The Maintenance and Repair of Traditional Farm Buildings:
A Guide to Good Practice
Farmsteads and buildings are as important to the character of the countryside as the pattern of fields and boundaries associated with them. Together they help to create local identity and sense of place. Traditional farm buildings provide tangible evidence of local history and forgotten skills. Retaining such buildings matters because their history tells us of past practices, technology, innovation and achievements.

Changing agricultural practices and economic pressures mean that many traditional farm buildings have lost their original purpose and become vulnerable to neglect and decay. Even those that remain in active agricultural use still need care and periodic repairs to keep them in good order. This guidance has therefore been designed to help anyone who owns or manages such buildings. As well as describing the best ways of carrying out maintenance and repairs it also explains how work of this kind can help to ensure these buildings have a sustainable future.

Further advice and research on traditional farm buildings, including the English Heritage policy statement *Living Buildings in Living Landscape: Finding a Future for Traditional Farm Buildings* is available at the Historic Environment Local Management website. [www.helm.org.uk/ruraldevelopment](http://www.helm.org.uk/ruraldevelopment)
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THE SOCIAL BENEFITS OF REPAIRING FARM BUILDINGS

As well as contributing to the quality of the landscape and its enjoyment by the public, the repair of traditional farm buildings creates employment, supports local economies and sustains craft skills. A project commissioned by English Heritage and Defra has evaluated these effects in detail for the Lake District National Park.

Without ESA (environmentally sensitive area) grant aid two-thirds of the park’s farm buildings were likely to become derelict with the remainder repaired to a standard not in keeping with local character. The grant-aided work provided a viable future for nearly 65,000 square metres of historic building floor space – 92% of the buildings repaired are now back in productive use without the need for conversion to alternative non-agricultural use. Because the building work has been carried out by local firms it has provided jobs for the local economy.

As well as contributing to the quality of the landscape and its enjoyment by the public, the maintenance of historic buildings creates employment, supports local economies and sustains craft skills.

Source: Building Value: Public Benefits of Historic Farm Building Repair in the Lake District. English Heritage 2005

Image: This early 18th-century field barn at Ullswater in the Lake District was rescued from dereliction with an ESA grant © Andrew Lowe

INTRODUCTION

This publication gives practical advice to farmers, land managers and others involved with the maintenance and repair of traditional farm buildings. It supplements Living Buildings in a Living Landscape: Finding a Future for Traditional Farm Buildings (English Heritage 2006), which sets out the general English Heritage position on the conservation and adaptive re-use of the farm building stock.

This guidance is primarily directed to buildings in active farming or related uses. However, it is also relevant for buildings that have uncertain futures or need urgent works to prevent further deterioration of their structure and fabric.

WHY CARE FOR FARM BUILDINGS?

Historic farm buildings and sites in the countryside provide a unique record of past human activity. Their great diversity stems from many influences, including varying local geology, farming practices, settlement patterns, land tenure and building techniques. Together these factors have shaped the form and appearance of buildings and provided them with their own distinct regional identities, not only in terms of visual character but also their expression of differing functional needs.

Farmsteads and buildings are as important to the character of the landscape as the field patterns, boundaries and route-ways associated with them. Together they help to create local identity and sense of place. They are repositories of local history and forgotten skills, providing tangible evidence of farming history.

Retaining such buildings matters because their fabric and history have so much to tell us about past agricultural practices, technology, innovation and achievements – a continuity of knowledge that helps us understand where we are today.
Although farming practices have changed and resources for maintenance and repair are limited, by far the best option is to keep buildings in active agricultural use wherever economically practicable. © Philip White

RETENTION IN AGRICULTURAL USE

Although farming practices have changed and resources for maintenance and repair are limited, by far the best option in terms of conserving their historic character is for farm buildings to be kept in continuing active agricultural use, wherever economically practicable.

Alterations needed to keep a traditional farm building in active agricultural use will often be less detrimental to the historic character of the farmstead and the wider landscape than the changes required for converting it to a non-agricultural use.

THE WEST MIDLANDS FARMSTEADS AND LANDSCAPES PROJECT

This project was conducted by English Heritage in collaboration with the regional development agency Advantage West Midlands and local county and metropolitan authorities. Its purpose was to help national and local decision-makers evaluate the future uses for farm buildings and to identify the most significant and vulnerable cases using the mapping of all farmsteads from around 1900 as a baseline.

The study concluded that historic farmsteads are assets that have significant potential to make an important contribution to the rural building stock, landscape character and local distinctiveness of the West Midlands, either through agricultural or new uses.

A third of historic farmsteads with buildings surviving from around or before 1900 remain in agricultural use with varying degrees of diversification; only 5% have been converted to sole industrial, commercial or retail use. The remainder, however, are in complete or partial residential use as a result of the conversion of some or all of their working buildings into housing. The economic significance of mixed residential and commercial use can be easily overlooked. Regardless of location, historic farmsteads are more often used for a diversity of home-based entrepreneurial businesses than other dwellings.

Pressures on public finances, environmental stewardship and other grant programmes for maintaining traditional farm buildings are all growing. This means that scarce resources need to be targeted at areas of greatest amenity and landscape value, especially those with high densities of farmsteads in continuing agricultural use, and towards the most significant but least adaptable buildings. For the majority of sites across the West Midlands, however, private investment and maintenance offers the most effective long-term solution to maintaining historic farmsteads as assets in the landscape.

Images: Farmsteads in the Teme valley
DECIDING ABOUT REPAIR
A PLANNED APPROACH TO THE SUSTAINABLE MANAGEMENT OF FARM BUILDINGS

The value of traditional farm buildings can easily be compromised by neglect or unsympathetic repair involving inappropriate materials and extensive replacement of historic fabric. It therefore makes good economic sense for farm businesses to include planned maintenance in their annual budgets – not least because major repairs cost far more than ongoing regular maintenance.

Farm buildings respond well to straightforward repairs using simple materials and building skills compatible with their existing construction. Once they are allowed to develop serious defects, however, the costs of repair can become so high that their continued agricultural use becomes difficult to justify. And if unused buildings are not kept weather-tight, they quickly begin a long gradual decline into dereliction.

The first aim of long-term maintenance planning is to make sure that financial investment is relative and appropriate to the benefits that the buildings can provide. It also needs to be informed by an understanding of how individual buildings contribute to the character of the farmstead of which they are a part and to the wider surrounding landscape in which they are set.

Before embarking on a programme of repairs it is also important to think about how the building or buildings are used now and how they might be used in the future. Do they have:
- Valuable agricultural use?
- Marginal agricultural use, for storage etc?
- No current agricultural use?

The assessment framework included in this guidance is designed to help with planning repairs and working out the available options for prolonging the life of the building. An initial assessment might cover the following issues:
- Ownership—whether the occupant is the owner or tenant?
- Is the building subject to any form of designation?
- What is the structural condition of the building?

A more detailed assessment would involve professional advice about condition and repair costs, alongside an options appraisal of the building’s potential short and long-term uses.

OWNERSHIP

How a building is owned – whether by an individual, a company, a charity or a public utility – can be a major factor in determining the options for sustainable management. Large estates often have a degree of flexibility in the use of their buildings that is not available to an individual owner. In the case of leased buildings the owner should note that:
- The repair costs of leased buildings may need to be apportioned between landlord and tenant.
- Buildings in very poor condition might have to be taken out of any tenancy agreement.

DESIGNATION

If the building or the area in which it stands is subject to one or more kinds of statutory designation its repair may require special consent in addition to planning permission. The specific questions you need to ask are:
- Is the building or farmstead listed or within the curtilage of a listed building?
- Does it stand close to or is any part of it a scheduled ancient monument?
- Is it in an adopted ‘conservation area’ or ‘area of outstanding natural beauty’?
- Is it located in a site designated for its nature conservation value or importance to bio-diversity?
LISTED BUILDINGS AND SCHEDULED MONUMENTS

General maintenance and repair work to listed buildings will not usually require ‘listed building consent’ providing there is a like-for-like use of materials and no major loss of historic fabric. For unlisted buildings, repair work does not constitute ‘development’ and therefore will not usually require planning permission. However, local planning authorities may require a consent application for larger programmes of work, such as re-roofing or structural repair involving extensive replacement of material, if these are likely to alter the character of the building.

It is important to note that buildings lying within the curtilage of a statutorily listed building are normally also deemed to be listed. All works to scheduled ancient monuments invariably require consent. If you are at all uncertain about the designated status of your building you should seek the advice of your local planning authority’s conservation officer.

URGENT WORKS NOTICES AND REPAIRS NOTICES

Local authorities have powers to serve ‘urgent works notices’ and ‘repairs notices’ to the owners of listed buildings. Although usually used only as a last resort, these can be invoked when a listed building has been allowed to deteriorate to such an extent that its future is at risk.

Urgent works are intended to be temporary measures and can lead to repair notices being served if specified work is not adequately undertaken. The building may therefore remain ‘at risk’.

CONSERVATION AREAS

Conservation area designations allow local authorities greater controls over demolition and minor development, even if buildings are not individually listed. While these controls do not apply to maintenance and simple repair they may affect proposed repair works that could significantly change the area’s appearance.

‘BUILDINGS AT RISK’ REGISTERS

English Heritage maintains a national register of Grade I and II* listed ‘buildings at risk’ from neglect and decay. Local authorities also hold their own separate registers of Grade II listed ‘buildings at risk’, which may also include unlisted historic buildings, especially those that lie within designated conservation areas or that make an important contribution to the overall rural or urban landscape.

BUILDING REGULATIONS

Although farm buildings are normally exempt from building regulation control there are exceptions to this rule, particularly when they are close to sleeping accommodation or are used for retailing, packing or exhibiting.

It is important to note that fire exits may be required for certain uses. Any queries about this should be discussed with your local authority’s building control officer.

CONDITION

Condition and the costs of repair can be key factors in determining the range of options available for a farm building. An initial assessment of condition can be made fairly easily but it is often necessary to follow this up with a more detailed condition survey, possibly involving some initial investigative work, to give a better idea of repair costs. A detailed survey is also essential for the correct diagnosis of problems and the production of a specification for repair works.

NEGLECT AND NATURAL WEATHERING

The most commonly encountered problems are those associated with neglect and a lack of regular maintenance. As a result, parts of the structure can become subject to prolonged wetting which in turn leads to decay and structural failures.

• Dry rot is one of the most damaging fungal infections affecting timber in buildings. However, it is almost unknown in traditional farm buildings. This is because of the high levels of ventilation in most farm buildings and the infrequent use of timber as a flooring material. It is also due to the natural durability of many old timbers. It is important therefore to maintain plenty of ventilation to prevent dry rot.
6 Slipped slates needing re-fixing at the verge – a particularly vulnerable area of a roof © Philip White
7 Single roman tile showing early stages of spalling © Philip White
8 Undersized rafters with a high collar showing considerable bending © Philip White
9 Neglect of the roof and guttering has resulted in decay to this timber lintel

10 Bird and vermin damage to decayed cob © Philip White
11 Cutting this tie beam to accommodate a grain bin could result in structural problems © Philip White
12 Poorly executed widening of this stable door has resulted in cracking above © Philip White

• The chances of fungal infection taking hold will also increase if the fabric becomes saturated as a result of defects such as raised ground levels or defective rainwater down-pipes. Wet rot, if left unchecked, will ultimately result in very high repair costs and the loss of historic fabric.

