

## Midland Hotel, Manchester – Fire Damage Repair Work

### METHODOLOGY

#### Objective

To describe a step-by-step process for the removal and replacement of polished granite and overhanging Terracotta damaged by fire in the entranceway to the Hotel restaurant.

From initial inspection from the ground, the fire has caused damage to much of the granite stonework within the Arched doorway, to the facing granite surrounding the doorway, especially above the Arch and to the face and soffit of the balcony above.



#### Core materials and tools required

Three different granite stonework, all with a polished finish, Peterhead, Shap and Dalbeattie, with primarily Peterhead a red granite required with Shap (grey granite) features and the Dalbeattie may be required at Low level. It should be noted that the Dalbeattie quarry is

currently used for producing aggregates and not dimensional stone. The process of extracting this stone involves explosives and means suitably sized and sound dimensional stone is difficult to obtain.

New replacement terracotta/faience blocks may be required, subject to site survey and subsequent agreement. These replacements are manufactured by specialist supplier who will provide sample pieces for approval, to ensure new replacements match closely to the existing in both colour and texture.

Cleaning of the remaining soot etc. from the fire will be carried out predominantly using the Doff system using hot water or steam following confirmation of an approved sample. Stubborn or carbon build up areas will be tackled with a single pass of the Jos System. All water and dirt run off will be collected in a sandbag barrier and be collected and bagged for subsequent disposal off site

Access scaffolding will be required, both for initial cleaning and survey works, and subsequent removal and installation of finished materials. Scaffolding will be of tube and fitting with boarded platforms, light duty initially for cleaning and survey works, and more heavy duty required for the removal and reinstatement works.

### **Step by step Methodology**

1. Behind an erected Hoarding an independent tubular scaffold will be erected for cleaning and survey work, and beefed up to a heavy-duty scaffold for the removal and reinstatement works.
2. Seek approval of samples of materials to be used in these repair works from Planners, Architect and Client.
3. We will prepare and distribute a Construction Phase Health and Safety Plan a copy of which will be kept on site and will be continually updated as and when necessary.
4. Site preparation
  - Agree with the Hotel management exactly how we are going to maintain the Restaurant fire exit route through the work area. The fire exit route must be maintained at all times
  - Clear the proposed work area of any debris, loose or friable material within the arched doorway
  - Set up safety barriers to prevent unauthorised access to the work area
  - Install access scaffolding to the Entrance and Balcony area together with perimeter hoarding for security and any banner/protective sheeting to be possibly agreed with authorities and the Hotel Management.
  - Carry out an initial inspection of the fire affected masonry to ensure there are no loose or dangerous overhanging masonry
  - Carry out a cleaning operation, using the Doff process to remove soot and smoke to leave clean surfaces for detailed inspection and survey works – Note: Subject to sample acceptance prior to full works. Stubborn areas would be tackled with a single pass of the Jos System

## 5. Detailed site survey

- Carry out a detailed dimensional survey of the arched granite doorway, surrounding structure and the balcony above, to prepare a working drawing identifying all the individual stones requiring repair and replacement.
- Intrusive investigation is also required to establish the depth (thickness) of the existing stones requiring repair and replacement to ensure that the remnants of these stones once the 50mm-100mm thick facing has been removed, will remain stable. Investigate & provisionally core diamond drill in several locations to confirm the full thickness of the existing stonework for agreement.
- If upon cutting back the face of the granite, the remaining granite is found to be in an unstable condition, then the advice of a **structural engineer** will be required.
- A schedule of individual replacement stones to be prepared each uniquely referenced to individual detailed stone drawings which detail the stone dimensions and polished finish surfaces required.
- The results of this survey to be submitted to the Architect for comment/approval before transmitting to the stone supplier for manufacture.
- Once the details of the site survey have been agreed, the initial access scaffold will be adapted to a heavy-duty scaffold to TG20 requirements, so that support is provided to both the arched granite and the balcony soffit structure, as considered necessary following the detailed earlier inspection.
- We have been advised that the manufacturing period for granite may be 20 – 28 weeks but can be affected by workload at the time we place our order.
- Replacement Terracotta/Faience can also take considerable time to manufacture.
- Following detailed survey/inspection the extent of Terracotta/Faience repair/replacement will be agreed. A full task briefing will be carried out to cover the full method of works. Those blocks requiring replacement will be carefully removed and their remains taken to terracotta manufacturer for them to model the replacements from, further investigations to be carried out to confirm methodology.
- Once the balcony structure has been opened up, the **Structural Engineer** will be able to inspect the condition of the existing support structure, further investigations to be carried out to confirm methodology.

