

£5

Edition 10 / Winter 2019

*The Full*

# CIRCLE

The journal of The Association of Scottish Hardwood Sawmillers

## A "MONET" BRIDGE

Written by James O'Keefe + Daisy Martine

## COIGNAFEARN BRIDGE

Written by Betsy Van Der Lee

## SHOU SUGI BAN BURNT TIMBER CLADDING

Written by by Jim Birley/Tom + Emma Fitzgerald



Scottish  
Forestry / Coilltearachd  
na h-Alba



Scottish  
Furniture  
Makers  
Association

**NEW!**

FROM **7,075 £**

**CUT WIDTH 35.5"**

**COMPACT SAWMILL IDEAL FOR SAWING WIDE BOARDS**

**LT15 CLASSIC WIDE**

The LT15CLASSIC WIDE was designed for those who need to cut wider logs economically. Standard features are the same as the LT15, but the LT15CLASSIC WIDE cuts up to 90 cm logs.

**WOOD-MIZER UK**  
HOPFIELD BARN  
KENWARD ROAD, YALDING  
KENT ME18 6JP

info@woodmizer.co.uk 0 1622 813 201  
[www.woodmizer.co.uk](http://www.woodmizer.co.uk)

**Wood-Mizer**  
from forest to final form

*Following the devolution of the Forestry Commission to Scottish Forestry and Forest Enterprise to Forestry and Land Scotland, here are the regional and national contacts for both organisations.*

For staff not listed here, the email addresses will usually be: [firstname.lastname@forestry.gov.scot](mailto:firstname.lastname@forestry.gov.scot) or [firstname.lastname@forestryandland.gov.scot](mailto:firstname.lastname@forestryandland.gov.scot) Scottish Forestry deals with grants and licences and Forestry and Land Scotland manages forests and produces logs.



**Scottish Forestry National Office**  
Silvan House, 231 Corstorphine Road,  
Edinburgh, EH12 7AT  
Telephone: 0131 370 5250  
Email: [Scottish.Forestry@forestry.gov.scot](mailto:Scottish.Forestry@forestry.gov.scot)

**Highland and Islands Conservancy**  
'Woodlands', Fodderty Way,  
Dingwall, Ross-shire, IV15 9XB  
Tel: 0300 067 6950  
Email: [highland.cons@forestry.gov.scot](mailto:highland.cons@forestry.gov.scot)  
Conservator: John Risby

**Grampian Conservancy**  
Portsoy Road  
Huntly, AB54 4SJ  
Tel: 0300 067 6210  
Email: [grampian.cons@forestry.gov.scot](mailto:grampian.cons@forestry.gov.scot)  
Conservator: James Nott

**Central Scotland Conservancy**  
Bothwell House, Hamilton Business Park,  
Caird Park, Hamilton, ML3 0QA  
Tel: 0300 067 6006  
Email: [centralscotland.cons@forestry.gov.scot](mailto:centralscotland.cons@forestry.gov.scot)  
Conservator: Keith Wishart

**Perth and Argyll Conservancy**  
Upper Battleby, Redgorton,  
Perth, PH1 3EN  
Tel: 0300 067 6005  
Email: [panda.cons@forestry.gov.scot](mailto:panda.cons@forestry.gov.scot)  
Conservator: Cameron Maxwell

**South Scotland Conservancy**  
55/57 Moffat Road,  
Dumfries, DG1 1NP  
Tel: 0300 067 6500  
Email: [southscotland.cons@forestry.gov.scot](mailto:southscotland.cons@forestry.gov.scot)

**Weavers Court**  
Forest Mill,  
Selkirk, TD7 5NY  
Tel: 0300 067 6007  
Conservator: Doug Howieson



**Forestry and Land Scotland  
Head Office**

1 Highlander Way  
Inverness Business Park  
Inverness, IV2 7GB  
Email: [enquiries@forestryandland.gov.scot](mailto:enquiries@forestryandland.gov.scot)  
Telephone: 0300 067 6000  
IV2 7GB

**Regional offices**

**North**  
Tel: (Golspie office) 0300 067 6850  
Tel: (Smithton office) 0300 067 6100  
email: [enquiries.north@forestryandland.gov.scot](mailto:enquiries.north@forestryandland.gov.scot)

**West**  
Tel: (Lochgilthead office) 0300 067 6650  
Tel: (Fort William office) 0300 067 6870  
email: [enquiries.west@forestryandland.gov.scot](mailto:enquiries.west@forestryandland.gov.scot)

**East**  
Tel: (Huntly office) 0300 067 6200  
Tel: (Dunkeld office) 0300 067 6380  
email: [enquiries.east@forestryandland.gov.scot](mailto:enquiries.east@forestryandland.gov.scot)

**Central**  
Tel: (Aberfoyle office) 0300 067 6600  
Tel: (West Calder office) 0300 067 6700  
email: [enquiries.central@forestryandland.gov.scot](mailto:enquiries.central@forestryandland.gov.scot)

**South**  
Tel: (Dumfries office) 0300 067 6900  
Tel: (Newton Stewart office) 0300 067 6800  
email: [enquiries.south@forestryandland.gov.scot](mailto:enquiries.south@forestryandland.gov.scot)

---

# Contents

- 5 ASHS NEWS
- 6 SCOTTISH WORKING WOODS NEWS
- 7 SCOTTISH FURNITURE MAKERS ASSOCIATION NEWS
- 8 MANAGING AN URBAN WOODLAND
- 10 FORESTRY IN SCOTLAND LOOKING BEYOND APRIL 2019
- 14 PROGRESS WITH THE SOLAR KILN
- 16 SHOU SUGI BAN
- 20 KILFINNAN COMMUNITY FOREST COMPANY - PART 2
- 22 AN INTERVIEW WITH LEO KERR (KERR CARPENTRY)
- 24 ALEX WARD FURNITURE MAKER
- 26 SOUNDWOOD
- 28 A "MONET" OAK-FRAMED BRIDGE
- 32 STRUCTURAL TIMBER GRADING AND THE ASSESMENT OF MECHANICAL PROPERTIES (*continues on p36*)
- 34 COIGNAFEARN BRIDGE
- 36 STRUCTURAL TIMBER GRADING AND THE ASSESMENT OF MECHANICAL PROPERTIES (*continuation from p32*)



ISSN 2631-6234  
PRINTERS - Edinburgh Copyshop  
(Printed on min 55% recycled paper)  
DESIGNER - Stephanie Christie Design

# The Full CIRCLE

The journal of The Association of Scottish Hardwood Sawmillers

**It's been 20 years since ASHS was set up** and in that time the homegrown hardwood and quality softwood industry has been transformed thanks to a coincidence of (a) new small-scale sawmilling and processing technology, (b) enterprising individuals wanting to produce quality timber from an underused resource, (c) policy makers recognising that the sterile arguments between conservationists and big industry about conservation versus production were getting in the way of sustainable forest management and rural businesses, (d) the rise of small scale wood-users making furniture, houses and other wooden products and (e) probably a few other things.

I take several messages from all this. First, that slow and steady development (and support) sustained over many years can create an industry much more effectively than a burst of enthusiasm and funding for this year's fashion. Second, that you have to take the opportunities that present themselves, and small businesses are (and have to be) adept at doing this. Third, that you have to keep looking at things afresh, be it strengths, weaknesses, opportunities, threats, arguments, opinions, friends and opponents. Fourth, that we're surrounded by unused or underused resources which can be used sustainably for the common good. Fifth, that it took the destruction of the traditional homegrown sawmilling industry in Scotland in the 1980s before a small-scale sawmilling renaissance was possible. And there are many more lessons to take from the past 20 years.



PRODUCTION  
EDITOR &  
COORDINATOR  
Nick Marshall



DESIGNER  
Stephanie Christie



2015

2016

2017

2018

2019

*The Full Circle aims to be a showcase for the transformed small-scale timber sector in Scotland and I hope it encourages readers to take some lessons from the recent past into the way they do things in the future.*

All the best, Nick  
**ASHS COORDINATOR**



**DEADLINE DATE FOR EDITION 11**

Friday 24th January

**CONTACT US... Email - [editor@ashs.uk](mailto:editor@ashs.uk) Mobile - 07906129627**

[www.ashs.co.uk](http://www.ashs.co.uk)



## ASHS NEWS

As I write this, the 2019 ASHS AGM is just around the corner... to be held at the Scottish Wood yard on October 25th. For me, that will see the completion of a two-year stint as Chair, and Keith Threadgall will be taking over in that role.

Many of you will know Keith not only as a long time ASHS member, but also as the Scottish representative for Woodmizer UK, a job that sees him traveling extensively up and down both the Scottish and the English countryside. Keith's extensive network of Woodmizer customers and industry related friends and acquaintances - along with his affable ways - will be a great resource for someone in this role. And especially so when it comes to dragging out the stats and information required for the next ASHS survey... something I believe he is contemplating as a pet project (this is your advance warning!).

Throughout 2018/19 ASHS has continued to steadily increase its membership numbers, from 40 members and 59 associates a year ago, to 42 members and 69 associates today. The Full Circle magazine, edited by Nick Marshall, continues to turn out two editions a year of really interesting industry related articles and information... a great read! And our work programme continues to deliver useful industry supporting activities such as training events; specific information publications; continued support and development of the Scottish Working Woods initiative; and a networking presence at many different forestry and industry related events throughout the year.

