EDINBURGH WORLD HERITAGE
Historic Home Guide

Roofs

United Nations Educational, Scientific and Cultural Organization

Old and New Towns of Edinburgh inscribed on the World Heritage List in 1995

Introduction

The topography of Edinburgh affords views of the city from many vantage points and is a quintessential part of the World Heritage Site. The consistency of Scots-slated pitched roofs and massive masonry chimney stacks, with rows of buff-coloured clay chimney pots stretching over a vast area is an impressive sight. This homogeneity is important to the integrity of the World Heritage Site and should be preserved for future generations.

This leaflet is designed to help homeowners better understand their roofs, the materials used to make them, and how to spot problems quickly, so they can be rectified before they turn into costly and disruptive repairs.

Photographer Kevin MacLean, courtesy of www.capitalcollections.org.uk

History

The Old Town: Before the 16th Century, the majority of roofs were thatch-covered as slate was such an expensive material. In Edinburgh, local byelaws insisted upon fire-proof materials from 1621, after which all buildings in the High Street had to be roofed in slate, clay tile or lead. Some of the earliest surviving domestic buildings date from the second half of the 16th Century. These steep pitched timber-framed roofs are predominantly covered in local Scots slate, whereas those from the 17th Century or later may have clay pantiles. The first pantiles arrived as return loads from the Low Countries during the boom in the supply of wool to the Flemish weavers. Dutch influence is also responsible for the prevalence of crowstep and curved gables on roofs and dormers in the Old Town.

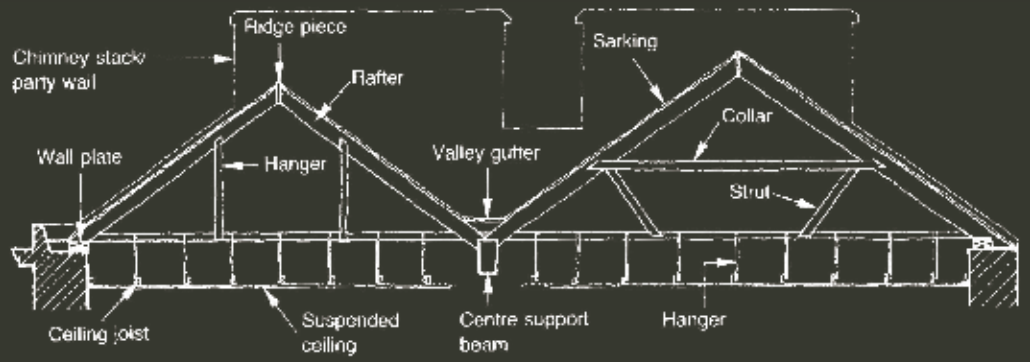
The form of the roofs is often the result of the availability of a limited range of affordable, local materials. Old Town roofs are steep, typically 40° or more. This is thought to be partly due to a shortage of timber in the 17th and early 18th Centuries (before the mass planting of new softwood plantations at this time to ensure adequate timber supplies). Thus roofs were clad in local slate or tiles fixed with hardwood pegs hung over battens fixed to the main timber rafters. Roofs needed to be steep to shed rain and snow quickly to avoid water penetrating the roof.

The attic spaces created by these tall, steeply pitched roofs meant that it was possible to create one or even two further storeys in the roof space. These rooms were generally lit with dormers, either built off the top of the walls or projecting out of the roof pitch and usually constructed in lighter timber, clad again in slate or tile.

As softwood became more available around 1800, and improved woodcutting techniques made mechanical sawing of timber possible, sarking (timber boards fixed horizontally across the rafters) became the normal construction practice. This had many advantages, not least that the varying sized Scots slates could be nailed at their head straight to the sarking. Sarking also improved the draught-proofing of rooms, increased structural stability and therefore allowed shallower roof pitches.

The New Town: There is a distinct change from the Old Town's decorative dormer clad, crow-stepped roofscape to that of the New Town. Here, the architecture of the wall and its proportions is dominant. Roofs were hidden from view behind the wallhead or parapet, or later, stone balustrading. Sarking boards allowed shallower pitches which could be tucked down behind the wall, and these pitches were further reduced in height by the introduction of the 'M' roof in the second New Town, where the roof is formed from two parallel pitches with a flat lead clad section of roofing between.

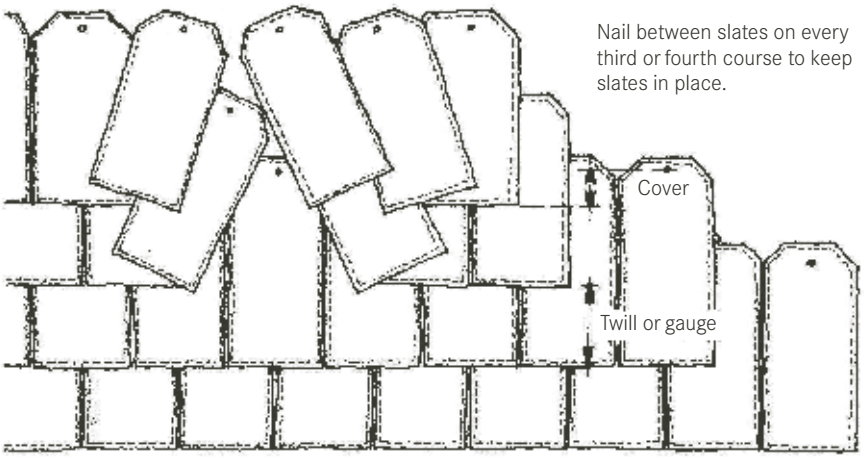
Cover image: Photographer Kevin MacLean, courtesy of www.capitalcollections.org.uk



Section through M roof

Scots Slate

Nail between slates on every third or fourth course to keep slates in place.



