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Expert Commentary: Application of Lime Render

Address: 39 Argyle Street, London, WC1H 8EP

Date of Review: Thursday, 7th September 2023

Review carried out by: Joe Malone BSc (Hons) MCIOB C.Build.E MCABE

Prepared by:
Malone Associates Ltd

Prepared for:
St Pancras Hotel GRP.
31-39 Argyle Street
London

Joe Malone BSc (Hons), P402 Cert. MCIOB, C.Build.E MCABE
Principal: Malone Associates Ltd

Landline: 0800 0437732 Mobile: 07447 030254
Email: joe@maloneassociatesltd.co.uk
Blog: www.buildingdefectanalysis.co.uk
38 Richmond Road, Kirkby in Ashfield, NNG17 7PR

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1.0 INTRODUCTION

1.1 Mr. Joe Malone of Malone Associates Ltd, was instructed by St. Pancras Hotel GRP to review the efficacy of the application of lime render at 39 Argyle Street, which as I understand, had recently been installed in error, as part of a larger scope of external renovation works at 31-37 Argyle Street.

2.0 EXPERTS CV

2.1 Joe Malone is a degree qualified building surveyor, a CIOB Chartered Building Consultant, a Chartered Building Engineer and a licensed asbestos surveyor. He is one of the UK's leading experts on damp and building pathology and runs a Chartered building consultancy in Nottinghamshire, with a strong specialism in building pathology and does a great deal of expert witness work, particularly relating to damp, disrepair and construction defects.

He was a visiting guest lecturer teaching undergraduate building surveyors in building pathology at Coventry University between 2010 and 2018 has been teaching damp investigation and remediation and building pathology to the wider industry since 2006, recently including training London Borough of Hounslow Environmental Health Enforcement Officers.

He writes and maintains the popular academic blog www.buildingdefectanalysis.co.uk and is a published technical writer with technical articles published in the CIOB's Construction, Research and Innovation Journal, SAVA's technical bulletins and the ICWCI's Site Journal. His expertise in damp investigation developed from two years research carried out into rising damp that resulted in a completed dissertation entitled, 'The Efficacy of DPC Injection.'

Joe Malone is regularly appointed as a key speaker for the Royal Institution of Chartered Surveyors (RICS) CPD conferences where he gives talks on damp and building pathology. RICS have commented that, *'you are one of our highest scoring speakers in our evaluation forms and we are always very keen to work with you.'*

He is also regularly asked to give talks on building defects and damp at CPD events for the Chartered Institute of Building and the Chartered Association of Building Engineers.
He works across the UK and has carried out hundreds of detailed building investigations for a wide range of private and commercial clients.

3.0 BACKGROUND

3.1 I was contacted by the client, St Pancras Hotel GRP, in August 2023, with regards to a listed building enforcement notice from Camden Council which requires St, Pancras Hotel GRP to; *'Completely remove the painted stucco render from No. 39 front elevation at ground floor level (reinstating and making good the underlying brickwork to match the adjacent building on the sites terrace)'*

"I understand that a program of external works was recently completed at 31 – 37 Argyle Street, to remove cementitious OPC pointing and render, clean up the 1830s London Stock brickwork, and to apply a lime render to the ground floor masonry. I also understand that at the same time Lime render was installed at number 39 in error. "

It should be noted that this is a purely technical review which is focussed on the efficacy and deleterious effects of the cementitious OPC (Ordinary Portland Cement) pointing, which was originally installed to 39 Argyle Street and the removal of OPC render and application of lime render to 31-37 Argyle Street.

I cannot attest to the condition of the London stock bricks, as seen when the OPC pointing was removed, but I will discuss the deleterious effects that Ordinary Portland Cement pointing has on historic London Stock brickwork.

It should also be noted that this is a desktop review, completed after a review of the information supplied by the client, Photographs were supplied relating to the condition of the brickwork at 31-37 Argyle Street but no photographs were available relating to the condition of the brickwork at 39 Argyle Street.

4.0 GENERAL PRINCIPLES FOR CONSERVING HISTORIC BUILDING FABRIC

4.1 There are universally accepted golden rules for conserving historic building fabric:

1. Mortar should always be weaker than the masonry units it bonds together.
2. Render should always be weaker than the masonry units it bonds together.

Bricks from this era are fired in the brick kilns at a much lower temperature, resulting in a softer, more porous brick, than would be seen in modern brickwork. Historic buildings of this type manage moisture in line with the 'overcoat' principle' that is to say, that just like a thick woollen overcoat, the bricks will absorb some moisture, but will keep the occupants dry, so long as the masonry is allowed to go through seasonal wet/dry cycles.

