STONE SLATE NATIONAL BRIEFING
STONE SLATE ROOFING A NATIONAL TREASURE IN CRISES.
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INTRODUCTION
Stone slates have been used in Britain since Roman times and are found wherever rock could be split to form a reasonably thin slab for roofing, and examples exist in almost every geological period and rock type.

Stone slates are known in different parts of the country as grey slates, flags, flagstones, thackstones, slats, flatstones, stonetiles and tilestones. Geologists prefer the term tilestone as these limestone and sandstone products are not geologically slates. That is they are sedimentary rather than metamorphic, and consequently split along a bedding rather than a cleavage plane. Stone slate is the most commonly used term and has been adopted in our work at English Heritage.

The principle areas of the country which sustain stone slate roofing are shown in the map in the English Heritage Stone Slate Technical Advice Note and is a reminder of how extensively it was one used. The geology of Britain is rich and complex and this is reflected in the great variety of building stones used for roofing across the country. It is possible to very broadly classify the roofing stones as:

Limestones and sandy limestones which are found in Dorset, Oxford, Somerset, Wiltshire, Gloucestershire, Northamptonshire and North Yorkshire (Brandsby)
Sandstone and limey sandstones which are found in Sussex, Kent, Northamptonshire, Cumbria, Northumberland, South Wales and Bristol, Gloucestershire, Cheshire, Derbyshire, Yorkshire and County Durham, Lancashire, the Welsh Marches, Shropshire, Herefordshire and Worcestershire.

Stone slating is thus a highly regionalised roofing form, arising from the distinctive local geology and fundamental to the distinctive local character of vernacular buildings in many parts of the country.
- Stone slates have been discovered on Roman sites at a number of locations around the country, and have been in use ever since. The major building booms often talked about in the 16th and 17th century seems to have been an important period for the expansion of stone slating, with the threat of fire making it much safer and more durable than thatch and thus it began to be used more widely for all buildings, not just the large manor houses of the wealthy. Stone slating continued in many parts of the country as an important local industry until the late 19th century when we begin to see a steady decline in its use, as noted by Morris. The fact that stone slating has always been a modest and local activity, generally utilising materials from the immediate area means that its use is very different in different parts of the country, and an important contributor to the development of the vernacular traditions in each area.

DECLINING USE
However local character and distinctiveness are under threat and sandstone and limestone roofing is becoming increasingly rare and in some areas is now defunct. As locally produced products come to the end of their natural lives, because of declining supplies, imported or artificial substitutes are taking their place These have little to do with the local architectural traditions, and are resulting in a gradual erosion of local distinctiveness. Conservation measures are thus needed if we are to ensure that the special architectural and historic interest and appearance of our towns, villages and the surrounding countryside is to be protected against the ugly and the fake. The strengthening of our own policies is a result of work we have been doing which aims to revive and enhance the stone slate industry.

The catalyst of this cycle of substitution and loss of local character which began in the 19th century was the development of transport systems which permitted the importation of cheaper, alien products from other regions of Britain. The extensive transport network which was in place through the canal and railway systems in the mid 19th century facilitated the widespread use of Welsh slate on a national basis. Today we can see the same process on an international scale. The consequence has been that the production of stone slates in some areas ceased years ago and the few examples that are still available are in a precarious situation - largely dependent on indirect support through the grant aiding heritage bodies for their continued existence.

The forces responsible for the continuous decline of the industry as noted by Morris in the 19th century, which is resulting in the loss of our stone slate roofing traditions, are closely intertwined. I would like to

run through them now as an introduction to the workshop sessions where they will discussed in more detail.

MANUFACTURE

One of the important factors which affected the character of the stone slates was the manner in which they were extracted, which was in turn a result of the local topography. They were either mined or quarried, but in both cases the quarries tended to be small in scale and often consisted of a small hole in the ground next to the building they were to roof. In Sussex for instance many of the duck ponds adjacent to old farm houses were the quarries for the Horsham stones found on the roof. Quarries produced a mix of products used in historic buildings work: flagging; walling; masonry as well as roofing.

Stone slates which were mined, such as Collywestons from Northamptonshire and Stonesfields from the Cotswolds, constitute only a small percentage of stone slate roofing. Here the rock was quarried through galleries to extract the suitable stone - known as pendle in the Cotswolds or log in Collyweston. This was then either stored underground or taken to the surface where it was wetted and covered with earth until the frosts came. These served to swell the beds of natural moisture within the stone and assisted in splitting it into its fissile layers. Frost split slates which use unweathered rock, tend to be thinner and therefore lighter than the quarried versions. Most stone slates were quarried rather than mined. The consists of simply removing the overburden and extracting the weathered fissile rock.

