

# INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

## The Maintenance of Cast Iron Rainwater Goods



## Introduction

The efficient disposal of water is essential to the well-being of all buildings, especially those that were built in a traditional manner. Cast iron has traditionally been one of the most popular materials for the manufacture of rainwater goods (gutters, downpipes etc.), which provide an important function in carrying water away from a building and preventing it from penetrating the fabric. The neglect of this system, and its component parts, can have disastrous consequences. Poorly functioning rainwater goods are often directly responsible for serious internal and external deterioration and costly repairs. This INFORM aims to let property owners and occupiers understand the risks so that they can quickly identify problems and carry out regular maintenance.



## Properties and production

Cast iron is strong and hard but is a brittle material and will shatter if struck with a sharp blow. It can only be shaped by casting. First a pattern is made (usually of wood), this is then used to make a mould using special sand, into which molten iron is poured and left to set.

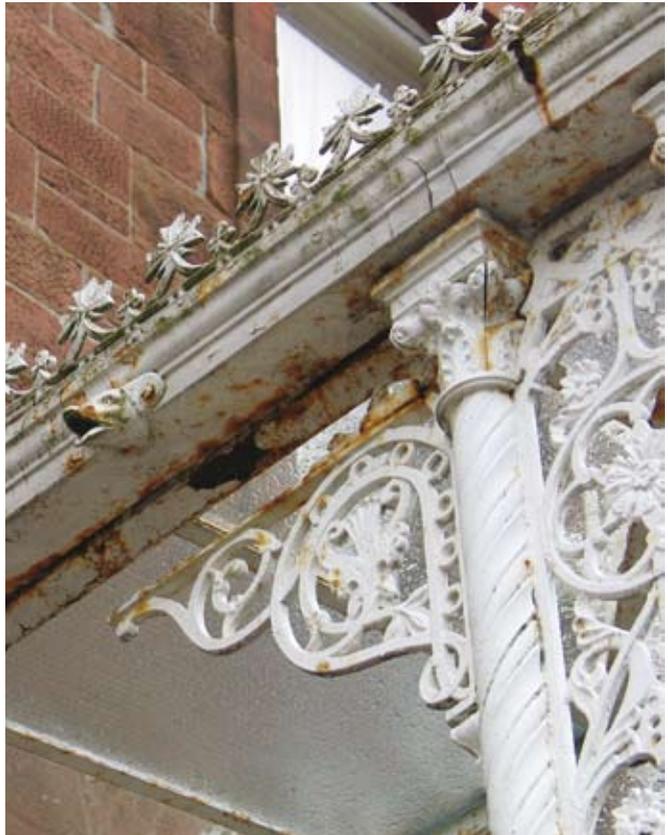
## Design and manufacture

Over time, rainwater goods have been made from a range of materials, typically timber, stone, lead, zinc, copper and iron. They form part of the building's architecture and styling,





along with parapet gutters and projecting stone gargoyles (constructed to throw water clear of a building). This progressed to the development of a system of devices attached to the building structure, such as gutters and downpipes (traditionally known as rhones, drainpipes, or rhone pipes in Scotland). Until the end of the eighteenth century, the high cost of manufacturing rainwater goods meant that their use was predominantly restricted to high-status buildings. However, technological advancements during the nineteenth century enabled mass production, and the affordability of the products meant that the installation of rainwater goods became widespread. The versatility of cast iron



also offered a popular medium for additional architectural embellishment. Hopper heads were frequently enriched with ornamentation (as were downpipes occasionally), and gutter brackets provided an additional opportunity for decorative designs.

Nineteenth century Scottish cast iron manufacturers were world leaders in the production of cast iron items and their many illustrated catalogues featured extensive selections and choices. A great variety of hopper head, gutter and gutter bracket designs still survive and it is often possible to identify the name of the original manufacturer by their marks on the surviving pieces.