The masonry must be allowed to breathe, and be able to lose moisture through the normal evaporative process to function as intended. With this is mind, it is critical to note that the lime mortar joints are sacrificial; with most of the salts and moisture being lost through the mortar joints. In the process, the lime mortar joints erode far more quickly than would be seen for hard OPC mortar joints. Substituting the lime mortar with OPC mortar results in a building that can no longer lose salts and moisture through the mortar joints, which in turn, drives up salt and moisture content in the bricks. This in turn leads to advanced spalling and erosion of the masonry due to freeze/thaw action and damage is often focussed on the brick arris.

The same principle applies where hard OPC render is applied to historic building fabric. Cracks will usually develop in the render due to differential movement between the render and the much softer brick substrate. This results in water ingress, which drives up brick moisture content and leads to wetting of the bricks and subsequent spalling due to freeze/thaw action. It is common to see a great deal of spalling and erosion to the underlying masonry, once these hard OPC based renders are removed.

Over the years I have seen numerous historic buildings suffer severe masonry damage, where lime mortar was substituted with OPC mortar, or where lime render was substituted for hard impermeable OPC render.

It is further critical to note that kiln fired bricks have a 'fire skin,' which can be defined as the protective shell surrounding the brick, this has greater weather resistance and durability than would be seen to the soft inner core of the brick. Once bricks have spalled and lost this fire skin, the brick is less weather resistant and more likely to be affected by penetrating damp, which in turn accelerates spalling due to freeze/thaw action. The loss of this fire skin and the resulting loss of weather resistance should be

a prime consideration in any discussion relating to the ongoing repair or conservation of the building fabric.

It is essential that repair and conservation work is carried out sympathetically using traditional materials and techniques if these buildings are to be preserved.

5.0 MASONRY DECAY AT 31-37 ARGYLE STREET

5.1 On review of the photographic evidence, it can be seen that brickwork at 31-37 is heavily spalled and the bricks have lost the sharp brick arrises. The brick face has taken on a rounded appearance which negatively affects the buildings aesthetic, as well as technical qualities.

Figure 1

It is inevitable that some damage will be done to the masonry as hard OPC render is removed, but also inevitable that some damage will have occurred due to the OPC render trapping moisture in the masonry. Freeze/thaw action and subsequent spalling and erosion would have been progressive and ongoing had this render not been removed.

The following statement is taken from 'Traditional Brickwork, Construction, Repair and Maintenance 2022, Terrence Lee, P114.

"*Cementitious Renders- Hard cement renders are applied to traditional brickwork in the belief that it will keep out the elements. Unfortunately the opposite is often true as once cracks begin to form, and these may barely be visible to the human eye, they can trap moisture from rainfall against the brickwork which cannot escape but can then capillary*

up the walls. Sometimes the render pops away from the brickwork, just enough to form a void behind which insects can form colonies. Whilst it is in some cases positive to remove cement renders, this action, even if done carefully can be particularly destructive as the render often pulls away at least the fire skin of the brick leaving the only option being to apply a lime render".

It should be noted that Mr. Lee, the author of this book, passed the City and Guilds Craft and advanced craft certificates in bricklaying, and also has a Master's Degree in Historic Environment Conservation.

6.0 MASONRY DECAY AT 39 ARGYLE STREET

6.1 I have been assured by the client that the lime pointing at 39 Argyle Street had been substituted for hard Ordinary Portland Cement pointing and that on removal of the render at 31-37, the condition of the brickwork at number 39 was in similarly poor condition to the masonry at 31-37

I am further assured that 39 Argyle Street has been pointed with Ordinary Portland cement for over 50 years, and that being the case I have no doubt that this pointing would have caused severe spalling and erosion to the soft London Stock brickwork.

To all buildings, moisture in masonry tends to be concentrated at lower levels and therefore spalling and erosion of the masonry tends to be focussed at lower levels and in my view, spalling and erosion of low-level masonry was the likely reason that an OPC based render was applied at 31-37 Argyle Street.

