INFORM

DAMP GABLES

HISTORIC ENVIRONMENT SCOTLAND | ÀRAINNEACHD EACHDRAIDHEIL ALBA

Fig. 1 The gable end of a traditional building showing signs of staining caused by water run-off.

Fig. 2 The poor condition of this chimney is likely to cause problems to the gable below.

DAMP GABLES

Gable walls are often the most exposed part of a building and are susceptible to driving rain. With increasing rainfall in Scotland due to a changing climate, damp gables are becoming a common problem. Issues can be made worse by poor maintenance and inappropriate repair. This INFORM outlines the symptoms, likely causes, and repair options when penetrating damp is identified in the gable walls and chimneys of a traditional building.

Vulnerable areas

Gables and chimneys take the brunt of the impact from severe weather. Water can penetrate through open or degraded masonry joints, poorly protected junctions and through cracks or defects in external coatings (Fig. 1).

Defects typically occur at the chimney (Fig. 2) and skews first. Masonry saturated due to driving rain, high level defects and poor water management is vulnerable to damage from frost and stress caused by wetting and drying cycles.

Wetting and drying cycles

Traditional construction relies on the movement of water vapour through the building fabric (often referred to as 'breathability'). This includes the absorption and evaporation of water during and after rainfall. If masonry is wet, its performance will be compromised. Persistent wetting can result in staining, stone decay and internal defects.

Signs and symptoms of water ingress

Internally, flaking paintwork and stained or bulging plasterwork can be indicators of wet masonry (Fig. 3). If these internal linings are adjacent to wet masonry they will be cold, attracting condensation, and consequent damage and mould growth.

Other indications of damp masonry include peeling wallpaper and a damp, musty smell in cupboards or attics. Drips and leaks above windows may indicate that water is seeping through masonry joints and junctions. High levels of water in a wall can mobilise salts from the chimney to the inside surface, resulting in yellow

or brown staining to plaster.

Externally, damp masonry is normally darker than dry stonework (Fig. 4). Lime-based finishes may show discolouration, especially near chimneys. Harder cement or hydraulic lime finishes may not always show symptoms of damp stonework behind, but moss growth between cracks, and black or dark green discolouration from algae indicates high moisture levels in the masonry (Fig. 5).

Other types of plant growth on masonry suggest that there are defects causing saturation. Fig. 6 shows common defects in a gable end of a house, and areas for improvement.

Approach to repairs

For internal repairs, an impermeable sealant layer to prevent damp ingress will not solve the problem. The source of the ingress should be identified and addressed. Externally, the use of 'water proofers' for masonry is also ineffective in the longer term. The effects on stone are not well understood and they are not recommended for traditional buildings.

Lead trays inserted into the masonry are costly to install and don't prevent water ingress. They only manage localised routing of the water within the masonry rather than preventing it coming in (Fig. 7). To maintain the breathability of the wall, lime-based mortars and finishes are generally considered the best material for repairs on traditional buildings. They should be carefully specified to be fit for purpose. This may mean using more robust mortars for exposed areas at high-level. A suitable repair plan may require additional masonry work or new lead details.

Fig. 3 Damage to internal finishes as a result of dampness caused by a defective cornice on the external masonry.

Fig. 4 Salt staining in saturated masonry caused by a chimney in poor repair.

Fig. 5 Moss growing in a crack in cement roughcast, indicating wet masonry behind.

