

# INFORM

INFORMATION FOR TRADITIONAL BUILDING OWNERS

## Bituminous Sheet Flat Roofs: Their repair and maintenance





*Flat roof covered in sheets of bituminous felt*

## **Introduction**

Whilst flat roofs are often regarded as inferior to their pitched counterparts and as being restricted to use on sheds and outbuildings they are found on many of Scotland's traditional buildings. Tenement buildings in particular often have flat roofs as part of their construction. Flat roofs pose a number of problems different from those encountered in pitched roofs. As they are not as proficient at shedding water, any defect can have serious implications for the building. They also may not receive the attention they require as inspection is sometimes difficult. This INFORM seeks to provide information regarding the structure of flat roofs, their inspection and common causes of defects.



*Standing water is a major source of deterioration in flat roofs*

## **Structure of a flat roof**

Flat roofs basically consist of joists, sarking and a waterproof covering built to a slight fall to drain off rain water. The most common covering material is bituminous or roofing felt. The felt covering is built up in layers each bonded with a bituminous substance such as tar. The upper surface is sometimes covered in a layer of stone chips set in tar to make it more robust, weatherproof and better able to deal with solar gain (this is the amount of heat which the roof structure absorbs from the sun).



## Inspection

It is important to regularly inspect the external surface of a felt covered flat roof to check for early indications of problems and defects. If spotted, these should be rectified as soon as possible.

Where practical to do so flat roofs should be inspected from inside as well as from ground level and if possible from the surface of the roof itself. Some points to bear in mind when inspecting flat roofs are:

- If damp patches appear on the ceiling below a flat roof it means that there is a leak in the covering. This should be sourced and repaired as early as possible to avoid further damage. It is important to note that the leak may not directly correspond to where the damp patch appears and some searching for the source of the problem may be required.
- Soft patches underfoot are indicative of deterioration of the substrate usually caused by water penetration.
- Gutters and other water outlets should be inspected for blockages particularly in autumn.
- Pools of standing water are indicative of poor drainage.
- The surface should be checked for signs of deterioration such as cracking, blistering or crazing.
- Walking directly on the roof can make the problem worse.

Where a flat roof meets an adjoining masonry wall, a parapet or a slopping roof, metal detailing known as flashing is used to ensure water is kept out of the junction. Flashing was installed in such a way as to allow for a little movement in the structure of the roof whilst still remaining water tight. Where flashing are sealed with tar or cement these often do not last as they become brittle and fracture.

## Flat roof deterioration and repair

There are a number of locations where deterioration can emerge in a flat roof including:

- Parapets
- Gutters and outlets
- Eaves and verges
- Fixings
- Roof Lights and openings
- Vents and flues
- Expansion joints
- Roof surface

Problems associated with each of these locations occur for a number of reasons and have a variety of signs and symptoms which allow for their early detection. Likewise, there are a variety of methods of repair which can be used to ensure continued performance.

## Parapets:

Sometimes the parapet wall can become cracked or have stones dislodged. This can be caused by a number of factors but is most often the result of water ingress or wind. The usual procedures for masonry repair should be followed with unsound masonry being rebuilt or re pointed as appropriate.

A further problem that may be encountered along the edge of flat roofs is that of split, torn or damaged skirting resulting in water ingress. Skirting occurs where the edge of a flat roof meets the masonry parapet. Deterioration can be caused by thermal or moisture movement, a lack of an adequate key to the backing or simply a failure in the original design or workmanship. Where this occurs the skirting will have to be repaired or replaced, and is best undertaken by an experienced contractor.



*Repair to detailing where flat roof meets parapet wall*



*Pooling water around a roof light will lead to major deterioration of both the roof light and the flat roof*

## **Roof lights**

There a number of potential failures which can occur in the area surrounding a roof light or other opening. Wind damage to flashings, defective sealing around the base of the roof light and rotting or degraded timber elements can occur. These should be repaired by making good flashings, ensuring seals are sound (replacing them where necessary) and renewing the frame if rotten.

## **Vents and flues**

Often flat roofs will be penetrated by vents and flues to allow for the disposal of waste gas or smoke from a building. Problems can be experienced around these features with roof coverings becoming soft, discoloured or

generally deteriorating. This can be caused by condensed solvents and other harmful agents leaching from the vent or flue. To combat this the affected area should be repaired and a new membrane introduced which can better resist such attacks. Raising the height of the vent may also solve such problems.

## **Roof Surface**

There are a wide range of problems which can affect the surface area. Each has its own cause and can be repaired in a variety of ways.

Cracks and tears along the line of the support joists of the roofing deck can be caused by thermal or moisture movement, saturation of insulation or sagging of the roof deck. This

can be repaired by cutting back the existing felt and allowing the area to dry before applying a new layer of high performance felt with a suitable overlap between the new and existing material.

Cracks, splits and rucks can occur when there is thermal or moisture movement between the roof substrate and membrane. It is likely that localised re-roofing will be necessary to tackle this using a high performance felt.

Surface crazing is caused where there is a lack of adequate protection from the harmful effects of exposure to the sun or, in rare occasions, chemical attack. If this is only in small localised patches no treatment is necessary but should be regularly rechecked. If more widespread the areas will have to be re roofed and specialist protection introduced.

Blisters can be caused by water vapour pressure occurring below the roof covering. The blister should be cut and then re-bonded to the underlay allowing any trapped moisture to escape first. The source of the moisture should also be traced and rectified.

Punctures and rips are most often caused by impact damage by people or loose debris. They should be repaired using localised patch repairs.

Where surface problems are serious it may be necessary to re-surface the entire roof. This should be considered where patch repairs will no longer be sufficient to ensure the integrity of the weather proof covering and should be carried out by a contractor experienced in such work. Well maintained, a flat roof should perform adequately for many years.



*Blistering of roof felt*



*Tear in roof felt*

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*Blistering of roof felt*



*Tear in roof felt*

## Further reading

- March F., Flat Roofing: A guide to Good Practice
- Hughes G., Flat Roof Covering Problems, (RICS, London, 1995)

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