Slate

Slates cover the majority of the roofs in the World Heritage site. Early slates would have been sourced from local quarries but as transport improved in the 19th Century, distinctive West Highland blue slate came to predominate in Edinburgh. This slate is thick and has poor cleavage (splitting) which leads to a characteristic uneven surface texture. In order to avoid wastage, all sizes of slate were used and varied considerably in length and width. The slater would sort the slates by size, working upwards from the eaves of the roof using the largest slates first then fixing in diminishing courses up the roof, with the slates at the ridge being the smallest. Scots slates are single-nailed at the head and double-lapped, which means that the nail-hole is protected by two further layers of slate. It is easy to refix a slipped slate by swinging the adjacent slates aside. Later in the 19th Century, Welsh slates (supplied by train) started to be used in Edinburgh. These are much thinner, smooth surfaced, generally a purplish colour and regular sized, leading to uniform courses. Because the slates are much larger, they are double nailed in the middle of each slate which means slates cannot be swung aside, making them more difficult to patch.

Maintenance, Problems and Repairs

A well-slated roof can last up to 150 years. Regular maintenance is the key to keeping your roof performing well, avoiding unplanned and expensive emergency repairs. The more complex the roof, for example with dormers or hips, the greater the likelihood of problems. Try to find a vantage point to enable you to see hidden areas of roof and arrange for a roofer to make an annual inspection. Check the roof regularly for slipped slates which allow water to penetrate to the timbers below. Slates can easily slip down if their fixings have rusted or the slate has broken due to wind uplift or foot traffic over the roof. If the roof is generally sound, the odd slipped slate can simply be re-nailed in place. If it is broken, a replacement slate will be needed which should match in type, texture, size and thickness. Unfortunately, Scots slates have not been quarried since the 1950's so matching-in can be difficult. However, a good slater is likely to have a source of second-hand slates for patching. Avoid using Welsh slates on a Scots slate roof as they will

stand out visually. Slates should always be fixed with broad-shanked copper clout nails; ferrous nails will rust. If large numbers of slates start slipping, look along the course (row) of slates. If the line is very uneven the roof may be 'nail-sick' which means the fixings are failing, probably rusting. In this case it may be wise to consider reslating the roof.

Originally, nailed slated roofs were fixed direct to the sarking boards, but from the early 20th Century, it became common practice to lay felt under the slates when reslating roofs

Felt can usually be seen either at the bottom of the roof where it sticks out or by swinging a few slates aside. Early felts are bituminous hairy felts. These tend to disintegrate and actually retain water. If the roof is going to be reslated, the bituminous felt should be removed and a new 'breathable' felt used, where appropriate. In the recent past, some roofs have been felted with non-breathable plastic felts but if the roof space is not properly ventilated this can cause the roof to 'sweat'. Moisture-laden air from rooms below is not able to escape, resulting in a humid atmosphere within the roof space. This moisture condenses onto the cold underside of the felt or sarking and may cause rot either in the sarking or structural timbers.

For further information see Historic Scotland Inform Guide: *Repairing Scottish Slate Roofs.*

Clay Plain Tiles and Pantiles

There are clay roof tiles in the Old Town and Dean Village. Tiles were first introduced to Scotland from the Netherlands, however by the 18th Century Scotland had its own clay industry. Tiles were made of local clay by hand, and therefore vary in colour and size. Clay plain tiles are flat, and are laid like slates. Pantiles are 'S' shape in section and interlock to form a series of ridges and troughs. The side-laps of pantiles are at the high point, channelling the water into the troughs away from the joints.

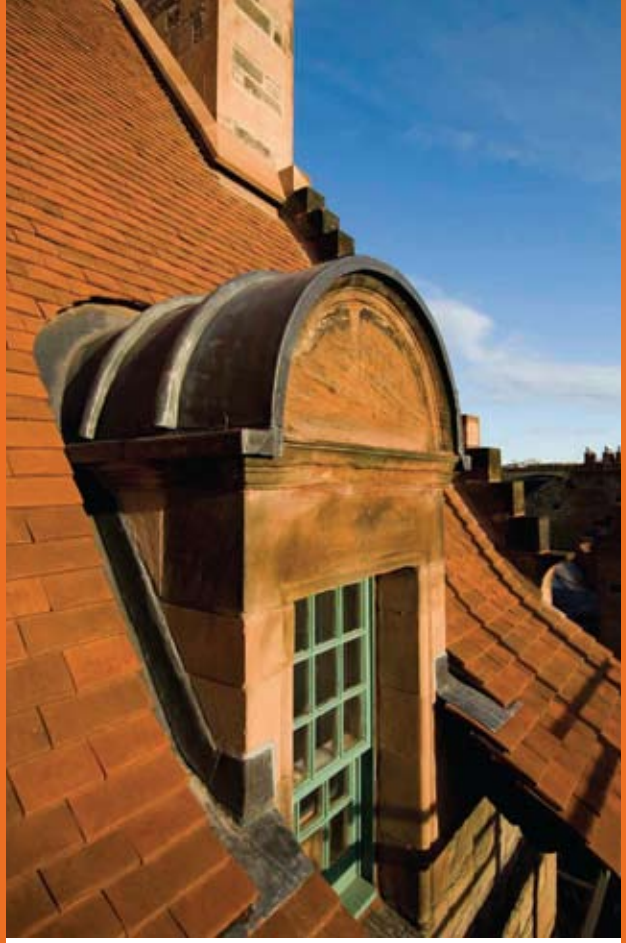
Maintenance, Problems and Repairs

The most common problem is loose or broken tiles so regular inspection is important. If it is possible the existing tile should be re-fixed. If you are replacing a broken tile, ensure that it matches exactly in size and profile and is made of clay. Modern concrete tiles are not appropriate and may affect the life of the surrounding clay tiles. Clay tiles will deteriorate with age and frost damage as they absorb water. Brushing moss off tiles (which holds water onto the roof) will reduce the effects of deterioration but eventually clay tiles will need replacement.