• Insect attack can seriously damage timber components and will lead to their failure if left unchecked. The sapwood of hardwoods, unseasoned softwood and timber infected by fungi are the most common targets for infestation by beetles.

• Frost and salts are two other natural sources of damage to building materials. If moisture penetrates imperfect masonry joints subsequent frost action can cause stones and bricks to become loose. As a result yet more water is able to make its way into the structure, which in turn results in mortar being washed from joints and eventually the collapse of the entire wall.

STRUCTURAL PROBLEMS
Sometimes it is inherent defects in the original construction of a farm building that lead to later problems. These can include:

• Inadequate foundations, which may have moved as a result of long-term structural loading overcoming the passive resistance of the sub-base.

• Roof trusses, particularly in older buildings, which eventually become stressed through overloading. Typical signs are bowing of the principal rafters and purlins and support walls that lean outwards as they resist the spread from inadequate trusses.

• Wall movement that may be the result of overloading from past or recent use, for example the storage of big bales or bulk grain against walls not designed as retaining structures.

ALTERATIONS
Problems can also arise as a result of inappropriate earlier repairs or alterations, including:

• Inappropriate structural alterations.

• Work that has compromised the ‘breathability’ of the structure, leading to excessive dampness and deterioration – for example, rendering or re-pointing walls with a strong cement mortar is often the cause.
• The use of heavy roofing materials such as concrete tiles that cause excessive loading to roof structures designed for a lighter material such as slate.

• Foundation sub-bases affected by ground water that result in wall movement and cracking – excavation can influence ground water movement even when carried out some considerable distance from a building.

• External ground levels that may have risen to such an extent that part of the structure is subject to prolonged wetting, which in turn gives rise to rot and decay.

UNDERSTANDING THE BUILDING AND ITS CONTEXT

Understanding the building and its context is fundamental to determining its historical significance and its adaptability to new uses.

SIGNIFICANCE

Significant traditional farmsteads will make a positive contribution to local distinctiveness and an area’s sense of place, through their varied scales and layouts, use of materials and the way that they relate to the surrounding form and patterning of landscape and settlement. They will have one or more of the following:

• Historic groups of structures that contribute to the landscapes and settlements within which they developed.

• Legible historic groups, where the buildings can be seen and appreciated in relationship to each other, and the yards and other open spaces within and around the farmstead.

• Historic buildings with minimal change to their traditional form, or in some cases their importance as examples of estate or industrial architecture.

• Locally distinctive building materials.

• Heritage assets – buildings that are listed or subject to another form of designation such as those within conservation areas (see Designation).

Farmsteads and their buildings can also be important wildlife habitats, in particular for protected species such as owls and bats. Existing nesting areas and roosts should be disturbed as little as possible and there may also be opportunities to create new ones, both within the buildings and through planting around the site.

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13 Farmsteads, including those in hamlets as here in Drebley in the Yorkshire Dales are often sited amongst piecemeal patterns of enclosure from farmland and open pasture, which may date from the medieval period.

14 Isolated farmsteads can be sited among small-scale and irregular fields which resulted from land and woodland clearance in the medieval period or earlier. The Elms, Keswick, Worcestershire.

15 Farmsteads within and on the edge of settlements can be appreciated in relationship to other historic buildings and distinctive patterns of enclosure. The latter often retain the narrow profiles of earlier closes and strips. A farmstead in a Leicestershire Vales village © Bob Edwards

16 Farmsteads sited amongst regular patterns of enclosure, which are most commonly associated with the re-planning of common land or earlier enclosed landscapes in the period after 1750. A farmstead in the Howardian Hills set amongst fields that date from the enclosure of open pastures and farmland after 1750 © Natural England.

17 Courtyard farmsteads have the building set around and often facing towards one or more yards. A courtyard in the east of Shropshire © Shropshire Council
The medieval farmstead with a range of buildings set around several yards, at Saddlescombe in the South Downs © Bob Edwards

A loose courtyard complex dating from the 16th century in the lowlands of Herefordshire © Herefordshire Council

Field barns and outfarms which are detached from the main group. These may have been built with yards and provided with access tracks. A field barn in Nidderdale © Jen Deadman

ADAPTABILITY

When thinking about potential for new uses for historic farm buildings it is important to consider both their own characteristics and their wider setting:

Landscape context
- Viewpoints towards the farmstead, which may be prominent or screened by landform, vegetation, other buildings.

The site and its buildings
- The opportunities or constraints offered by the plan form and the level of proposed change.
- Ease of access. Some farmsteads may only have a single, private point of access, which constrains the amount of traffic that can leave and enter the site. Others may stand alongside, or sit astride a road or public path, or be at a junction of route-ways that provide public rights of way to the centre of the farmstead.
- The capacity for change presented by the form and scale of the buildings. The number and size of openings and the existing and historic sub-division of internal spaces. Buildings of varying sizes designed for different historic purposes – from smaller-scale traditional buildings to large post-1950 sheds – will clearly present different capacities for change. The number and size of the openings and the existing sub-division of the internal spaces.
- The evidence for lost floors and partitions, historic features such as stalls, machinery, grain bins and floor surfaces, exposed carpentry including roof trusses and floors, historical graffiti and marks of lost features.
- The durability and vulnerability of the building materials.
- The cost and availability of traditional building materials, and the potential for the use of materials salvaged from the site or available elsewhere.
HISTORIC DEVELOPMENT
The character of farmsteads and the landscapes around them reflects how distinct agricultural regions have developed since the medieval period, specialising to different degrees in the production of corn, livestock or dairy products. Most traditional farm buildings date from the 19th century, and especially the capital intensive ‘high farming’ years of the 1840s–70s that saw a particularly sharp increase in productivity. This was followed by a long but regionally varied depression that lasted until the Second World War.

LANDSCAPE AND SETTLEMENT CONTEXT
The siting and density of farmsteads also reflect patterns of settlement and land use that frequently reach back into the medieval period and sometimes earlier: in some areas the land was worked from villages, while in others there have since the medieval period been high densities of isolated farmsteads.

FARMSTEADS AND BUILDINGS
A farmstead is the hub of the farm where the farmhouse and some or all of the working farm buildings are located; some farms have field barns or out-farms sited away from the main homestead. Complete historic farmsteads, where the working buildings are seen in relationship to each other, are usually more significant than individual surviving buildings.

It is important to understand the original purpose of any farm building before undertaking repairs. Farm buildings are often simply described as ‘barns’, although they may in fact have housed a number of different functions under a single roof. Clues to those functions can range from the overall form of a building to the size and layout of its openings, the pattern of its doorframe and style of its windows. Other fittings such as handles, brackets, and mouldings and details associated with individual estates also serve to lend local distinctiveness to farm buildings.

The three main traditional uses of farm buildings were for housing animals, storing crops and equipment or for processing the products of the farm. Where two or more functions co-existed, they were usually separated by partition walls or changes in floor level. For example, cow houses and stables often had haylofts above them, with adjacent feed-preparation rooms connected to them by a door.
STORAGE AND PROCESSING BUILDINGS

The Barn for threshing was the most important building on the farm and usually the largest, though in some areas – usually where little corn was grown – barns can be very small. Threshing barns are unlit ventilated buildings that were used exclusively for threshing and storing the harvested crop. Combination barns – such as the bank barns of Cumbria and the West Country – incorporated animal housing, granaries, root stores and feed preparation as well as the essential storage and processing of crops. From the late 18th century equipment for threshing and the preparation of feed for livestock was powered by horse mills, waterwheels or steam, all of which were usually housed in attached buildings of their own. Wind power was rarely used. By the mid 19th century traditional barns had been replaced in some areas by ‘mixing barns’ – multi-functional ranges for storing and processing grain and feed with the aid of portable steam engines.

The most distinctive feature of the traditional flail-threshing barn is a threshing floor with opposing doors for winnowing. The floor will be of timber, or less commonly stone, running across the width of the building. A threshing floor will often have heavier boards than the adjacent storage floor and there may be steps from one to the other. Entrance doors were typically large and paired so that a varied draught could be arranged. The winnowing (rear) door might be relatively small and corn holes (small-boarded chambers) may survive close to the threshing floor. Slots at the side of the barn doorways were designed to hold boards at floor level. Corn holes may also be found close to the threshing floor.

Some barns were only built for storage and feed preparation. These will have no threshing floor. Field barns are in-field cow-houses or shelters with lofted fodder storage.

Haybarns were constructed in areas where large numbers of cattle were housed over winter. Metal-framed ‘Dutch’ barns (originally termed ‘French’ barns) date from the 1880s.
Outfarms are multi-purpose buildings used for animal housing and crop or fodder storage. They are sometimes contained within an enclosure, and always sited away from the main farmstead. Their distinguishing feature is that no farmhouse existed with the facility.

Cider barns are usually older farm buildings that were re-used for cider making from the 19th century onwards; examples designed specifically for cider processing tend to be rare. Even if the original cider press or ‘horse’ gin has been removed, its former presence can sometimes be confirmed from marks on the walls or floor. Another indication is the inclusion of a mezzanine or part upper floor for storing apples.

Granaries were very important facilities for storing grain. Their age and size can be an indication of a farm’s earlier scale and wealth. They can either be detached structures or incorporated in the upper floor of a working building such as a cart-shed or stable. The latter can often be recognised from their external stairs, sometimes with a step up behind the entrance door. Other telltale evidence can include various methods for keeping vermin and thieves from the stored grain, such as staddle stones, iron tongues in boarded flooring, plastered ceilings and fillets around walls, locks to doors, and gaps or steps at the entrance.

Oasthouses and hopkilns are confined almost exclusively to England’s two main hop growing areas in the South East and around Hereford and Worcester. Malt houses have a wider distribution but are very rare: they are associated with brewing which was an ancillary part of the livelihood of some farms. They can sometimes be misinterpreted as grain-drying facilities. Mills for grinding grain into flour are found on some farmsteads, but they are very rare.
Cartsheds are most commonly 19th-century buildings but earlier examples are sometimes found on larger farms where machinery needed to be sheltered separately from the main barn. Sometimes they include overhead granaries and their entrances can either be in the side or end, depending on the region. Waggon houses, designed to shelter a loaded waggon overnight, are much larger than simple cart-sheds and were normally open at both ends, although some have now been closed off at one end.

ANIMAL HOUSING

Dairy cow housing varies regionally more than any other housing type. The majority of cow houses built before the mid-19th century were lofted to provide hay storage and are typified by hardened stone or brick floors. The standings for the animals may be along the building or across it depending on the region and period of construction, typically with a step up to the standings and partitions that meet a manger in front. Today however, these are often concreted over. Removing concrete will usually destroy historic details such as cobbling, partition lines, and drainage routes. Cowhouse doors needed to be wide enough for the cattle to come in and out without damaging their hips. To make dung-cleaning easier ventilated doors typically opened outwards and had gaps beneath them for drainage. Loose yards and shelter sheds generally have earth or chalk floors and little else besides mangers, ladders to lofts, where these existed. A noticeable type in South West England is the two-storeyed linhay, with an open or part-boarded upper floor facing the yard.