### **Granite manufactured off site**

- Supply, preparation and manufacture of the replacement Granite and Terracotta will be carried out by our suppliers at their premises.
- Preparation and manufacture of the replacement Granite will take place in Inverurie, Aberdeenshire. A factory visit for Client and Architect escorted by Bullen representative(s) can be arranged to check on manufacture progress and to inspect the quality of the production process/finished products as required.
- Individual granite blocks are cut and shaped using specialist heavy duty machinery. The surfaces requiring a polished finish are treated by polishing pads with varying grades of grit and cold water diminishing the grit grade as the level of polish required is achieved either using hand operated or fixed machinery.
- Delivery of the completed material will be made to our Lowerhouse works, where the stones will be stored, sorted and delivered to site in small quantities to meet site needs “just in time”, avoiding the need for a large site storage area. Each stone identified with a unique indelible mark, as recorded on the survey drawing.

### **Replacement Terracotta for the Balcony**



- Supply, preparation, modelling and manufacture of the replacement Terracotta will be carried out by our suppliers at their premises.
- Firing of individual samples for colour will be carried out and offered for comment/approval.
- Our detailed stone drawings will show the dimensions of the finished block, but the manufacturer will make clay models slightly larger than detailed, allowing for the drying out during their manufacture process.
- Once modelled the clay models are left to air dry.
- Eventually they are moved into mechanical dryers over a five day operation to achieve the required moisture content.
- Any glaze finish is applied before the blocks are placed in the kiln for firing in excess of 1000 degrees Celsius, an operation which takes five days from closing the kiln to opening up once the kiln has cooled down sufficiently.
- Once removed from the kiln, the individual blocks are inspected and if any damage is found, the damaged block must be remade as the whole process once again.

### Site removal and replacement works

- A heavy duty work & access scaffold will be erected using tube and fitting with boarded lifts each 2 m high, together with painted security hoarding at ground level and sheeted perhaps with monarflex.



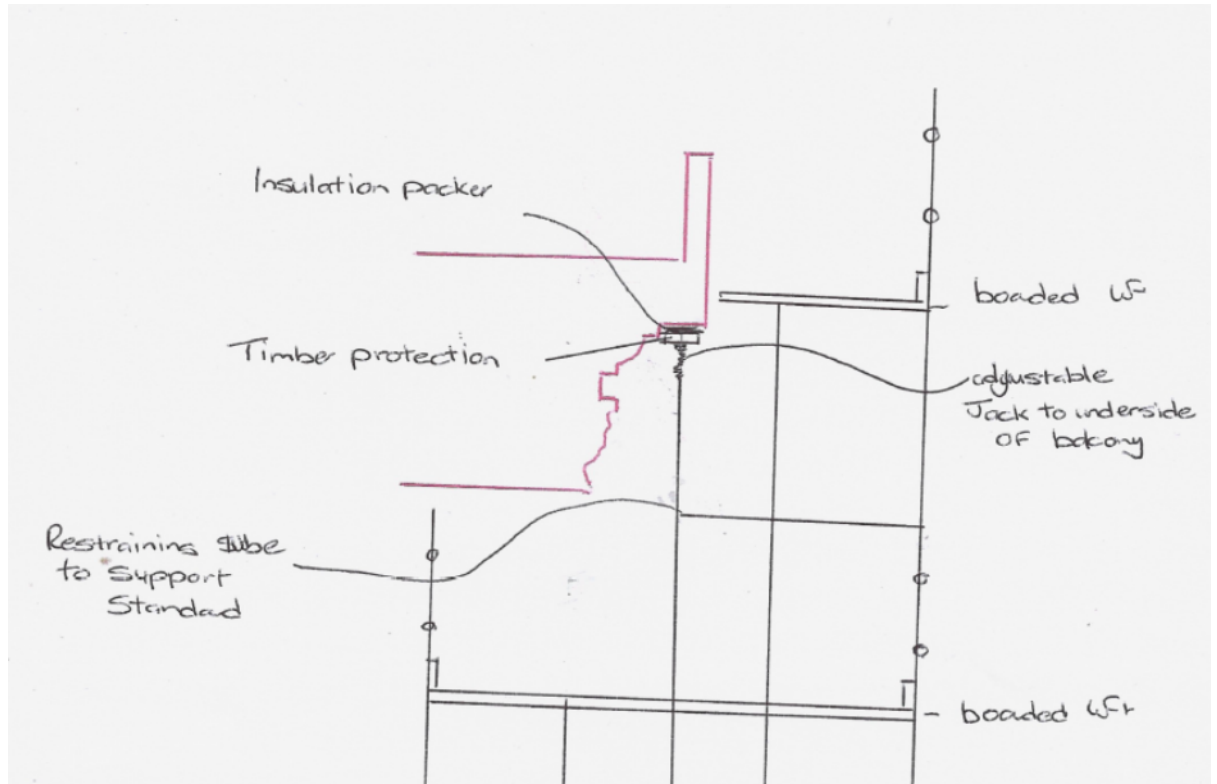
***A possible printed banner to wrap the scaffolding above the painted hoarding is subject to client discussion and cost approval!***