Clay tiles are sometimes bedded in mortar as are clay ridge tiles. Mortar is also often used at abutments. Mortar repairs must always be carried out in lime mortar, not cement, for various reasons:

- Cement mortar is hard and impervious while clay tiles are soft and porous. When a clay tile is set beside a hard mortar the rainwater evaporates through the more porous surface, ie. the clay tile. This exaggerated wetting and drying cycle is concentrated in the tile which will accelerate its deterioration. Lime mortar is more porous by comparison with cement.
- It is tricky to loosen tiles bedded in hard cement mortar which leads to unnecessary breakages and loss of original tiles during future repairs.
- Lime mortar is slightly flexible, accommodating movement of the timber structure below.

For further information refer to Historic Scotland Inform Guide: *Pantiles*



Flashings

'Flashing' describes the material used to form the watertight junction between two different materials. For example at the junction between a slate roof and a stone gable wall, or at the change of plane of a roof at a ridge, hip or valley. These junctions are often where roofs fail and water gets in. The traditional materials used at these junctions are sheet lead or zinc flashings.

Abutment Flashings

Where the roof meets a stone wall or chimney, there are three ways of keeping the water out:

- mortar fillet or skew
- lead watergate flashing
- lead soakers.

Mortar Skews

In the Old Town, prior to the 19th Century, lead was rare and prohibitively expensive. Lime mortar fillets were used to protect the junction between the roof and the wall. These need regular maintenance and would be limewashed every 2-3 years with a strong wash to fill any cracks caused by movement of the timber structure expanding and contracting or through frost damage. Mortar fillets can absorb water, and a small amount of dampness in the wall at this junction is likely, but in a well-ventilated, unused roof space this is acceptable. Damp may be more problematic where there is a room in the roof. If persistent dampness occurs, it may be worth considering the introduction of a lead flashing which will involve stripping some of the slates. Although mortar skews are the more traditional detail, they need regular maintenance, and on an inaccessible roof the choice to replace in lead may be pragmatic.

Modern mortar fillets should be formed in a strong hydraulic lime mortar because of their degree of exposure. If cement is used, the mortar will be too hard and likely to fail by cracking when the materials below move. Strong cement mortars are also likely to cause erosion of adjacent stone in the long run. For further information refer to Historic Scotland's Inform Guide: *Masonry Decay and the Use of Lime and Cement in Traditional Buildings.*

Lead Watergate Flashings

Lead can also be used in place of mortar at abutments. This may have a minor impact on the appearance of the roof, but if laid properly and secured, lead should have a long life with little maintenance. Lead sheet became available for normal domestic buildings in the late 18th Century and the design of the New Town roofs depends upon it. Lead is a malleable sheet metal which can be folded, welded and beaten to form any shape required to accommodate a roof. However, lead expands and contracts readily in response to changing temperatures and must be laid carefully to accommodate this or it will tear or buckle. The Lead Sheet Association has developed a series of details for leadwork which should be followed to avoid problems. Lead should always be laid by a skilled lead plumber, preferably to drawings by an architect experienced in conservation work.

Lead soakers and Mortar Skews

If a lead watergate is unacceptable for aesthetic reasons, it may be possible to insert lead soakers under the slates, cover these with a strip of expanded stainless steel lath as a key and apply a mortar fillet over, thus giving the appearance of a mortar skew with the water-tightness of lead.

Mortar skews protect the junction between the roof and the wall.

Ridges and Hips

In the Old Town, prior to the introduction of lead, these junctions were covered with shaped stone ridge pieces, or clay ridge tiles fixed down with mortar and held in place from wind uplift by their own weight. Stone ridges can still readily be seen surviving on the main roofs and dormers in the Old Town and should not be replaced with other materials. Stone ridges can be affected by frost or impact damage, mortar failure or weeds growing in the joints. Regular inspections to check for early problems should avoid the loss of old ridge pieces. If they are damaged beyond repair, new stone ridges can be made to match.

By the 19th Century lead sheet was the material predominantly used for ridge and hip flashings. These are made of long sheets of lead dressed over timber rolls and held in place by lead clips, which are screw-fixed to the timber under the lead sheets and bent up over them. Ridge and hip flashings can fail if these fixings are not maintained; clips should be checked and pushed back down if affected by wind lift. Sometimes failed lead sheet is replaced with zinc, which is cheaper, however lead is preferable and will give a longer life if properly detailed. Zinc is fixed with zinc straps over the zinc ridges and is much more prone to wind lift. Once loosened, wind can easily remove a ridge completely. Zinc is often fixed with ferrous screws and these will rust.

Cornices

Many New Town buildings have cornices. These carved stone projections at the top of the wall have a slight fall (run) on them and are designed to cast water away from the top of the wall outwards. Cornices are always made from ashlar stone and the joints between the stones are very small (2-3mm).

Maintenance, Problems and Repairs

Over time, the lime mortar filling the horizontal joints between cornice stones becomes eroded, leaving a path for water to find its way into the wallhead, where it can start to affect the roof timbers, which are often built into the wall. As more water enters the fine joints they become eroded and increase as does the problem of water ingress. It is therefore important to inspect the joints regularly and repoint open joints with a suitable lime mortar mix. For further information refer to *Historic Scotland Inform Guide: Repointing Ashlar Masonry.*

Sometimes projecting cornice stones can deteriorate through mechanical damage, because there is a fault in the stone or due to delamination of the stones if wrongly bedded (see *The Care and Conservation of Georgian House*) Structural movement can also affect the way water runs off them. In these cases, it might become advisable to cover the cornice in lead sheet. If this is necessary, advice from a building conservation professional should always be sought to ensure that the leadwork is carried out properly.