Pig housing may take the form of enclosed piggeries or individual pigsties. The more common pigsties are identifiable by their small pens and yards. In areas without open yards, pigsties might be attached to or incorporated within other buildings. These are characterised by the presence of feed hatches that can be accessed from the outside. Other significant features are fixed troughs or feed positions, often within the wall line. Boar housing, perhaps with a service pen, may be found nearby.

Dairies may be attached to and part of the dwelling house. Good examples will still have stone or slate shelves and stone or brick floors with good drainage. Less commonly, a channel will allow a through-flow of cooling water. Examples within model farms may also feature decorative tiling and even elements of gothic or ferme ornée design.
Fowl houses are much less common than pig houses because hens and geese were often encouraged to shelter in buildings designed for other purposes. Geese houses may feature low entrance openings and ‘nests’ within the interior wall faces. Hen houses can be small buildings offering sound refuge from predators. Occasionally they are found above pig housing since it was thought that foxes did not enjoy the proximity of pigs.

Stabling was second only to the barn in status because of the importance of horses to the farm. The quality of construction and levels of ornamentation may reflect this importance, alongside horses’ needs for good light and ventilation. Many stables were lofted for hay storage and evidence of hay ‘drops’ in the floor above may still exist. Internal plastering to walls and ceilings was typical. Floors were always of stone or brick pavers, and only later concreted. Partitions could be of industrially manufactured iron, or joinery-quality timberwork. The positions of mangers and hayracks on the walls can sometimes still be detected.

Dedicated Sheep housing is rare compared with unroofed sheepfolds and is generally confined to the most remote parts of the northern uplands. Hogg houses (for young adult female sheep) and shearing sheds are the main forms, and are concentrated in the least accessible parts of the uplands. Open fronted single-storey sheds, typically low in height, are also found in upland areas and other parts of England where large numbers of sheep were kept.

Dovecotes are among the most easily recognised and attractive of farm buildings. Freestanding examples date back as far as the medieval period, becoming more common as early legal restrictions on dovecote ownership began to relax. However, not all dovecotes are dedicated freestanding structures. By the 19th century, many farms provided accommodation for pigeons in the form of nest holes with perching ledges on the external faces of barn and stable walls.
CONSTRUCTION MATERIALS

The wide range of materials used in farm buildings is one of the keys to local distinctiveness and sense of place. As well as reflecting England’s great geological diversity it owes much to different regional building traditions, degrees of wealth, access to transport links and the way in which local timber and other resources were managed. The resulting variety in traditional walling and roofing materials and forms of construction often survived much longer on working farm buildings than farmhouses.

Awareness of these regional variations in the use of materials and construction methods is fundamental to achieving a successful repair. For instance:

- The type of stone determined the way builders dressed and laid the material.
- Buildings constructed of locally dug earth mixed with water, straw and cow dung were often lime-plastered inside and out to protect the vulnerable earth core.
- Colourwash applied to plaster over timber may be locally distinctive.
- Timber construction can display local and regional patterns of framing.
- Bricks may be imported or baked from local clays; they can also display variations in decorative treatment and bonding.
- Constructional details such as masonry bonding styles, plastering, jointing types and structural layout all differed between regions.

A fundamental characteristic of traditional construction is its ‘breathability’ and flexibility. Breathability is the ability of materials to absorb moisture and release it again as conditions change without causing long-term damage to the building itself. Until the mid-19th century, masonry buildings (except those of dry stone) were pointed with lime putty or earth based mortars. Timber-frame construction also relied on masonry bases and breathable infill panels.
Lime, when used in mortar and plaster, has a high degree of breathability. This, coupled with ventilation through roofs, doors, and windows, allowed buildings to accommodate moisture and dry out through evaporation. Earth buildings have a similar character.

Some lime mortars contained impurities that made them slightly hydraulic, but others did not. Builders might add materials such as brick dust to the mortar to create a more hydraulic lime. The stronger naturally hydraulic limes have the ability to set when wet or under water and so were used below ground and in other continuously damp conditions. For internal plastering, ordinary (non-hydraulic) slaked lime putty was the norm.

Cement began to supplant lime as the main bonding agent at around the time of the First World War. After the Second World War cemented concrete block-work laid on substantial foundations and with damp-proof courses rapidly replaced traditional walling materials for farm buildings.
**BUILDING MATERIALS**

- **Stone** dominates the stock of farm buildings in many parts of the country, its use sometimes reflecting the status of the farm and its owner. Because each kind of stone has its own special properties, masons learnt to shape and bond the material in locally distinctive styles.

- **Flint** was used as a building material in those chalk areas of eastern and southern England that lacked a better local form of building stone. Brick lacing courses provided extra strength and stability and brick dressings were used to form quoins and openings.

- **Brick** has a long tradition as a building material. It was first used in eastern England in the 14th century but did not come into general use until the late 18th and 19th centuries. Mass production and the growth of the canals and railways allowed bricks to be transported widely, even into areas where timber framing had been the main form of construction.

- **Earth walling** is an ancient building tradition that has its origins in the medieval period and beyond. It also displays greater regional variation than any other construction technique. Areas in which it was particularly favoured include the South East, South West, the East Midlands, East of England, and northern Cumbria. Mud and stud is a form of earth walling in which earth daub is used to completely encase a frame of timber studwork, resulting in a wall approximately 300mm thick. It was mainly used for cottages but just a few mud and stud farm buildings have survived in Lincolnshire and in the Fylde area of Lancashire.

- **Timber frame** buildings are now concentrated in southern England and the Midlands and different traditions of carpentry developed either side of the limestone belt. The walls were either infilled with wattle and daub, bricks or stone or clad in boards. The earliest cleft or hand sawn boards are often of elm or oak. These should be re-used wherever possible and new boards sawn to match existing work and fixed in similar fashion. During repair, careful inspection of interior faces for grooves, holes or slots can reveal the method and type of earlier infill work.
Slate for roofing could traditionally be obtained only from parts of Wales, the Lake District, the West Country, Leicestershire, and the Isle of Man. From the late-18th century onwards Lake District and Welsh slate was carried far and wide as a result of improved canal, coastal shipping and rail networks. Slate was also used to clad the walls of some farm buildings, most notably in Cornwall, West Devon, and Cumbria.

Stone slates, usually of limestone or sandstone, were used for the roofs of high-status buildings from medieval times. Despite improved transportation from the later 18th century it was always more restricted in its distribution on account of the great weight of the individual slates. Today the best examples are encountered throughout the Pennines, part of the Kent and Sussex Weald, and across the limestone belt that runs from the Isles of Purbeck and Portland in Dorset up through Bath, Oxford, Lincolnshire and on to Whitby.

Clay tiles have been produced wherever suitable clays are found – essentially southern England east of Somerset and the whole eastern side of the country as far as the Scottish border. Many domestic tile patterns came from the Low Countries and some found their way onto farm buildings. In the South East hanging clay tiles were also used as a form of wall cladding.

Improved transport systems also allowed the widespread 19th-century introduction of pantiles – instantly recognisable from their distinctive ‘S’-curve profile. These are concentrated in Somerset, parts of Dorset and in the north east from the Vale of Pickering to Northumberland.

Thatch was historically the most widespread method of roofing farm buildings, although its method of application varied from region to region and according to the available raw material. Long straw and combed wheat straw (also called Devon wheat reed) were the most common, but heather and water reed were also used in areas where they grew naturally.

Many thatched farm buildings had their roofs replaced with tiles or slate during the 19th century, and in the early 20th century many others were saved from terminal decay by the application of cheap and easily maintained corrugated iron sheeting.
DOORS, WINDOWS AND FITTINGS

The doors and windows of traditional farm buildings show considerable variation, depending on a combination of functional need and local tradition. Cow house doors, for example, have no frame and open outwards to facilitate cleaning out. Features of this kind need to be respected if the character of a building is to be maintained. Replacement with different types of doors and frames can significantly reduce the historic and visual interest of a building.

The internal features of historic farm buildings are also of fundamental importance for working out the original use of a building. They should not be removed from a building before a survey has been undertaken, even if only to a basic level. Without such a record, important evidence will be lost.

Partitions within cow-houses and stables are the most noticeable and may be part of the original construction. Less obvious but important features include hanging hooks, cupboards, window treatment, door types, and fixing details. The different ways in which doors are hung can be a very useful guide to the date of buildings.

Granaries were either plastered and/or boarded for grain bins and may contain evidence such as tongued flooring, wall-to-floor junction fillets and steps or gaps at their entrances. Corn holes and timber bins for storing grain are other historic features that are not always easy for the non-specialist to understand.

Various forms of carpenters’ marks can tell much about the original construction of the building but are often overlooked. As well as indicating how the timbers were originally prepared (by hewing, cleaving or sawing) they can also explain the sequence in which the frames and trusses of the building were assembled. The style of the marks may also demonstrate whether the timber was locally sourced or imported from the continent of Europe or North America.
As work places, farm buildings naturally acquire the usual wear and tear resulting from constant use signs of use. Other evidence takes the form of deliberately incised markings often on timbers or walls. Amongst the most intriguing are secret ritual and religious marks made for the protection of the building or workers within it. These are found in all parts of England but are particularly common in East Anglia, which also has the most complicated examples. Tally marks and general graffiti, often in pencil, are usually associated with those who worked in the building. If unrecognised or ignored, fascinating information of this kind can all too easily be lost when material is removed from buildings.

OPTIONS TO CONSIDER

Having carefully considered the historical interest and sensitivity of a farm building the next step is to examine the options for its future maintenance, repair and possible adaptation to an economically viable new use.

- **basic maintenance** – for buildings with low-intensity uses such as storage
- **emergency repairs/holding repairs** – to prevent collapse or significant further deterioration in building fabric
- **short term repairs** – minimal repair to extend the life of the building
- **full repair** – for significant buildings that will remain in agricultural use, have the potential for adaptive reuse or are located in designated landscapes
- **do nothing** – for buildings of lower significance with little potential for adaptive reuse and where repair for agricultural use is not economic.

In the case of buildings that no longer serve an economic agricultural function, sympathetic adaptation to new uses will often be an acceptable alternative means of conserving their character while simultaneously recouping the costs of repair. The related English Heritage publication *The Conversion of Traditional Farm buildings: a guide to good practice* provides further guidance.

BARNES ON THE BOLTON ABBEY ESTATE

Bolton Abbey is a 12,000 hectare estate in North Yorkshire that includes large numbers of traditional farm buildings amongst its assets. Maintaining these buildings requires long-term planning and the careful prioritisation of financial resources. Investment has to be appropriate to the economic benefits that can be sustained from repair or adaptation for other uses. It also needs to contribute to the estate’s overall objectives of creating employment in the community and enhancing the wider environment. The estate therefore used an adapted version of the assessment framework developed by English Heritage’s Characterisation Team to identify the options for change and establish priorities for action.