Today one of the difficulties we have is that the quarrying industry is culturally split between those producing very high volumes of aggregate which involves crushing the rock and those carefully extracting stone for architectural products. The aggregate producers see it as a hassle to bother with the more careful and hand crafted requirements of stone slate. Those producing architectural products on the other hand are fixated on the use of the saw which again is not what we want for our stone slates. Thus in modern production there is little room for including stone slates within these peoples lists of products.

However, as we have seen, stone slates were originally only one of the local stone products which make up the building stock of an area. Thus there is a mixture of stone products which will be required for the maintenance and repair of that area's buildings. Walling stone, kerbing, paving and stone slates are likely to all be required and it seems unfortunate that many quarriers are unprepared to provide a more comprehensive range of products.

Along with these difficulties, environmental pressures were discouraging the reopening of existing or new quarries. This conflicted with the planning policies which included conservation measures to protect stone slate roofs but which required replacement materials to match the originals. In fact as we have seen, the demand for stone slates is small, and can be satisfied from existing or former quarries, and when the issue was discussed specifically with mineral planners they agreed that there was a need and a general acceptance for the idea to reopen stone slate quarries to fulfil the historic building requirements within the region. So there is clearly a need to improve the planning framework that controls the production of stone slates and this is a subject we will be discussing throughout the day.

Once the rock had been obtained either by mining or quarrying it was then split into layers of a suitable thickness for roofing. Recently products have begun to be produced by sawing the slates to thickness. These slates may be technically unacceptable, as it cannot be guaranteed that they are sawn along the bedding plane. If the bedding cuts obliquely through the slate thickness weathering will occur along the bedding and the slate will break.

After splitting to the required thickness the stone was dressed to provide a stone slate. The fixing or peg hole was then made for the timber pegs which were most commonly used to hold the slate in place on the roof.

Today, as nailing is the usual fixing method the holes may be drilled, however attempts at the mechanisation of the trimming and dressing should be avoided as it produces a square edge to the slates which is aesthetically unacceptable. In addition, in some areas the slates were dressed at an angle which meant that they sat neatly over, rather that butted each other.

The production of stone slates is very much a hand process and it is difficult to introduce mechanisation and reduce production costs much more without compromising the product.

MARKET

In many parts of the country the production of stone slates has declined to the point where they are simply no longer available. The availability of cheaper mass produced products such as Welsh slates and more recently imported slates, pantiles, plain tiles and since the 1950s concrete and asbestos roof coverings has provided fierce competition for the small scale hand driven stone slate producers.

The growth of the salvage industry to service the heritage market is an additional problem. The reuse of existing historic materials is something to be commended, however the result has been that the salvage market is able to provide the material far cheaper than the producers of new stone slates, which has subsequently encouraged a sometimes unscrupulous salvage industry which in some cases has resulted in theft of stone slates from roofs all over the country.

The market for new stone slates which has always been small and localised has thus been further reduced by the availability of the salvaged product often unnecessarily removed from buildings and thus contributing in any case to this loss of local character.

The increasing number and cheapness of the substitute product, particularly with the increased competition from imported versions is another threat to buildings where the roof is unprotected by listing. Recently imported stone slates have begun to be available in England at lower prices than the local alternatives - a recent example being considered for importation for Derbyshire from India is able to be produced for 4p a slate a price we cannot possibly compete with here. Some of these are in themselves good materials such as the French limestone slates used at Woodchester Mansion, but their use is extremely difficult to legislate against, and again serves to reduce the market for local products.

COST

A stone roof is one of the most expensive to produce and install. However, it is important that we begin to put these initial costs in perspective. Stone slates are a high quality, long lasting material. When examined over the potential lifespan of the roof, and considering that even when the building is reroofed a hundred or more years later, and even then the stone slates can probably be reused, they prove to be an economic choice. There is also the sustainability argument which is now integral with most local development plans. Stone slates are the most sustainable of all roof materials - they require low energy to produce and install, are long lasting and reusable.

The potential for reducing costs by increasing and retaining the market for new stone slates to a sustainable level is clearly a key issue.