Valleys and Parapet Gutters

These gutters are generally found on 19th Century buildings and later. Parapet gutters are tucked behind the front parapet walls, taking the water from hidden front pitched roofs thus avoiding having visible gutters and downpipes on the front elevation. (See diagram on page 4).

Valley gutters are found in the middle of 'M' roofs and take water from both the inside pitches. This double-pitched arrangement channels water towards the middle of the building and not to the edge, as for single pitched roofs. This design was only possible following improved availability of lead sheet and sarking boards to form the sole of the gutter and support the lead sheets.

Maintenance, Problems and Repairs

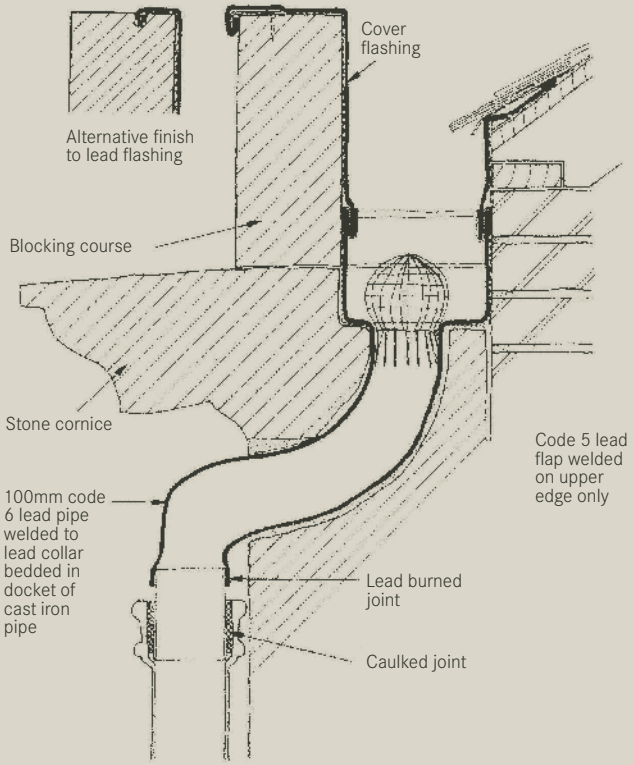
Leadwork in gutters can fail because:

- The sizes of the sheets are too big, or badly fixed, causing the lead to crack.
- Joints between pieces of lead have been badly formed and are unsound.
- The material has worn thin and reached the end of its life, or has been damaged by acid run-off from slate roofs. This run-off is caused by algae that forms on slates, generally on the shaded pitches, and manifests as pale grey staining on the lead, eventually wearing a hole in the lead. Lead can be protected by inserting sacrificial pieces of lead flashing tucked under the bottom row of slates and secured with lead clips. When these sacrificial pieces wear thin they can easily be replaced.

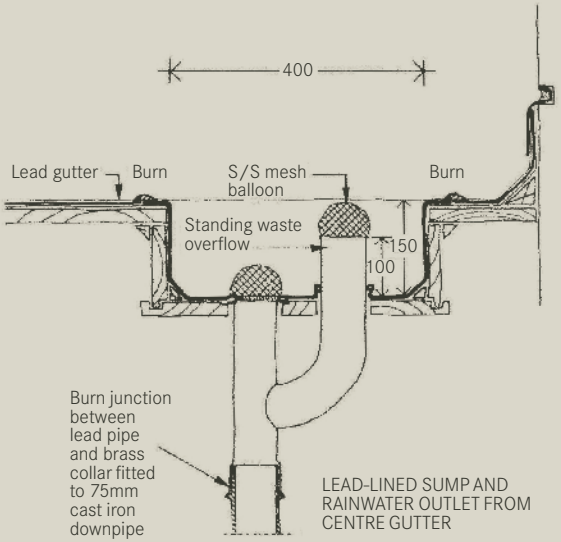
Lead gutters should be cleared out regularly.

- Parapet and valley gutters often suffer physical damage from foot traffic or nails and debris being stood on and piercing the lead.
- Damage can also happen if loose slates slip down the roof and cut through the lead.
- Problems can occur if the gutter boarding under the lead starts to rot or the boards have been laid without proper falls, causing the water to pond and find its way into the building.

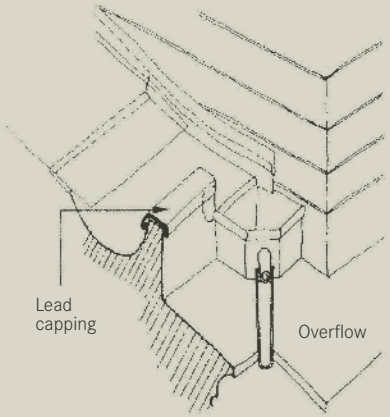
Leadwork is formed by a series of laps and steps and is not sealed. If water builds up it can find its way over upstands and leak into the building. Outlets from parapet gutters need to be regularly cleared of leaves and debris or they will become choked, causing the downpipe to backup and overflow back onto the leadwork.



