

Europa Nostra Awards 2024 – response to additional question of 18th March 2024 (Westminster Hall)

Issued 25th March 2024

To specify conservation treatments of the masonry we were advised by Jefferson Consulting Ltd (geologist) and David Odgers (Odgers Conservation Consultants). The consultants, architect, and subsequently the masonry conservators worked together to schedule out the conservation works to the carvings based on condition surveys and reference to older photographic records.

The treatments were selected based on the success of previous projects: the results of a magnesium research project at Howden Minster; recent experiences at York Minster and trials carried out on the stones.

The approach was to clean and remove sulphation from the surface of the stone, to consolidate any powdering stone, and protect decayed areas with mortars. Finally, the surface was coated with a lime-based shelter coat to mitigate against the effects of condensation. The intention was to stabilise the surface in a subtle way, retaining some patina and avoiding the stone looking 'painted' to the untrained eye.

The carvings were generally cleaned with laponite / clay / ammonium carbonate poultices (rather than the Arte Mundit latex product which was used on ashlar, cornices, and similar). This was typically made up of 8-10% ammonium carbonate solution and a mixture of sepiolite clay and paper pulp (1:1 or 5:3 ratio) to give a relatively dry poultice. This was applied to the surface, covered with clingfilm and left for up to 2 hours (contact time varied depending on the extent of dirt). After removal of the poultice, the surface was rinsed with clean water using a microporous sponge, bristle brushes and lightly misted if required.

Nanolime consolidation needed to be able to penetrate beyond the zone of deterioration (up to 5mm) without changing the behaviour and appearance of the stone. Nanolime (Calosil E25) introduced lime (as a suspension in alcohol) into the stone, thereby avoiding excess water being introduced into the stone and allowing for deeper penetration. This was applied by syringe, controlling run-off, with excess sponged off, comprising three applications with up to two days between each. This approach was informed by a contemporary research project by English Heritage.

Where necessary, fine cracks and fissures were consolidated using CalXnova lime injection mortar. Larger repairs used traditional lime mortars, made with dispersed lime putty (as the lime compounds in DHL carbonate significantly faster because the surface of the lime is increased by dispersion). Mortars were typically 1:1:1 silver sand, Bath dust, Portland dust, dispersed lime putty.

The shelter coat had several benefits such as filling the pores of the stone to reduce accumulation of pollutants in the pores, reducing the potential for damage to the stonework from condensation and finally by homogenising the surfaces to make the carving appear more consistent with the original architectural intention.

The shelter coat was based on dispersed lime; due to the very fine pore structure of the magnesian limestone, the aggregates to be mixed with the lime will need to pass through a very fine sieve (<300 µm). Mixes were typically 1:2 putty and Bath stone dust, with Portland dust, Ham stone dust and raw sienna used to adjust colouring to suit. The shelter coat was applied to pre-wetted stone and well worked into the surface. After ten to fifteen minutes, the surfaces were further stippled with a bristle brush and then allowed to dry / carbonate slowly. Once it had dried, excess material was removed by brushing. Where appropriate a base coat, a shadow / recess coat, and a final coat for high relief detail was used, to maintain visual depth.

Reports were prepared for each bay, recording exact conservation treatments per carving and mapping the locations of consolidation and mortar repairs. Paint analysis was undertaken in advance; traces of historic lime wash were found, but very little paint or gilding; exceptions include the medieval figures above the medieval treasury door and the north door. In these instances, the polychromy was mapped, and no shelter coat was applied.

Appendix A: photographs and Schedule Extract

The photograph queried shows the final result.

The below images show the three stages of work to typical carvings: before cleaning, after cleaning, and after shelter coating.

Before
cleaning



Recording
areas of
mortar
consolidation



After
consolidation
and lime
shelter coat