And 2019 has also seen an exciting new development within Scotland's hardwood industry... namely, new interest from the whisky distillers for using Scottish Oak for the manufacture of whisky casks. This concept is not a new one, however previous operations have tended to be small and experimental. This time we are seeing some real momentum, driven by conceived marketing opportunities from the combined story of Scotch whisky and Scottish Oak - where those Oak trees that have been sustainably grown, felled and processed in Scotland.

On the back of this, Andrew Russell from Speyside Cooperage, has informed ASHS of a requirement for 100 cubic meters of sawn Scottish Oak suitable for cask manufacture,

and this will be required annually over the next three years. At an ASHS meeting in May (and subsequent meetings later on), Andrew outlined some of the supply and quality requirements for those of us interested in being involved, and these will be covered at a morning ASHS training event on the same day as this year's AGM.

I have enjoyed meeting and blethering with a wide range of different people throughout this time as Chair, and I would like to pass on thanks from ASHS to the many who have given their time and support to our work. I can't list them all here, but I will mention two... Nick Marshall our Coordinator, without whom ASHS would soon be adrift; and the Forestry Commission... or rather Scottish Forestry (SF), who continue to support and take great interest in our efforts to sustain and grow this industry in Scotland.



Written by,  
**Jim Birley**  
[www.scottishwood.co.uk](http://www.scottishwood.co.uk)



*Local. Ethical. Sustainable.*



Joined Oak bench with elm detail by Nicholas Farr (Black Rose)



- Figures by Ingrained Culture (Robert Lawrence)

## SCOTTISH WORKING WOODS

*The slow but steady expansion of the Scottish Working Woods label continues each year. We now have 31 licensees producing Sawn Timber, Joinery and Building Components, Furniture, Craft materials, Crafts, Sculpture, Ornaments, Firewood, Baskets and willow sculptures.*

The Scottish Working Woods label is run by Working Woods Scotland Ltd, comprising four trade associations - ASHS, SFMA, Scottish Wild Harvests Association and Scottish Basketmakers Association.

The SWW label is available only to Scottish micro-businesses (fewer than 10 FTE employees; less than £2M turnover), producing goods made from timber (plus other tree and woodland products), sourced locally from sustainably-managed woodlands. All licensees must first be members of one of the trade association members of SWW.



Burr elm top unit Dovetail Scotland (Steve Mclean)

We will soon be large enough to look for serious funding to increase the public awareness and hence influence of the SWW label and its messages. Watch this space.

If you want to know more, to buy SWW-labelled products, or are interested in becoming a licensee, look at the website [www.scottishworkingwoods.org.uk](http://www.scottishworkingwoods.org.uk) or email [info@scottishworkingwoods.org.uk](mailto:info@scottishworkingwoods.org.uk).



Written by,  
**Nick Marshall**  
ASHS Coordinator

## SFMA NEWS

***The Scottish Furniture Makers Association has recently agreed an exciting collaboration aimed at raising the profile of furniture makers and designers, whilst boosting awareness of the organisation itself.***

The Visual Arts Scotland/Society of Scottish Artists - VAS/SSA Open 2019-2020 is the biggest show of contemporary art and applied art in Scotland - with artists and craftspeople from across the world being invited to apply.

SFMA will sponsor a series of prizes at show at the Royal Scottish Academy on Edinburgh's Princes Street from 22 December 2019 to 30 January 2020.

***Prizes will be awarded in three separate categories in furniture design and making:***

1. Craft Excellence
2. Design Innovation
3. Student Award

***Prizes for the Craft Excellence and Design Innovation categories are:***

1st Prize £250 plus 1yrs SFMA membership (value £100)  
 2nd Prize £100 plus 1yrs SFMA membership (value £100)



The Student category is for current students and those recently graduated from courses in furniture making / product design / applied art. The Student Award: £100 plus 1yrs SFMA student membership (value £25)

The competition is open to all-comers; non-members and members alike. The competition is now closed for entries, but please come and see the winning submissions as well as the many other fine pieces of craft and artworks in the exhibition.

***This is part of a new and developing relationship between SFMA and Visual Arts Scotland. News about the show and a spotlight on the winners of each of the categories will feature in the next issue of Full Circle.***

Images of Span Tripods  
 As submitted to VAS-SSA Open 2019-2020

Originally created to accompany the Span Table for Maggie's Centres, Edinburgh

Seats made from Scottish Elm via The Wood Place  
 Legs made from RBGE Norway Maple via Angus & Mack

Designer: Simon Whatley  
 Maker: Jonathan Pang



Forestry and  
Land Scotland

Coilltearachd agus  
Fearann Alba

## MANAGING AN URBAN WOODLAND

### Drumchapel Woodland In and Around Towns (WIAT) first thinning

Drumchapel Woodland, which is owned by Glasgow City Council, is a 60 hectare mixed woodland on the north side of Glasgow.

Originally planted in 1997 under the Millennium Woodlands initiative, the woodland is composed of Ash, Silver Birch, Oak, Alder, Cherry and a variety of commercial softwood species.

The woodland had a number of long-standing management challenges in the shape of poor tree form and high stocking densities within single species group planting - and on top of that there was potential infection from Phytophthora and Ash dieback. A further issue to contend with was some social issues surrounding instances of unauthorised camp sites, shelter building, fires, litter and anti-social behaviour.

All in all, plenty of considerations and factors to address in bringing the woodlands under management - which was why in April 2019 Forestry and Land Scotland (building on work already carried out by its predecessor Forest Enterprise Scotland) took responsibility to undertake woodland management at Drumchapel.

It was very quickly evident to the FLS team, given all the site factors, that a thinning was required to address tree health issues and improve residual tree quality. A thinning would also create a more open space that would be less attractive to anyone intent on anti-social activities. But - as is usually the case - it wasn't a straightforward exercise: the team also had to contend with small crop size, sensitive soils, awkward access and a clear need to generate and maintain community support.

In order to make the thinning a success, a considerable amount of planning went into considering small scale harvesting approaches, engaging with the Drumchapel community - including producing site-specific leaflets and arranging ongoing dialogue with local people - and finding a market for any recovered timber.

The thinning was eventually undertaken by Clydebank based forestry contractor, John Walker, through chainsaw felling and extraction using an Alpine tractor equipped with a forwarding trailer and winch.

However, thanks to the small tree size across species, securing a customer for the Drumchapel timber proved more difficult - there was no open market interest! But, with a good representation of hardwood species, it was obvious that the best way of generating income from the first harvesting - and of getting a first foot on the timber sales ladder - would mean targeting the buoyant firewood market.

Working to customer specifications, the bulk of recovered timber was purchased by a Cumbernauld based firewood merchant with an interest in milling.



A well-formed stand of Drumchapel birch



Alpine tractor with forwarding trailer loading logs



Alpine tractor with forwarding trailer

Income generation from first thinning operations is frequently problematic on account of volume extracted, crop size and limited market options which can induce reservation. However, the current market demand for both soft and hardwood does give growers and landowners an opportunity to realise a meaningful return from this necessary operation, which should be viewed as a generational future investment given forestry is a long-term industry.

Thinning got underway at Drumchapel in early 2019 with forestry contractor John Walker working to a prescription of creating racks for future interventions and selectively removing remaining trees from between the racks. From a tree health perspective, the risk of further Phytophthora infection was reduced by removing larch from the woodland. A similar approach was undertaken with the Chalara infected Ash, with thinning being used to break up groups of pure Ash and create an opportunity to introduce other species and make the woodland more diverse.



A feature for the Drumchapel Woods are concentrations of well-formed silver birch, which are possibly of Scandinavian origin. As a follow-on management activity, seed will be collected from these stands for propagation and eventual planting back at Drumchapel. This will give greater future diversity and visual impact with more light filtering through the remaining trees to encourage ground flora and make a more welcoming woodland for visitors.



An area of Drumchapel post thinning

In order to ensure the safety of both forestry contractors and the general public, areas of woodland were closed to allow work to progress after community consultation to avoid any potential conflicts of interest. An important component of safety planning was ensuring that roadside timber was uplifted promptly, which required close co-operation between the harvesting team, the local forester and the customer. Aware that there was substantial community interest in the works, FLS's team in the area hosted site visits where people could view what was taking place in a safe and controlled environment.



Fire damage resulting from anti-social behaviour

By the end of the operation a total of 390 cubic meters of mixed species timber had been recovered from the Drumchapel thinning with the majority of timber being cut into 3.0 meter lengths for commercial firewood. A small proportion of 2.0 meter logs was retained for sale to members of the public in order to ensure that the opportunity to purchase was not just restricted to commercial businesses. Given the residual problems of fires and shelter building at Drumchapel woods, branchwood and small trunks were chipped as a means of removing potential future problems.

Urban woodlands like Drumchapel serve as important resources which allow people the opportunity to walk through diverse and interesting areas that contrast against development and the fast pace of modern life. In order to ensure functionality, urban woodlands require to be managed for tree improvement and maintaining a welcoming environment that people can confidently use on a regular basis. The work undertaken by FLS's Central Region staff to ensure a successful outcome at Drumchapel is a testimony to their professional approach and desire to make a difference in a woodland and social context.