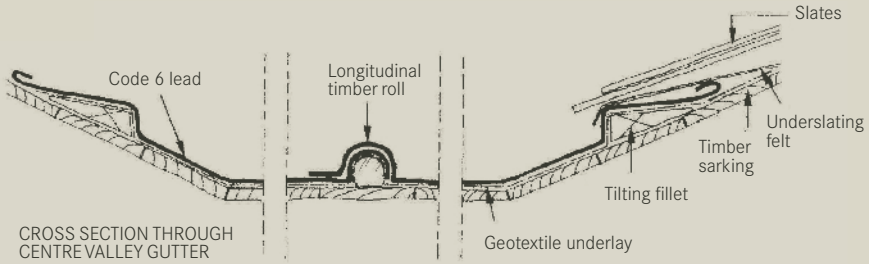
OUTLET FROM PARAPET GUTTER



LEAD-LINED SUMP AND RAINWATER OUTLET FROM CENTRE GUTTER



WALLHEAD GUTTER AND LEAD CATCHPIT WITH OVERFLOW



CROSS SECTION THROUGH CENTRE VALLEY GUTTER

Ensure that the tops of downpipes are covered with either a mesh ball, or if the water is gathered in a catch pit (a sunken lead box before going into the down pipe) a mesh box is placed into the catch pit.

Small holes in lead can be repaired with a lead-welded patch. These 'Hot Works' involve using a blowtorch in the proximity of timber and must therefore be carefully watched as there is a small chance that the heat could cause a smouldering fire in timber sarking below. If, however, the cause of the lead's failure means that the gutter is likely to fail again, it will eventually be necessary to renew the lead sheet. This should always be carried out by a suitably qualified lead plumber to a design by an architect or surveyor qualified in conservation. Old sand cast lead is thicker than lead available today and new sheets of lead may need to be laid in smaller pieces requiring the timber base that the lead is formed over to be redesigned or adjusted.

Gutters and Downpipes

Old Town buildings, prior to the second half of the 18th Century, would not have had gutters and water would have shed straight off the eaves slates or tiles. Later improvements introduced lead or cast iron rhones and downpipes. These were often difficult to fit and sometimes cut across facades in an awkward way. In such cases they should be painted to match the colour of the building behind. Gutters were also sometimes formed in the stone cornices. Early downpipes would have been made in lead but by the 1800's cast iron rainwater goods were being mass-produced locally, for example in Falkirk and Bo'ness. Cast iron is made by pouring molten iron into sand casts and it is still the process used today.

The rear elevations in the New Town generally have plain half-round, double beaded cast iron gutters and downpipes. As the industry took off, more elaborate mouldings became available. Victorian buildings often have decorative ogee rhones, hoppers and downpipes and most patterns can still be cast today.

Maintenance, Problems and Repairs

- Gutters and downpipes need to be checked regularly and cleared of leaves, debris and vegetation to operate properly. A proprietary mesh leaf guard should be fitted at the top of downpipes to stop leaves blocking them further down. If pipework becomes blocked, water cannot flow away and will back up, and run down the face of the building washing out pointing or eroding stonework, or may find its way into the building.
- Wallhead gutters, moulded gutters that sit on top of wallheads, are particularly prone to problems, as they are horizontal. If they overflow, water will pour onto the top of the wall, soaking the wallhead and getting into the building. If sitting water freezes it will expand and can split gutters. The only remedy is to replace the entire gutter.
- Other signs of problems are damp staining on walls, green algal growth on stone or failed render.

- Cast iron rusts if it is not protected with paint. Check for signs of rust, especially at the backs of rhones and downpipes which are hard to get at. When repainting, ensure all the rust is removed by wire brush and sandpaper first, and then repaint using a proprietary paint system specially designed for metal. The Planning Department advise that a dark grey or stone colour is most suitable.
- If new sections of cast iron gutters are needed they should be replaced like for like with matching profiles. There are several foundries which still produce a wide range of traditional castings which normally come pre-primed. New cast iron should be painted with one additional coat of primer, two coats of undercoat and two coats of top coat prior to being installed. UPVC pipes are not appropriate.

For further information refer to Historic Scotland Inform Guide: *The Maintenance of Cast Iron Rainwater Goods.*

Dormers

Dormers may be part of the original roof design in the Old Town, giving daylight to accommodation in the roof space, and are often decorative. They are often built up in masonry off the top of the wallhead, with timber structures behind and pitched roofs, all clad in slates or tiles. There are examples of crowsteps, ogee-arched and classical pediments. If a second storey is fitted into the steeply pitched roofs, there is a second row of timber-framed dormers above. There are also some 'catslide' dormers.

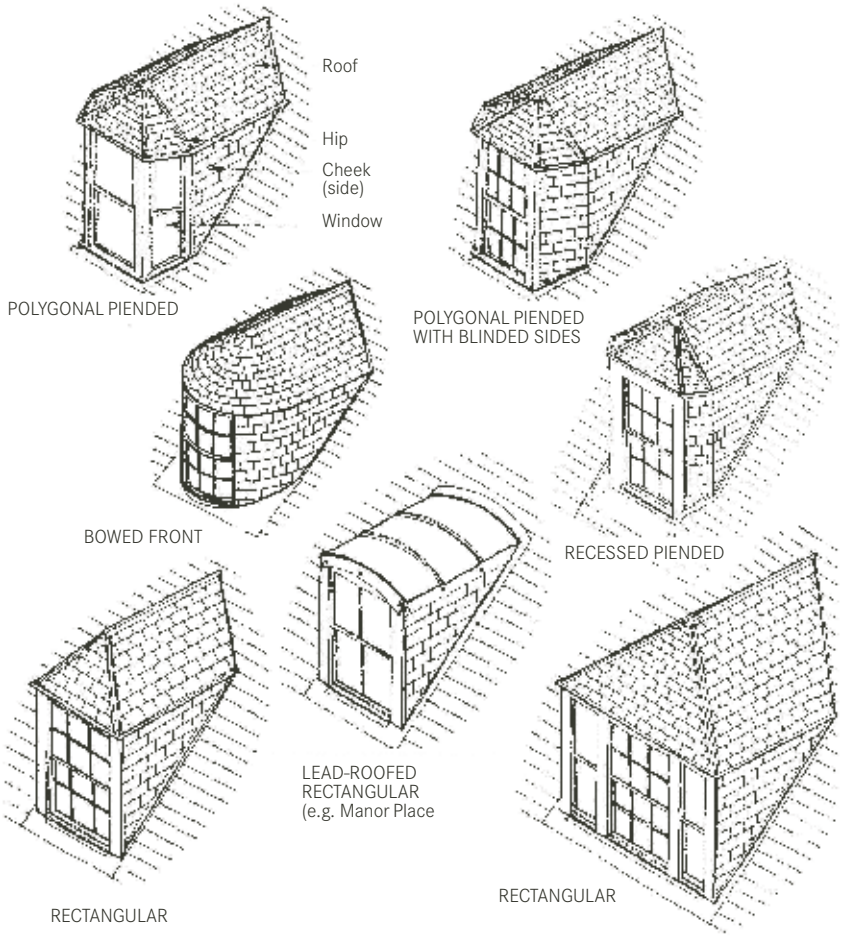
In the New Town, dormers were seldom part of the original design and were often expressly forbidden in the title deeds, but many were introduced soon after the buildings were completed and make good use of the roof space. New Town dormers are usually rectangular or polygonal and generally have hipped roofs.

