



# England's Heritage in Stone

*Proceedings of a Conference*

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English Stone Forum

A PUBLICATION OF THE ENGLISH STONE FORUM

## CONFERENCE ABSTRACTS

### **Slate Walling for the Wales Millennium Centre: an ancient craft in a climate of risk aversion**

**Jonathan G Adams BSc (Hons) AADip RIBA**

Project Architect, Wales Millennium Centre

The new millennium saw a large number of new cultural building projects carried out around the UK. Aiming to make the new Wales Millennium Centre distinctive, I looked to aspects of the Welsh landscape to provide ideas for its architecture. At the same time, I set out to make use of natural materials that could be found within the country, and to use them in as nearly as possible to their natural state. This led to the development of a proposal for the use of reclaimed slate waste, to be assembled using traditional masonry techniques. In this case, though, the building would be of a strikingly contemporary form.

As the Wales Millennium Centre project moved from the design phase towards tender and construction, the seemingly innocent and straightforward notion of the slate wall took the project head on into the risk averse culture of the national building industry.

The prevailing attitude of the construction industry is to avoid any material or construction method that does not come from a catalogue, or with a ready warranty. In order to realise the architectural concept of the Wales Millennium Centre, it was necessary to adapt the age-old craft of slate walling to fit into the contract management methods of the national contractors: a process that showed modern construction in its best and worst light.

**Challenges encountered by cathedral architects regarding the appointment of skilled craftsmen in stonework repairs**

**Patrick W Crawford B Arch, M Phil, RIBA**

Caroe & Partners

1 Greenland Place

London NW1 OAP

*london@caroe.co.uk*

Cathedral Architects in England are responsible for the care and conservation as well as alterations to some of the finest examples of stone craftsmanship in the Western world. The purpose of this talk was to consider the various ways in which individual Cathedrals undertake stonework repairs. How Cathedral Architects and Stonemasons need to work together to ensure that a variety of projects are successfully completed, were also considered. Additionally, this talk explored the manner in which work forces are chosen, together with the criteria used by Cathedral Architects to ensure the quality and craftsmanship, employed when these structures were first built, [and](#) are maintained.

## **English Stone: an Overview**

### **Barry J Hunt**

Independent Building Investigation Services Ltd

10 Clarendon Road, South Woodford, London, E18 2AW

*barry.hunt@ibis4u.co.uk*

Presently there are around 250 stones from England being marketed, making individual discussion impossible within the scope of this talk. Instead, a broad approach concentrating on generic stone type and end use has been adopted. The purpose of the overview was to assess the current state of the English stone industry and discuss how an English Stone Forum could impact it.

The vast majority of English stones are limestones and sandstones, which are used predominantly for traditional dimension stone purposes, more specifically ashlar and paving. The few other stones available are mostly granites and slates, which may be used for a wider variety of purposes including modern uses such as thin cladding and modular tiles.

The traditional English stone market has a solid base with strong home competition whilst large block sizes at relatively low cost prevent many imported stones being selected in their place. The greatest threat to traditional English stone use must be viewed as the alternative use of concrete, ceramic and other materials, though the gap in cost has been narrowing. Legislation has helped to curb the use of alternative materials in historical settings but this should not be relied upon.

The modern English stone market is poorly developed due to the lack of stone resources considered acceptable for the typically more onerous deployment requirements. This also results in a restricted colour and texture availability, which is anathema to architects. There is strong competition from abroad presenting a great variety of stones that also face few legislative restrictions. Codes of practice and standards affecting England also are unfavourable to the use of the alternative traditional stone resources.

One issue that needs to be challenged is the tendency for best value and competitive tendering to opt for lowest overall price. Whilst the cost element for English stone may be higher, raising total price, the difference often will be only a small proportion of the overall stone contract value. Furthermore, the many hidden benefits from maintaining a health and safety conscious home industry are often lost; public projects at least should consider these factors.

Decisions not to employ English stones may result from a lack of readily available information, with sources often fragmented and difficult to access or charged at a premium. The information may be further obscured as it is often presented along with that from Irish, Scottish and Welsh stone supplies.

The presence of an English Stone Forum must be considered a positive asset providing assistance to the English stone industry. It must be used to address the various issues raised in this overview and consider ways of removing obstacles to English stone use. A dedicated website of English stone data, recommended uses and relevant advice for potential English stone users should be created. This will focus on and promote the use of English stone to help it realise its greater potential.