Having completed their work at Drumchapel, the Central Region staff are now preparing for their next thinning operation in Easterhouse which will demand a similar pattern of sensitive harvesting coupled with community engagement.

## Forestry and Land Scotland

On the first of April 2019, Forest Enterprise Scotland, which was an agency of the Forestry Commission ceased to exist and was replaced by Forestry and Land Scotland as a new Executive Agency of the Scottish Government.

Forestry and Land Scotland supports Scottish Ministers in leading on sustainable forest management and rural development through stewardship of National forests and land. The new organisation is primarily funded by trading activities with timber sales being at the heart of income generation with over 3 million cubic meters of logs sold annually. At the operational heart of Forestry and Land Scotland are five Regions which serve as hubs for initiating direct management in their respective locations across Scotland.

While the marketing of timber to specialist customers represents a small proportion of overall timber sales, the important economic role played by small scale timber processors and manufacturers is recognised by Forestry and Land Scotland through the provision of dedicated sales events and staff. Moving forward, there will be a continued commitment to ensure that customers have the opportunity to purchase small volumes of interesting timber on the open market which is reflective of Forestry and Land's need to secure income from its forest resource.

For Forestry and Land Scotland, having stewardship of the Nations Forest Estate is both an honour and a great responsibility to manage on behalf of Scottish Ministers. There are many challenges ahead for the new organisation as it mitigates against climate change, meeting an array of social and environmental objectives and working within a commercially competitive timber industry.



Written by,  
*Douglas Halliday*

Scottish Land & Forest Niche  
Marketing Officer

[douglas.halliday@forestryandland.gov.scot](mailto:douglas.halliday@forestryandland.gov.scot)



# Scottish Forestry

## Coilltearachd na h-Alba

### **FORESTRY IN SCOTLAND, LOOKING BEYOND 1ST APRIL 2019**

*Out With The Old.....*

1st April 2019 saw the end of Forestry Commission Scotland and Forest Enterprise Scotland and the establishment of two new executive agencies of the Scottish Government, Scottish Forestry (SF) and Forestry & Land Scotland (FLS) respectively. Both bodies report to Fergus Ewing MSP as Cabinet Secretary for the Rural Economy. Jo O'Hara heads up SF with Simon Hodgson in charge of FLS.

The Scottish Government's Scotland's Forestry Strategy was laid in the Scottish Parliament on the same day. Implementing this strategy will require action on many fronts across the public, private, community and voluntary sectors. Actions will need to be co-ordinated with other Scottish Government plans and strategies and incorporated into public bodies operational plans. This means that other parts of Government will support relevant components which are within their areas of expertise and sphere of influence.

The changes from FCS and FES are not just cosmetic - though they are that too: gone are the two trees in Scotland with both bodies having new logos and, in time, new corporate colours and clothing (the change will be particularly noticeable with SF).

The Forestry Strategy has six "Priorities for Action", including one of particular relevance to readers of The Full Circle, on "Improving efficiency and productivity, and developing markets" (p32). We will achieve this by carrying out actions in six areas, including:

*- Supporting businesses of different types and scales to develop and grow markets for value-added wood products and forest tourism and recreation opportunities.*

Scottish Forestry will co-ordinate the publication of an implementation, monitoring and reporting framework by 1st April 2020, and also establish a national stakeholder group to advise on, and support the implementation of the strategy. The framework will be structured around the six priorities and the related activities set out in the Strategy. For each activity the plan will include the key deliverables, lead implementation bodies and indicators to monitor and track progress.

An important task that Scottish Forestry is working on is pulling together its own Corporate Plan, which will be published 1st April 2020. The Corporate Plan will set out the vision, strategy and outcomes for this new organisation. It will describe how Scottish Forestry is going to meet targets laid out by the Scottish Government, as part of the Climate Change Plan, Programme for Government (PfG), Scotland's Forest Strategy and other areas. The Corporate Plan will provide an opportunity to explain what Scottish Forestry does and its role to a broad range of people. In late 2019/early 2020, there will be an opportunity for the general public and the partners we work with to read and give feedback on our draft Corporate Plan. Staff at Scottish Forestry are looking forward to this part of engagement process, and would welcome





### Business continues

During 2019-20 we are all continuing to deliver programmes developed during the previous year, though with increasingly tight budgets. The recently published PFG flags up wider governmental targets - such as an increase in the annual planting target to 12,000 ha per annum. The Government will be developing a proposed 2020-21 budget, which the Finance Secretary will publish in December, followed by negotiations before a final vote takes place in Parliament, usually in February. This will then cascade down into the wider Scottish Forestry, Group and Team budgets which we allocate towards works delivering our priorities for action. Over the last year it was great to see some of the outcomes of the work which we have supported in previous years e.g.

input from readers of the Full Circle. There will be more information available on the Scottish Forestry website on the developing Corporate Plan in December.

As well as a new name and forthcoming new priorities and targets there have been changes to the structure within SF, particularly within National Office. These include the introduction of a new Head of Policy and a separation of that role from the one of the (currently being filled) post of Head of Standards, Evidence and Expertise. The Business Development team, of which I am  $\frac{1}{4}$ , sits within the latter group and the focus of our efforts will be changing, slowly but surely.

The Forestry Commission name does still remain, but south of the border only. The one anomaly relating to Plant Health staff who also have some responsibilities in Scotland. Forest Research is now also a part of FC England. Email addresses have also changed so be sure to get that correct as if not the intended recipient won't get it and you won't get any notification to that effect!



to develop, refine and promote solar kilning and to capture the key information in a handy ASHS guide. It is early days but the low cost solar kiln certainly enables ASHS members, and others, to add more value and - if Ulrich Loening is correct about the impact of drying oak in this way - to possibly even enhance the workable properties of that timber, then it will be a good investment all round. With almost no running costs a solar kiln should pay for itself in a relatively short space of time if the capacity is utilised effectively. We also supported training days on sawmilling and hardwood log grading and valuing; publication of a booklet on hardwood grading and valuing (both building on the previous year's film which is still available to view on the SF website) as well as support for two issues of the Full Circle.



We agree outputs with the ASHS Board for the year ahead in detail, and ask them to develop proposals/ideas for two subsequent years. Delivering outputs on time and to budget encourages and enables us to continue to offer some targeted support, helping the sector help itself to improve and grow. You and your committee are best placed to know what is required and we will respond and support where we can, bearing in mind my earlier point that budgets get ever tighter. We therefore increasingly need the evidence of the impact of our support, not just the deliverables themselves, to justify continuing to work with you. When the Committee seeks information from you on levels of overall investment, growth in turnover / staffing / timber used etc. please respond positively - they are not being nosy, and we are not asking them to give us company specific information, but we need to be able to show what our money is doing, not just what it is buying. As our new section name (above) makes clear, we are now actively seeking evidence to show that we are doing the right things.



ASHS solar kiln at Angus & Mack



*For 2019/20 we have agreed to support:*

- *co-ordination of ASHS activities;*
- *work developing new markets (specifically: whisky barrels, visual grading and solar kiln development);*
- *two issues of the Full Circle;*
- *work to more accurately determine sector size and growth*

### *Linking outputs - or is it tangential thinking?*

The major part of my workload is managing the Strategic Timber Transport Fund, which this year totals £7 million. The overall aim of this fund is to facilitate the sustainable transport of timber in rural areas of Scotland for the benefit of local communities and the environment. The bulk of the money was awarded this year to support work on minor and non-trunk roads in the eleven different local authority areas - particularly but not exclusively in the key "timber baskets" of Scotland.



We were pleased to be able to support one relatively small project that provides all those benefits and more, including some that I am sure are close to many ASHS members hearts, on the island of Eigg. There is a maturing conifer plantation forest in the middle of the island scheduled for harvesting and a wind damaged mature broadleaved policy woodland to the south. The island population is growing, more houses are being built and log-based wood fuel is a growing source of heat for many residents. The road, the only road, requires strengthening in a number of key areas if it is to enable haulage of the spruce

sawlogs to take place without serious negative impacts on the residents (and tourists) reaching the ferry.

Harvesting and haulage of round timber utilises skills and smaller scale equipment from similar operations elsewhere, with the spruce logs leaving the island on a timber transporting landing craft to market, raising funds for the Community. Local value added comes from larch sawlogs being sawn on the island into cladding for new houses and the small roundwood being processed on site into firewood. A polytunnel in the forest beside the firewood shed will grow some of the young trees - with input from the island children - and these will be used in replanting operations, completing the circle to some extent. There are opportunities to enhance the timber processing with kilning ....possibly solar powered?



### Changes to Felling Licence Regulations for windblown trees

Just in case you had missed it, there have been some important changes in the licencing of felling of windblown trees, a source of raw material for many ASHS members:

- Up to five cubic metres within any set calendar quarter may be felled without a licence - **BUT** this exemption does not apply to native broadleaved woodland between 0.1 and 0.5 ha, and Caledonian Pinewood Inventory sites.
- Completely dead and other dangerous trees which need to be felled to prevent immediate danger to persons or property do not need a licence.
- **NOTE:** Windblown trees above 5 cubic metres now need a licence unless they are covered by other exemptions. Windblown trees in areas of significant environmental sensitivities will be carefully considered. See "Felling Permission - Application Guidance" document online and if in doubt, contact the local Conservancy Office for guidance.