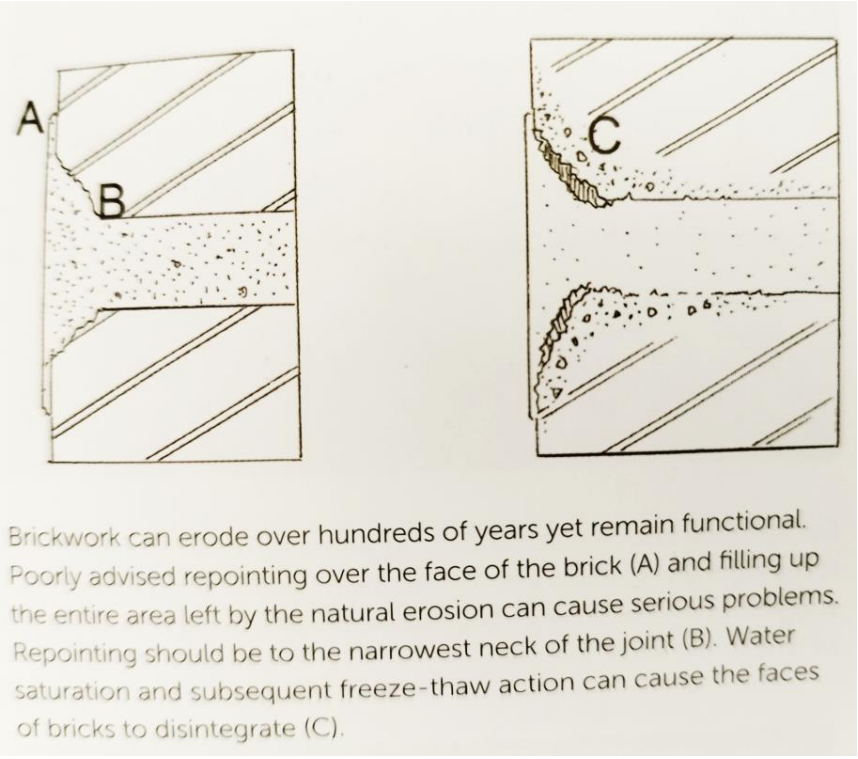
As discussed in section 4.1 of this report, when lime mortar joints lose the ability to lose salts and moisture due to the application of hard OPC pointing, then inevitably, we will see significant spalling and erosion of the brickwork, which tends to be focussed on the brick arrises. Future attempts to correctly repoint using lime mortar will result in messy smeared mortar joints due to the loss of these arrises.

The following statement is taken from 'Traditional Brickwork, Construction, Repair and Maintenance 2022, Terrence Lee, P113.

"Blocking the joints with hard cement render pointing mortar will seal this moisture escape route, forcing it to pass through the brickwork instead, filling up the countless voids they contain and forming ledges on which moisture can sit inside the brickwork. Moisture sitting inside the brick freezes, causing damage to the brick through spalling or flaking of the brick surface. A Common problem is the filling of the places where bricks have eroded deeply with cement mortar. This creates a hard spot and potentially destructive repair which usually results in accelerated decay spreading to adjacent lime built brick work.

Use of hard cement pointing mortars compounds the problems of water ingress by trapping moisture inside the walls . Since the lime mortar joints form the main conduit for water evaporation from the wall, and as this can be up to 20% of the wall surface, greater areas are at risk from frost damage and spalling if cement pointed. Hard cement pointing can form horizontal ledges inside the brickwork on which water can accumulate. During freezing weather the ice formed can expand, which causes cracking and breaking off the edges of bricks, or an arris to break, resulting in the widening of brickwork joints and the faces of the bricks in the form of spalling and disintegration of the brick. Constant presence of moisture, trapped in this way. Will also result in physical wearing of the brick edges."

Figure 2 below illustrates the damage that will be seen where lime has been substituted for OPC pointing.



Brickwork can erode over hundreds of years yet remain functional. Poorly advised repointing over the face of the brick (A) and filling up the entire area left by the natural erosion can cause serious problems. Repointing should be to the narrowest neck of the joint (B). Water saturation and subsequent freeze-thaw action can cause the faces of bricks to disintegrate (C).

Figure 2

7.0 CONCLUSIONS & RECOMMENDATIONS

7.1 I have concluded that if the masonry at 39 Argyle Street was in a similar state of decay to that seen at 31-37 Argyle Street, then this was not a candidate for simple cleaning and re-pointing. This was highly likely to be the case given that the masonry had been repointed with hard OPC mortar.

Spalling and erosion at 31-37 was so widespread that the aesthetic appearance of the building is severely impaired but more importantly, the masonry façade has severely reduced weather resistance due to loss of the brick fire skins and as such, will be at significantly increased risk of penetrating damp and accelerated freeze/thaw action and subsequent erosion. I have no doubt that the application of lime render was the technically correct course of action to take when dealing with 31-37 Argyle Street,

Whether or not the application of lime render complied with listed building consent is outside of the scope of my appointment, but I can state that given the alleged condition of the brickwork at 39 Argyle Street, the application of lime render to the masonry was also the correct and appropriate course of action to ensure that the facade now has the required degree of weather resistance.

8.0 RISK OF FURTHER CONSEQUENTIAL DAMAGE

8.1 I have to be clear in stating that if action is taken to remove the recently installed lime render, then it is inevitable that further chipping and damage will occur to the underlying masonry. Arguably, removal of this lime render would not cause the degree of consequential damage as would be seen when removing a hard OPC based render, but there will be some degree of consequential damage.

Moreover, it will be extremely difficult to remove render stains from the brickwork without either acid washing or sand/media blasting, both of which will also likely cause further harm (chemical or abrasive) to the masonry. An order to remove this render is an order to cause further consequential damage to the brickwork.

Signed

Joe Malone BSc (Hons) MCIOB, C.Build.E MCABE
Chartered Building Consultant & Chartered Building Engineer.

Principal, Malone Associates Ltd

7th August 2023