A Practical Guide for the Conservation and Restoration of Heritage Metalwork

A publication of

NHIG
National Heritage Ironwork Group

Endorsing organisations:

BABA
British Artist Blacksmiths Association

National Trust

ICON
THE INSTITUTE OF CONSERVATION

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Introduction

The National Heritage Ironwork Group (NHIG) was formed in 2009 to raise awareness and understanding of the importance of heritage metalwork, which is an integral part of the historic environment.

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 metalwork. This document has been developed to outline best practice in its care and conservation.

Prior to any conservation treatment being carried out, it is imperative that the significance and function of the object and site are fully understood. This is usually achieved by commissioning a conservation report which will:

- Identify the historic value of both object and setting
- Assess its current condition, including the archaeology
- Instigate any research and trials
- Develop a treatment plan

Within conservation philosophy, a significance-based approach is used as the context for decision making. Decisions are based on assessing:

- What am I dealing with?
- Why is it important and what is important about it?
- What is wrong and why?
- What can be done about it and what is the best option?

The following guidelines aim to help readers navigate the process of asking these questions and making decisions about which route to take.

Core principles

1 Analyse, understand and assess the significance of the object

2 Record the object as found and at all stages of work

3 Care for and maintain the object to halt or control decay

4 Minimise interventions and make informed treatment choices

5 Retain original fabric and finishes wherever possible

6 Source specific expertise where needed

Best practice guidelines

1. Consideration and understanding of significance

This is fundamental to the practical application of these guidelines.

Significance is the historic, aesthetic, technological or social value for past, present or future generations, including:

- Historical association with people, places or events
- Aesthetic qualities of form, colour, decoration, etc.
- Uniqueness of design, scale, materials, innovation, construction etc.
- Spiritual, political, or cultural association
- Rarity as a survivor of its type
- Educational and research value

Photographs and sketches supported by notes and dimensions are recommended as quick and effective methods of recording.

Records need to be stored in a registered archive such as the County Records Office, or the registered archive of the organisation commissioning the work. Records are of no value if they deteriorate or are lost, so must be stored securely in stable conditions, preferably close to the object to which they refer.

Technological advances may make digital records unreadable in the future, so these should be backed up by paper, which is the most long-lived recording technology to date.

3. Protection of surfaces

The corrosion of surfaces is a threat to the survival of all metalwork in an exposed environment. Surface coatings are historically important, and are likely to be lead based, along with fillers and jointing compounds.

Historic coatings should be retained and consolidated. Localised defects can be made good, and / or over painting can be carried out if required. This will have the added advantages of retaining historic fabric and information, as well as reducing the risk of operative and environmental contamination with lead.

Paint samples should be taken and analysed as part of the initial survey, and certainly before any intrusive work takes place. Samples should be retained as part of the conservation record.

Choice of paint type and colour will be made during the development of the scope of works. However, it is preferable to retain existing historic coatings so new paint systems should be compatible with older coatings. If replicating an earlier identified finish then decoration and level of sheen should be adopted.

The least intrusive/risky cleaning method consistent with achieving a stable, clean surface should be selected to minimise the risk to surfaces. Soundly adhering forge-scale on wrought ironwork, foundry scale on castings and surface evidence should be retained where possible.

Paints must be applied in accordance with the manufacturer's instructions by skilled operatives. Where modern-specification paint is applied over a traditional paint, adhesion and stability should be tested by sample areas ideally left to weather over several months.

4. Use of additional materials or structures for strength or support

Where ironwork is weakened or subject to increased stresses that cannot be relieved, structures may be strengthened by applying additional props, stays, ties or materials bonded on. These should be minimally intrusive and reversible wherever possible.

Care must be taken to avoid water traps and damaging point-loads where the new structure fixes to the original. Stiffening flexible structures and changing stress regimes in a way potentially damaging to the ironwork should be avoided.

5. Improvement of immediate environment

Where practical, the environment of historic metalwork should be improved by protection from the elements, by covering, coating, packing, dehumidification, reduction of pollutants, control / removal of vegetation, debris etc, and by measures to prevent de-stabilisation or theft.

