

# INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

## Boundary Ironwork

A guide to  
re-instatement



Many buildings in Scotland have lost their original boundary ironwork (gates and railings) through damage or deterioration.



Much ironwork was given up for the war effort, and often little survives other than railing stubs in boundary walls. Increasingly, building owners wish to re-instate the boundary ironwork to enhance the appearance and value of their property, but are unsure where to start. This guide provides basic advice about re-instating boundary ironwork using traditional techniques and materials.

## Where to start ?

The condition of the masonry wall, its coping stones and gate piers should be evaluated for fractures, pointing, alignment and stability to provide a sound footing for the ironwork installation. The removal of vegetation is particularly important in preventing future maintenance problems.

## Identifying the original design

There are a number of ways to identify which particular design was originally used for your boundary ironwork. Those removing the ironwork during the war sometimes left an original example for future reference in a street, or where removal may have caused a safety hazard.



*Archive Image courtesy of The Scottish Ironwork Foundation*

In a group of buildings, other examples in the street may provide an indication. Archive photographs can be particularly useful. Some historical ironwork pattern books are available and can be a useful reference point (see useful contacts). Some surviving panels may have a founders mark, pattern number or date stamp which is useful in identifying the original manufacturer. Set in lead, the stubs in the boundary wall may provide a clue in terms of the cross section dimensions of the uprights, spacing (regular centres may indicate



*Image: Run of original railings left in street as a reference in 1942. © D S Mitchell*

railing spears, grouped stubs possibly baluster panels), and the original shape if it was round, square or fluted. A regular newel or baluster post which is heavier and more structural may be found at regular intervals in railings.



*Image: Trademark of Saracen Foundry / Sun Foundry. Images copyright of The Scottish Ironwork Foundation.*



*Image: Railing Spears with cope rail and baluster / railing panels. © D S Mitchell*

## Materials & Practitioners

Many boundaries were created in cast iron from the 1820s onwards, as Scotland developed into a global centre for such work. Major architectural ironfounders were established across the central belt, but most towns had a foundry which might make simple railings.

Combinations of cast and wrought iron are not unusual. There has also been much 'replica' ironwork re-instated to imitate cast iron railing spears in particular. Most utilise steel bars and cast steel, or cast iron heads, welded together. Much of this work is poorly executed, employing modern fabrication techniques and modern materials with inappropriate designs.



*Image: poor quality replica in steel.*

© D S Mitchell

Whilst it may be cheaper than using traditional materials and techniques, in the shorter term the aesthetics and longevity of this type of installation do not compare to using cast iron.

Original castings were made from stock wooden patterns in grey iron, moulded in sand by hand. Molten iron was poured into the mould to create a standard casting. Wrought iron was manufactured from cast iron through the puddling (heated and hammered to create an iron rich fibrous material) process. Unlike cast iron with its rigid structure, wrought iron is a wonderfully workable material in skilled hands at the forge.



*Image: Open greensand mould for baluster panel.*

© D S Mitchell

Wrought iron has not been available since the 1960's, although recycled material can still be obtained. The term 'wrought' has become increasingly used to describe any kind of ornamental work in mild steel when wrought steel would be a more accurate description.

There is much good contemporary work undertaken in mild steel, but for conservation or restoration work it is often not appropriate. Mild steel is also liable to corrode to a greater degree than both wrought and cast iron.

## Specification

In order to receive a high quality installation, and to be fair to all concerned, you should be very clear as to what your expectations are. You might wish to employ an architect, engineer or surveyor to draw up plans / specifications depending on the scale of the project. It is important to agree :

- What materials are to be used.
- The designs.
- The installation method.
- The paint specification.
- Who retains ownership of the pattern if a new one has to be made.

You may require formal permission to undertake the work prior to starting on site, and you should check with your local planning authority. Listed building consent will be required if your property is Listed. See 'useful contacts' for additional sources of information.

## Reinstating Cast Ironwork

The removal of original railing stubs from boundary walls can be straightforward, or this may previously have occurred during the war effort, leaving a socket that can be re-used. Removing this stub and its lead surroundings can occasionally be more problematic, although not impossible. A decision should be made on balancing the ease of removal against damaging the adjacent stone. Another option is to drill out the original using a larger diameter core – but this needs to be carefully done without enlarging the socket too much. Leaving the stubs in place and installing the new ironwork between the original fixings can be employed, but very much depends whether the original design lends itself to this. Each individual casting should be secured into the masonry as originally fixed. The insertion of a lower bar, horizontal to the wall, is not recommended.



*Image : Damage to masonry copes from wrought iron 'corrosion jacking' railing stubs © D S Mitchell*

There are a small number of ironfounders who continue to specialise in producing architectural cast ironwork. Many have stock patterns that may match your requirements, otherwise you may have to pay for a new pattern to be made in timber. Sharing the



*Image: Traditional cast iron joints owe much to woodworking principles © D S Mitchell*

cost of such work with neighbours who have similar needs can be a useful economic approach. The foundry may offer a discount on the pattern if they retain ownership of it on completion. Ironfounders usually undertake the manufacture of castings, and some of them also use their own staff to install their products. You might prefer to use a reputable ironwork specialist, or blacksmith, who has appropriate experience and who can source castings on your behalf.