## **Performance of replacement sandstone in the Edinburgh World Heritage Site: implications for decision-making in the selection of replacement stone**

**Ewan Hyslop**

British Geological Survey, Edinburgh

The New Town of Edinburgh, acknowledged as one of the foremost examples of urban design in Europe, was constructed in the eighteenth and nineteenth centuries using local sandstone. Today, all the original quarries have closed and stone for repairs is imported from other parts of the United Kingdom. Detailed records of stone repair over the last 30 years allow sources of replacement stone used in the Edinburgh New Town to be identified. To date, there has been little formal attempt to document the effect of introducing these replacement sandstones, or assess their compatibility with the original stone. Examination of petrological characteristics, including mineral composition, grain size and porosity, indicates that there are marked differences between the original and replacement stone types. These differences have an effect on the visual appearance of repairs, but more importantly may cause accelerated decay of the historic masonry. Selection of replacement stone must consider the long-term effects of employing sandstone types of differing compositional and textural characteristics. Improved decision-making in the selection of replacement stone could be achieved by undertaking routine petrological analysis, which, combined with a drive to reopen historic quarries, would further safeguard the valuable built heritage over the longer term.

### **Reference**

Hyslop E.K. 2004. *The performance of replacement sandstone in the New Town of Edinburgh*. Historic Scotland Research Report, Edinburgh.

## **Jefferson Consulting case studies**

### **David Jefferson**

Jefferson Consulting

*enquiries@jeffersonconsulting.co.uk*

The English landscape is largely man-made, having been developed and modified by man mainly since the middle of the fifth century. The traditional man-made features blend in with the natural landscape because they utilise the local natural materials in their construction. If we are to conserve our landscapes and our heritage, we require access to the natural materials that are so much part of the landscape.

The same can be said for our historic townscapes where, although the architecture may have changed over the centuries, the local materials used have remained, at least until recently, constant, providing a connection between the different periods of construction. All raw materials have to be won from the ground. In effect this means the countryside since, apart from the occasional mine, building materials are extracted using opencast methods. Unfortunately, the modern conception of conservation is purely in the context of wildlife. As a result fauna and flora are now more protected than man himself. This results in conflicts when attempting to extract traditional building materials, frequently resulting in failure to obtain the required stone. As a result, repairs and restoration have to be undertaken with incompatible materials, often resulting in irreversible damage to the historic buildings involved. In conservation areas where the buildings are an integral part of the landscape, failure to obtain the correct materials can result in the use of completely unsuitable stone or man-made products for new buildings. This can alter the nature of the area forever.

In 1997 there was a complete lack of sandstone roofing materials in the south Pennines. This had been highlighted in a report prepared for English Heritage, Derbyshire County Council and the Peak District National Park. The Linshaws project was a private initiative to help remedy this situation by locating

a source of suitable tilestone and re-start, on a small scale, the manufacture of stone roofing tiles. After extensive research, it became apparent that the only source of the raw material was on the very edge of the Peak District National Park and just within the Dark Peak SSSI. This paper described how, despite the support of the Peak Park Planning Committee and English Heritage, nature conservation and other environmental bodies managed to thwart the efforts of those involved to open up the one-hectare site. As a result, it is still not possible to restore the stone roofs of buildings within the southern part of the Pennines, or even in the surrounding cities, with a material that satisfies the modern criteria for the repair and restoration of historic buildings. Since there are no suitable alternative stones available, many buildings, or even areas, will be scarred forever by the use of inappropriate roofing materials. The problems encountered at Linshaws are not unique and reference will be made to other sites where the repair and restoration of historic buildings has been put at risk due to similar problems.

## **An English Stone Forum: can the future be guided by the past?**

**Ingval Maxwell OBE DADun RIBA FRIAS AABC FSAScot**

Director TCRE, Historic Scotland

Longmore House, Salisbury Place

Edinburgh, EH9 1SH

*ingval.maxwell@scotland.gsi.gov.uk*

There has been an inescapable connection between geology and architecture for millennia. Using indigenous materials, architecture was formed in a way that was part-limited by the underlying geology. At the same time, the available materials were determining the colour, texture and regional variations that helped make the visual distinctions apparent in our traditionally built villages, towns and cities.

With the coming of better transport links, we began to lose this connection from the mid-eighteenth century onwards. By the 1960s our understanding of how to build traditional stonework effectively, appropriately and economically was all but lost. In the interim, substitute technologies and materials have emerged. These often emulated the natural but, in performance terms, they have frequently revealed themselves as being incapable of providing a suitable match.