## Indications of problems

A number of signs can emerge on a building which indicate that problems are occurring with rainwater goods. Usually this is because their maintenance has been overlooked. Signs to note in the vicinity of downpipes and gutters can include:

### *External signs*

- Plant or algae growth
- Eroded mortar joints
- Eroded masonry
- Damp staining to walls behind or beneath rainwater goods
- Saturation of masonry, brickwork or render
- Local failure of render
- Wet rot in external joinery
- Damage to foundations
- The build up of water in drains
- Staining to external walls caused by run-off from iron rainwater goods

### *Internal signs*

- Damp patches on walls and ceilings
- Damp and mouldy plasterwork on walls and ceilings
- Decay of timber skirting boards and panelling
- Dry rot in structural and concealed timber
- A musty smelling odour caused by dampness in rooms

## Typical Causes

**Lack of regular maintenance** – Many significant problems can be attributed to the unchecked deterioration of rainwater goods. Their relative inaccessibility on the building often means that they are frequently overlooked and not inspected regularly.

**Blockages and vegetation growth** – A build-up of leaves and other debris can block gutters, down pipes, gullies and drains. If left unattended, water is likely to overflow and leak into the building through the roof space or external walls. The shoes of downpipes (the curved base of a downpipe) and swan-necked sections (curved sections of pipe) are particularly vulnerable. Blockages to gullies and drains can cause flooding at the base of walls, often resulting in rising damp. This excess of water also encourages plant growth, which further blocks and impedes the discharge of collected rain water. It is important to clear out the entire rainwater system to remove trapped debris on a regular basis.

**Fractures** – Trapped water can freeze to such an extent that it can fracture cast iron downpipes and gutters. On thawing, the running water will seep through the fracture.

**Corrosion** – Infrequent painting, or painting that misses inaccessible areas such as the rear of pipes and hoppers, can make cast iron sections and their fixings vulnerable to corrosion. This can go unnoticed for some time. Badly sealed, leaking joints are particularly prone to further corrosion and deterioration.





**Misalignment of components** – The misalignment of components, such as broken sections of drainpipes or gutters, eliminates their effectiveness. This can be caused where fixings or holder-batts (collars that are fixed to the wall on either side of the drainpipe to secure it in place) have not been maintained and have become loose. Where supporting gutter brackets or rhone hooks have been lost, they should be replaced before the gutter sections become dislodged and damaged.

**Mechanical damage** – Rainwater goods are also vulnerable to mechanical damage. Gutters can be broken by the pressure of ladders being placed against them, rather than against the wall.

**Inappropriate repairs and replacements** – Extruded aluminium, mild steel or plastic are not suitable materials for replacement cast iron rainwater goods. They detract from the traditional character of the building and have shorter life spans. Money saved in the short term will be cancelled by the need for future expenditure to replace them when they reach the end of their relatively short life when compared to cast iron.

Repairs using dissimilar metals such as mild steel or inappropriate fixings can also create problems as they are liable to corrode at an accelerated rate. Welding can damage the performance and appearance of iron if the wrong techniques and materials are used. Undersized replacement gutters and downpipes can lead to overflows and leaks, so care is required to ensure that replacement sections are of the correct dimensions.

## **Maintenance and repairs**

### **Establish a maintenance programme**

– Prevention is always better than cure. Establishing a regular maintenance programme is the most effective way of preventing serious problems from arising. Annual inspections should be planned. They should bear in mind that many problems, such as emerging leaks and overflows, might only be visible during heavy rainfall. Any signs of leaks or water ingress should be immediately investigated, and the cause identified and remedied.

Vegetation, leaves and debris should be regularly cleared out from rainwater goods, gulleys and

drains, particularly where the property lies close to trees, after leaves have fallen in the autumn, or following a severe storm.

