Historic England

Conserving War Memorials

Case Study: Deterioration of Metal Fixings

Waterloo War Memorial, Bispham Hall, Wigan, Greater Manchester

Summary

This case study describes a conservation project to the Grade-II listed Waterloo Memorial at Bispham Hall. The memorial was in poor condition with deformation caused by ferrous cramps. Grant aid was secured from War Memorials Trust, who offered to fund 75% of the repair work costs and associated professional fees; the remaining costs were funded by the Waterloo Monument Group. Without this funding it would not have been viable to carry out the level of conservation repairs required to secure the long-term future of the monument.

This guidance is intended for those designing, specifying and undertaking conservation and repair work to free standing war memorials, such as architects, building surveyors, structural engineers, project managers, contractors, craftspeople, and conservators. It will also be of interest to those responsible for making decisions, such as local authority conservation officers, custodians or volunteer groups. It also indicates where to get further help and advice.

This guidance forms part of a series of resources produced by Historic England, to coincide with the centenary of the First World War. This series covers the overall approach to caring for these memorials, as well as some of the more poorly understood technical aspects. It includes:

- guidance on how to record, repair, conserve, maintain, and protect these unique monuments for future generations: The Conservation, Repair and Management of War Memorials and Conservation and Management of War Memorial Landscapes
- short technical advice notes covering inscriptions, structural problems and repairs, and maintenance
- case studies on conservation options for specific war memorial issues
- films on technical aspects of war memorial conservation

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Front cover:
Bispham Waterloo war memorial before and after conservation work.

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1 Description and Condition

Description

The Grade-II listed Waterloo Memorial was erected in 1816 by brothers Robert and John Holt of Bispham Hall to commemorate the 1815 victory at Waterloo. The monument comprises an ashlar obelisk, topped by a ball finial, surmounting a square plinth. The plinth has rebated inscription panels.

Usually a war memorial is shared and accessible by the community, but this monument was erected within the grounds of the Hall for the family's private use. The grounds of Bispham Hall are now let to the Scout Association who look after the surrounding woodland and use the site for camps and outdoor activities. The monument is also used by the Scouts for formal ceremonies.

Condition

The custodian was concerned because the monument appeared to be leaning over: the deformation was clearly visible in the top two-thirds of the obelisk. Previous investigations had suggested that an iron rod was embedded within the centre of the obelisk, fixing the ball finial in place, but this was unconfirmed.

1

1 The sandstone monument consists of an obelisk, capped with a ball finial on an inscribed stone plinth. The deformation to the top third of the monument is evident.

However, what was apparent from visual inspection was that the wrought-iron cramps used to secure the stones had corroded, causing cracks in the masonry. The cramps had also jacked the course joints open, causing distortion throughout, which threatened the stability of the whole monument.

Therefore, the corroding cramps embedded within the structure were identified as the source of the deformation and damage to the stone.

Apart from the cracks caused by the ferrous cramps, the stonework was in fair condition, with some delamination on exposed faces.


2


3

2 Cracking and spalling of plinth stonework caused by corroding cramps.

3 Open joints where movement had caused the loss of mortar.

2 Remedial Options

Repointing

A minimal intervention scheme could have reduced moisture ingress by repointing open joints, thereby reducing further corrosion to the cramps. However, such an intervention would not have addressed the deformation or instability of the structure, nor would it prevent further damage to the stone.

Cutting out the cramps

Cutting out the cramps without dismantling would have caused an unacceptable amount of damage and would not be a viable economically.

Dismantling and rebuilding

Another option was dismantle the memorial, remove the corroded cramps, and rebuild it using new stainless-steel cramps.

4

4 The effect of corroded cramps was evident in the jacking of course joints throughout the monument. Individual masonry pieces were generally in a sound condition, with minor surface delamination.

3 Solution

The preferred option to address the underlying issue and secure the long-term conservation of the monument was to dismantle it, remove the corroded cramps, and rebuild it with new ones. Underpinning was not required as most of the deformation occurred above plinth level. Small variations in the level at the top of the plinth caused by settlement (less than 10mm over 1000mm) were capable of correction by levelling the courses.