Whilst the masonry industry is generally thought of as a 'dimensioned stone' industry focusing on new-build activities, the need to care for the existing building stock requires it to have a variety of skills in conservation, restoration, rehabilitation, repair and maintenance work. Across the spread of activities each aspect needs different competencies, ranging from the highly specialised to the multi-skilled. The conservation and maintenance extremes are generally the prerogative of singleton operatives. Whilst industry tries to satisfy the various requirements, in the reconstruction and rehabilitation sectors, there is often a lack of knowledge, skills and materials to do so effectively.

At the same time, the new-build world has ambivalence towards traditional buildings and their constructional techniques. Increasingly it has emulated them through factory-produced units, or through a superficial understanding that

naturally occurring challenges can be easily remedied by following instructions on printed product sheets. The results of such an approach have, unfortunately, already negated much of the quality of our traditionally built heritage.

For the stone industry to survive effectively in the future it requires a greater awareness of the needs of both sectors – new build, and repair and maintenance – each to be considered in equal measure.

Such a challenge requires a recognition and understanding of where to source traditional indigenous materials, and the equally more demanding need of trying to win them, sometimes against insurmountable odds, for use.

Getting the correct sources of stone and skills to undertake appropriate restoration, rehabilitation and repair is a matter that requires a combined approach, where new-build demands augment traditional building needs. But, this requires a greater awareness of our regional diversity, and the need to retain and enhance it through appropriate design, specification and practical work.

At the international level a variety of new-build projects have recently emerged where the quality, individuality and benefits of building in natural stone have been recognised. Interestingly, a close inspection of their design details reveals distinct parallels with constructions from the past. This hints at the prospect where, if a greater awareness of the quality of traditional building in stone was recognised by more planners, architects, surveyors and engineers, all disciplines could learn much from developing a retrospective appreciation of earlier building techniques.

At a time when sustainability, energy audits, life cycle costing, and the awareness of embodied energy is high on the political agenda all of these issues, at one time or another, have been accommodated by our forefathers in the construction of traditional buildings. It could therefore be argued that by looking back to obtain a fuller understanding of traditional building technologies we will achieve a much better insight on how to go forward into the future. How to address this effectively could be a challenge for an overarching body, such as an English Stone Forum. In Scotland, the Scottish Stone Liaison Group has already

made a start on this front and much mutual benefit could be had if a way could  
be found for both bodies to work in unison.

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## Scottish Stone Liaison Group: it works for Scotland

### Alan McKinney

Chief Executive, Scottish Stone Liaison Group  
Room 133, Pentlandfield Business Park, Roslin EH25 9RE  
[amckinney@support-services.fsbusiness.co.uk](mailto:amckinney@support-services.fsbusiness.co.uk)

Over the years, numerous UK agencies have undertaken significant research into matters that relate directly to the needs of the built heritage and the challenge now facing everyone is to convert that valuable research into positive action. The Scottish Stone Liaison Group (SSLG), officially launched in May 2000, established its Business Plan upon which a Minute of Agreement enabled Historic Scotland provide the funding.

The SSLG's mission statement is: *The aim of the Scottish Stone Liaison Group is to enhance availability, promote utilisation and advance knowledge and skills in design, specification and use of indigenous Scottish stone in existing and new build projects.*

The SSLG has a Board of Directors, which meets four times a year. These meetings are held in the mornings and are followed by the full SSLG meeting in the afternoons, which are attended by Associate Members and Observers. The full meetings receive reports from the two Project Teams, namely the Indigenous Materials Team and the Industry Team – and are also apprised of the development of the Natural Stone Institute. The structure of the SSLG allows it to 'tap-into' areas of particular skills and expertise and this ensures that these are available whenever they are required.

The Board comprises: Building Research Establishment, Hutton & Rostron, National Federation of Roofing Contractors, Royal Incorporation of Architects in Scotland, Royal Institution of Chartered Surveyors in Scotland, Scottish Building, Scottish Landowners Federation, Scottish Lime Centre Trust, Stone Federation GB, Stone Federation GB: Scottish Section.

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In addition, the British Geological Survey, CITB–Construction Skills, the Drystone Walling Association, Highland Council, Historic Scotland, Institute of Quarrying, Scottish Environmental Protection Agency, Scottish Enterprise, Scottish Executive – Architecture Policy Unit, Scottish Natural Heritage, and Robert Gordon University are Associate Members.