There are however other production issues which relate to the local variety of the vernacular material and the way in which they were fashioned into slates which require discussion and for which producers need a clear lead. In the South Pennines for instance where we initiated our study - we identified a number of different stone types which varied markedly in character. All are needed to achieve conservation objectives. At Langley Chapel in Shropshire there are two different materials on the roof, both from the same quarry- one a sandstone - identifiable by the green lichen, and the other a calcareous sandstone which supports the white lichen growth.

It was the roofer's skill and style of working that added the final dimension which created the local and regional character of stone roofs. Distinctiveness derived from the colour and texture of the rock; the size, thickness, flatness and surface texture of the slates and the treatment of hips and valleys, ridges, dormers, eaves and abutments; all intended primarily to resist the weather but allowing the expression of the craftsperson's artistry and made possible by the particular characteristics of the rock. In Yorkshire, for example, the large, gritstone or sandstone slates result in simple roof shapes and detailing, whilst on the typical Cotswolds building smaller limestone slates are used which can be fashioned into swept valleys, and dormers so characteristic of this part of the country.

The size and thickness of the of the material along with the local climatic conditions also determined the pitch of the roof. The large Pennines slabs can be used on lower pitches about - 30-35 degrees, whilst smaller stones require steeper pitches (up to 60 degrees).

There is thus a close relationship between the local topography and geology and the resulting building forms. So if we are to retain this cherished local distinctiveness it is imperative that adequate mineral and conservation planning policies are in place to ensure that the local materials and details are retained. It is important for example that new stone slates should match the existing as closely as possible in terms of

geological type, colour, texture, and thickness. Existing features of the roof should be retained, such as the mix of stone slate sizes, the verge, ridge, eaves and valley details and so on. Of course in many instances the choice will be limited by the supply problems, but if we are serious about this issue we need to help the few entrepreneurial people who have responded to our pleas for local products by ensuring that policies encourage rather than discourage a market for new stone slates. In any event one should always be wary of introducing a foreign product into and area which may have very different climatic conditions and may not be compatible with existing local materials.

ROOFING SKILLS

The gradual decline in available products, and thus in stone slate roofing has had another knock on effect - that is that there has been a loss of skills and understanding of the traditional roofing techniques over the last century and in particularly during the second half. It is not just the roofers who are responsible for this drop in standards as there is also a very poor understanding of traditional roofing by specifiers. Usually there is no reason why a stone slate roof should not last at least a hundred years, and most early failures are a result of poor execution rather than a failure of the material itself.

There is great confusion between traditional and modern practice and often the adaptation of traditional practices to meet modern requirements is unsuccessful and causing early failures. The use of cement mortar to point roofs is a misuse of what may be a traditional technique but in the wrong material. Examples exist were bedding and pointing have been used together in an attempt to recreate what was mistakenly thought to be the historic method, but which drew moisture into the roof.

Training for both roofers and specifiers is abysmal - there is none available. There is little information on stone slate roofing, and this lack of knowledge and experience is causing a crisis for our historic roofs. There is very little written guidance available on stone slate roofing. Derbyshire County Council have now revised their guidance leaflets, which address stone slate roofing in the South Pennines. The document includes an outline specification for stone slating in that region. We are also launching at this event a general guidance leaflet. However, as the methods of roofing vary according to the available stone types, stone slate roofing is a highly regionalised activity. We are thus hoping to encourage other local authorities, with our help, to produce their own local guidance to sit alongside our more general one. Mike Hill in the Cotswolds is already preparing one and our colleagues in the Collyweston area are also considering one which covers local practice in that area.

REGENERATION

The fact that the decline has gone on for so long and the pressures are so great, means that funding is now needed to help re-establish the industry and help counter some of the forces at work. At present funding is limited to grant aid support from the heritage bodies that helps individual roofs but is ineffective at a strategic level. So we are in effect starting at the wrong end with no ability to help the industry or affect improvements in the specification and workmanship of stone slate roofing.

What is needed to revive, protect, and enhance stone slate roofing is a multi-faceted approach. Firstly we need a consortium of people with the skills such as architects and surveyors, producers, and roofers with the interest to pursue the issues. Our own policies and those of the local planning authorities in terms of mineral planning, environmental policies and conservation legislation and grant aid need at the same time to support the industry and protect the buildings. As it is a regional issue it really must have direct and proactive involvement at a local level. This is essential to assist the market to reach a sustainable level, and to survive against the competition. Increasing knowledge through training, and guidance is essential. Awareness raising is important but success is dependent on all of those involved.

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