### Harvesting and Processing Grant: Additional application round for 2019/20

(See: "Harvesting and Processing Grant Scheme" details online)

There is normally one application round each year but there will be an additional round in 2019. Applications are invited for projects that will be completed in 2019 or early 2020; the closing date for submission of applications is 31 October 2019 and successful applications for 2019 must spend grant awards by the end of March 2020. If interested, please contact the local SF Conservancy Office\* ASAP.

#### **Examples of what might qualify for grant aid are:**

- Equipment to facilitate local timber primary processing (i.e. sawmilling) at a non-industrial scale (excluding wood chipping)
  - Non-industrial scale processing equipment, e.g. firewood log processors, small-scale mobile or static saw benches for primary processing of felled trees, handheld timber strength graders and sawn timber (not firewood) drying kilns
  - Non-industrial small-scale secondary processing of home grown hardwood or quality softwood. Secondary processing is the milling of already sawn boards into components for manufacturers or builders. These are not end products (eg pieces of furniture) but the finished or routed components that go into them. Examples of secondary processing products are exterior cladding, beams, finished (planed) planks, interior and exterior mouldings and flooring
  - Work to promote development of markets (including cooperative marketing) for the products from these woodlands generated from the small-scale primary processing
- You must demonstrate that the equipment you are seeking for grant support adds to the local timber harvesting, processing and utilisation capacity and does not unreasonably compete with the existing capacity within a realistic distance for the size of the investment sought.

There will then be £300,000 available for 2020-2021. Fully worked up bids should be submitted by 31 January 2020, and if successful grant awards must be claimed by the end of March 2021 after purchase of the relevant kit.

\* South Scotland: 0300 067 6500 | Central: 0300 0676 6006 | Perth and Argyll: 0300 067 6005 | Grampian: 0300 067 6210 | Highland & Islands: 0300 067 6950



Written by,

**Derek Nelson**

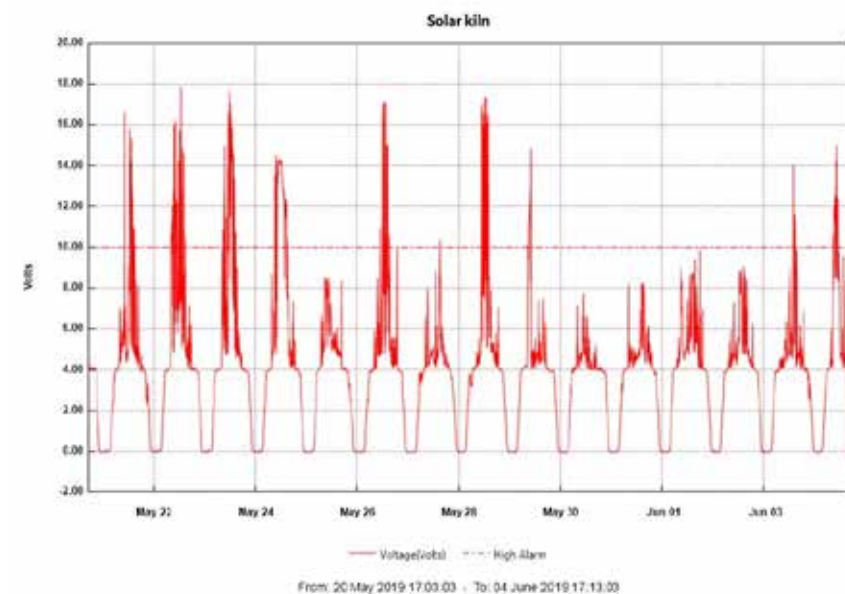
Business Development Adviser, Standards Evidence and Expertise Group, Scottish Forestry: derek.nelson@forestry.gov.scot

## PROGRESS WITH THE SOLAR KILN

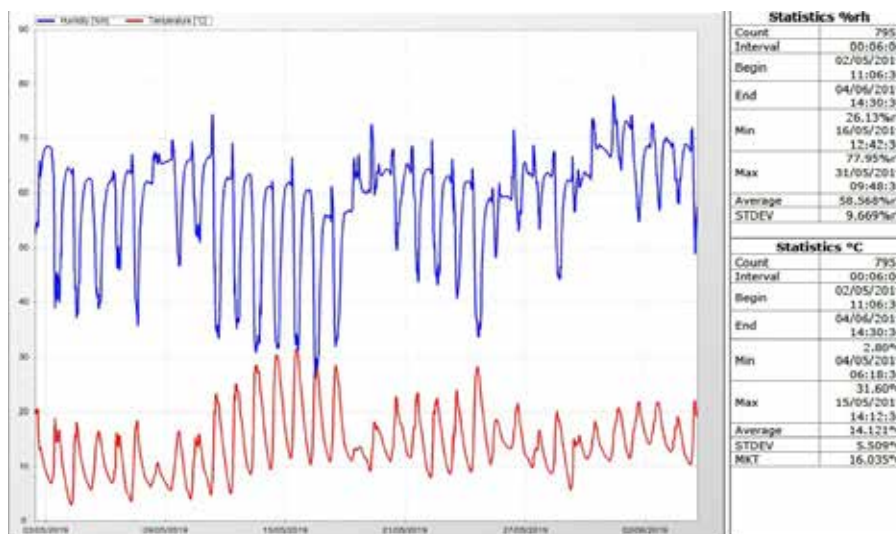
The completed timber drying Solar Kiln was described in The Full Circle No 9, Spring 2019 when the first batch of timber had been loaded on 18th January. This load was partially air dried (in the log) sycamore, starting at 18 to 20% moisture. The moisture content was monitored at intervals and in several widely spaced places in the stack, through to August. I also logged the voltage from the PV panels to give some measure of how long the sun shone. I hoped to be able to see how many total sun hours were needed to dry the timber; but as you will see (in Fig.1), there is too much fluctuation to make this easy. A Rotronic (expensive) temperature and humidity logger, was fixed to the inner front wall of the kiln, measuring conditions just below the fans. Three more (cheaper) T/H Elitech RC51H loggers were got to keep tabs on air in different parts of the kiln and outside. The idea was to check that air flowed through the timber evenly and to check that it was suitably warmer and drier than outside. We found that the timber dried fairly quickly initially, even in the dark cold conditions of Feb/March.

At the end of March, we felt encouraged enough to load freshly felled and sawn 52mm sycamore and 45mm walnut on top of the existing stack, about 5 layers in total. We wanted to see if this was possible without affecting the existing stacks below. No-one in their right mind would contemplate loading wet onto half dry timber in a conventional kiln.

*Here are some of the results, mostly presented as figures.*



- Figure 1: Voltage at 3 minute intervals, 21st May to 4th June



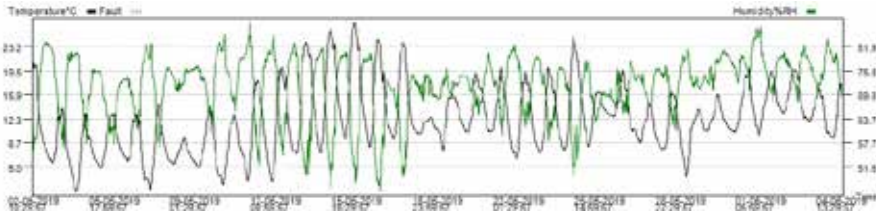
- Figure 2: T/H on the front wall of the kiln below the fans, temperature red, and humidity blue, scale for both on the left. Taken with the Rotronic logger!

It is remarkable how every morning the voltage rises rapidly to 4V and hovers there. It rises further only when the sun comes out. May 29 to 31st had only short bursts of intermittent sun; 24th May had longer sustained sun. It appears that the fans take little current until they start above 4V; then current consumption rises steeply with voltage just above 4V until there is much more light. The software allows one to expand the graph so the effects studied down to the 3 minute intervals. It remains a puzzle how the current consumption of the fans varies with voltage and how the voltage of the PV panels varies with current taken.

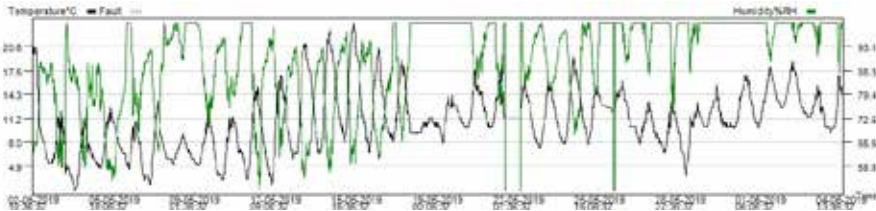
These first four figures can show us quite a lot about how the kiln is operating. But if you don't like lots of numbers, leave out the next two paragraphs.

Consider a good day, like May 15th. The outside temperature reached about 21° with 67% RH (Fig. 4). The sun-warmed air entering the kiln was 31° with RH 30-31% (Fig.2) (The Voltage data is missing, because just then the logger had become disconnected.) At these conditions, the equilibrium moisture content of timber would be 6%.

