roof has ridge or gable ventilation, this may give the impression that the roof space is still ventilated but, without the cross flow that eaves ventilation provides, ridge or gable ventilation may do more harm than good by sucking more of the humid air straight into the roof space from the floor below than would otherwise trickle through.

Deterioration of metal connectors, hangers or clamps can occur in conditions that promote rot, and they can also be at risk from tannic acid in oak, or certain preservatives and fire retardants.

Masonry decay

The decay of masonry walls can also be insidious if the cause is hidden, but unlike timber decay, it is not easy to reveal by uncovering vulnerable spots. Unless an extremely thorough inspection is justified, as might be the case if substantial refurbishment threatens to increase stresses in walls, we have to wait for symptoms to become apparent.

Internal walls were often built ahead of external walls, and not bonded into them. This may leave external walls more slender than they appear to be and thereby more vulnerable to damage than might be expected. The slenderness can slowly increase as normal thermal expansion and contraction erodes the weak bond originally provided by friction. Conversely, of course, there is opportunity to reduce slenderness and improve strength and stability at reasonable cost.

Sometimes the cross walls, and even the external flank walls, were built of low quality studwork, and seldom tied to the masonry at junctions. Again the consequence is a hidden weakness, which can get slowly worse but can be simply cured, provided the materials themselves have endured.

Masonry cross walls, and other internal walls, were often built to lower standards using poorer quality material, such as underfired bricks. Such walls may have consolidated in the past and will have been damaged if burdened with even modest alteration. Occasionally, party walls of underfired bricks have been exposed to the elements by demolition of the adjoining building, leading to rapid decay.

The same poor quality material was sometimes used in the internal skin of external walls, hidden behind facing brickwork or ashlar. This has sometimes led to distortion as the internal skin has shortened under load, causing bowing of the outer skin (Figure 9.2). In the long term the internal skin may also have suffered deterioration caused, for example, by penetrating damp eroding its mortar, or rotting the bands

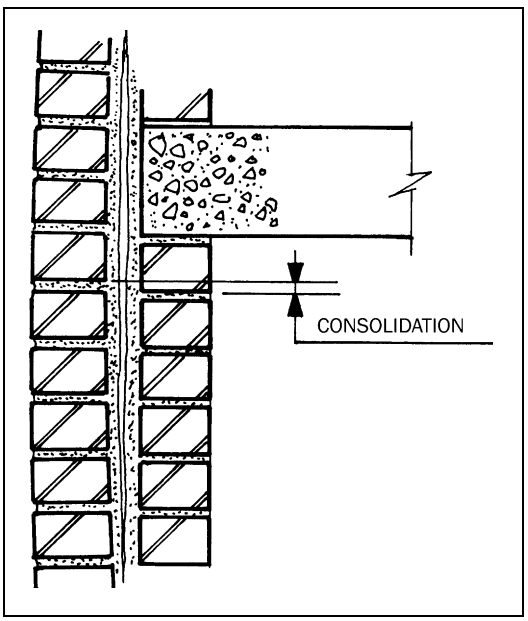

Figure 9.2 Inner skin consolidation.

of timber reinforcement (bond or bonding timber) that these walls sometimes contain (Figure 9.1). Again, the result has been shortening of the internal skin and bowing of the outer. Masonry bees can erode mortar, especially if it is lean. The erosion can be locally severe, very occasionally requiring rebuilding.

Frost damage eats into masonry by the action of absorbed water freezing and repeatedly splitting off the face of the unit. Surfaces that are soaked regularly, or hidden behind impermeable render or paint, are most likely to be damaged. Earth-retaining walls of porous masonry with no damp-proof membrane are particularly vulnerable; so are water-collecting projections and ledges, as well as masonry which is accidentally soaked by faulty rainwater goods or traffic splashing. Water from melting snow has least chance of evaporating before the next freeze cycle, and most chance of doing damage. Parapets, chimneys and walls that trap snow (Figure 7.3, *page 86*) will attract this particular risk. In one case, a chimney was built of frost-resistant bricks above the roof line but of frost-susceptible bricks below, and frost damage within the roof space became serious enough to cause instability. The damage had been caused by water percolating downwards and then freezing within the roof space.

Frost damage is sometimes the unintended result of repointing. If the material used is cement-rich, as it so often is, the mortar beds become suddenly dammed by their new impermeable face. Water no longer

Plate 9.4 Frost damage is usually worst in walls that are permanently soaked.

Plate 9.5 Frost damage can be exacerbated by hard cement pointing, which traps water that would otherwise drain into mortar joints and evaporate outwards harmlessly. The delay provides more opportunity for the water to freeze and split away the faces of the bricks.