Assessment was based on a rapid survey of the character, significance and sensitivity to adaptive reuse of more than 70 field barns scattered across the estate. This showed that the potential for change depended not only on the type of barn but its location. As a result, the estate was able to identify preferred and secondary options for the long-term management of the estate’s traditional farm buildings. Since its completion in 2008 the survey has informed a number of successful applications for adaptive reuse as well as prompting a range of other solutions for reuse and maintenance. For example, the architects Feilden Clegg Bradley Studios (with support from the Yorkshire Dales National Park Authority, Yorkshire Dales Millennium Trust and the Bolton Abbey estate) led a practical experiment to install a prototype free-standing ‘eco-pod’ into a field barn identified for adaptive reuse.


Images: Farm buildings on the Bolton Abbey Estate in North Yorkshire
OPTION ASSESSMENT FRAMEWORK

**OWNERSHIP**
individual/tenanted?
duty of care landlord/tenant
implications for capital investment?

**DESIGNATION**
is the farm building a scheduled ancient monument/listed building or within the curtilage of a listed building?
is the building within a conservation area/area of outstanding natural beauty/national park or a
designated area of nature conservation?

**PRESENT USE**
building in original use?
valuable agricultural use
marginal agricultural use
eg. storage
no agricultural use

**CONDITION**
— preliminary assessment
— fully costed assessment

very poor – emergency repairs required
ongoing maintenance is sufficient
basic holding repair with 10 year life
full repair for continued agricultural use

**UNDERSTANDING THE BUILDING**

**SIGNIFICANCE**
Consider levels of change – assess survival as a traditional group in its landscape setting – rarity as a building/group

**ADAPTABILITY**
Site scale issues location – is it part of a group? – access to highway – access to services – capacity for change

**REPAIR OPTIONS**
do nothing - repair not economic for agricultural use
emergency repairs - structure needs urgent attention to avoid collapse
basic holding repair - to keep building in use
full repair for long term continued agricultural use - investigate grant aid
change of use - this may emerge as an option where repair costs are uneconomic for continued agricultural use
MAINTAINING FARM BUILDINGS

THE IMPORTANCE OF BASIC MAINTENANCE

The best way to retain the value of a farm building is to keep it in good condition. In turn this means carrying out the regular maintenance needed to keep it weatherproof and thus avoid expensive future repairs. Damp penetration is the commonest cause of decay in buildings and is usually the result of simple problems such as defective guttering and downpipes that can be easily avoided with regular maintenance.

Maintenance differs from repair work. Repair is work to put right significant decay or damage that has already occurred whereas maintenance is the continuous protective care of the building. Maintenance can be carried out either on an ‘as needs’ basis or as part of a proactive cyclical plan.

PLANNED MAINTENANCE

When carried out on a regular basis, maintenance prevents those predictable and often expensive types of failure that occur within the life of a building. The annual cleaning of gutters can be much cheaper than dealing with a discovery of rot in the feet of rafters or a wall-plate.

Planned maintenance means regular inspection, cleaning, testing and carrying out minor repairs. To make the task easier it is a good idea to work from a plan. Begin this by deciding how frequently each maintenance inspection or task is to be carried out. Most jobs will be annual but you should also plan to do some of them after one-off events such as bad weather or accidental physical damage. An example of a maintenance schedule is included here.
## MAINTENANCE CHECKLIST

<table>
<thead>
<tr>
<th>EXTERNAL ELEMENT</th>
<th>WHAT TO CHECK FOR</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof coverings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slate, tile, stone</td>
<td>Slipped, cracked and missing tiles or slates; moss growth; loose lead flashings;</td>
<td>Annually and after storms</td>
</tr>
<tr>
<td></td>
<td>cracking to mortar fillets</td>
<td></td>
</tr>
<tr>
<td>Shingles</td>
<td>Curling; splitting; moss growth; fungal attack</td>
<td></td>
</tr>
<tr>
<td>Thatch</td>
<td>Ridges; moss, algae etc; bird damage</td>
<td></td>
</tr>
<tr>
<td>Sheeting</td>
<td>Rusting; wind damage; lifting ridges; loose fixings</td>
<td></td>
</tr>
<tr>
<td>Roof structure</td>
<td>Racking; sagging; twisted frame members; cracking; open joints to trusses; wet</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>or damp areas on timbers wood frass</td>
<td></td>
</tr>
<tr>
<td>Timber frame</td>
<td>Bowing or leaning; rot; decayed joints; soft areas; defects to infill panels;</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>soleplates; wood frass; masonry plinth condition</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td></td>
<td>Annually</td>
</tr>
<tr>
<td>Masonry</td>
<td>Leaning; cracking; defective mortar joints; dropped arches; loose or spalling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>masonry; plaster or render failure and hollowness; ground levels; erosion</td>
<td></td>
</tr>
<tr>
<td>Earth</td>
<td>Cracking; surface degradation; plaster failure and hollowness; rodent damage;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>long term damp patches</td>
<td></td>
</tr>
<tr>
<td>Openings</td>
<td>Dropped arches; failing lintels; dislodged quoins</td>
<td></td>
</tr>
<tr>
<td>Timber floors</td>
<td>Failing supports; broken and missing boards; dampness; ventilation to granary</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>floors</td>
<td></td>
</tr>
<tr>
<td>Rainwater goods</td>
<td>Defective paintwork; blockage to gutters, downpipes and drains; splits; leaking</td>
<td>Annually and after storms</td>
</tr>
<tr>
<td></td>
<td>joints; broken or misaligned brackets; poor falls or backflow (reverse flow)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of discharged water</td>
<td></td>
</tr>
<tr>
<td>Drainage</td>
<td>Blockages or silting to gullies; test in the event of blockage or leakage;</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>monitor quality of water supplies</td>
<td></td>
</tr>
<tr>
<td>External Joinery</td>
<td>Failing paintwork; open joints; rot to cills; casements and frames; defective</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>putty; broken glass; failed hinges; rusting in metal frames</td>
<td></td>
</tr>
<tr>
<td>Intrusive vegetation</td>
<td>Cut back and remove all invasive growth, especially ivy colonising walls</td>
<td>Annually</td>
</tr>
<tr>
<td>Boundary walls</td>
<td>Decay to copings of walls; dislodged mortar and masonry; raised ground levels to</td>
<td>Annually</td>
</tr>
<tr>
<td>and fences</td>
<td>fences</td>
<td></td>
</tr>
</tbody>
</table>

### SAFETY PRECAUTIONS

Inspection and maintenance requires access to roofs and other potentially dangerous areas. Ideally, operations should not be undertaken alone. Always wear suitable protective clothing and make sure ladders are propped at a safe angle and secured on firm ground. Where access is particularly difficult, consider employing a professional.
REPAIRING FARM BUILDINGS

PRINCIPLES OF REPAIR

The purpose of repair is to stop the process of decay without damaging the historic, architectural, or archaeological significance of the farm building and its landscape context. This generally means carrying out the minimum work necessary to put the building into a sound condition. The repair work should also pay due regard to habitats for wildlife that the building/s and the site may provide.

Retain as much original material as possible
The replacement of historic components and features can undermine the historic value and authenticity of a building. Contractors who have the right building skills can usually repair decayed or failed components rather than having to replace them.

Minimise changes
Altering features that give the building its historic or architectural importance should be avoided. If significant features have already been lost, there may be a case for reinstatement providing that there is good evidence for their former existence.

Use appropriate methods and materials
A key feature of traditional farm buildings is the use of ‘breathable’ materials in their construction. Permeable materials coupled with the good ventilation inherent in most traditional farm buildings allows moisture to escape without causing damage to the building fabric. Serious damage can result from the use of incompatible materials that restrict this ability of the building fabric to ‘breathe’.

Repair materials
New materials should be used only to replace existing materials where necessary and should be close matches for those being repaired or replaced. Where the cost of using matching materials could jeopardise the viability of a repair project it may be appropriate for the planning authority/grant giving body to consider alternative materials.

Respect historic repairs or changes
Repairs or additions made in the past may be of historic interest. Do not remove them simply because they are of later date.
Modern materials such as stainless steel ties can offer the optimum conservation solution if they allow significant historic fabric to be retained without dismantling parts of the building © Philip White.

This window has been repaired sensitively allowing maximum retention of original joinery © Philip White.

Careful scarf repairs have retained much of the historic fabric of this door © Philip White.

WILDLIFE AND COUNTRYSIDE ACT 1981
CONSERVATION (NATURAL HABITATS) REGULATIONS 1994

Re-roofing and repair works to the walls of farm buildings can disturb bats and other protected species. Because it is an offence to intentionally or recklessly disturb bats or their roosts, or to obstruct access to their roosts, a Natural England licence is needed before any work is begun. It is always best to assume that bats are present in a traditional building and you should seek advice from Natural England at an early stage of any planned work to a building.

Only use a modern material if it helps to retain original features

Modern materials, such as stainless steel ties, can be the best solution if they allow significant historic fabric to be retained and avoid the need to dismantle parts of the building. Resin repairs to timbers can sometimes help retain more material than traditional methods and so aid future interpretation of the building’s history.

Do not rob material from other buildings

Avoid using second-hand materials of unknown provenance as this encourages the practice of ‘robbing out’ material from existing buildings that may be of historic and architectural value.

Obtain professional help

Take professional advice before carrying out major repairs. The conservation and repair of traditional buildings often requires specialist skills if mistakes and unnecessary damage are to be avoided.

EMERGENCY AND HOLDING REPAIRS

Emergency action is needed when the deterioration of a building or its valuable features will soon reach the point when repair is no longer be feasible on either practical or financial grounds. Holding repairs, on the other hand, can prevent the building deteriorating to such an extent that emergency action is needed.

Among the reasons for limiting work to temporary holding repairs may be a lack of funds or grant aid, a temporary shortage of expertise or suitable materials, or the need for more time to plan a full repair programme. Interim repairs can be a cost-effective and reversible means of slowing down the deterioration of the historic fabric of a building, thereby extending its life and reducing the scale of longer-term repair work. However, they...
should always be carried out in ways that neither preclude nor hinder further work from:

- using inappropriate materials which might accelerate decay
- making insufficient repairs that encourage further decay
- removing important historic fabric
- postponing more comprehensive and effective temporary work
- using methods that might permanently damage existing fabric.

ASSESSING CONDITION
Someone experienced with older buildings and structures should carry out a careful survey to identify the most urgent needs for protection and repair. The two most common problems are structural movement and water penetration. There will often be more than one option for resolving each issue and a competent specialist is best equipped to find the optimum solution.

STRUCTURAL PROBLEMS
If part of the building has collapsed immediate attention will probably be required to avoid further serious damage. Depending on the cause of the collapse it may be necessary to relieve loadings on the structure by introducing temporary supports (shoring, scaffolding, tying and temporary construction) and removing the roof finishes or even the entire roof structure. External shoring and patent scaffolding can be an economical option, especially if the equipment is purchased and then re-sold following a full repair programme. Internal ties of steel rod or hawser can also be effective at restraining lateral movement, provided that the potentially dangerous aspects of such work have been properly assessed in advance. Structural problems should be monitored following temporary support or repair.