6. Relocation to a less destructive environment

Ideally, historic metalwork should be retained in its original location, protected from damage, deterioration and theft.

If it is generally agreed that relocation is the only practical means of ensuring long term survival, the site should be fully recorded, fixings carefully released, and the structure moved to an agreed suitable location by skilled operatives.

Metalwork should be moved in sections as large as practicable with minimal disassembly. Components must be tagged, recorded and reassembled fully at the new location without delay.

All stages of the work should be recorded fully and records archived.

7. Levels of intervention

Treatments of minimum intervention, focusing on retention of original fabric and finishes, should be implemented wherever possible.

To minimise intervention consider the following options:

- Do nothing – sometimes the best course is to take no further action
- Holding repairs and maintenance; regular cleaning, removal/treatment of corrosion and organic matter, oiling, waxing or localised paint repairs and/or additional propping or bracing supports.
- Avoid if possible wholesale dismantling for repairs - consider modern cutting and joining techniques if necessary.
- To minimise disturbance to structure and surrounds consider carrying out work on site and in-situ.
- Original fasteners and fixings should be labelled and set aside during dismantling for reuse on assembly.
- Components that have deteriorated in their performance and stability can be repaired and/or strengthened to extend their life and serviceability. This could be achieved by filling, patching and reinforcing and may be more suitable than replacement.
- When an original object is deemed too vulnerable and its removal to archives or museum display is felt to be more appropriate, new or replica elements can be made. However, it is important to state that removed items can get misplaced, damaged or lost, in which case they would have been better off staying in service.
- Techniques of higher intervention may be appropriate if they allow retention of a component or assembly of greater significance.

8. Use of techniques and materials as originally used

Decisions on the use of materials and techniques will be guided by the principles of respecting significance, minimal intervention and avoiding loss of evidence.

To guide decision-making, consider the following:

- Details of the original materials and techniques used should be identified and preferably adopted for new parts. However, if the original type is unobtainable, or service requirements make its use inappropriate, the material with the nearest physical properties should be used.
- Where possible new components should exactly replicate the method of construction, form and detail of originals, including joint and fixing details, and should be identified by discreet date stamps.
- Castings may be replicated in the same method and grade as originals, using originals as patterns. Alternatively other technologies such as 3D scanning, modelling and printing may be more appropriate.
- The recipe of bedding and 'rust-joint' compounds should be analysed and reused wherever possible.

9. New material should be identifiable

Ideally all repairs and replacement items would be recorded within the treatment report. However, these sometimes go astray and digital records can become obsolete over time, therefore, the name of the conservator and the date of the work should be identified on replacement components where practical.

For example:

- By stamping onto replacement forged components.
- By raised lettering and numerals on new castings.
- By use of brazing to distinguish a new patch from original wrought iron.
- In the cases of small items it may be appropriate to mark with a small punch

10. Use of replicas

In certain circumstances use of replicas might be considered, for example where ironwork is subject to wear, or is at risk of serious damage and corrosion or theft, its on-going preservation may best be achieved by creating a replica, and retiring the original from service.

This should not be promoted if it is liable to result in the care and maintenance of the original being neglected.

A replica should remain distinguishable from the original after it has aged or weathered, so may need to be stamped or signed and dated with the new installation date. Replicas are of particular value where service requirements have increased, compromising the integrity or safety of the original object, or where originals are missing.

11. Storage of parts and materials that cannot be re-used

Components (including wasted / rusted fragments) that cannot be retained in use, should be stored in a secure and stable environment, preferably close to where they originated. Where possible entire parts should be stored, but otherwise good representative samples should be chosen.

The original location of stored items must be identified by individual tags or labels, and full details included in the conservation record. These should be supplied to the client on completion of the project along with the report and maintenance programme.

