

# INFORM

INFORMATION FOR HISTORIC BUILDING OWNERS

## Dry Stone Walls



HISTORIC SCOTLAND  
ALBA AOSMHOR

NATIONAL CONSERVATION CENTRE  
IONAD GLEIDHTEACHAIS NAISEANTA

## Introduction

This INFORM aims to broaden the awareness of the importance and complexity of dry stone walling in Scotland, and outlines common causes of deterioration and the maintenance tasks which can be performed to prolong the life of such walls.

Dry stone walls, or drystone dykes as they are known in Scotland, are an integral part of the built heritage and landscape of Scotland. They perform several functions such as to delineate boundaries, to corral livestock and to provide shelter for wildlife. Despite the many thousands of miles of dry stone walling which can be seen forming field boundaries and related structures it is a much neglected and misunderstood part of the built heritage. Their construction, as well as their repair, is a complex task that should not be undertaken lightly. It is recommended that any large-scale repair is performed by a competent or accredited dyker; however, there are some maintenance tasks which can be undertaken by the owner or manager to reduce or limit the need for larger repairs.



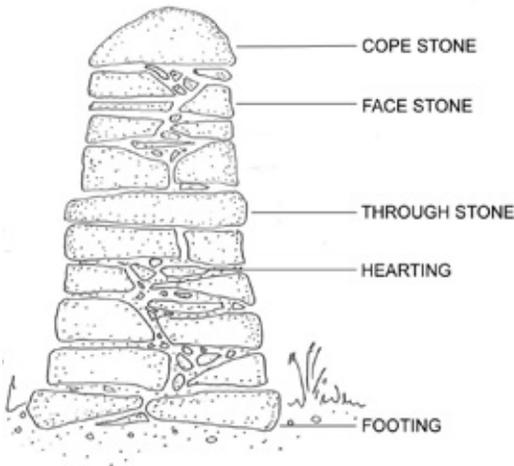
*Fig. 1 Two regional variations showing how local geology influences walling style.*

## Composition of dry stone walls

Dry stone construction is an ancient building technique. Dry stone walls are constructed from carefully positioned interlocking stones placed on top of each other without the use of mortar. Pressure from the stones at the top and the way in which the stones are interlocked ensures the self-supporting stability of the wall. There is more to the construction of a dry stone wall than simply randomly setting stone upon stone. The skill required to properly construct a wall without mortar, which will last for several hundred years, is considerable.

The construction of the wall depends on the quantity and types of stone available. Although today it is possible to source quarried stone, originally walls would have been constructed with stones found on

## TYPICAL SCOTTISH DYKE



*Fig. 2* Illustration of a typical double dyke.

local ground. There are regional variations in the type of stone used for dry stone walls, as the local geology varies from one place to another, dictating the shape and size of available stone as well as the workability of the material (Fig. 1). Dry stone walls can be built as a 'single' wall, of one stone in thickness, or two stone walls (double dyke) built parallel to each other (see styles of dry stone walling).

The stones used on dry stone walls diminish in size as the wall is erected (Fig. 2), using the largest stones as the foundation layers, also known as the footing or foundation stones. The following courses are constructed using building stones for single wall construction or face stones for double wall construction. Hearting or packing is used to fill in voids within the wall. The top stone on the wall is the cope stone which holds down the stones beneath and sheds rain water.

## Styles of dry stone walls

There are a several styles of dry stone walls in Scotland:

- A **double dyke** consists of two stone walls built parallel to each other with the core in-filled with smaller stones (Fig. 2). Through stones and cover (top) stones span the full width of the dyke and are used to hold the two facing walls together. This style of building produces a thick and substantial wall and is the most common style encountered in Scotland.
- A **single wall** or **boulder dyke** is one which is only a single stone thick (Fig. 3). Such walls are often built of stones cleared from fields. They are most commonly associated with areas where granite is the predominant stone type such as the south-west and north-east of Scotland.
- A **Galloway dyke**, also known as a half-single dyke, combines a lower half of double dyke construction and an upper half of single wall. Galloway dykes feature a cover band half way up the build where the section of double dyke ends and the single dyke begins.
- A **Caithness flag fence** is a regional variation of dry stone walling (Fig. 4). It consists of large slabs of local sandstone set into the ground and overlapped to form a continuous fence.



*Fig. 3 Single wall or boulder dyke.*



*Fig. 4 Caithness flag fence.*

## Construction of dry stone walls

A correct understanding of the basic rules followed when building walls is vital to their proper upkeep. It is not possible within this guidance to describe all the complexities of building a dry stone wall but the following points should be borne in mind when considering the upkeep of such walls

- Prior to starting to build the wall, the top 150mm of soil must be cleared, and footing stones then laid with the flattest side up.
- Subsequent layers are then laid across the joints formed by the course below. Stones should be placed with their long edges into the dyke rather than along it, this helps to give strength to the wall.
- Sedimentary stones should be laid with the bedding or grain oriented horizontally to prevent water ingress.
- Building stones should be carefully pinned from behind, using small wedge-shaped stones to fill gaps and take the weight of unusually-shaped stones.