However, consider a bad day like 1st June. Outside air was 17° and RH 100%; inside was 20° and RH about 75%; voltage failed to reach 10V, the fans will have been running weakly. Equilibrium moisture content of timber would then be 13.1%. But air that had been through the stack of timber was at 19.4° and RH 76.8; then the timber would be at 15%.



- Figure 3: T/H 3rd May to 4th June: black, temperature (scale on left); green, relative humidity, (scale on right). Inside the timber stack at bottom rear, after the air has passed through the stack. Taken with Elitech logger.



- Figure 4: T/H Outside: 3rd May to 4th June, Temperature black; humidity, green. Logger placed under the kiln, out of the sun.

These two examples of May 14th and June 1st were the best peak conditions during a good day and a bad day. But even in these relatively long days and short nights of summer, temperature at night in the kiln went to well below 10° with RH up to 80%. And in Feb - March when the timber had been loaded, conditions of course were worse. So one wonders whether the kiln could possibly work.

**The proof is in the pudding.**

Figure 5 shows the drying of the initial load of timber, through the early Spring and Summer months. Note how the drying was fast at first, down to about 15%, and then more slowly. The boards at the front of the stack, just behind the fans, then dried slowly to about 9% and boards at the rear bottom corner (where the logger (Figure 3) had been placed, to about 14%.

The further load of fresh timber was loaded on top of the initial load, and its course of drying is shown in Figure 6. Drying was rapid down to 15 to 18 % and then slow reaching 11 and 7 %.

Very quickly during the early fast stage, the wide sycamore boards split open, as in photo the Figure 7. Despite this, or maybe because of it, the final dried sycamore at 10% moisture, was apparently free of any internal strain, as shown by the saw-cut in Figure 8, with no movement at all behind the cut.

**Conclusions so far**

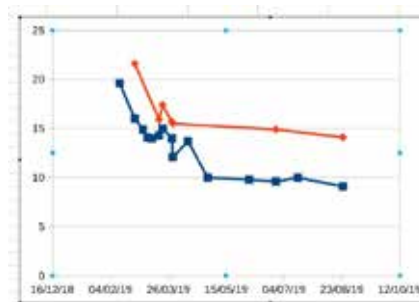
- 1) The kiln works. Timber can be dried rapidly even in Feb-April to better than conventional 1-2 years air drying, and then dried to conventional kiln dried moisture more slowly, perhaps only in summer.
- 2) The total time taken is much less than the usual air to kiln procedure.
- 3) Timber dried to 10% moisture is produced free of internal strain, confirming earlier findings. This is remarkable and is probably the result of the alternating conditions between day and night.
- 4) But there are still some problems to solve. Malcolm and colleagues did a smoke test, to see how the air flowed through. It churned around in the space between the front

wall intake and the timber. And took some 4 minutes to appear out of the outlets in the rear doors. It matters in detail how the timber is stacked, so that air must go through it and cannot get around the sides. I also think an increased flow would be good, even if this leads to slightly lower temperatures.

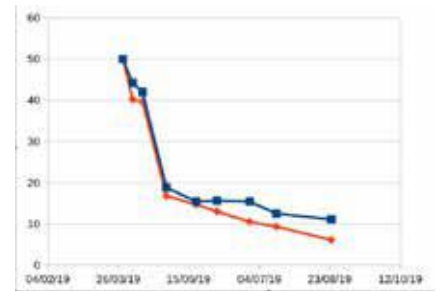
So we will improve the internal layout and change a little the design of the warmed air intake so it flows in direct and not zig-zag through the front panel. The increased flow should help to minimize the difference between top and bottom of the stack.

5) Finally, I wonder whether this experience has challenged the conventional drying method. Kilns are usually run at around 40° and the air re-circulated and dehumidified. Maybe this is unnecessary, and cooler air could be blown straight through, perhaps saving a lot of energy.

6) I hope we can offer free solar drying while we continue to experiment.



- Figure 5 Moisture content of partially air dried 50mm sycamore, end January till 24th August. Blue is at the front, middle of the timber stack, red is at the rear, bottom edge. The wobbles in March are due to a combination of technical difficulties with the moisture meter, water leaking into the kiln during rain, and probably the re-arrangements of the air flow.



- Figure 6: Moisture content of fresh felled and sawn 52mm sycamore (blue) and 45mm walnut (red), placed at top of kiln over the partially dried previous load of Figure 5.



Figure 8: Sawcut in the fresh-dried sycamore, showing no tendency to close or open



## SHOU SUGI BAN

*Shou Sugi Ban (also known as Yakisugi) is the traditional Japanese method of using charring to reduce rainwater penetration and decomposition of timber cladding. Yaki means to heat with fire, sugi means Cypress and ban means plank. It has recently seen a resurgence in Europe and the USA, and our two articles describe different approaches to achieving the same end result.*

### MAKING SHOU SUGI BAN AT SCOTTISH WOOD

We originally got involved when contacted by the Ivor Davies at Napier University. They were getting regular enquiries for charred cladding and asked if Scottish Wood would be interested in working alongside Napier to try out different methods of charring Scottish Larch cladding boards. So we did this, while also working alongside a customer keen to do a whole house clad in Scottish Larch supplied with a deep char.

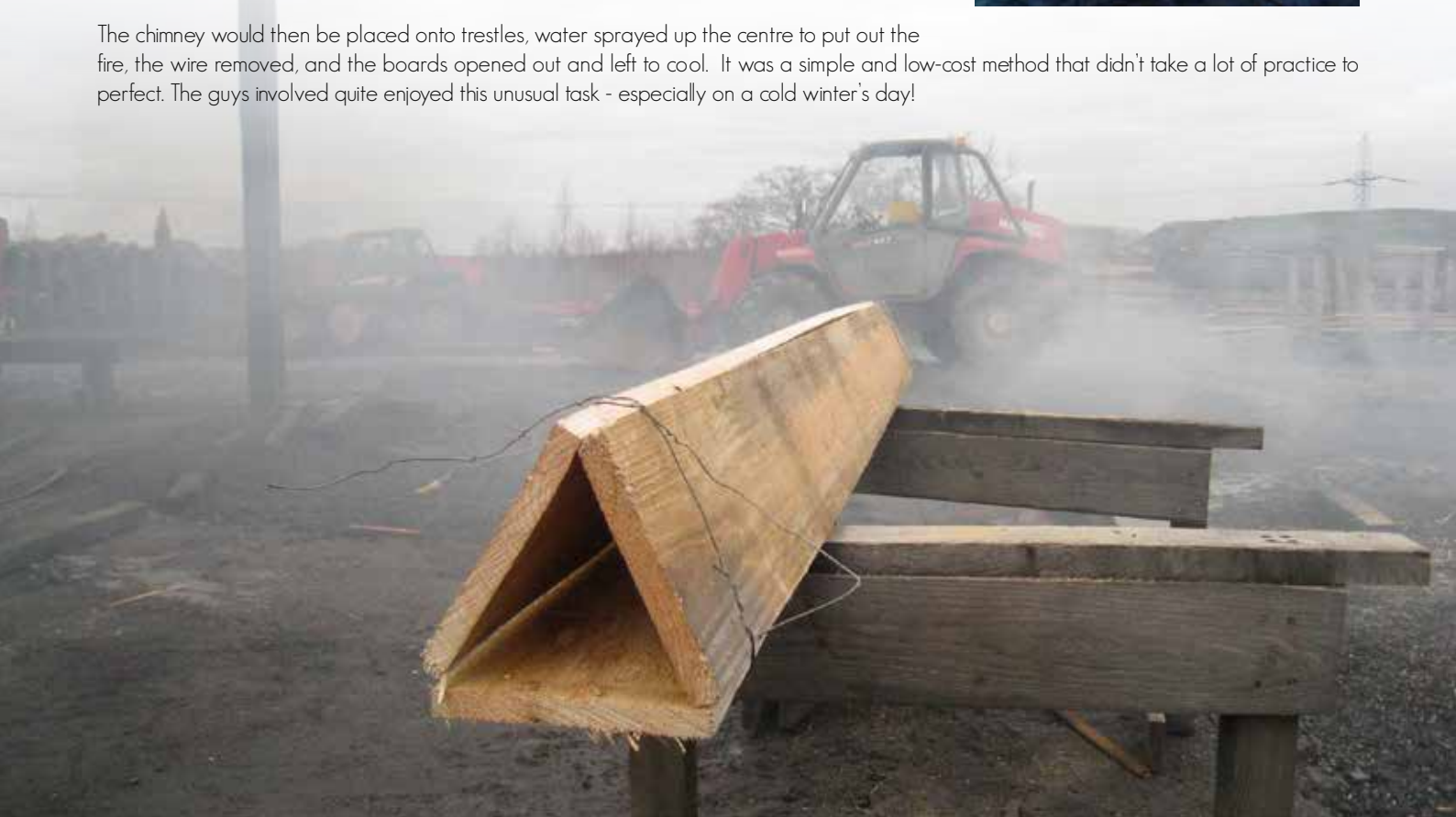
Our initial research involved simply looking on-line for some of the different methods being used both in Japan and Europe. The one we liked the most, and the one that seemed to best fit the bill for this customer, was the traditional burning-over-a-fire system that resulted in a deep charring to the wood.

