

INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

Exterior Masonry Steps



HISTORIC SCOTLAND
ALBA AOSMHOR

NATIONAL CONSERVATION CENTRE
IONAD GLEIDHTeachais Nàiseanta

Introduction

This INFORM offers owners of buildings information on masonry steps, their different forms and parts, and the repair and maintenance issues that can arise.

Many traditionally constructed buildings in Scotland have exterior masonry steps. These range from simply a few masonry blocks rising from street level to much grander structures designed to make a statement at the entrance to a building. Like all building elements, masonry steps require periodic maintenance and repair. From time to time, defects may arise which require more substantial intervention.



Fig. 1 Simple block step and platt, constructed from large slabs of stone.

Form of exterior steps

Block steps

The simplest form of exterior step is simply one or more built up masonry blocks, sometimes incorporating a larger slab or 'platt' which forms a threshold at the entrance to a building (Fig.1).

Rectangular steps

These are the most common type of steps formed of masonry blocks, which are rectangular in section. They are often simply constructed with the front of one step supported on the back of the lower step, but sometimes the step is rebated (secured under) into the one below. The nosing (top edge) of the step is often rounded or chamfered to prevent impact damage, but is sometimes left square. When the steps have to bridge a void, they are built over a supporting arch (Fig. 2). This is a common feature in urban properties that incorporate a basement.

Spandrel steps

Spandrel steps are masonry blocks cut in triangular section, so that each step sits on the back edge of the one below, with a diagonal soffit (underside), creating a lightweight and elegant appearance (Fig. 3). Each one is held in place by a rebated joint between the bottom



Fig. 2 Rectangular steps built with a supporting arch over a basement, a typical urban detail.

front edge of the higher step and the top back edge of the lower. Spandrel steps are either built into a wall or supported by masonry or brick.

Outstairs

Projecting steps, built on a masonry structure (which may incorporate a store area below the steps), can be found when the upper-level property is either in different ownership or use from that on the ground floor (Fig. 4).



Fig. 3 Spandrel steps.



Fig. 4 Outstairs leading to an upper-floor property.

Repair and maintenance

Structural issues

External steps can suffer from structural defects which, if left unchecked, can result in serious damage and costly repairs. It is important to regularly inspect them for early signs of these problems. Sometimes evidence of past settlement or cracking is historical and need not be a cause for concern (Fig. 5). If there is evidence of recent structural movement such as treads beginning to come loose, gaps appearing between steps or cracking appearing in the masonry, then further action should be taken.

Where any of these signs are noted, a thorough inspection will be required to try and identify the cause of the problem. An appropriately experienced engineer may have to be consulted. It is important that the sub-structure which supports the stair remains sound as, without this, the steps have little structural stability. This is particularly the case with external stairs that bridge a gap. Where the structure is unstable, steps may need to be dismantled and rebuilt.



Fig. 5 Evidence of past settlement can be historical and need not be a cause for concern.



Fig. 6 Open joints can allow water to penetrate leading to masonry decay.

Masonry decay

In common with all masonry elements, steps can suffer from stone decay if not properly maintained. Where decay is evident measures should be taken to ensure that the cause of the decay is understood and rectified. The following are common causes of and remedies for masonry decay:

- Excessive wear on treads can lead to water pooling which can result in decay from freeze/thaw cycles. Originally steps would be constructed with a very slight slope to shed water from their horizontal surfaces. Where wear is pronounced, it may be necessary to insert an indent or mortar repair to level up the steps.
- Salt can induce serious decay in stone. External steps are particularly susceptible due to the widespread application of de-icing salt in the winter. Only the minimum amount of salt and grit should be used to create a safe surface.

- Biological growths such as mosses, grass and even small shrubs can establish themselves on steps in gaps between treads and the side faces of spandrels. The growth should be carefully removed to prevent the root structures creating further damage and the open gaps repointed with an appropriately specified lime mortar.
- Open joints left between steps and platt slabs also allow water to seep through leaving the underside of the steps saturated with little chance of drying out. Open joints should be repaired as soon as possible to prevent further decay (Fig. 6).

Worn steps

Given the traffic which external steps carry over their lifetime it is not surprising that the masonry can become worn. Some wear is normal, and can add considerably to the character of old steps (Fig. 7). Large pieces of stone were often used for steps and platt slabs.