Maintenance, Problems and Repairs

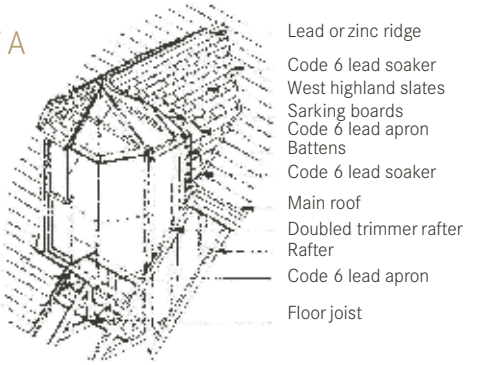
As dormers interrupt the main roof slope and are complex in shape, there are many junctions between planes and materials which are potential weak points and are prone to failure. Dormers are also exposed to extremes of weather. They are often physically and visually inaccessible and as a result suffer from a lack of maintenance. It is advised that an annual inspection of the flashings between the dormer and main roof, gutters and apron flashings (the lead flashings below the window cills) is carried out. Find a good vantage point – even from a neighbour's flat across the road and take your binoculars!

- Dormers are prone to wind damage and slates and nail fixings can be pulled out. Dormer cheeks (sides) have vertically-hung slates which are traditionally double-nailed (have two nails at the head of the

TYPES OF DORMERS IN THE NEW TOWN



CONSTRUCTION OF A DORMER WINDOW



slate). It is therefore more difficult to re-fix individual slates.

- Rhones are particularly inaccessible, and if unmaintained will rust.
- Timber windows and fascias also need regular painting and are particularly vulnerable at their bases. If you suspect that the fascia is rotten, push a screw-driver into the wood to test how soft it is. The Planning Department advises that fascias should be painted grey to match the roof colour and that windows should be off-white or to match the windows below.
- High winds can lift or even pull off lead or zinc flashings.
- Apron flashings are fixed along their top edge. If the window is wide, the lead can crack in the middle because it is restrained from thermal movement. A piece of lead can sometime be tucked under the cill to cover this crack and is the least disruptive repair.
- Stone wallhead dormers will need to be repointed regularly. Lean (partly eroded) joints will allow wind-driven water in and will erode the arrises (edges of the stones). Junctions between stone gablets and slaterwork behind are often finished with a mortar skew. Although not traditional, a lead flashing may be preferable here, and properly fitted should be fairly maintenance-free. It will not generally be visible from the street.

Cupolas and Rooflights

Cupolas are a feature of the New Town and are a very elegant way of letting light down through the centre of the building, usually to a stairwell. They are often elliptical or round in plan and constructed of a timber kerb with thin timber astragals bridging from the kerb to a central high point. Cupolas always sit in a flat area of roofing finished in lead sheets. The roof is an exposed position for this complex joinery and decay can go unnoticed from inside, so don't assume that because it looks sound from underneath it doesn't require external inspection.

Maintenance, Problems and Repairs

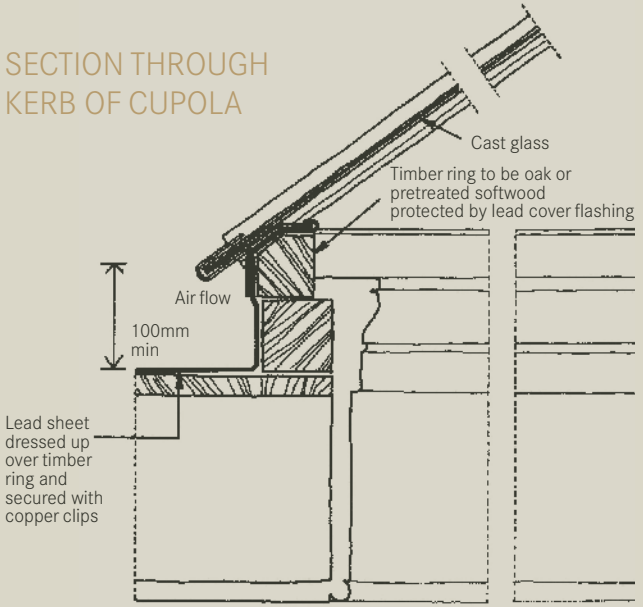
Cupolas are particularly susceptible at the base of the astragals which have exposed timber end grain. If the glazing putty cracks, water can sit in the crack and rot the timber hidden from view underneath. Cupolas often go unpainted because they are so awkward and dangerous to get to. A solution to this problem is to flash the cupola by dressing thin Code 4 lead sheet over the astragals. Although initially expensive, this will be relatively maintenance-free and save paint work and timber repair costs in the longer term.