To do this, we cut roughly two feet off the bottom of a metal forty-gallon barrel drum. We then cut the lid off the drum and loose fitted this over the top of our two feet high drum. With holes punched through the sides, we then had our fire stove or brazier.

The Larch cladding boards were cut to 22 x 200 x 2400mm and were kiln dried. Three of these boards could now be placed together - touching along the long edges - to form a long triangular "chimney". Wire was wound around to keep it together.

This three board "chimney" was now placed and manually held over a small hole (about five inches in diameter) cut through the stove lid. Flames would be quickly drawn from the stove and up the chimney until they came out the top. After two minutes, this chimney (now burning fiercely), would be turned end for end and held in place for a further minute of burning (total burning time around three minutes).

The chimney would then be placed onto trestles, water sprayed up the centre to put out the fire, the wire removed, and the boards opened out and left to cool. It was a simple and low-cost method that didn't take a lot of practice to perfect. The guys involved quite enjoyed this unusual task - especially on a cold winter's day!







Manually holding and spinning the three-board chimney was heavy and awkward. I'm not sure how that could have been minimised... other than using lighter and shorter cladding boards. Health & Safety might have raised an eyebrow should they have happened in on the operation. Complying with their (likely) recommendations, could, I think, have been a problem should we have considered doing this on a longer-term commercial basis.

There are different techniques for charring cladding boards, and burning the surface of the board with a blow torch is the obvious one. A more commercial method is to have the boards pass under a powerful directed gas flame. I'm not a fan of this. Yes it's a much easier system, and also easier to comply with likely Health & Safety recommendations when done on a commercial basis. But it's heavy on fossil fuels. (I found it takes a surprisingly long time for a powerful flame to surface char a piece of wood.) In comparison, for the system we used, most of the "burn energy" is coming from the cladding board itself, with the rest coming from a few scraps of kindling.

Using the gas jet method means the char can be quite light. This can look good to start with, and it may be what the customer is after. But, in my experience, the satisfying heavy black charring is not achieved, and a light char will often become indistinguishable - and even disappear - as the wood naturally weathers.

It is said that a charred piece of wood, with its protective mineral outside layer, will be more durable and last longer. This makes sense to me, but I'm not aware of any testing having been done on this.



described above - make it a non-starter on a commercial basis. Also, I'm not a big fan of the end product, and so I wouldn't be good at selling the idea to other people. However, we have explained the system to several interested parties who have gone on to char their own cladding for their own projects - and in one case we ran an informal training event.

Our customer was after that deep black finish to the whole house cladding. The boards did look quite beautiful, with an almost glinting black sheen along with the rippled surface effect of a deep char. I hope he was satisfied - I didn't hear anything to the contrary! The joiner who put up the cladding said it was a "hellish messy job to do"! But he liked the look of the end result.

This was really an experimental operation for Scottish Wood, and not one we will be doing again. Health & Safety considerations and challenges in carrying out this operation - as



Written by,  
*Jim Birley*  
www.scottishwood.co.uk

## SHOU SUGI BAN FOR A SELF-BUILD CONVERSION IN EDINBURGH

We are a husband-and-wife team who have spent over 2 years rebuilding, altering and extending an 18th-Century cottage in Edinburgh, which will one day become our first home. Although we both work in the construction industry, as an Architect and Planner respectively, we are amateur self-builders who have learned on the job doing virtually everything ourselves. For those interested in seeing photographs of our journey, we are on Instagram. @h\_cottage

Our project includes a new kitchen extension built in a courtyard garden. We used shou sugi ban boards to clad part of the extension including two hidden doors, as well as the sides of a new roof dormer.

We enjoy the simple and quiet aesthetic of shou sugi ban cladding. Unlike more typical methods of external timber treatment, such as painting or staining, the charring process of shou sugi ban dramatically enhances the natural variation in the grain character of each cladding board. Secondly, the charring process is known to provide excellent fungal and pest protection and give some resistance to over saturation from rain.

Because the quantity of cladding was small (around 150 linear metres), we could afford to spend time and burn each board individually or in very small batches, using a high temperature roofers propane torch. We found that the Siberian larch we used was relatively slow burning, which meant that it was quite easy to control the amount of charring. However, we still had a small water spray bottle on hand to extinguish the edges of boards before the faces had charred effectively. Because the boards we used were a tongue-groove profile, we struggled to fully char the internal corners of the tongues using the roofing torch without overcooking the rest of the board. We decided to finish these areas using a smaller plumber's propane torch, which proved very effective. Although we tried to control warping by wetting the faces afterwards, the amount of warping was still so dramatic that we had to stack individual layers of boards under heavy weights until installation. After fixing the boards we applied 2 coats of natural oil by Osmo, which helped to seal the surface texture and enhance the deep black shade.





The timber is 25mm thick A/B grade Siberian larch from Russwood. The boards were machined to a tongue-groove profile with a finished face width of 95mm. A tongue-groove profile was important to allow us to have hidden nail fixings, as we didn't want to have to puncturing the face of the charred boards.

We are delighted with the outcome of our shou sugi ban experiment. The biggest downside was how labour intensive it is. It also requires much greater care on installation, as the charred surfaces remain very delicate until sealed. If using it over larger areas, we would consider using square-edge boards and visible fixings.

Time will tell whether our shou sugi ban cladding will hold up against the elements and age gracefully. The depth of charring is only a few millimetres, so we don't feel we've compromised the durability of the timber. We have noticed that the cladding tends to attract more dirt than you might expect, especially near ground level and probably highlighted by the black finish, but we are happy to live with that.



Written by,  
Tom + Emma Fitzgerald



## KILFINAN COMMUNITY FOREST - PART 2

We set about by taking a typical log, if ever there was a case of 'overthinking' a problem it was pulling a 'typical' log off the stack. To process that into what a builder would recognise as useable timber took about an hour. Interestingly much of that time wasn't actually spent cutting the wood. Loading the log dealing with the waste stacking the product all took time too. What quickly became clear was that around 90% of the value tied up in producing a 6"x2" was labour and this would be the same whether a particular log yielded 1 or 5 gradable sticks. Therefore a specification had to be found that allowed us to use all the nearly but not quite gradable but still 'paid' for planks.

A way to reduce the need for stress graded timber was to reduce the stress, (or at least change it from structural to cerebral). Stress being force over area, make the area bigger and the stress goes down. So how about building a solid wall? Instead of having the roof held up by a few dozen 6"x2"'s stood on end have the whole load spread out over a 6" by well the perimeter of the building cross section of wood. This led to the concept of simply laying 6" by in the end 3" horizontally on top of each other to build up a wall. In effect a log cabin just with squared off logs. This meant that structurally the design didn't need to use graded timber in the wall, as well as not requiring standard lengths of wood.

As I imagine most of the readers of Full Circle know when milling a log say 3.6m log there'll be sections near the end where four right angle corners are not possible, or that knot in a really inconvenient place. By using timber in the way we do none of this is a problem as the wany ends can be cut off. An awkward knot being only loaded in compression need be not worried about. So far so good but what about shrinkage and joining?

As the wood is loaded perpendicular rather than in line with the grain shrinkage will be an issue. The solution was to build a drying room and dry the wood before use, while this was an obvious extra process it turns out to be not too time consuming. The problem comes once the wood is dry - keeping it that way. Rather than on a conventional building site where all the kiln dried timber is left out in the rain for a couple of weeks before it's finally covered up, we do have to make an effort to try and keep things dry. This in many ways is the most difficult part of this build process, feeling like the ground staff at Old Trafford cricket ground ....covers off covers on covers off etc. But so far we seem to have not suffered problems caused by moisture induced swelling. That said we have left generous expansion gaps around openings but nothing modern building foams can't handle. Thought needs to be given to careful detailing but that's just best practice anyway when building with wood. One other thing drying does is to show up any trouble-makers, any plank that bends excessively in the drying room gets sent to the firewood pile...as an example to the others.

Joining the planks was the next challenge, gravity won't do. Originally, we planned to dowel them together with home-made dowels, from oak, cut square. Driven into a round hole in the soft spruce gave a very tight joint. Not to mention the whole square peg in round hole metaphor - it's merely a case of hammer size. But it turned out to be very time-consuming drilling all the holes with not just drill bits but the drills themselves becoming



- Test Wall



- Close up cladding

consumable items. So we started using 140x8mm construction screws which were expensive. In the end the screws won out as they were so much quicker and were better at showing slightly bent planks the error of their ways.

In the end, after the application of many membranes, an I beam roof and our own design of cladding we've produced a building in which over 95% of the timber used came from within sight of its bathroom window

- Half built walls



- 5th and 6th batches of wood drying



Written by,  
**Rob Borusso**  
[www.kilfinancommunityforest.co.uk](http://www.kilfinancommunityforest.co.uk)

- New Forest Centre





## **KERR CARPENTRY – AN INTERVIEW WITH LEO KERR**

### *Tell us about your business*

I started my own business of 'Kerr Carpentry' 5 years ago. Today we have 6 people working in the firm, with many other sub-contractors involved. Our work varies from fine bespoke hand-made furniture to specialist property builds and renovations.

### *A bit about your history*

At 17 I left school and started my career doing furniture making and furniture restoration under my father. He was a master-craftsman in his own right and had moved to Orkney from Brighton to start his own business when I was 10 years old. I had always been around woodwork growing up and remember playing with shavings and banging lots of nails in to off cuts at my dad's workshop during school holidays.