- The adjacent detail of the proposed hoarding has been agreed with Highways – formal application to be made upon receipt of order.
- A safe and clear exit route will be maintained through the scaffold and our work area with an escape door

formed in the painted hoarding at both ends.

- Prior to initial breaking out to install suitable propping as shown locally on typical sketch drawing below to include cushioning to protect any bracing, voiding, and any undue movement. The scaffold design drawing will include details of these temporary supports. A brief sketch is provided below.
- All areas will be regularly inspected during breaking out to ensure no cracking occurs.





- Commencing at the higher levels, with the necessary propping of the balcony soffit in place, breaking out of the moulded granite string course immediately below the balcony and the ashlar facing below will be carried out using a combination of diamond core drilling, cutting/ribbing to required depth together with drills, power tools and hand tools comprising mallet and chisels.
- This operation will continue with the arch voussoir stones and arched soffits, followed by the quoin stones and reveal blocks lower down.
- Noise and silica dust can be a hazard that will require managing. Quiet times can be established with discussions with the hotel management, and our craftsmen are tasked with keeping their work area clean and tidy. Masonry debris will be bagged and airborne dust minimised by water suppression/spray attachments and collected by vacuum equipment and/or suitable plastic sheeting. Waste material will be removed regularly via Bullen vans, we are registered waste carriers, and disposed via Holroyd's waste management service in Oldham. Risk assessments and Method Statements will be produced to manage these hazards.
- The replacement granite and terracotta blocks will be delivered to our Lowerhouse works, and delivered to site in small quantities, as and when required "just in time".
- The new blocks will be stored on site temporarily within a compound erected in a nearby car parking bay commissioned from Highways and will be trolleyed into the work area and hoisted up to the required scaffold level by an electrical hoist within the erected scaffold, safely behind the hoarding. No new blocks will be stored on the pavement behind the hoarding, to ensure the fire exit route remains unhindered.
- Installation of new stonework will follow the breaking out works, ensuring no newly installed stones could be disturbed by any adjacent breaking out works.
- Commencing at ground level, the replacement quoin and reveal stones will be installed, ensuring line and level to the existing structure is maintained.

- The replacement voussoir and arched soffit stones will require to be founded on the moulded string course below, and supported temporarily with an arched former and therefore the string course must be installed before the Arched soffit can be installed.
- Removal of the temporary arch former should not occur until the bedding mortar has cured.
- Restraint of the new stones will be using a combination of stainless-steel pins and threaded rod dowels drilled into existing and set in epoxy resin. All beds and vertical perp joints will be jointed with a mortar slurry. Details to be agreed with structural engineer once all masonry has been cut back before fixing.
- Final pointing of new replacement stones will be carried out in one final operation using an approved mortar mix. The joints will be very fine and will require a very finely sieved aggregate mortar mix carefully applied by hand to avoid any smearing of the new stones and will require care until the mortar is finally cured.
- The newly installed stones will be cleaned down as work progresses and will receive a final clean using the Doff hot water/steam process with detergent applied if necessary.

### **Final Inspection and clear site**

Regular site visits and inspection by the Architect is anticipated, a final inspection will be arranged before the scaffold is removed.

The scaffold will be progressively removed enabling any last-minute cleaning and touch up pointing to occur whilst the areas remain accessible.

Once the scaffold has been completely removed on last clean will be carried out whilst the security hoarding is being removed, to leave our work area and adjacent pavement areas clean and tidy.

### **Future Cleaning & Maintenance**

The polished granite surfaces are very resilient but may require routine cleaning using mild detergent for localised cleaning, do not use any abrasive cleaning materials/products.

Wholesale cleaning should only be carried out by specialist DOFF cleaning process by experienced specialist contractors like ourselves (Please see attached data sheet).

We will produce an operation and maintenance manual at completion of the project which will provide full details of the suppliers, manufacturers of the materials incorporated together with their recommendations for future maintenance and cleaning.