The use of materials such as concrete block-work as buttresses to temporarily support the existing structure might be justified so long as it does not accelerate decay and is reversible without causing further damage.

Decay to joints in timber frames may be stalled by carefully removing very soft material and filling the joint with a low to medium-strength hydraulic lime mix. Decayed post bases may be relieved of loading by the use of support props. These must be located securely and the frames may also require lateral restraint.

Roof spread is common in older farm buildings. Steel tie cables, rods, or timber members can restrain further movement when properly installed. It is important that fixings are securely embedded in sound timber or masonry.

Sets of roof trusses that appear to be leaning in one direction should be monitored. Where movement is active it is inadvisable to attempt to right the trusses because this will weaken the already stressed joints and the rafter purlin system. Further movement can be prevented, however, through the use of correctly located ties, or timber ‘wind braces’ fixed diagonally to rafters from the eaves to the truss peak.

Decayed or broken timber members may need to be supported, particularly those in roof trusses. Timber splints can be useful, although additional propping is often needed.

Water penetration
Replace missing and slipped slates or tiles to maintain a watertight roof. Individual slates can be held in place with copper tinges or stainless steel clips.

If the roof has lost a considerable number of slates or tiles, causing water damage, it may be sensible to strip the remainder for refitting at the full repair stage. A secure temporary roof such as galvanised steel sheeting or a reinforced tarpaulin would then be needed. Plastic sheet tarpaulins are only short-term measures because they can be difficult to tie down and are easily damaged by the weather.

Defective rainwater goods should be repaired or replaced unless alternative means of disposal can be set up.

Cracks and holes in the coatings to earth walls are potentially more damaging than those on masonry walls. Filling smaller cracks with a hydraulic lime plaster mix is a good all-round option but larger openings should be filled with suitable mixes of earth, lime and chopped straw.
DAMAGE FROM TREES AND VEGETATION

Tree roots can cause serious harm to farm buildings particularly in areas with clay soils. Overhanging trees can impede airflow and may increase the growth of moss and algae through constant shading and the retention of moisture. Overhung thatch is more likely to remain damp and have higher levels of moss growth.

Climbing plants can conceal serious problems and may exploit and worsen existing problems. Any proper roots may cause damage to walls in poor condition and shoots can dislodge roof coverings and block gutters. They should be removed from rainwater goods, window or doorframes, and the eaves lines of roofs and in some circumstances may need to be removed from walls.

Ivy requires particular attention as its roots can sometimes penetrate the structure of a building, although it is important to distinguish between ‘proper’ roots, which increase in size, and ‘aerial rootlets’ which are only used to cling onto the climbing surface and do not get larger over time. If removal is considered necessary, it should be carried out in one operation and with great care – wall collapses caused by heavy-handed removal of climbing plants are not uncommon.

Cutting through the main stems at the base and leaving them to wither is inadvisable because it can encourage the severed sections to form new penetrating root systems of their own. Climbing plants cannot regenerate from root material alone but any remaining stem material may need to be treated with a chemical herbicide. Once the ivy has been removed it may also be necessary to repair any damage its roots may have caused to the stability and integrity of the wall. In particular, it may be necessary to fill the voids that will form once the dead roots have rotted away.
REPAIRS TO SOLID WALLED BUILDINGS

STRUCTURAL PROBLEMS
Any sign of structural failure or cracking in walling is evidence of excessive movement. A variety of factors can bring this about:

- Differential settlement due to ground movement.
- Moisture getting into and being retained in the structure.
- Timber decay.
- Inadequacies in the original construction.
- Rotation through loading from roofs and floors.

Ground movement may be due to heave or subsidence particularly in clays soils, drainage problems, tree roots or even heavy farmyard traffic.

Moisture entering and freezing within walls can physically move masonry. Long-term dampness also weakens mortar resulting in movement. It can also encourage fungal growth and insect attack in timber, ultimately leading to structural failure.

Long-term loading from roof structures and overloading of upper floors can cause support walls to rotate and lean outwards. Many stone walls consist of two skins of masonry with a rubble infill. Degradation from imposed loads and weathering can cause these skins to separate, typically leading to the collapse of the outer skin.

Many cross walls are not tied to the main walls and this creates instability over time. Brick walls were often poorly bonded and previously inserted iron ties may have subsequently corroded. Before re-building, seek advice from a structural engineer as many walls bulge or bow while remaining stable. Others can be stabilised by the use of steel tie rods with connections back to sound structure.

When faced with cracking to walls the first task is to establish whether the movement is active. Monitoring over months rather than weeks with patent tell-tales or thin pieces of glass bedded across a crack is an established method, but periodic measurement across marked points can also be useful.

If the tell-tales indicate that movement has ceased, an experienced contractor may consider it acceptable to stitch across cracks with compatible masonry; they will also advise on any benefit to be gained from the use of additional reinforcement such as helical tie bars or full-width tie rods. On some occasions, even where movement exists, a buttress might be a suitable remedy.

86 Temporary protection can avoid situations like this one where the roof timbers are rapidly decaying.
87 If a building is in a dangerous condition warning notices should be displayed.
88 A cracked lower truss member needs propping to avoid potential collapse.
89 Felting held down with battens can provide a temporary roof covering once roof finishes have been stripped © Philip White.
Each circumstance will warrant analysis to find the most acceptable solution.

Specialist structural advice is invariably fundamental to finding workable and effective solutions to movement issues. Propping a wall with timbers may work for a while but, besides being dangerous, it will sooner or later fail, leaving an even more expensive problem to be resolved.

MASONRY WALLS

Bricks

Bricks required for repairs should be compatible with the existing work in colour, composition and strength. Reclaimed bricks can be useful where the original type is no longer manufactured but the source should be checked to avoid the use of stolen or otherwise ‘robbed out’ material from listed and other historically important buildings.

Bricks need to be inspected in order to pick out damaged examples. Sound bricks usually have a slight ring when tapped together. Well-burnt examples will also be of roughly equal weight. Bricks that are sooted or distorted should be discarded.

Providing a perfect visual match with the original wall will never be possible, but this need not be seen as a fault – an easily understood repair is an honest repair; it also causes much less disruption, loss of original fabric and expense compared to rebuilding.

Chalk and flint

Chalk and flint construction has much in common with other kinds of stone building but in other respects it more closely resembles earth-built walling. Like the latter, it is built up from harder or more durable base courses that provide protection from damp and rain splashing at the base of the wall. The relative softness of chalk and the higher quantities of mortar in flint walling means that overhangs to wall heads are important, just as they are with earth walling. To provide extra structural strength, layers of flint are often alternated with courses of brick.

Rebuilding and re-pointing flint walls should only be undertaken by suitably experienced practitioners. All too commonly, flint walls are re-pointed with cement mortar; which is also smeared over large parts of the stones themselves. Walls repaired in this way may look sound but will decay more quickly and cause more damage than if the flints are bedded in traditional mortar.
Earth wall construction

Cob, cobb, clay lump, mud, clay dabbins, chalk mud, rammed earth and wychert are all regional terms applied to localised forms of earth walling. Clay lump (adobe) and chalk lump are allied techniques in which earth or chalk is made into un-burnt blocks that are laid in clay-based or lime mortars. All forms are vulnerable to water penetration, particularly where wall faces are exposed to severe weather. In such circumstances walls were generally plastered with lime, which should be rigorously maintained whenever it survives.

While exposure to the elements can be a serious source of damage, there are many earth-walled structures, especially in the wetter West Country, that have survived all their lives without being plastered because of their sheltered locations. The West Country phrase ‘a dry hat and wellie boots’ tells you the essential needs of earth structure maintenance. It is important that wall-heads are kept dry by adequate overhangs and sound roof coverings. Base courses usually take the form of stone plinths. Nevertheless, attention to their maintenance is fundamental to a dry building.

Typical problems in earth-walled structures include damage from bird and rat activity, vertical cracking and water damage, particularly in association with defective plasters and cement renders. While bird activity generally damages only wall surfaces, infestations by rats and mice can eventually lead to complete collapse because of the way in which their burrows create a destabilising honeycomb structure.

Cracking can be due to a number of factors, which means that a specialist in earth wall construction should be consulted before repairs are carried out. Bonding old earth to new can be difficult, though earth-wall specialists are able to achieve sound repairs in mass walling. A primary aid to bonding is the use of ties in the form of dowels or tile slips inserted into old material. Larger cracks can be prepared and stitched across with mass earth or earth blocks bonded in a clay and lime mortar.

Earth blocks are also useful for rebuilding quoins because they are of similar strength to the original work — a repair that is too strong will always be in danger of breaking away from the original work.

REPAIRS TO TIMBER FRAMED BUILDINGS

TIMBER FRAMES

Traditional timber-frame construction in England is primarily of oak. Apart from natural aging due to weathering, most timber-frame problems result from excessive moisture getting into joints leading to rot and ultimately structural failure of components.

The use of cement-based fillings to joints and coatings to panels can both result in accelerated timber decay. This is aggravated by fungal and insect attack because the impervious work is unable to release moisture quickly, or in other words to breathe.

Insect attack is usually historic and the use of chemicals is rarely necessary. It is also unusual for the attack to be serious enough to result in structural failure of a component. Improved ventilation and the eradication of dampness are the best ways of avoiding such problems. Inspections should aim to locate any active infestation. Principal clues include insect holes with clean pale edges and the presence of frass (grain-like wood dust) on the timbers or on surfaces below insect holes.

Distortion and movement are common in timber frames and contribute much of a building’s character. It occurs because moisture and temperature changes are greater in timber frames than in earth or masonry walls. Like roof trusses, the various members and associated joints constantly absorb and distribute the stresses and strains of imposed loadings. Different types of joint were designed for different purposes; mortice and tenon joints are more efficient in compression than in tension; simple half-lap joints are poor at bending.

Distortion may also be the historic response to loading of timbers that were green (fresh) when erected. Once settled into position frames can regain acceptable stability. Do not try to force a distorted frame into square without professional advice because this can cause damaging stress to the joints. The condition of joints is a major determinant of the stability of an existing timber framed structure. Monitor any suspect areas for movement by using tell-tales or periodic measurements. Excessive distortion may be an indication of more significant structural problems.
The success of repairs depends on understanding how the structural frame functions, how it developed and its condition before repairs are undertaken. Only when an analysis of this kind has been completed is it possible to take informed decisions about repair, including whether or not to dismantle a frame. While dismantling may be the simplest way to repair joints and members, it should be a last resort because the operation risks a greater loss of historic fabric than in situ repair.

INFILL PANELS

Wattle and daub infill is generally resilient to impact but can become loose once cracked. Lime-washing is a highly effective way of sealing minor cracking; its permeability also makes the best means of protecting wattle and daub from the elements. Limewash should be applied to a wetted surface to avoid suction and be protected if rapid drying is likely. A minimum of three coats are recommended.