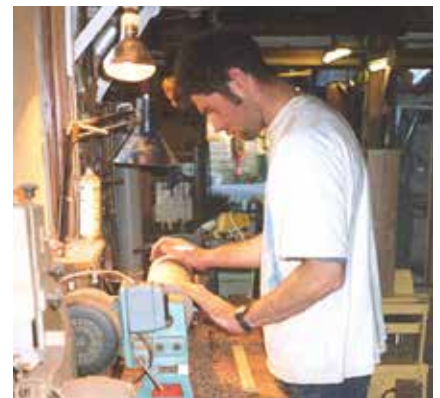
My apprenticeship was a steep learning curve for me, and I had to learn on the job! Over the years my father taught me many skills and I had the opportunity to work on many diverse projects from four poster beds, and panelled libraries, to carvings, and making bespoke one-off furniture. However, starting with furniture restoration was a great opportunity to strip furniture down items and learn about how things were made and constructed. I was also taught to use traditional hand tools, such as the bit and brace, yankee screwdrivers, and even how to sharpen gents saws, dovetail saws and tenon saws.

Later in my career I went on to work for a large Joinery and Carpentry company to further my career and expand my woodwork knowledge and abilities. This helped me develop my bench joinery skills and streamline my efforts. I gained experience in sash and case window making, doors, staircases, gates, fitments and finishings, along with other site joinery skills.

From this experience I went on to build my own cedar clad timber frame house and then built my own workshop, to start up my own business in 2014. I now like to offer clients the cross over better furniture making and design and adapt this skill for the specialist property work we carry out.



Leo and Dad's workshop



---

### ***What's different about working on Orkney?***

Orkney is a wonderful place to work and bring up a family. It is a safe and peaceful place to be without the worry of crime or traffic jams. However, with virtually no trees in Orkney I have to import all of my timber in.

I do like to support the Scottish sawmills and still enjoy visiting them to hand pick my timbers. I always feel like the kid at the candy shop when I enter the sawmill, picking up those extra beautiful boards, because you know it will be for a fantastic project one day!

### ***Tell us about some recent jobs you've done***

A highly prestigious project we have recently been involved with was the restoration of the St Andrews Kirk in Orkney. Jewellery Designer and Maker Sheila Fleet approach me in 2015 about helping carry out some of the work on this building. We were asked to be involved in the restoration of the kirk, converting the old pews into new booth style table and chairs and creating the new Oak furniture for the café.

The tables were designed to represent the theme of a Viking boat, and the chairs were given leaded light glass panelled backs. The glass being reused from windows that had to be removed from the kirk. This project allowed me a platform to show case my work and be involved with such a legacy. The project was then completed in April 2018.

### ***What difficulties have you faced***

One of the biggest difficulties I have faced as the company has expanded is recruiting new highly skilled staff. Unfortunately living in a small location with high employment, it is difficult to find the right workers who are available. However, I am very lucky with the staff I already have. Currently most of my work is for the Orkney market but we are expanding out further afield as the company develops.

### ***What else would you like readers to know?***

I would like to encourage more youngsters to get involved in this amazing skill and career. Focus in the woodwork industry is now leaning heavily towards technology and automation. Hands on skills and abilities are unfortunately being lost.

I also like to support the use of home grown Scottish Hardwoods that are sourced from responsible and ethically considerate sawmills. Timbers from sustainable sources can be a very environmentally friendly way of creating our homes and

furniture. In times of heightened awareness of our ecosystem I personally would like to support the cause.



Leo Kerr  
info@kerrcarpentry.co.uk



Refurb Kirk



Kirk Table



Kirk Round Table

## ALEX WARD FURNITURE MAKER

I am Alex Ward, the man behind Shetland Fine Craft. I'm a designer/maker of bespoke, contemporary and traditional fine furniture, using predominantly hand tools from my purpose-built workshop on the beautiful Shetland Isles.

My interest in woodwork began at the early age of 5, practicing cutting joints in the garden on my father's workmate. This developed to a point where at 13 years old I bought myself a lathe and a planer/thicknesser with money earned from grass cutting and my father generously gave up part of his shed to accommodate my ever-growing collection of tools and timber. I taught myself to turn and sold the results of my labour locally. This was of course no great surprise to my family as in generations past there were 3 French Polishers, a wood turner, a cabinetmaker and organ maker and a wooden ladder maker- so obviously working with wood must have been in my blood.

Throughout my school career I had immersed myself in as many woodworking and design books as possible and was greatly influenced by the work of James Krenov and Alan Peters, as well as the designers and makers from the Arts and Crafts Movement. I knew what I now wanted to do and how to achieve it - university. It was here I worked long hours (6

am to 9pm) almost everyday for 3 years, pushing my skills and the course content to its limit.

Now, with over 35 years' experience in cabinet making, and a BA(hons) degree in Furniture Design and Craftsmanship from Brunel University, a commendation in cabinet making from the late Alan Peters OBE, and awards of distinctions in advanced cabinet making, chair making and traditional polishing, I produce fine furniture that has sold all over the UK and beyond.

As well as practical qualifications and awards, I have also won many business awards, including regional award winner for Shell Livewire and the Prince's Youth Business Trust, to name just two.

Staying true to my forefathers and the Arts and Crafts ethos, the only part of the construction process that uses machines is that of the gruelling, crude dimensioning of the timber- sawing and planing. After this process, 99% of the work is achieved by hand. This is because I believe that the over dependence on power tools removes the fingerprints of the craftsman left on a finished piece of furniture that only handwork can leave.

By employing hand skills, not only is sawdust replaced by shavings, but the noise from power tools is replaced by the gentle sound of hand planes and chisels resulting in a quieter calmer workshop, which reflects in the furniture made.

Each piece of furniture that emerges from the workshop has been handcrafted to the highest standards and refined to show off the true beauty of the wood, and is identified with a luxury embossed solid metal plaque, so the its provenance can be proved, identifying the maker in years to come.



- Sam Maloof inspired rocking chair made from American Black Walnut



- Reproduction Stanley Davis stationary cabinet, made from English Walnut



- Houndstooth dovetail details on the corner of my workbench made from American Black Walnut and Maple





- Houndstooth dovetail details on the corner of my workbench made from American Black Walnut and Maple

Furniture from my point of view should have visual movement and a presence of its own. I always strive to push the boundaries of my creativity, so as not to become stagnant in my furniture making and to keep my craftsmanship at its peak.

All the timber I use is carefully selected from trusted sources sometimes travelling great distances to sawmills, large and small, across Scotland and the rest of the UK, to find the right timber, or that little gem hiding in the back of a sawmill. Living and working on Shetland means additional logistical problems in sourcing good timber, than workshops on mainland Scotland. Careful attention is given to the variation in wood grain and colour to create harmony in a piece of furniture, sometimes seeking out highly figured unique pieces of wood to be used selectively to give the greatest impact. Quite often it is the piece of timber itself that dictates what furniture will be made out of it. This is achieved by selecting timber at source, sometimes purchasing in the round and milling it for particular projects years in advance. In this way I can use the right timber for the right project instead of having to use what is available at the time. The timber is either FSC accredited or from windblown



- Japanese sunrise dovetail, made from Scottish Cherry and American Black Walnut

or damaged trees from country estates enabling me to identify trees origin in many cases. I cut all my joints and dovetails etc. by hand, and this gives the joint a delicateness and finesse that cannot be matched by any machine and does not compromise strength in any way. Hand cut dovetails are used on all the drawers and these drawers are made with tight tolerances so that they effortlessly glide in and out of a carcass as if floating on air.

As well as making furniture I have been making Windsor chairs for over 25 years, and am the most northerly professional Windsor chair maker in the UK. I still use the same traditional hand skills and techniques that the original Windsor chair makers did over 300 years ago. Each chair seat is hand shaped, using travishers and spokeshaves, out of one piece of Scottish Elm. When heavily sculpted this reveals an inviting, rich, continuous grain pattern that is not achievable is the seat was made from jointed planks.

You can be rest assured that whether it's a new piece of furniture or a commission, that is traditional or contemporary, rustic or minimalist I have used the same time honoured methods and high quality materials and your new piece of furniture will have receive the highest care and attention to detail that will exceed your expectations.



Written by,  
*Alex Ward*

[www.shetlandfinecraft.co.uk](http://www.shetlandfinecraft.co.uk)

- Twin seater double bow Windsor chair, made from Scottish Elm and Ash



## SOUNDWOOD

The Soundwood yard is on land leased from Forest Enterprise (now Forest and Land Scotland - FLS) at Savary near Lochaline on the north shore of the Sound of Mull. I started the business in 2009, with the intention of dividing my time between sawmilling and consultancy work. I now spend about 50% of my time working on projects to support the rights and livelihoods of local communities and indigenous peoples living in tropical forests in Central Africa, South-east Asia and Latin America. This involves helping communities to get recognition for their rights and tenure over their land, particularly where there is the threat of land grabs by agribusiness companies wanting to clear forests for oil palm, rubber and other commodities, or from conservation groups seeking to create people-free wildlife protection areas.

