GROWTH:

Moss and algae may naturally grow on brickwork, as well as larger creeping plants such as ivy. Be aware that green stains may not be moss or algae if they appear on buff-coloured bricks. This could instead be vanadium, a type of metallic stain.

Organic growths can trap water around the surface of the brick and mortar, leading to potential frost damage from repeated freezing and thawing.

How to remove organic growth from brickwork:

Moss, algae, and lichens thrive in damp, cold, shaded areas. If these conditions can be addressed and mitigated, the organic matter will usually reduce without a chemical treatment. If this is not possible, the contractor can remove any loose growth then apply a surface biocide to prevent and destroy growth. It is most effective to apply biocide during drier weather to prevent dilution. The contractor must test a small inconspicuous area first and follow all manufacturers' instructions.

5.0 BRICKWORK COMBINED WITH STONE DRESSINGS

Cleaning stonework is similar to cleaning brickwork, but modern techniques have developed a number of alternative methods.

The principal methods have been developed by Stonehealth and are as follows :

DOFF : It is a steam based stone cleaning system that can achieve temperatures of 150C at the nozzle end. The operator is able to vary the temperature and pressure to remove many types of paint or biological matter.

TORC : The Torc system creates a gentle swirling vortex using a mixture of low-air pressure, little water and a safe, inert, fine granulate.

Clean-Film? : It uses a latex paste that is applied to surfaces to remove dirt, stains and pollution. This product does not use water and there is no risk of leaching salts or other chemical residues. There are no chemical after effects to the substrate.

It is sometimes necessary to combine the DOFF and TORC systems to deal with different means of cleaning the stone. It is critical that the cleaning methods are first applied in discrete areas to assess their effectiveness. Sample panels should then be located once the method has been agreed so that quality control measures can be agreed to achieve a consistent approach.

Acknowledgments: This Method Statement has quoted extensively and in many places verbatim, as well as using the photographic examples, from Historic England 'Repointing Brick and Stone Walls: Guidance for Best Practice', produced in January 2017.

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November 2023