Cracking around and within the panel face can be repaired with a dry daub or a fine lime-plaster mix depending on the size of gaps. Minor repairs are relatively simple as long as the wattle and daub remains soundly in place. Similar problems with panels of brick-nogging can be dealt with in this way.

The ingress of water, salt contamination, frame movement and poor repairs can all cause severe cracking, crumbling and bulging to panels. Loose material can be removed and re-made as a daub mix and damaged wattle can be repaired by the insertion of new sticks.

Daub can incorporate various materials including wetted earth, lime putty, cow dung, chopped straw and sharp sand. For repairs, barley straw chopped to a maximum length of 150mm is a better and softer alternative to wheat straw. Mixing must be thorough and a pug mill is best for this. Otherwise, the mix will need to be trodden, beaten and chopped for about half an hour.

Achieving the right workable consistency for any given combination of materials will can only be determined through trial testing, although the finished mix should normally be as dry as possible. An earth-mix daub can be applied to wetted areas and then shaded if hot sun is a problem. Wattle may be of oak or elm laths, or hazel or willow rods depending on local tradition.

Brick infill may be original but is often found to be a later replacement for wattle or lath. Grooves and holes in the inner faces of framing will confirm this.
WEATHERBOARDING
In some parts of the country, especially the South East, East of England and West Midlands, timber frames were often clad in horizontal weatherboarding. Hand sawn hardwood boarding is now rarely found, its place having been taken since the late 18th century by machine-sawn softwood. Early weatherboarding in oak or elm was usually left unfinished but the less robust softwood needed artificial protection – wood tar (also known as Stockholm tar) or limewash mixed with pigments were often used as coatings. Up until the 1950s weatherboarding in the South East and southern areas of East Anglia was commonly finished in white lead paint, and since then with lead-free alternatives.

When repairing weatherboarding try to disturb as few boards as possible. Old boards are likely to be of better-quality timber and should be re-used whenever possible. Replacing slightly irregular boards with modern machine-cut ones may detract from the character of a building. New boards need to be matched to the original profile and width to maintain the historic and visual interest.

ROOF REPAIRS
STRUCTURE
Most traditional farm buildings have roofs of timber construction, usually oak, although ash, elm and softwood are found locally. Roof trusses are designed to contain and resist loading and it is a tribute to their design and fabrication that so many of them have survived unaltered. The condition of a roof structure is often overlooked in the belief that it is stable. It is important to remember that it has constantly to bear not only its own static weight but also the dynamic loading and stresses that the weather brings. The resistance to these loads depends upon the way in which it has been designed (and later modified) and subsequently maintained to keep it free from excessive moisture, movement, or physical damage.

Close inspection is the best way to determine condition but much also can be seen from floor level. Look for sagging, tilting or twisting of timbers, gaps to joints and cracked or broken timbers. These symptoms are typical of overloading or spreading of the structure. Look at the feet of trusses where they bear on the wall or wall-plate for signs of compression or crushing which can indicate long-term dampness. Investigate the cause as moisture may have been wetting and softening timber over a long time. Most insect holes are inactive but wood dust (frass) found on timbers or floors will indicate active infestation.

Where timbers are slightly decayed or softened steel plates, brackets, flitches or shoes can be used so that original material is retained instead of complete replacement. Such repairs can be designed for minimal impact on visual appearance.

Slight sagging of purlins may be a natural response to loading over the years, but purlin rotation (tilting), open joints, and cracked members are indicative of structural movement.

Racking is the term used for trusses that are beginning to ‘fall over’ and this is quite easy to see from below. Concerns about any of these issues should be discussed with a structural engineer.

The most common cause of roof spread is lack of maintenance. It can also be seen when roof finishes have been replaced with a heavier product such as concrete tiles rather than the original slates. Sometimes roof structures have been adapted to provide space for agricultural equipment such as storage bins and this inevitably leads to roof spread if not correctly designed.

Carrying out repairs to failing roof trusses is not only difficult but can be very expensive because their failure can also affect walls and roof coverings. This makes attention to good maintenance all the more important. While the popular option of inserting steel tie rods between support walls may resist roof spread it does not necessarily address other structural matters such as wall stability and truss integrity.

Before roof coverings are replaced, the roof timbers must be inspected and assessed for decay so that all damaged areas can be repaired. The aim should be to replace the minimum amount of historic timber necessary by splicing in new timber rather than replacing entire members. New timbers always should match the existing – for example oak heartwood for oak. Sourcing suitable sections of elm can now present problems, particularly for large members. If home grown or imported elm cannot be found, then oak will be the best option. Ash is rarely found as roofing or structural timber and is not available as a stock item.
ROOF COVERINGS

A properly laid roof will be weatherproof. Before circa 1900 roofs never incorporated under-felting. This allowed good airflow, which in turn helped dry an atmosphere made humid by animals, fresh crops, and occasional damping from rain or snow. Some roofs were laid with timber under-sheathing both for lateral strength and to temporarily absorb moisture from animals, while some later roofs clad in single-lap tiling used hessian felting. The inclusion of modern under-felting in historic buildings is unnecessary, inhibits drying and is visually obtrusive.

Abutment flashings often showed local preferences and these should be continued where they are shown to be traditional. Cement fillets are often found on late Victorian buildings.

Roof coverings usually fail due to deterioration of their fixing nails or pegs, the battens or laths supporting the slates or tiles, or enlargement of the fixing holes. Where riven or sawn timber exists, this should be used in repair work to maintain character, uniformity and compatibility of strength.

Always try to reuse existing sound materials even when, in the case of worn slates, re-holing is needed. On roofs covered with random-sized slates it will often be worthwhile to re-dress the worn slates to smaller sizes as a way of recovering sound material. Replacement slates, tiles or flags should be of matching or compatible colour, size and thickness. Compatible thickness is particularly important for achieving an even plane of slating (slates lying close over each other without raised margins).

Whenever possible, replacement tiles and slates should match the original materials. In the case of listed buildings or grant-funded work you will always be expected to carry out any replacement with roofing materials from the original source.

Moss can increase dampness and deterioration and should be removed by brushing or by proprietary washes. Always read the instructions on usage of such products before attempting any mixing or application.

Slate and stone finishes

Slated roofs can resist the need for maintenance or repair longer than any other roof covering. Once slates start to fail — often indicated by many loose tinges or clips on the roof — it is usual and sensible to strip the whole roof in order to make sound and worthwhile repairs.

Many features of the roof need to be retained, not only to preserve traditional regional character but also to achieve a dry roof. These include the size of slates, numbers of courses, amounts of overlap, method of laying and bedding, torching, edge treatment, slating layout and use of backers. These aspects are particularly important where stone slate is used.

Some roofs featured stone ridges, which were often bedded without mortar. Cement-based mortar may sometimes have been added as part of a later re-roofing. This can make it difficult to recover ridge pieces intact and care is needed when removing them.

Slated roofs become ‘nail sick’ with age, that is to say that movement through weathering enlarges nail holes and erodes nailheads. Lead, copper or zinc ‘tingles’ or clips are useful for re-fixing the odd slate. An alternative is the use of small blocks bonded to the underside of each slate when in position. This avoids the obtrusive look of external tinges showing. However, where many are needed it is a sure sign that the roof covering will need to be stripped and recovered. This would then constitute a major repair.

All of the above highlights the need for high quality nails in repair and re-roofing. Nailing should not be carried out with galvanised nails as these will have a shorter life than copper, alloy, or other non-ferrous types. They are also often harder to remove from battens when later repair is needed. Pegged slates are now rare but still exist in older roofs, particularly those laid in diminishing courses. They are typically laid onto narrow split (riven) laths or battens. Pegs might be cut off after fixing so that partial or full under-torching or parging could be carried out.

Fixings fail either by falling out or by slipping due to the weight and movement of the slate. In older roofs large areas of the roof finish can all move at once. This can be caused by the simultaneous splitting of the narrow and frail laths or battens. Pegs might be cut off after fixing so that partial or full under-torching or parging could be carried out.

One modern approach to this recurrent problem is to use metal alloy pegs. These need to be made in a number of different lengths to suit individual slates or courses. Since they cannot readily be shortened, their use would preclude the renewal of the under-torching that provides some roofs with their distinctive regional character.

The ‘like-for-like’ renewal of laths and battens is of paramount importance in all roofs where the originals are failing. Even sound battens will have hardened over time, which makes re-nailing difficult because of the
shaking it induces. Hardwood pegs are readily available for renewal. A few roofs, mainly in northern areas, used sheep bones as pegs and these should be re-used whenever possible.

Tiles
Most early plain tiles were pegged and these will be of historic significance where found. Some plain tiles will have integral nibs and may have holes for nailing. Where intermittent nailing of tiles occurs this is usually to a regular pattern and its purpose was to help resist wind shatter and skew on exposed roofs. Whenever possible it should be replicated in repair:

All traditional tiles were made of clay and many types are still widely available. Less common varieties may need to be sourced from specialist manufacturers.

Tiled roofs need little attention beyond checking for any dislodged tiles, particularly following a storm. Signs of failure include spalling and breakage. In this case, tiles should be carefully removed and inspected. Acceptable tiles should be stacked under cover to avoid accidental damage. It is usual to renew battens prior to retiling.

Single-lap and larger tiles such as ‘double Roman’ tolerate undulation in a roof less well than plain tiles. This should be considered during roof repair and it may be necessary to provide packing over sagging purlins to create a suitable line.

Thatch
Whether of straw, water reed, or heather the maintenance issues are similar for all types of thatching material. Early signs of failure occur at ridges, gables, and chimney abutments. Thatched ridges will always deteriorate sooner than the coat itself and so particular attention is needed for ridge maintenance, which usually consists of recapping. Wire netting over the ridge can prolong the life of the thatch by retaining material in place.

As the thatch ages it attracts moss, algae and fungi. This is often worse where trees overhang or restrict airflow over the roof. Raking down of the roof to remove growth and debris can be beneficial as part of a maintenance routine.

Moss growth can also be exacerbated by wire netting over the main coat because of its tendency to retain debris and thereby increase moisture retention. It also makes raking or brushing down less effective. More important still, it seriously inhibits removal of
Most farm building roofs had no under-felting, which allowed a good airflow to dry an often humid atmosphere © Spratley and Woodfield Architects.

Long-straw ridgework in progress © Philip White.

Corrugated iron sheeting has become part of the farm building vernacular and has saved many roofs from decay © Philip White.

Steel T section inserted to joist end with top plate © Philip White.

Steel T section inserted to joist end © Philip White.

New joist ends have been scarfed onto an existing joist and bolted © Philip White.

thatch in the event of a roof fire. New material may be stitched in where faults are beginning to show. The advice of an experienced thatcher can prove invaluable.

Traditionally, straw thatch was repaired piecemeal and only fully over-coated when absolutely necessary. After a number of re-coats thatch becomes too deep and heavy for the supporting timbers. It will then be necessary to strip back to a sound coat or even to the basecoat, and to re-thatch. Basecoats can be extremely old and can contain much historic information. Old basecoats should be recorded before any removal is carried out.