Glass can crack due to impact or movement (for example due to timber rot) or if a piece of glass slips. Traditionally, it is held in place at the base of the pane by lead straps, fixed to the kerb and turned up over the glass. However, due to thermal movement, the lead can slump and the glass creeps. Modern safety glass should always be used when replacing a pane or reinstating a cupola or rooflight.

Cupolas are single-glazed so some condensation on the underside of the glass is inevitable. The small gap formed by the thickness of the lead strips at the base of the pane is enough to allow air movement across the underside of the glass and form a weephole for water to get away. Do not block this gap or condensation will cause corrosion of the lead (seen as a white powder) at the foot of the kerb or rot the timber kerb or astragals. Cupolas and lanterns generally have a vent at the head which must also remain open.

Early rooflights simply consisted of a large sheet of thick glass set into the roof like a large slate. It is very unusual to find these now. Later, cast iron pattern rooflights were introduced which need to be painted periodically. Timber rooflights with lead flashings are also found, and these need to be checked to ensure that the paint and flashings protecting the timber are sound. Modern double-glazed metal-framed rooflights, designed to traditional proportions, are now available from several manufacturers, but it is preferable to reinstate a rooflight in the original materials and proportions.

SECTION THROUGH KERB OF CUPOLA



Chimneys

Chimneys are an important part of the Edinburgh skyline throughout the World Heritage Site. Each room in a traditional property would have had an open fire, as this was the only means of heating them. Flues were generally built into the thick masonry party walls and gathered at roof level into big stone stacks with rows of buff clay chimneypots. Old Town chimneys were often built of rubble stone intended to be lime-harled, with thick decoratively moulded stone caps.

Stone finishes to New Town chimneys vary with prominent chimneys built of ashlar (smooth stone) and less prominent ones with a droved or broached finish to the stones. Rear chimneys are often rubble with dressed broached and droved quoins.

Maintenance, Problems and Repairs

Flues are not generally used for open fires now but many take flue-liners for gas boilers and gas-effect fires. Chimneypots need cowls for these, which should be in buff-coloured clay to match the pot rather than metal. Where flues are no longer in use, they can be capped with clay ventilators, which stop rain running down the inner face but allow a small amount of air movement within the flue.

Chimneys should be inspected to ensure that they are pointed and that the haunching round the pots is sound. Often the haunching has been reapplied in a strong cement mortar, which is more likely to crack than a traditional lime mortar. Removing this mortar may be impossible without breaking the clay pots and it is better to manage the situation by filling any cracks with mortar than breaking it out. New and replacement pots should match the existing ones.

For further information refer to Historic Scotland Inform Guide: *Domestic Chimneys and Flues.*

Balustrades and Parapet Walls

(see also parapet gutters)

These are a New Town architectural feature, extending the top of the front wall above the natural eaves level, used to increase the height and therefore improve the proportions of the front elevation whilst concealing the roof behind.

Maintenance, Problems and Repairs

As the stonework is exposed to wind and rain on both sides, regular inspection is important. There are often dormer windows behind parapet walls or balustrades, which can afford a good view and sometimes safe access for a closer inspection. Because of the exposure, maintaining the pointing is extremely important, to avoid the erosion of joints and instability of the individual stones. Water ingress to joints allows water into the wallhead and can affect roof timbers such as rafter feet and timber bearers behind, leading to a series of problems and expensive repairs. Water ingress can also corrode the ferrous fixings often used to pin balustrade stones together. Rusting iron expands, breaking the stone around the fixing. This makes it unstable and potentially damages adjacent stones. These balustrade stones are complex pieces of carving and expensive to re-make. Problems with individual stones can affect long unbraced sections of balustrade (or parapet) causing horizontal and vertical distortion. In this case, expert professional advice should be sought.

Insulation and Ventilation

Heat is lost through a typical roof and in this age of spiralling fuel prices and demands to reduce carbon footprints, it is sensible to insulate the roof space.

There is a bewilderingly wide range of insulation materials available. It is beyond the scope of this leaflet to look at each in detail but generally natural

materials (such as sheep's wool, hemp or recycled newspaper) work better in older properties as they are able to absorb and disperse moisture and prevent the condensation problems that can occur when retrofitting insulation. Always seek advice from manufacturers. Please refer to: EWH Historic Home Guide*: Energy Efficiency*

In an attic, insulation can be laid between and over rafters. However it is important to maintain ventilation within the roof space. In roofs that have no underslating felt this occurs naturally through gaps between the slates and sarking boards. It is therefore important to check if a slating felt has been laid. Current best practice is to use 'breathable' felt underlay as this will still allow air movement through the gaps as described above. In the recent past, plastic non-breathing underslating felts were regularly laid, and before that, hairy felt bituminous underlays. If either of these are present when insulating, additional ventilation will need to be introduced into the roof space above the insulation to avoid a build-up of condensation.

Air movement in old buildings is very important as it minimises dampness through a series of interlinking air paths (For further information refer to Historic Scotland Inform Guide: *Ventilation in Traditional Houses*). The airpath between the lath and plaster and outer masonry walls generally links up with the roof space. It is therefore important not to block this when laying insulation or moisture may build-up elsewhere and cause rot in other parts of the building.