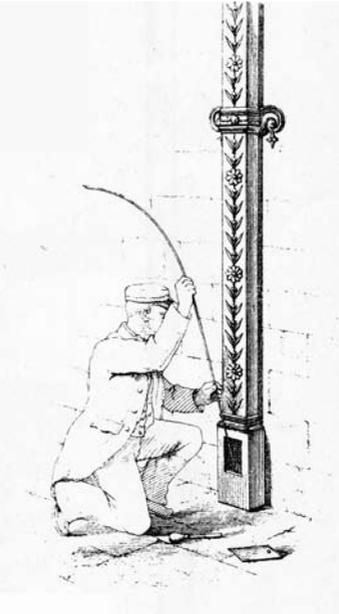
Leaf guards can be fitted to gutters, and wire balloons placed over the tops of downpipes, to help reduce blockages. These also require regular checks to prevent a build up of debris around them.

**Retain original elements where possible** – It is always preferable to retain as much of the original building fabric as possible. Only components that are missing or are beyond repair should be replaced.

Cast iron can be difficult to repair; welding is problematic and the integrity of such repairs cannot always be guaranteed. Cast iron welding should only be carried out off-site by experienced craftsmen. Badly damaged sections may need to be replaced by new castings with a matching profile.

**Replace like for like** – Replacement sections should match the original in size and appearance. Cast iron replacement rainwater goods can still be obtained through foundries specialising in traditional casting techniques. It is generally possible to match most designs to the original. Plain castings can be obtained from most builders' merchants.

Where downpipes are missing, existing gutter outlets will usually indicate where original downpipes were located. Replacement downpipes should be fixed away from the wall to facilitate repainting and to allow any



leaking water to run down the back of the pipe rather than down the wall. Gutter brackets or rhone hooks should be re-used where possible.

**Painting** – Cast iron rainwater goods should be periodically painted, taking care to paint inaccessible areas as far as possible. Never paint over rust; the surface should be clean and free from corrosion, dirt and grease. Some modern paints may not be compatible with the original paint, therefore it may be necessary to

seek the paint manufacturer's advice before proceeding.

Cast iron rainwater goods that are suffering from minor corrosion, but which are otherwise sound, should have all their rust removed (by wire brush and sandpaper) prior to being re-painted. Existing sound paint should be roughened with sandpaper to help the fresh coats adhere well.

For new castings, current best practice recommends two coats of a zinc-based primer, one coat of micaceous iron oxide, followed by two coats of gloss paint. Any defective gutter joints should be re-sealed with an oil putty to stop leaks. Any small holes should be filled prior to painting to prevent water seeping in and getting trapped.

With appropriate care and attention there is no reason why surviving cast iron rainwater goods should not continue to perform as effectively as they have always done.

## Useful Contacts / Further Reading

Bereton, C (1995) *The Repair of Historic Buildings: Advice on Principles and Methods*, London: English Heritage

British Research Establishment, 1997, *Good Repair Guide 9, Repairing and replacing rainwater goods*

Society for the Protection of Ancient Buildings, *Technical Advice Q&A 4 – Rainwater Disposal* (SPAB, 2001). Available for free download from the SPAB website: [http://www.spab.org.uk/publications\\_Q&A.html](http://www.spab.org.uk/publications_Q&A.html)

Scotland's Listed Buildings: A Guide to Owners and Occupiers  
Visit <http://www.historic-scotland.gov.uk/index/publications/ownerspublications.htm>

The Scottish Ironwork Foundation  
Visit <http://www.scottishironwork.org>

### **Historic Scotland TCRE 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)

### **Historic Scotland Investment and Projects 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,  
[hs.listingsandconsents@scotland.gsi.gov](mailto:hs.listingsandconsents@scotland.gsi.gov)



Principal author: Ali Davey

Cover image courtesy of The Scottish Ironwork Foundation

Published by Technical Conservation, Research and Education Group, January 2007

Historic Scotland, Longmore House, Salisbury Place, Edinburgh EH9 1SH

Tel: 0131 668 8638 Fax: 0131 668 8669

[www.historic-scotland.gov.uk](http://www.historic-scotland.gov.uk) email: [hs.conservation.bureau@scotland.gsi.gov.uk](mailto:hs.conservation.bureau@scotland.gsi.gov.uk)