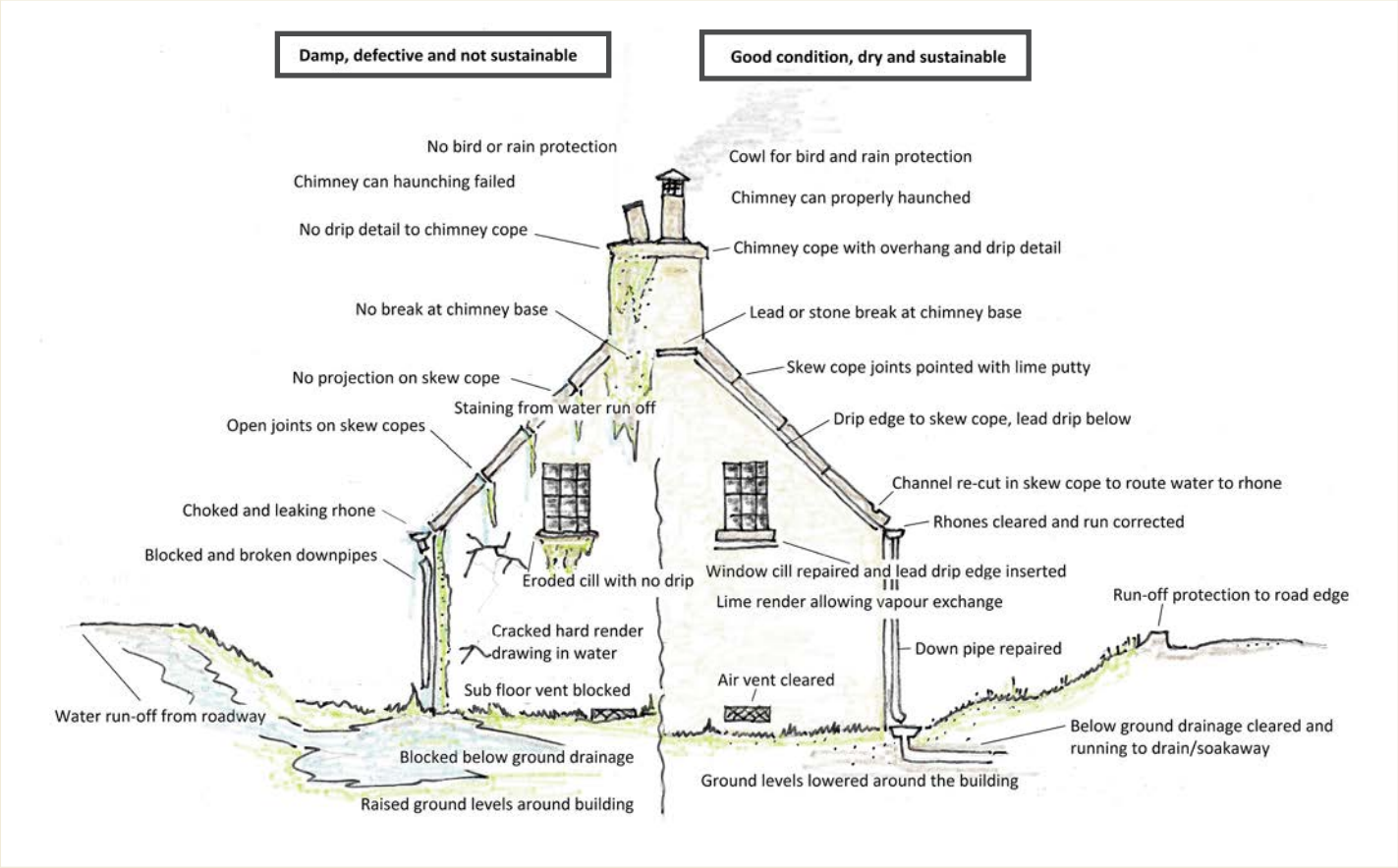

Fig. 6 Sketch of a traditional gable end showing common areas of weakness and water ingress (left), and repairs and measures that resolve them (right). For further details please see the Historic Environment Scotland Short Guide 11: Climate Change Adaptation for Traditional Buildings.

Fig. 7 Lead trays in the mortar to direct water away from the masonry.

If the building is listed such alterations may require consent. Owners of traditional buildings should contact their local planning authority for further advice before carrying out any alterations.

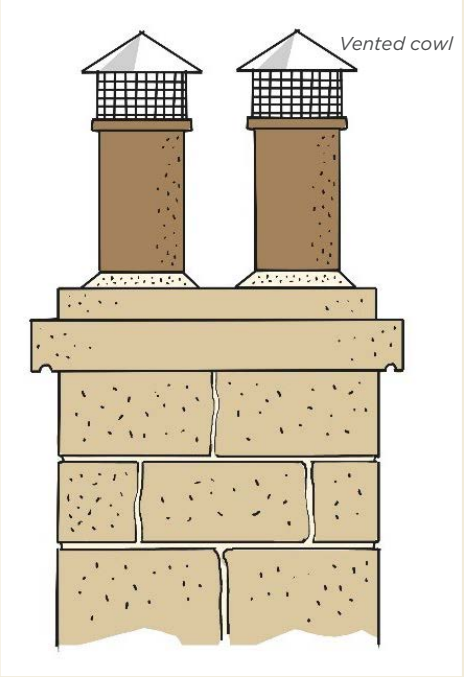

Fig. 8 Well detailed chimney, vented cowl and overhang with drip detailing.

Areas to check and remedial measures

Chimney cans and haunching

These should be secured with a durable mortar. A vented cowl should be fitted to the chimney can to maintain air movement and keep water out of the flue (Fig. 8). Ceramic caps, sometimes called 'elephant's feet' (shown in Fig. 10) are only effective if there is a good overhang with the chimney can, otherwise water can be routed back into the chimney.