The extent of dismantling posed a philosophical challenge. Should the monument only be taken down to where the cramps were visibly jacking, or down to plinth level, or perhaps even to base level to remove every corroding cramp?

It was decided to take the monument down to plinth level in order to access and inspect all of the ferrous cramps to ensure that if any could be left *in situ,* they would not corrode enough to start the cycle again.

5

5 The monument was dismantled down to the plinth, which sits on a coursed stone base.

A CARE (Conservation Accreditation Register for Engineers)-accredited Engineer was consulted and confirmed that this level of dismantling was sufficient to ensure the long-term conservation of the memorial.

A detailed photographic record of the monument and index of the location and orientation of each stone was kept. The monument was then carefully dismantled. Old mortar was scraped off the stones and they were set aside for re-use.

6 As dismantling continued, the masonry elements were carefully stored so that they could be incorporated accurately as the monument was rebuilt.

7 Replacement stainless-steel cramps were fixed in lead. This image shows a trial after the lead was introduced. Hot, molten lead was poured into the cavity in the stone. Once cooled, the lead solidifies tightly around the cramp (not seen).

Opening up during the works revealed that the cramps had been secured with poured lead. No central iron rod was identified during dismantling, although a 300 mm long, 15-mm diameter iron rod had been used to fix the ball to the top of the obelisk.

The corroded cramps were replaced with austenitic stainless-steel cramps (grade 316), set with poured lead. Other options were considered to set the cramps – including the cost-saving option of a resin compound – but the more authentic repair using poured-lead fixings was preferred. Working with the poured lead also provided an opportunity for the development craft skills. A detailed method statement was prepared by the contractor, along with samples on an off-cut of stone to check the quality of this method before it was used on the monument.

Stone replacement

A large indent repair was required at the base of the monument to replace a irregularly shaped cement mortar panel. A square indent would have required a substantial section of sound stone and inscription to be removed. A smaller indent and proprietary mortar mix was specified so that the minimum amount of historic fabric would be lost. The lifespan of the repair may be less, but this was considered an acceptable compromise to retain more historic fabric.

Scaffolding erected around the monument allowed a closer inspection of the top section. It was discovered that a hairline crack had developed in the stone below the ball finial. The contractor suggested using stainless-steel dowels to stitch across the crack. This repair was attempted, but the stone was found to be too friable to withstand this method. Therefore this element had to be replaced.

The original stone was known to have been sourced from a small delph on the estate. For this project, this source provided replacement stone for smaller indents, but pieces for larger elements were unavailable. An alternative sandstone from Fletcher Bank quarry was identified as a suitable alternative since it was similar aesthetically and petrographically to the original.

4 Lessons Learnt

Post-project reflections are useful for learning what could be done differently in the future. The nature of conservation often means that unforeseen dilemmas and situations arise and even the best planned projects require flexibility and adaptation to resolve them to produce appropriate outcomes.

Condition assessment

In this project pre-contract inspection and assessment were financially constrained. It was not possible to inspect the stones at the top of the monument in the same detail as those at lower levels. A cherry picker or scaffold tower could have been employed, but was difficult to justify on cost grounds. Instead, contingencies and provisional allowances were used for the repairs to damaged masonry that became evident during dismantling.

Sourcing replacement stone

Although there was just enough stone in the delph to carry out the smaller indents, there was not enough to manufacture the new stone needed for the ball finial. This meant that not all of the repairs were carried out in the same stone. If the stone quantities could have been accurately predicted at the outset, sourcing new stone from an open quarry that offered a geological match for all of the indents and replacements could have been considered. This would have reduced the risk of mid-project delays.

5 Acknowledgements

Project team

Client: The Waterloo Monument Group

Surveyor: Jubb and Jubb Ltd.

Engineer: Blackett-Ord Conservation Engineering

Principal Contractor: W.J. Structures

Costs: The contract value was around £20,000 ex VAT and fees

Images

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War Memorials Trust

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