They are impressive and designed to add status to entranceways. It can be very difficult today to obtain stone of the same type and quality and it may not be possible to source stone of suitably large dimensions. Therefore replacing steps with new should only be considered as a last resort. Other ways of reducing the risk associated with worn steps should also be considered, such as adding or improving handrails and lighting, or adding edge marking. Where excessive wear is considered to be a safety hazard, the affected steps can be repaired using a variety of methods:

- Worn surfaces are sometimes considered unsafe as they can be slippery. Re-dressing the surface can avoid the need for replacement in many cases.
- For large or wide entrance steps, often only the centre of the steps becomes worn. Swapping unworn steps from the sides into areas of greater wear can extend the life of the original steps. Similarly, steps can sometimes be turned over so the unworn underside can be used to create a new surface.
- Where a significant area is worn or damaged an indent repair may be appropriate if the steps are of sufficient thickness. This involves a pocket being cut around the worn patch and a thin replacement piece of stone being inserted in its place to bring the upper surface back to its original level. It is important to note that the replacement stone should match the original as closely as possible in type, dimensions and detailing.
- Where it is undesirable to cut into the steps, they can sometimes be overlaid with another material to provide a safe surface, whilst retaining the historic steps underneath.
- Where steps are genuinely beyond repair, it may be necessary to replace the entire step or steps. Again, any replacement stone should match the original as closely as possible.



Fig. 7 Some level of wear is normal and acceptable.



Fig. 8 A poor quality repair using cement.

A cheap repair option involves cement or other proprietary materials being screeded over the existing tread to fill the worn section (Fig. 8). This approach should be avoided; it not only diminishes the visual appearance of the steps, but can lead to an increased risk of decay in the future, as cement is harder and less permeable than natural stone. Some lime-based formulated repair mortars are available specifically for stone step repair and these may be appropriate in some instances.



Fig. 9 Stone for indent repairs should be carefully matched to the original.

Fractures and impact damage

Parts of a step can sometimes be broken off or fractured due to impact damage. Where there is a clean break, and the original piece of stone has been retained, it may be possible to have an experienced contractor carefully re-secure the broken piece. Where this cannot be done a stone indent may have to be fashioned (Fig. 9).

These options are preferable to either the wholesale replacement of the step or carrying out a repair with cement.

External stone steps elements

Balustrades

Most external steps will incorporate a balustrade, or handrail, on one or both sides. Its function is primarily for safety, but many are also decorative. Balustrades are usually made from cast or wrought iron or, for grander structures, stone.

Iron

Iron balustrades were generally set into holes cut in the stone steps. Once in place, molten lead was poured into the holes, which hardened and held the balustrade securely in place. Balustrades can be fixed into the upper face of the tread or, where space is limited, they can be 'over sailed' and fixed into the side face of the step. Iron balustrades should be well maintained, including an annual inspection and a complete re-painting every three to five years.

Maintenance problems that can occur with balustrades include:

- Over time the lead caulking can become loose. This can allow water to penetrate the hole into which the balustrade is set, causing corrosion of the metal and/or frost jacking, both of which can cause the surrounding stone to crack (Fig. 10).
- Other parts of the balustrade can also suffer from corrosion and deterioration appearing as: cracked or blistered paint, rust coloured staining and delamination of the surface of the iron.
- Sometimes individual pieces of the balustrade can become damaged or lost. Given the important safety function that a balustrade performs, missing elements should be replaced promptly. Replacement pieces for such elements should match the design and dimensions of the original as closely as possible.



Fig. 10 A lack of maintenance can lead to rusting ironwork and masonry decay.

Stone

Stone balustrades can become damaged and suffer stone decay in the same way as the steps themselves, from salt or frost damage or biological growths. Similar repair principles should be followed. Where movement or rust staining is evident on stone balustrades this is likely to be due to failings of ferrous metal fixings and these should be repaired.

Wood

External stairs occasionally incorporate a wooden safety balustrade, normally a later addition. Here it is important to paint the wood regularly, and to inspect it annually for signs of rot or deterioration, with repairs being carried out as necessary.

Access requirements

If a building requires public access or if an occupier is disabled, special measures may have to be introduced. This may require modifications to external steps or the addition of a ramp or lift. Care should be taken to retain existing steps wherever possible and consider the overall design and status of the building. Listed Building Consent from the local planning authority may be required if the building is listed.

Further reading and contacts

Jackson, A., Day, D., Collins, *Period Homes: An Owners Guide* (2005)

J. Gilbert and A. Flint, *The Tenement Handbook: A Practical Guide to Living in a Tenement* (1992)

Historic Scotland INFORM Guides

The INFORM series, containing over 45 titles, is available for free download on Historic Scotland's technical website:

www.historic-scotland.gov.uk/conservation and relevant titles include:

- Masonry Decay – Dealing with the Erosion of Sandstone
- Repointing Ashlar Masonry
- Indent Repairs to Sandstone Ashlar Masonry
- The Maintenance of Iron Gates and Railings
- The Use of Lime and Cement in Traditional Buildings

Historic Scotland Conservation Directorate (Technical advice)

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