Castings were traditionally made in grey iron to a particular mix to produce sharp detail. Some firms advocate the use of spheroidal graphite which has a greater degree of resistance to impact damage, but assurances should be obtained that they can match the quality and detail in terms of surface finish before using this material. The castings should be clean and sharp with no jointing mismatch where the two moulds have come together. They should be free from blow holes

or imperfections. It is useful to obtain and approve a sample that subsequent castings should match in quality and appearance.

Ironwork should be secured into the boundary wall pre – cut sockets using hot poured lead which is then tamped down when cool. There are some health and safety issues arising from the use of hot lead, but a reputable contractor will have experience in this area. The stone should be dry and clean for this operation. Using lead is a reversible approach, and it will contract and expand at roughly the same rate as the iron. It also offers a degree of corrosion resistance to the iron. The lead should be finished around the fixing to shed water away from the railing root onto the stone.

Cope rails were often manufactured in wrought, or sometimes cast iron. Cast and wrought iron will out perform mild steel in most applications, but mild steel may be required for use in some situations. Railings



*Edwardian Wrought Ironwork in Glasgow.*

© D S Mitchell

should not be welded to the cope rail under any circumstances. The use of lead or pins in such circumstances is the traditional, and most satisfactory, method.

Ironwork often employs carpentry principles in its assembly. Traditional fixing techniques such as pins, joints and screws should have a low visual impact and be neat in their execution. Galvanised fixings should not be used as they accelerate corrosion when in contact with iron. Lead is often used to fill voids between railings and the cope rail, and lead paste is still available. A high quality polysulphide mastic can be used discreetly to seal joints, but will not have the same life expectancy of lead based bedding compounds. Balusters often have a cast iron capping rail which overlaps panels and is secured to the panel below by pins or countersunk screws.

## **Wrought Ironwork**

The use of wrought ironwork is more unusual than cast iron in Scotland. Good quality wrought work is made at the forge, has a “three dimensional” appearance and indications of its handmade origins. Forge welding, and jointing techniques such as scarf joints, rivets and mechanical fixings are employed. Welding is not appropriate. The quality and skill of the smith is of paramount importance in matching original details, and it may be useful to see a sample piece of work prior to commissioning.

The use of cast iron components or ‘stock’ mild steel fabrication components to imitate historic ironwork is not a useful strategy. Whilst frequently cheaper at the outset, it is often aesthetically displeasing, historically inaccurate, and does not offer a long term installation. Costs for repair works are liable to increase in the future, compared to traditional materials.

## **Painting**

Ironwork should be painted to completion in a controlled environment as per the manufacturer’s instructions before installing on site. A good painting specification for ironwork might include:

- Zinc – rich primer coat
- Micaceous Iron oxide build coat
- Two coats of gloss.

Boundary ironwork did not usually display highly decorative colour schemes, it was often painted a single colour. Gilding was unusual, and the use of gold paint to railing heads is not recommended as it is historically inaccurate and usually tarnishes quickly to brown.

## Gates

Most cast iron gates would be cast in one piece, although some are liable to be an assembly of smaller components. Cast iron gates for domestic use were usually hung on pintles secured to an adjacent wall or gate post. These fixings are often to be found intact in the masonry, with only the gate itself being removed.

Mixtures of cast and wrought iron components are relatively common, and those constructed solely of wrought iron were still made during the first half of the 20th Century. The cost of manufacturing a pattern for a cast iron gate can be significant, so it is also worth checking if the foundry has an appropriate pattern first.



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## Useful Contacts / Further Reading

Scotland's Listed Buildings:

A Guide to Owners and Occupiers

Visit <http://www.historic-scotland.gov.uk>

Glasgow West Conservation Trust Technical Manual

30 Cranworth Street, Hillhead, Glasgow G12 8AG

<http://users.colloquium.co.uk/~glasgowwest/home.htm>

The Scottish Ironwork Foundation

<http://www.scottishironwork.org>

Historical and technical advice on Scottish Architectural Ironwork

Historic Scotland Technical Conservation

Research and Education Group,

Conservation Bureau & Technical Enquiry Service

Room G33, Longmore House, Salisbury Place,

Edinburgh EH9 1SH. Tel 0131 668 8668

[hs.conservation.bureau@scotland.gsi.gov.uk](mailto:hs.conservation.bureau@scotland.gsi.gov.uk)

Technical advice and the Building Conservation Register for Scotland.

Historic Environment Grants Team

Historic Scotland, Longmore House, Salisbury

Place, Edinburgh, EH9 1SH. Tel 0131 668 8801,

[hs.grants@scotland.gsi.gov](mailto:hs.grants@scotland.gsi.gov)

Historic Scotland Inspectorate

Historic Scotland, Longmore House, Salisbury Place,

Edinburgh, EH9 1SH. Tel 0131 668 8600

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Published by Technical Conservation, Research and Education Group, November 2005

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