If you still have a cold water tank and water pipes in your roof space and then introduce insulation, it is essential not to insulate under the tank. You should insulate around and over the tank to prevent freezing. Pipes should either run under the insulation or be encased in proprietary foam pipe insulation. For further information refer to EWH Historic Home Guide*: Energy Efficiency* and Historic Scotland Inform Guide: *Energy Efficiency in Traditional Homes*.

loft insulation topped up with 300 mm of mineral wool

Access and Safety

Health and Safety legislation sets out guidance on working at heights to which contractors must comply by law. Most buildings in the World Heritage Site are at least three storeys high and often more, with pitched roofs, so safe access for inspection and maintenance is essential. It is normally possible to find a vantage point to see the roof for survey purposes, from a dormer, rooflight or a building opposite, with the use of binoculars. Many later New Town 'M' roofs have a ladder and an access hatch onto the middle valley which will allow safe inspection of most of the roof. Access for maintenance work may be more difficult. If there isn't a suitable fixed access ladder or stair and hatch, but one could be fitted, this should be considered. If introduced, new access ladders and roof hatches will need Planning Permission and should be positioned discreetly. More detailed information on the design of new hatches can be found in *The Care and Conservation of Georgian Houses.*

Sometimes, work may only be possible from a mobile 'cherry picker', tower or access scaffold: this can seem costly, but will be less so than ignoring a problem that leads to a huge repair project. The cost of scaffold can be a considerable proportion of the overall cost of the repair work, so it is worth considering all other works that can usefully be carried out at the same time to make the most of the scaffold.

Duck boards are timber walkboards laid in lead valley gutters to protect the lead from damage by foot traffic. These can be very slippery when wet, and may trap leaves and other debris if not cleared out regularly. .

TV aerials and Satellite Dishes

New satellite dishes are subject to Planning Permission and are only acceptable where they can be hidden from view and do not affect the character or setting of the buildings. Where there is a double 'M' roof, a dish can be hidden in the valley, as long as it is kept below the ridge level. It may be possible to site a dish behind a parapet wall, again so that it cannot be seen. Similar consideration should also be given to how cabling will reach the dish without compromising the weather-tightness of the roof, or damaging stone or leadwork at cable fixing points. These points also apply to TV aerials. It may be possible to locate aerials within the roof space and if possible this is the best option. Redundant dishes should be removed.

For details of solar panels please see EWH Historic Home Guide: *Energy Efficiency.*

Glossary

Abutment – an intersection between a roof and a wall

Apron flashing – a flashing (normally lead) at the base of a chimney or below a window cill

Arris – a sharp edge or corner of a stone

Ashlar – precisely squared stones finished to a smooth surface, with fine 2-3mm wide joints

Astragal – moulded glazing bar

Battens – rough sawn small timbers used for framing

Broached – fine chisled lines approximately 5mm apart, often found in bands forming an arris to a dressed stone face

Dormer cheeks – sides of a dormer

Droved – coarse chisled lines approximatetly 10-15mm apart on a large area of a stone face

Cornice – a decorative overhanging moulding at the top of an external wall, to throw water away from the wall face

Down pipes – vertical pipes to take rainwater away

Double-beaded rhones horizontal rain water conductor with half-round decorative beads at each edge

Double-lapped slates – slates laid such that the nail fixing is covered with two further layers of slates

Eaves – bottom edge of a roof where it meets the wall

Fascia – a timber board set below the eaves or round a dormer

Gable – a triangular piece of wall formed by the pitches of the roof

Gablets – small gables formed by a dormer

Hip – the edge formed by the meeting of two roof pitches, from which water flows away

Hydraulic lime mortar – as for lime mortar below, but with impurities in the lime, which causes the mortar to set harder

Kerb – timber upstand on a roof

Lean joints – joints lacking mortar

Lime washed – painted with a wash made from lime

Lime mortar – mortar made in a traditional way with quick lime and not modern cement

Mortar skew – a mortar fillet covering the junction between a roof and a wall

Parapet – a section of wall rising above the eaves line

Quoins – dressed corner stones

Rafters – structural sloping timbers forming a roof

Rhones – horizontal rain water collectors at the eaves of a roof

Ridge – meeting point at the top of two roof pitches

Sarking - timber boards fixed horizontally across the rafters

Gutter sole – the timber forming a base for a gutter

Valley – the juntion formed by two meeting roof pitches, towards which water flows, the opposite of hip.

Wallhead – top of a wall

Further Reading

1. Historic Scotland Inform Guides:
Repairing Scottish Slate Roofs;
Masonry Decay and the Use of Lime and Cement in Traditional Buildings;
Repointing Ashlar Masonry;
Domestic Chimneys and Flues;
Ventilation in Traditional Houses;
The Maintenance of Cast-Iron Rainwater Goods;
Pantiles

2. Edinburgh World Heritage Historic Home Guide, *Energy Efficiency*

3. *The Care and Conservation of Georgian Houses*, by Davey, Hodges, Ketchin, Milne, published by Butterworth Architecture

Useful Contacts

Questions about listed buildings or conservation areas
City of Edinburgh Council, Planning Help Desk
0131 529 3596, helpdesk.planning@edinburgh.gov.uk

Advice on traditional construction and appropriate maintenance and repair techniques
Historic Scotland, Conservation Group
0131 668 8683, hs.cgoutreach@scotland.gsi.gov.uk,
conservation.historic-scotland.gov.uk

Want to find out more about your building?
The Local History Archive
The Edinburgh Room, Central Library, George IV Bridge
0131 242 8030, www.capitalcollections.org.uk

The National Building Record
The Royal Commission on the Ancient and Historical Monuments of Scotland
www.rcahms.gov.uk

EDINBURGH WORLD HERITAGE
Historic Home Guide

5 Bakehouse Close, 146
Canongate
Edinburgh, EH8 8DD
Tel: 0131 220 7720
info@ewht.org.uk
www.ewht.org.uk

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Author: Rachel Mayhew

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