Chimney copes

The cope, or top of the chimney stack, should have some form of overhang or drip to throw off water (Fig. 9). This is usually an integral part of the masonry design, but if absent a drip detail can be formed from lead, slate or stone.

Flues and hearths

Due to the presence of flues, gable walls vary in thickness and contain voids. Soot and other combustion materials tend to absorb water from wet masonry and the air,

Fig. 9 A chimney cope showing the drip detail to the underside, designed to shed water.

causing staining and sometimes damage to the masonry. Flues in gable ends should be kept open to maximise drying through ventilation. Fireplaces may be closed with a vented timber board or a chimney balloon to prevent draughts.

Skew copes

Sometimes wallheads are finished with an angled line of flat stones called skew copes or 'tabling' (Fig. 10). The narrow joints between them are vulnerable and often found to be in poor condition. They should be well maintained and pointed in a fine lime mortar. To improve resilience, copes can be fully or partially covered (cloaked) in lead, or packed with lead wool before re-pointing.

Copes are typically flush with the gable wall. Occasionally this area may need to be modified to provide an overhang, which can be achieved by the addition of lead (Fig. 11) or slate. Where copes are being replaced, creating or increasing the overhang may improve water management. Any drip detail added should be angled to shed water away from the masonry below.

Skew putts

The lower end of the skew, where the copes meet the wall, is vulnerable to the run off from the cope. A 'skew putt' is a decorative detail at the end of a cope which also sheds water from the corner of the building (Fig. 12).

Roof junctions and abutments

The point where the roof covering meets the masonry is a significant area of vulnerability. The addition of small sections of lead (soakers) underneath the slates, covered by a mortar fillet (Fig. 13) is often

Fig. 10 Well detailed overhanging copes or 'tabling', and ceramic chimney cap.

Fig. 11 Lead drip under a skew cope, angled to shed water (Photo credit: Jonathan Gotelee Architects).

Fig. 12 A skew putt detail designed to assist the shedding of water.

Fig. 13 A mortar skew fillet, which forms a weathertight seal between roofing slates and masonry.

Fig. 14 A reworked skew junction with lead watergate.

Fig. 15 Dampness persists on new harling due to inadequate detailing on the skew copes.

sufficient, but a more robust lead junction, 'secret gutter' or watergate is sometimes required (Fig. 14).

Masonry pointing on gables

Re-pointing may be proposed as a solution for damp masonry. While defective pointing will admit water, it is not normally the sole cause of dampness. Therefore re-pointing should only be done after more critical works are complete. Cement pointing will prevent saturated masonry from drying out, as can poorly specified lime pointing. On rubble masonry, a flush point will maximise the surface area of the joint for drying, and reduce traps and ledges for water.

External finishes

External finishes are often replaced without due attention to defective elements which may be allowing water ingress. Simply replacing external coatings will not always reduce dampness (Fig. 15). The design and condition of the chimney and the skew copes should also be addressed. However, when masonry details have been addressed and appropriate finishes used, the improvement can be considerable. In a recent project at a historic cottage in Culross, Fife, improved skew details and new lime harling have significantly improved internal conditions, and the previously saturated masonry continues to dry out (Fig. 16).

Prioritising repairs

Homeowners may not be able to repair all the above areas at once. Priority should be given to the more critical high level masonry and detailing. A suitably experienced building surveyor or architect can advise on a programme for repairs.

Fig. 16 This gable end is drying out following repairs and improved detailing at the skew copes, and the application of traditional harling and limewash.

Conclusion

Damp and saturated masonry on gable ends and other exposed features is becoming increasingly common in Scotland. This problem is caused by a greater intensity of rainfall, often combined with poor maintenance and inappropriate repairs. More information on modifying buildings to cope with increased rainfall caused by climate change is described in the Historic Environment Scotland *Short Guide 11: Climate Change Adaptation for Traditional Buildings*.

To address dampness in gables a 'whole building' approach should be taken. This means repairing or improving vulnerable areas, working on the external fabric from the top down and addressing ventilation and internal conditions. With appropriate repair and continued maintenance, the durability and resilience of traditional buildings can be assured, despite the challenges of a changing climate.

Further reading

INFORM: Damp Causes and Solutions. Historic Environment Scotland, 2016.

INFORM: Repointing Rubble Stonework. Historic Environment Scotland, 2007.

INFORM: Hot-Mixed Mortars. Historic Environment Scotland, 2015.

Short Guide 6: Lime Mortars for Traditional Buildings. Historic Environment Scotland, 2013.

Short Guide 9: Maintaining your Home. Historic Environment Scotland, 2014.

Short Guide 11: Climate Change Adaptation for Traditional Buildings. Historic Environment Scotland, 2017.

Further information

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