Having established a workable structure, the SSLG then had to publicise itself and promote its activities. This was, and continues to be, done in a variety of ways. A Newsletter, distributed on an infrequent basis, is mailed to over 2000 people. After consultation with readers, it was resolved to contain the printing costs and distribute a reasonable quality production with a more comprehensive version being available on the web. (www.sslg.co.uk). Other methods of drawing attention to the SSLG is by submitting newspapers articles, including contributions to specialist magazines, for example *Natural Stone Specialist* and to 'Letters to Editors'. Opportunities have also been taken to appear on TV and radio. All of these initiatives have generated interest and has resulted in coverage in *The Times* and the nine-minute slot on the 'Landward' programme screened by BBC Scotland TV.

As the SSLG seeks to pursue its objectives in a variety of ways it must be explained that those were identified and underpinned by research previously undertaken by Historic Scotland and remain lynch pins in the development of the Group. They demonstrate both the extent of the research funded by Historic Scotland and the issues that confront Scotland in the twenty-first century.

The SSLG is seeking to translate some of that research into reality.

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## **Reigate Stone and other southeast English building stones**

**R W Sanderson**

71 Acacia Grove, New Malden, Surrey KT3 3BU, UK

*robin.sanderson@btinternet.com*

The southeast of England, bounded by the Thames valley in the north and Hampshire in the west, being closest to the major political entities of continental Europe has been the focus of settlement since prehistoric times. In consequence the political and ecclesiastical authorities have required prestigious masonry buildings to advertise their importance. Although this region is now not seen as an important dimension stone producing area, and indeed much stone was imported from France from an early date, the varied geology has provided a large number of stones of adequate quality, although often of limited quantity.

Increasing use of petrographical analysis is now identifying the widespread use of hitherto forgotten or unrecognised stones. The main problem has, until recent times, been with transportation and distribution within and across the central Weald. Two examples, the Bembridge Limestones of the Isle of Wight, and the Upper Greensand 'malmstones' of Surrey, Hampshire and Sussex, are discussed as illustrations. The 'malmstones', especially, have been widely used for ashlar and moulded work, but have proved to be of poor weather resistance, and now give building conservators great problems. Mineralogical and petrographical analyses of Reigate firestone, Farnham malmstone and Ventnor stone indicate that unusually high proportions of amorphous and lepispheric silica cements are the main reactive components, which induce decay.

## **Planning for the supply of building stone in England – policy and research**

**Alan Thompson<sup>1</sup> & Brian Marker<sup>2</sup>**

<sup>1</sup>Capita Symonds, UK

<sup>2</sup>formerly of Office of the Deputy Prime Minister,

*brian@amarker.freemove.co.uk*

Planning guidance on building and roofing stone supply in England was published in 1996 and on the built heritage in 1994. The guidance documents made only limited references to building and roofing stone. There have been significant subsequent changes in European and National legislation and a national sustainable development strategy. The planning system has been extensively changed through the Planning and Compulsory Purchase Act 2004. Therefore the planning guidance needed to be updated.

Research was undertaken to examine whether existing guidance should be changed or amplified. The research examined the diversity of these materials; methods of extraction and processing; the scale and environmental effects of operations; constraints on extraction; and environmental opportunities.

Key recommendations were that the new Planning Policy Statement 1 ‘Sustainability and planning’ and Minerals Policy Statement 1 (MPS1) ‘Planning and minerals’ should deal more fully with building and roofing stone and that reference should also be made to these in new guidance on environmental effects (MPS2) and rehabilitation (MPS3) of mineral workings. Regional Spatial Strategies and Minerals and Local Development Documents should contain policies on building stone supply, and on safeguarding of resources including, where necessary, specific former extraction sites. Better information on the environmental, economic and social aspects of the industry should be made readily available. Public awareness of the importance of building stone quarries for the National heritage should be improved. A national database of building stone and roofing stone sources should be set up.

Results of the research were carefully considered by the Office of the Deputy Prime Minister. An annex on building and roofing stone in England to the new Minerals Policy Statement 1 'Planning and Minerals' was published in 2006. This takes due account of the planning aspects of the recommendations, but aspects that are not directly related to the planning regime will need to be subject to wider debate. The draft annex will be put to public consultation during 2005.

The recent Barker review of the planning system proposed, among other things, that planning guidance should be simplified. A forthcoming Government White Paper will respond to the recommendations of the review. If Government decides to greatly reduce the amount of planning guidance there is a risk that the recently completed guidance on building and roofing stone might be discarded.