Materials and Techniques

for

Repairs to Traditionally Forged Ironwork

NHIG

National Heritage Ironwork Group

Cover:
Georgian terrace in Bath, fronted by traditional wrought iron balustrades

Acknowledgements

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About the authors

Chris Topp has four decades of experience as a blacksmith specialising in both conservation and new work to traditional designs.

Geoff Wallis has four decades of experience in metalwork, machinery and mills conservation.

About the NHIG

The National Heritage Ironwork Group (NHIG) was formed in 2009 to raise awareness and promote understanding of heritage ironwork in the historic environment.

Traditional forged and cast ironwork is an important and integral part of the historic environment, used widely in structural, architectural and functional applications.

The NHIG intends to set up a nationally accredited training and development programme to ensure that the skills of the Heritage Ironworker and Blacksmith are recognised, preserved and promoted.

It is the duty of all professionals and practitioners to promote good conservation practice in order to safeguard the long term survival and integrity of heritage ironwork. This document has been developed to help owners, professionals, blacksmiths, and conservation metalworkers to uphold best practice in the care of heritage ironwork.

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Introduction

This booklet provides concise guidance on the use of materials and methods appropriate for the repair of traditionally forged ironwork. It aims to help eliminate the use of inappropriate and damaging practice by increasing the knowledge of professionals and practitioners engaged in conservation work.

It is important that craftspeople are experienced in all the basic hot and cold working skills before embarking on heritage work, and are not learning these skills while working on historic ironwork. For further information about selecting and evaluating a blacksmith for heritage work, see **Commissioning Guidelines** in the Resources section of our website: www.nhig.org.uk.

A **Glossary of Ironwork Terms** is also available in the same Resources section on our website.

These guidelines are not written to teach the basic forging skills in which conservation blacksmiths should already be proficient, but to demonstrate how these skills are used to carry out repairs and renewals.

This booklet covers the architectural applications of ironwork in the post medieval and industrial eras up to the end of wrought iron production in the early twentieth century. Conservation of the forged steelwork that subsequently replaced ironwork is not mentioned specifically, but most of the principles and many of the practices for conserving iron also apply to steel.

Screen in the parish church of St. Lawrences, Ludlow

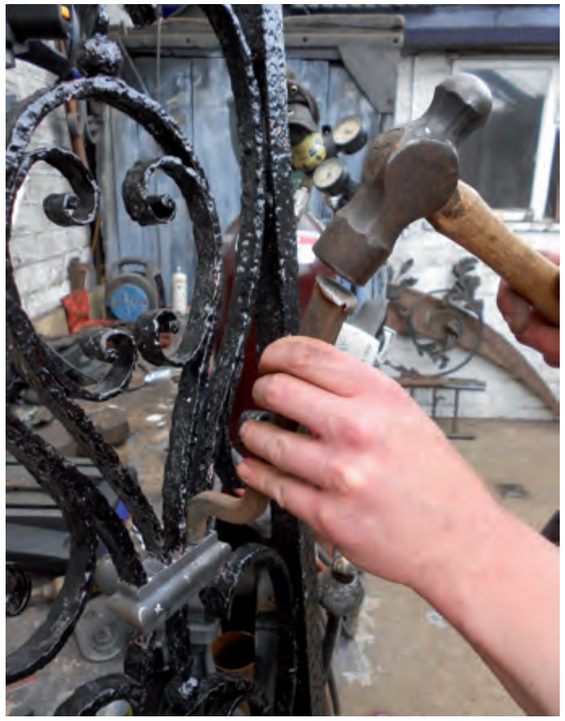
The Core Principles of Conservation

These guidelines are not a comprehensive list of every solution and therefore should be viewed only as an introduction to the subject.

The original text-only version of the NHIG Conservation Principles is available at www.nhig.org.uk

- Analyse, understand and assess the significance of the object prior to undertaking any decisions regarding intervention.
- Record the object as found, and at all stages of work.
- Care for and maintain the object to halt or minimise ongoing deterioration
- Retain the maximum amount of original/existing material
- Any interventions should be reversible where possible, but where this is impossible, interventions must respect the significance of the object.
- Professionals and practitioners must be competent in ironwork conservation and source other specific expertise where needed.

Fire welding



Collars - clockwise from top left:

Cold-fitted collar with integral rivets, which will be upset into countersunk reliefs.

This moulded collar has been assembled cold and is being filled with molten lead to prevent water ponding.

The lead contracts slightly as it cools, so has to be tightened by dressing, for which a cranked tool has been made especially.

Hot-fitted collar being quickly closed onto an assembly.

◂Collars, dismantling and reassembling

The treatment of collars depends on whether they were originally fitted hot or cold. The construction of each is very different.

Cold-fitted collars

Eighteenth century practice was to make the collar in two parts, a forged "U" shaped saddle with two small rectangular tenons and a strap secured by the tenons. The collar was assembled cold and the two tenons headed (upset) to secure it. Moulded collars were made in four pieces, carefully fitted, and usually secured by small round tenons at each corner. These were also assembled and the tenons headed cold. Cold-fixed collars are frequently found to be damaged, usually through loss of section or opened up by rust jacking. Removal is usually straightforward using a little heat to release the rust, but there is usually corrosion at least to the collar's rivets. Wastage is also common to the internal surfaces of the collar so the smith may need to manufacture new components or complete collars from recycled wrought iron to match the original.

Hot-fitted collars

Nineteenth century practice was to forge collars in one piece, with an open joint. These were heated, opened up and closed in place in one operation. Collars fitted hot are prone to being split open by rust jacking and internal wastage, often requiring complete replacement.

Collared joints should be painted thoroughly before assembly. On cold collars painting is effective, but is less so on hot collars where the paint tends to burn off. It is therefore particularly important to forge new collars from relatively corrosion-resistant wrought iron, marked to show its origin as not original.

Fire welding (see next page)

Top: this is to be a cleft weld and this is the way it is prepared

Left: The weld being made. The first blows are to the end of the bar, then the sides are struck and finally smoothed.

Bottom: The finished weld.

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