- Cope stones are laid along the top of the wall. These stones hold down the building stone and shed rainwater. They are well-shaped stones, which fit tightly together set on edge, usually vertically, and are slightly wider than the wall. They are sometimes bedded onto turf.

When building a double dyke:

- The hearting should be carefully packed and not simply thrown in loose.
- Through stones should be incorporated and sometimes a cover band just beneath the cope stone is put into place.
- Galloway dykes should have a through stone where the double dyke section ends. On this type of wall, no stone should project above the course below, with the exception of through stones. This helps to maintain an A-shape in the cross section called 'the batter' (Fig. 5).



*Fig. 5 Rebuilding a section of a dry stone wall – note the use of a batter frame.*

## Corners and wall heads

Wall or cheek heads (sometimes called cheek-ends) are constructed where a wall is to start or end. They provide strength and stability for the wall and they are built where gates or other openings are taken through a wall, where a new wall abuts an existing one and cannot be tied in, and where extra strength is required (e.g. where a wall is built on a steep slope).

The wall head is the section that is most vulnerable to damage and should, therefore, be built from the largest, most regular stones. When rebuilding a damaged wall head it is good practice to take the wall down a few courses from the top to ensure a thorough rebuild that is integral with the rest of the wall.

Where a wall has a corner it is important that through stones are used to ensure the wall's strength is maintained. Likewise, where two walls meet in a T-junction it is vital to tie the two walls in together rather than simply butt one against the other.



*Fig. 6 Stile built into dry stone wall.*

## Special features

There are a number of special features that can form part of dry stone walls including:

- Stiles which allow access for people to cross the wall without damaging it and can take a variety of forms such as steps built into the wall, sometimes with an opening left in the cope (Fig. 6).
- Squeeze styles are gaps in the wall which are narrower at the base than the top to allow people to pass through but not livestock.
- Lunky holes and badger gates are openings in the base of the dyke which are large enough to allow sheep to pass through but not cattle.
- Smoots are smaller openings in the wall which allow the passage of either water or, in some cases, rabbits through a wall.
- Bee boles are small alcoves built into a wall to house beehives.
- Shooting butts are small round enclosures which provide shelter for game shooting or bird watching.
- Pens are sometimes built against dry stone walls to provide a corral or shelter for livestock particularly in exposed areas.

Such features should be maintained as they often still serve a practical use. These features are also important historical evidence of former practices and are worthy of conserving in their own right.



*Fig. 7 Even where a lack of maintenance has led to collapse, repair is always possible and can utilise much of the fallen material.*



*Fig. 8 Rebuilding a section of dry stone wall – note the construction of the wall-head.*

## **Causes of deterioration of dry stone walling**

Deterioration of dry stone walls can be caused by a number of factors (Fig. 7). Small trees and other vegetation growing through, or close by, dry stone walls may seriously destabilise the structure of the wall. Unchecked tree growth will eventually lead to stones becoming dislodged, or the wall being slowly pushed out of line and eventually collapsing.

Large animals such as horses, cows and deer may rub against a dry stone wall and dislodge top stones. Burrowing animals can cause problems by destabilising the ground beneath the wall. The provision of a badger gate or lunky hole can help prevent this.

One of the biggest threats to dry stone walls is deliberate destruction. This can be due to the enlargement of fields, the cost of upkeep, and changes of use from pasture to arable land.

People are by far the most likely cause of damage to a dry stone wall. Walkers trying to cross a wall can dislodge stones, particularly cope stones. Walls are sometimes pillaged to obtain stones for rockeries, landfill and other building purposes.

If there is inadequate drainage water may undermine the foundations of a wall leading to collapse. Flooding is a threat where there is a stream

close to, or passing under a wall where an appropriately sized gap has not been built into the structure.

If mortar has been inappropriately introduced to a dry stone wall, water ingress and frost damage can occur to the stones themselves. It is therefore inadvisable to apply mortar to a wall originally of dry stone construction.

## **Maintenance of dry stone walling**

Walls should be regularly inspected, at least once a year, and the following maintenance tasks carried out:

- Potentially damaging vegetation which has begun to establish itself should be removed as early as possible. A strip on either side of the wall should be kept free of encroachment by trees and shrubs.
- Cope stones which have been dislodged or removed should be replaced.
- Where damage has occurred to the structure of the wall, repair should be carried out as soon as possible to prevent deterioration spreading (Fig. 8).

## Conclusion

Dry stone walls in Scotland were built in a wide range of styles specific to particular regions, and are an impressive part of our built heritage. With the correct care and, where necessary, appropriate repair using traditional skills and materials, dry stone walls can continue to perform their important function long into the future.

## Further reading and contacts

British Trust for Conservation Volunteers,  
*Dry Stone Walling, A Practical Handbook*,  
(BTCV reprinted, 1999).

Dry Stone Walling Association (DSWA),  
*Dry Stone Walling, Techniques and Traditions*  
(DSWA, 2004).

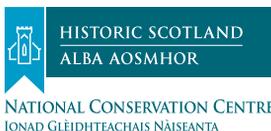
A series of free leaflets are available from the  
DWSA at <http://www.dswa.org.uk/leaflets.asp>

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