12. Specification of all stages of work in accordance with good conservation practice

Specifications, drawings and schedules of work define the scope and standard of work required and provide a basis for payment. Documents forming the basis of a contract must be:

- Based on good practice for metals conservation
- Sufficiently detailed to avoid misunderstandings
- Supported by adequate funding and terms of contract
- Based on adequate knowledge of current conditions

If the current condition of ironwork or the scope of conservation work is not fully known, a preliminary survey at the client's expense may be needed. It is the responsibility of the conservation specialist to highlight this need.

Inadequate specifications risk damage being done to the ironwork and strained contractual relations between employer and metalworker/conservator.

Clients would be wise to allow reasonable provision for contingencies

13. Selection and proper training of suitable practitioners

Craftspeople, managers and professionals must be competent in the theory and practice of metals conservation and have good knowledge of:

- Best practice in conservation
- Properties and uses of historic and contemporary materials
- Manufacture, design and application of traditional metals and associated materials
- Historic ironworkers, artisans, sculptors and founders; their designs and techniques
- The mechanism of corrosion and methods of controlling it
- Repair and conservation techniques
- Coating / finishing traditional metalwork

Practitioners must continually update their knowledge and understanding of best conservation practice.

14. Planned maintenance

The long term preservation of ironwork can only be achieved through regular and thorough inspection by competent practitioners. Maintenance is vital to minimise the rate of deterioration of historic materials, and should be:

- Planned to allow advance allocation of resources.
- Regular, so that it is not forgotten.
- Adequately funded.
- Thorough and effective.

A condition survey should be undertaken to:

- Identify present and potential deterioration, damage and loss.
- Recommend a course of action.
- Facilitate the budgeting and carrying out of maintenance and conservation Work.

Inspection and maintenance should include:

ANNUALLY

- Thoroughly inspect all ironwork for defective coatings, corrosion, discolouration, damage, distortion, instability and any other signs of decay.
- Remove dirt, debris and biological matter.
- Clear hopper-heads, rainwater pipes, drains, etc.
- Clean local defects in coatings, fill as necessary, prime and re-coat.
- Fill water-traps and joints, ensure interiors are drained and ventilated.
- Record the work carried out and materials used, archive the records.

EVERY FIVE YEARS

As annually, and;

Carefully inspect, prepare and re-coat the object if necessary.

LONGER TERM

In the long term more intrusive work may be required including repairs to components and removal of accumulated coatings. Advance warning of this should be given to the owner / guardian.

15. Comprehensive written maintenance schedules and operation guidelines

On completion of conservation works an 'Operations and Maintenance Manual' should be issued to the owner / guardian and in some cases be a legal requirement under CDM regulations; this will incorporate all documentation and records, including materials and techniques used and set out clear instruction for the objects operation and maintenance including all Health and Safety requirements.

These are needed to:

- Facilitate planned maintenance (see Clause 14).
- Minimise the potential deterioration and damage to historic metalwork.
- Minimise the danger to those who use or come into contact with the metalwork.

Appendix: Definitions

Cast iron	is a form of iron whose shape is produced by pouring liquid metal into moulds.
Conservation	is the careful management of change, ensuring that the significance of an object is understood and protected with minimal loss of evidence, to be enjoyed by present and future generations. Conservation stabilises the object in its existing state, maintaining its materials and slowing deterioration.
Maintenance	is the periodic inspection and care of an object, with routine attention to defects as they occur.
Material	is the physical substance of which the object is made, including its surface Finish.
An object	is an historical item which may be anything from a single small detail to a monumental structure.
Pure iron	is pure metallic iron with traces of carbon, manganese and other elements.
Restoration	is returning the object to a known earlier state with minimal introduction of new material.
Stabilisation	is the prevention of on-going degradation by removal of, or protection from, adverse conditions.
Stainless steel	is a form of iron with alloying elements to provide some degree of resistance to corrosion.
Steel	is a highly refined alloy of iron and carbon, commonly available for structural purposes from the late nineteenth century.
Strengthening	means providing structural adequacy.
Wrought iron	is a mixture of iron and slags produced by direct reduction in a charcoal furnace or by puddling in a reverberatory furnace.
Wrought ironwork	refers to decorative objects made by a blacksmith.

A comprehensive glossary of ironworking terms can be downloaded from NHIG