The thatcher will be able to provide advice on the most suitable material for your building. Although there has been a general move towards the use of imported water reed for thatching, there is still some uncertainty about its durability. The best guide to the quality of the material is its growth history. This is easy to monitor when the reeds or straw have been locally grown but difficult when the material is imported. The lifespan of a thatched roof is also influenced by exposure, roof pitch and airflow over the roof.

A thatcher will not necessarily deal with repair work to roof timbers but may insist on certain sizes of batten to suit his style of work. This may not be the same as that used previously, so any changes in method should be specified beforehand, as should any required attendance by a builder for scaffolding or preliminary repair work.

The first base course of straw thatch was often tied even where the remainder was fixed with spikes and sways. Spiking into battens requires larger-section timber than is often found in tied roofs. Such traditions should be respected in repair.

If the finished level of the thatch is to be changed its relationship to chimneys and protective gables must be checked. It may be necessary to adjust both in order to provide a weatherproof junction when renewing or remaking flashings and fillets.

Less commonly used materials such as heather and bracken require specialist help because they each have their own special methods of application. Heather is applied around the roof in courses so that a coat is built up gradually; it may not be waterproof until the material has settled a little to form an effective barrier.

Your local planning authority is likely have a policy concerning the thatch types that are appropriate to its area.
Corrugated Sheeting

Corrugated sheeting has been used from the 19th century, either as a replacement or covering for thatch and other roofing materials or (mostly in the case of Dutch barns) as part of the original construction. Unprotected galvanised sheeting will eventually decay naturally, but its deterioration will be accelerated if it has been damaged during storage or fixing. The first signs of decay are often seen at the under-laps and are due to moisture retention between sheets, particularly in animal houses that have inadequate ventilation. In such buildings, painting between the laps or indeed across the whole underside before fixing is an excellent aid to preservation.

The painting of metal roof cladding is the best way of prolonging its life. Some regions have a long-standing practice of using a particular colour; generally red raddle, or black. Traditionally, the chosen colour related to that of the local soil; in general a matt black finish is particularly good at helping the building sit into the landscape. On new galvanised sheeting an etch paint needs to be applied as a basecoat. Alternatively, the material can be left to weather and tone down for around a year before painting.

FLOOR REPAIRS

It is common to find the joist ends of timber floors decaying due to damp. It is normally less disruptive to splice on new ends or add steel support brackets and flitch plates than replace whole lengths of joist. Resin can sometimes be used as a repair medium and might be justified when joists or beams contain historic information such as chamfering or ritual marks.

Floorboards of oak or elm are especially likely to be of historic interest but softwood boarding may also be of significance, particularly if it involves broad planks. The type of wood, size, and the age of boarding are all important. Softwood boarding does not last as long as hardwood and the existing flooring may well be replacement work.

Many ground floors were constructed simply of compacted earth. Rammed chalk floors occur in chalkland areas and these are relatively easy to repair with lump chalk thoroughly wetted and rammed into place.

Occasionally, and especially along the limestone belt of England, upper floors may be made of a plaster composition (gypsum lime-ash) and laid upon a reed or brushwood base. These are very important to the historic character of a building. They can be surprisingly robust but recreating original mixes is not always possible and they may need to be repaired by specialist contractors. Some solid ground floors may also be of a lime-ash composition. Now rare, these are softer, warmer, and more forgiving than later concrete floors and can be repaired using similar materials. Early Victorian concrete floors can be lime-based and often included additives such as animal blood, or isinglass. Again, knowledgeable specialist contractors will be able to repair these.

In the case of cobbled or pitched stone floors the stones were beaten into a clay base and packed down tightly. Joints can be brushed with a lime bedding mix to further tighten the stones. Repair is possible but sourcing compatible stones may be difficult. Original sources include riverbeds and weathered stone from field margins. Commercially available imported sea cobble is a poor match in most cases and cement should always be avoided as a bedding material.

MORTARS AND PLASTERS

The appearance of masonry owes as much to the character of the mortar joint as to the stonework itself. Inappropriate re-pointing can have a significant impact on the character of farm buildings and can ultimately be damaging to the fabric.

Before the mid-19th century masonry bedding mortar was either lime-based or; particularly in earlier buildings, made simply of earth or earth mixed with lime. Mortar was also often spread across the face of stone as a render finish. Some later and higher-status buildings featured cement-based decorative joint finishes.

Decayed joint mortar and all earth walls are vulnerable to water penetration and damage. The subsequent expansion of frozen moisture causes movement and surface spalling, both of which may damage the wall surface and even the interior: Spalled brickwork and stonework (particularly softer stone) caused by cement-based mortar that has forced moisture to evaporate through the weaker medium is one of the commonest problems affecting historic farm buildings.
Mortar should be weaker and more porous than the masonry in which it is placed. Although it is necessary to take account of the exposure to which the walls are subject it is the nature and attributes of the masonry that will usually dictate the strength of mortar required. Establishing a compatible composition may well require trial mixes to be tested on site. The use of contractors experienced in lime work is fundamental to the success of a project.

Much damage to masonry is caused by the use of cement-rich mortar. Soft lime-based mortars are preferable because their elasticity allows slight movement and their porosity allows the wall to breathe. When deciding on a mortar mix look for evidence of the aggregate and sands used in the past, which may well have local significance and will enable a close visual match.

Until the advent of harder mortars in the mid-19th century many rubble, earth and some brick-walled farm buildings were lime plastered and lime washed for additional protection. If they are regularly maintained, external plasters can last for many decades. However a reduction in maintenance, or the application of inappropriate cement renders, will both cause the original finish to degrade or fail.

When considering external finishes as part of a repair project it is well worth trying to find out what kind of coatings may have been used before. Does the building show remnants of a lime plaster or was the building simply lime washed? Lime plaster and lime wash create an authentic and protective external finish for many traditional farm buildings and are especially appropriate where there is surviving evidence of previous use.

The 20th-century practice of nailing wire mesh to walls as a support for cement rendering has caused varying degrees of damage to walls, most disastrously to earth walling because of both moisture ingress and physical damage from nailing. Because cement renders are inflexible they invariably start to crack and let in water which is then unable to freely evaporate. Defective cement render should be removed entirely and replaced with a lime-based render.

Defective plaster coats may not need to be removed entirely. It is not uncommon to find that finishing coats are degrading and falling away from a more stable basecoat. Where a basecoat strengthened by hair remains in sound or repairable condition further coats of haired lime plaster can be applied together with a new finishing coat.
DRAINAGE

RAINWATER GOODS

Particular attention will be needed if gutters and downpipes are near to, or overhung by, trees. Though rare in farm buildings, any parapet or valley gutters require particularly close attention.

Signs of blockage to gutters and downpipes will be most obvious during heavy rain. Leaking joints to cast-metal gutters should be disconnected, cleaned and resealed with a non-acidic gutter sealant suitable for metal application or a joint sealing tape suitable for use on metal. Painting metal downpipes and gutters (both inside and out) can extend their lives for many years.

Some traditional buildings now feature plastic rainwater goods. Plastic products are generally not as suitable as metal products as they are not designed to follow the often sinuous changes of line that occur on the eaves of traditional buildings. As a result they are liable to respond to stress by deforming, springing, and sometimes breaking their fixing brackets. Their insubstantial visual appearance can also impair the historic character of a traditional building.

It is now common practice to attach modern guttering to fascia boards but for farm buildings these are often out of character. They are relatively short-lived in comparison with metal fixings, which in contrast, can be safely connected with a wider tolerance of angles. In many cases installations are mounted on gutter spikes driven into the bedding joints.

DRAINAGE SERVICES

Drainage runs and outlets need to be regularly inspected for blockages, and especially after storms. The latter are likely to cause the most serious problems in autumn and winter when leaves and debris can be washed into drains.

RECORDING

Recording is carried out in order to collect information about a building that will help with its future management, whether it is about to be changed or not. Where parts of an historic building are likely to be dismantled prior to repair an accurate record of existing detail can help to avoid unnecessary loss of historic information. It is strongly recommended that records should be sent to the county or district Historic Environment Record by the project manager or building owner. The local authority’s conservation officer should be able to provide advice on how this can be done.

The level of recording required will depend on the nature of the building, its significance and the extent of the intervention in its fabric. The cost of recording should not usually be disproportionate to the cost of the repair work. Advice on the levels of recording appropriate to different kinds of structure is set out in the English Heritage booklet Understanding Historic Buildings: A guide to good recording practice (2006). The four levels are linked to the complexity of the building and the amount of repair required.

Level 1 is essentially a basic visual record supplemented by the minimum of information need to identify the building’s location, age and type.

Level 2 is a descriptive record, made in circumstances similar to those of Level I but when more information is needed. Both the exterior and the interior will be viewed, described, and photographed. The record will present conclusions regarding the building’s development and use, but will not discuss in detail the evidence on which these conclusions are based.

Level 3 is an analytical record, and will comprise an introductory description followed by a systematic account of the building’s origins, development, and use. The record will include an account of the evidence on
which the analysis has been based. It will also include all drawn and photographic records that may be required to illustrate the building’s appearance and structure and to support an historical analysis.

**Level 4** provides a comprehensive analytical record and is appropriate for buildings of special importance. The record will draw on the full range of available resources and discuss the building’s significance in terms of architectural, social, regional, or economic history. The range of drawings may also be greater than at other levels.

A photographic survey differs from other surveys in that it provides a very full visual record, accompanied by a brief written account, but without an analytical or drawn survey at a comparable level of detail.

**SPECIFICATION**

Once the surveys and evaluation have been completed attention can be turned to specification and subsequent cost of work that is needed. A competent specification can only be produced from comprehensive surveys and their proper evaluation. It should include for all works necessary to return a building to a weatherproof and structurally sound state in sympathy with its historic character.

However, there may be hidden problems that cannot be fully assessed from surveys alone. An experienced consultant will draw attention to such issues and may recommend that a contingency sum is included as part of the specification for costing.

**REPAIR CASE STUDIES**

Most of the following case studies involved grant-aid for repairs, often quite small amounts that have been sufficient to give the building a future. All of them benefited from careful investigation by those skilled in traditional construction – work designed to determine the most appropriate way of repairing the building while retaining as much of its original fabric as possible. In every case the repairs were then carried out by highly skilled contractors and traditional craftsmen.

**BARN IN COURTYARD RANGE**

This small early-19th century moorland farmstead in Devon had been derelict for some years and the corrugated metal roofing to the bank barn was leaking. Although the principal floor beams were in an acceptable condition, the doors and hatches, which were modern replacements, were in very poor condition.

A structural survey was commissioned to establish the condition of the roof structure with a view to retaining as much original timber as possible. This revealed some roof spread and the need to strengthen the trusses to carry the roof loads. An experienced local building contractor was engaged to undertake a condition survey and draw up a specification of works for repair. The existing roof trusses were strengthened with additional timbers and many of the roofing battens were retained. New doors and hatches were made to the original design and finish. Salvaged hinges were overhauled and further new ones made to the original pattern.
THRESHING BARN ▲

Parts of the stone-slate roof of this large Grade II listed Cotswold stone threshing barn were failing. As a result, some of the roof timbers had suffered water damage. A porch with an upper wool store was in a dangerous state due to a cracked and leaning gable wall caused by a failing door-head lintel. The barn doors were damaged and required new ‘Ham-type’ hinges to be made.

A conservation architect was engaged to produce a specification and oversee the repairs. A structural engineering report was commissioned to assess the condition of the gabled porch and suggest remedial work.

The roof was largely stripped so that the existing rafters could be repaired with only minimal replacement. Battens were added to the rafters to make it easier to fix the slates and steel ties were attached to a failing roof truss. Some slates were reused together with new local stone to re-roof the barn to match the existing. The gable end to the porch was re-built above a new oak lintel.

GRANARY ▲

This small freestanding early 18th-century brick granary on staddle stones in Wiltshire was in a perilous state due to a failed soleplate and some ground settlement. Cracking was extensive and the stone slated roof needed replacing.

Complete re-building could have resulted in a major loss of historic integrity and character. Consequently, the building was entirely propped for support so that individual parts could be repaired as necessary. The great majority of original brickwork was retained and repaired, with some new bricks sourced to match the existing. Virtually all original timbers were retained in-situ and the roof re-slated and re-torched. The building is now in use again for storage.
FIELD BARN

This is one of four upland barns on a farm in Cumbria that were repaired with the aid of funding from an Environmentally Sensitive Area (ESA) scheme. Barns of this kind form a key part of the upland landscape around Helvellyn and are passed by thousands of hikers every year. This particular example was derelict and had to have substantial repairs to bring it back into use. Without grant-aid its repairs would not have been economical; today it is once again being used for the practical storage of hay.

CART-SHED

This late 18th-century stone-and-brick cart shed in Gloucestershire with later sheeted roofing was in a serious state of decay. The initial proposition was to replace the original collar tie, pegged rafter roof structure with a new arch-braced roof that would be thatched in combed wheat straw. Further inspection showed that the existing roof structure was in fact repairable, while surviving traces of thatch beneath metal sheeting proved that the building had originally been thatched with long straw. The proposals were therefore revised to allow the existing roof structure to be repaired and re-thatched in long straw work.
FURTHER INFORMATION

WILDLIFE

Many species of wildlife that live in or gain benefits from farm buildings may be adversely affected by major works of repair. An ecological survey should therefore be carried out right at the beginning to establish whether any species protected under the Wildlife and Countryside Act 1981 are present. If there are any positive sightings or indirect evidence of occupation you should seek advice should from the local Natural England office and if necessary obtain a licence before the project can be approved. This licence may require mitigation measures to prevent disturbance of the species or its habitat, particularly during nesting and breeding seasons.

- Buildings can become important habitats for birds and mammals (including bats). These can be further enhanced by the provision of nest boxes, improvement of eave and roof design, retention of rough surfaces and use of the small openings typical of farm buildings.
- Buildings also serve as habitats for many genera and species of plants, which should not be removed unless they are clearly causing physical damage or speeding up weathering.
- Regular maintenance on a rolling basis is good for wildlife as only a proportion of the building is affected at any one time.

PROFESSIONAL HELP

The amount and type of professional help you require will depend very much on the size, complexity and nature of your farm building and kind of repair that it needs. It is very important to choose someone who has a thorough understanding of traditional buildings and is aware of the problems and pitfalls associated with their repair.

Many of the repairs needed by traditional farm buildings are relatively straightforward and involve little risk. A reliable local firm of building contractors skilled in traditional construction may be all you need. Independent recommendations can be useful, especially if they allow examples of a contractor’s work on comparable buildings to be inspected at first-hand.

If costs have to be kept to a minimum, contractors may be relied upon to offer sound impartial advice on the works that are needed. However, if you are unsure as to the experience or competence of a building contractor, you should seek independent professional advice.

For buildings with any sign of structural problems a structural engineer’s report will provide a sound basis from which to design a scheme of repairs. The Institution of Structural Engineers (ISTRUC) and the Institution of Civil Engineers (ICE) maintain a list of engineers accredited in building conservation (Conservation Accreditation Register for Engineers – CARE, www.careregister.org.uk). Structural engineers deal primarily with the examination, condition assessment and specification of repairs to defects in building structures including matters of ground movement.

If the building is listed, unusually complicated or a candidate for grant aid for repair then other expertise may be required:
ARCHITECTS
An ‘architect’ is a person whose name appears on the register held by the Architects Registration Board (ARB, www.arb.org.uk). There are other professional design practitioners who are not registered architects but adopt similar titles such as ‘architectural designer’.

Only a small proportion of architects specialise in the repair of old buildings. Those registered as Architects Accredited in Building Conservation (AABC, www.aabc-register.co.uk) or on the Conservation Register of the Royal Institute of British Architects (RIBA, www.architecture.com) have been assessed as having knowledge and experience in conservation work. The Society for the Protection of Ancient Buildings (SPAB, www.spab.org.uk) also keeps a list of architects experienced in the repair of traditional buildings. Architects can also carry out condition surveys.

An architect would be particularly useful for overseeing repairs that are more complex, where a number of craft trades are required and where there is an element of design needed in the approach to the repairs.

BUILDING SURVEYORS
Members of the Royal Institution of Chartered Surveyors (RICS, www.rics.org) have a broadly similar role to architects but are trained primarily in building construction rather than architectural design. An RICS Building Conservation Group has its own list of members accredited in building conservation. Building surveyors can also deal with condition surveys.

QUANTITY SURVEYORS
These professionals deal with the financial side of building work and contractual issues. Those who are members of the RICS are termed ‘chartered quantity surveyors’.

SPECIALIST SUPPLIERS OF CONSERVATION MATERIALS
There is a wide range of specialist suppliers who can help with the sourcing of appropriate materials, ranging from lime products and earth block to ironmongery and specially matched bricks (www.buildingconservation.com).

Reclaimed materials can sometimes help to sustain the visual character of repaired and restored farm buildings. However, to avoid the risk of materials being stolen or taken from listed buildings without legal consent it is of paramount importance that they are obtained only from legitimate suppliers. A statement of provenance should be requested at the time of purchase.

A number of suppliers adhere to the voluntary Salvo Code (www.salvo.co.uk/salcoinfo.html). Members undertake not to buy any item if there is the slightest suspicion it may be stolen or taken from a protected historic building without legal consent. Seller’s details are recorded including proof of identity.

LOCAL AUTHORITY CONSERVATION OFFICER
Conservation officers are local-authority specialists who are able to give technical advice on work to old buildings as well as advice on development and planning issues.

THE ADVANTAGES OF USING PROFESSIONALS
Hiring experienced professional consultants will add to the overall costs of repair but can be the best way to avoid ‘cowboy’ builders and problems with inappropriate or poor workmanship. The tasks that can be dealt with by professionals such as architects and surveyors include:

• carrying out surveys
• obtaining consents and approvals
• writing specifications of works, appropriate materials and standards for repair
• finding suitable builders
• drawing up a contract
• tendering works and deciding on a contract
• supervising on site and administering the contract.

Further help with finding suitably qualified professionals is provided by HESPR (Historic Environment Service Providers Recognition), a promotional service for companies operating in any area of historic environment conservation. It is maintained by the Institute of Historic Building Conservation, the professional body for historic environment conservation specialists across the UK.
Sometimes hidden repair problems will only become apparent once ‘opening up’ works have begun on an historic farm building. It is therefore a good idea to establish with the builder before he starts work how any additional unbudgeted works will be costed. It is also sensible to allow a contingency sum in your own budget to allow for such problems.

CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2007
These are statutory health and safety regulations designed to encourage safe working on construction sites. Under these regulations all owners of farm buildings, as well as their designers and contractors, have a duty to ensure competent design, management and construction.

There are further comprehensive duties covering everyone involved in projects that will last for more than 30 days or involve more than 500 person days of construction work.

Further information is available from the Health and Safety Executive (www.hse.gov.uk).

SOURCES OF FUNDING
NATURAL ENGLAND (PREVIOUSLY DEFRA RDS)
Agri-environment funding via the Environmental Stewardship scheme has considerable potential value for traditional farm buildings, on two levels:

- the Entry Level Scheme (ELS) can provide small but regular payments for the maintenance of historic farm buildings
- the Higher Level Scheme (HLS) can provide larger payments for repair projects.

Applicants for HLS grants have access to a general guide to the repair of historic buildings. It explains which types of buildings and what restoration works are in principle eligible for grant aid. Successful entry to the HLS scheme may then allow grant aid to be offered for repairs that return an eligible building to sound condition (termed ‘restoration’ within the scheme). Contact Natural England for further advice and eligibility on the Environment Stewardship schemes (www.naturalengland.org.uk).

LOCAL AUTHORITY AND OTHER GRANTS
Some local authorities may offer discretionary grants for the upkeep of historic farm buildings and it is common for such grant aid to be targeted at listed buildings. Of those authorities that provide grant aid at least half stipulate a restriction to listed buildings or for buildings in conservation areas, some of them also saying the building has to be on the authority’s ‘Building At Risk’ register to be eligible.

The majority of authorities have very small budgets and historic farm buildings are only one of a number of building types eligible for funding.

If the farm building is listed Grade I or II* the work may be eligible for a grant from English Heritage as part of the Historic Buildings, Monuments and Designed Landscape grants scheme (www.english-heritage.org.uk/grants). The grant application is more likely to be successful if it meets national and regional priorities that are outlined in the application pack. The application must demonstrate that there is financial need for a grant and that the work will be undertaken within two years.

These and other sources of grant aid are described in detail in the Funds for Historic Buildings website (www.ffhb.org.uk).
FURTHER READING

LEGISLATION AND GOVERNMENT GUIDANCE


ENGLISH HERITAGE GUIDANCE

Most of the publications listed below can be downloaded from www.helm.org.uk/guidance. Further information about historic farm buildings and their settings can also be found at www.farmsteadstoolkit.co.uk, English Heritage’s online resource for everyone involved with the care and management of these vital components of our rural heritage


Clark, J, Darlington, J, and Fairclough, G 2004. Using Historic Landscape Characterisation


EH 2004. Farming the Historic Landscape: Caring for Farm Buildings

EH 2004. Farming the Historic Landscape: An Introduction for Farm Advisers

EH 2005. Stone Slate Roofing


EH 2006. The Conversion of Traditional Farm Buildings: A Guide to Good Practice

EH 2006. Identifying and Sourcing Stone for Historic Building Repair


EH 2009. Farm Buildings and Change on the Bolton Abbey Estate, North Yorkshire

EH 2009. Historic Farm Buildings: Extending the Evidence Base


TECHNICAL GUIDANCE


Lodge, D and Wright, A. *Care and Repair of Flint Walls*, Technical Pamphlet 16. London: SPAB


**HISTORY OF FARM BUILDINGS AND SETTLEMENT**


**WILDLIFE**


(www.nationaltrust.org.uk/main/w-wabman.pdf)


Bat Conservation Trust (www.bats.org.uk)

This guidance has been prepared on behalf of English Heritage by David Pickles, Philip White and Jeremy Lake

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