At the outset, I hoped that my small-scale sawmilling business would contribute to bringing Morvern and Sunart's unmanaged woodlands (Atlantic oakwoods and mixed estate policy woodlands) into sustainable management to ensure their long-term survival. It's been partly successful but there's a long way to go to bring silviculture back to these abandoned woods.

After I got a lease for my yard and cleared it, I built a large shed in Douglas Fir for working the sawmill undercover (essential on the West Coast) and put up a ventilated polytunnel for drying firewood and slabwood in bulk bags and tattie crates. I bought a new Woodmizer LT20 and a second-hand telehandler and firewood processor, all supported by a 50% SRDP grant. I hire the Morvern Community Woodlands alpine tractor and log trailer for woodland operations. As there's no electricity at the yard, everything is diesel-powered. I also built a timber workshop at my smallholding where I can add value using a Logosol PH260 planer/moulder and a kiln box (home-made) with an Arrowsmith senior dehumidifier.

I produce mostly (75%) softwoods (often from commercial harvesting rather than local policy woods) - Douglas fir, European Larch and Scots pine - and about 25% hardwoods - mainly Oak, Ash, Beech, Sycamore, Elm and some Cherry - not the balance I had originally intended



but it's what the local market wants and is what I can get my hands on. My customers are mostly local - Mull, mainland Lochaber, the Small Isles, even Arran. They include builders, DIYers, self-builders, furniture makers and timber framers.

I buy logs from local woodland owners and managers as well as FLS, and get some logs from managing my own 12 acre of mature policy woodlands on the smallholding and doing occasional tree surgery contracts locally.

People mostly come to me to buy what they want as I've found that offering a delivery service is expensive and takes time away from processing and adding value. People can check my prices on my website and send an enquiry about stock before they come to the sawmill to buy timber. I don't advertise but word of mouth is pretty effective at getting yourself known on the West Coast if you have good products at reasonable prices.

I sell very little kiln-dried timber, largely because of the time and effort it takes to stack the kiln, although I do keep timber drying in a large shed that houses my biomass boiler. I think a solar kiln might be ideal for drying and storing dry timber. However, most of my customers are aware of how to deal with air-dry (but not kilned) timber in their projects.

- Raven Studio - Old Ardtornish





- Cutting curved timbers at Old Ardtornish

I also sell firewood but this year I've stopped delivering and people come to the yard to buy air-dried logs. I don't buy in logs specifically for firewood but sell sawn up slabwood, offcuts and timber harvested from my own woods, which is enough to keep my small pool of Morvern customers going.

ASHS has been a great help, especially at the start of the business, when I needed to learn about sawmilling, setting prices and other difficult questions. ASHS is unusual in the degree of trust and willingness to share knowledge among members and I very much appreciate the help and support from Maggie and Jim at Scottish Wood in particular.

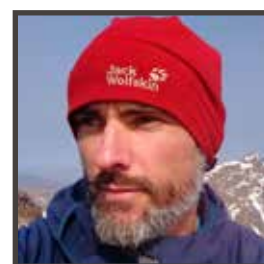
What's in line for the future? Well, my consultancy work is picking up as rural communities in the South face increasing challenges and there is increasing pressure on the private sector and conservation NGOs to implement safeguards and best practice (at least on paper!). So I do not foresee the business expanding in the near future though I don't rule out someone moving to the area (Morvern is a fantastic community!) who wants to take on what I started and work it full-time. The yard is large enough to develop more value-added activities such as offsite construction, hut building, etc. There is also potential to develop a larger firewood operation to feed a wider market, there is so much mature hardwood locally, it just needs someone with that interest and initiative. All in all, it has been a

fascinating learning adventure these past 10 years, I have enjoyed meeting great people and seeing all the projects that my timber contributes to.

To finish, possibly the most interesting project has been a forest-to-house experiment on Ardtornish Estate a few years ago that involved me felling and milling mature European Larch and Wych Elm at a beautiful site near Old Ardtornish Castle, to create the cladding, structure and flooring for a curved woodland house and art studio. This involved milling logs up to 9m long on the 6.1m Woodmizer bed and cutting a curved 7m beam with an Alaskan chainsaw mill that sits as the centrepiece of the building!



- Raven Studio - Old Ardtornish



Written by,  
*Jake Willis*  
[www.soundofmulltimber.co.uk](http://www.soundofmulltimber.co.uk)



## A "MONET" OAK-FRAMED BRIDGE

*I should have learned by now to be wary of decisions made the morning after a big night. So I should have known that a request by this particular client for a simple footbridge to enable his mushroom foraging would turn into a more ambitious undertaking.*

I had tested some theories on a couple of small arched bridges before, and so a proper 'Monet' bridge was decided upon over several coffees. We then relocated the venture to the other end of the garden where it could be fully appreciated, agreed to produce it from his own trees, and to recreate Monet's bridge at Giverny as nearly as possible.

Monet's bridge requires a particular curve to achieve its effect, so some miles were covered before we found two trees: one for the main carriage beams, and luckily a second with an identical curve for the handrails. We use windblown or standing dead oaks wherever possible, and as the main tree had a shattered top, it was considered fair game.

The felling of that vital tree was maybe the riskiest part of the process, as so much depended on it arriving on the ground in a useable state. Everything went to plan, although it revealed a large heart split that would require careful milling to bypass. By their nature, curved trees have overcome challenges to be as they are, so they often contain defects that may not be obvious until they are milled.

A flying trip to Paris in the midst of a train strike revealed that the current bridge in Monet's garden sits on a steel substructure, the first having collapsed, probably as it was made from beech I seem to recall.

As our bridge was to be based on traditional oak framing, it had to be designed from scratch, using just the original proportions and the handrail structure as guidelines. There are various ways a bridge can fail, and these had to be resolved with as little use of visible metalwork as practical.

The milling of the main tree was crucial, as despite being a metre in diameter at its base, the two beams required could only just be obtained from it, and no other tree like it existed on the estate. We used a 46 inch Sugihara bar with a standard ripping chain on a single Stihl MS-880, and an old Alaskan mill. This ran on a jointed ladder rail that we can adapt to any curve, requiring three sections in this case, with the initial rips being about 9 metres long. The process was too slow and therefore expensive to have lifting machinery on hand, so we used a lifting tripod and chain hoist to move the slabs around, which worked well.



As often happens, the tree decided the final dimensions of the bridge. A symmetrical curve that avoided the heart split and all sapwood gave us two beams of 12.5x25cm cross-section, 7.75metres long, and a deflection of 55 cm. The same curve was scribed onto the second tree, giving two continuous handrails plus the interrupted mid rails between the posts. The curves were followed freehand using a Stihl MS-261 in a vertical mini-mill, which coped admirably and gave perfectly square timbers. You certainly knew you had been working at the end of each day though.

All the straight timbers and boards were milled on a Woodmizer, entirely from home-grown windblown oak extracted from the client's estate in the west of Scotland, some of it only 30metres from the bridge's final resting place.

We quickly realised that a Japanese-style bridge required Japanese scribing techniques to achieve the required joints on a curved structure, and some lateral thinking to remain true to the design of the original bridge. All the joints were mortise

and tenoned, and pegged where appropriate. The entire bridge was fully constructed in the workshop, including the deck, and all peg and screw holes were predrilled. It was then dismantled down to deck level for installation.

We had stainless steel shoes made up for each beam foot that performed several functions; they had to transmit the mainly horizontal forces exerted by the bridge to the abutments, while keeping the oak off the ground and allowing any end grain to dry out. The plates also had to provide fixing points both for anchorage during flooding, and as part of the tension bracing system that prevented wracking during installation, and lateral deflection in use. The plates were bolted to the beams before installation, and the 30mm space between them and the vertical step of the abutments backfilled with resin once in position.

The abutments were installed by a local civil engineering company who specialise in the construction of hydroelectric and other water-based infrastructure across Scotland, often in rural locations. This required the pond to be dammed and pumped out until the work was above water level. They also installed the bridge, lowering the fully assembled substructure into place on a glorious day last February. The nature of oak framing makes it very quick to assemble on site if the timbers are small, so their 14 ton digger was still around later in the day to lower the final handrails into position, with incredible precision, given that each rail had to line up with its seven tenons.





One particularly pleasing aspect of the structure was the confirmation of my theory that braces were not needed along the long axis of this bridge. This is because the bases of the posts do not sit on a flat plane, so any sideways force rotates the posts around their own arc rather than along the line of the handrail as with linear structures. Therefore when the handrails lock the tops of the posts together, they cannot move as individuals, and the unit becomes absolutely solid.

*So for anyone asked by a client after a big night out to build them a small bridge in their garden, I would advise them to consider the thirty days milling and further eight months work (for two workers) to achieve that goal. But if, and only if they use just Scottish oak and stainless steel for their creation, it will be crossed over and lingered on for many years after we are gone.*



Written by,


James O'Keefe

+ Daisy Martinez

[www.flickr.com/photos/thinkingwood](http://www.flickr.com/photos/thinkingwood)

#### FOOTNOTE:

After a change of career I now design and produce traditionally framed structures for private clients, often using their own timber, which is mainly oak. We currently work loosely under the name thinkingwood as a small team of two, and bring in other trusted workers and trades as necessary, including mills.


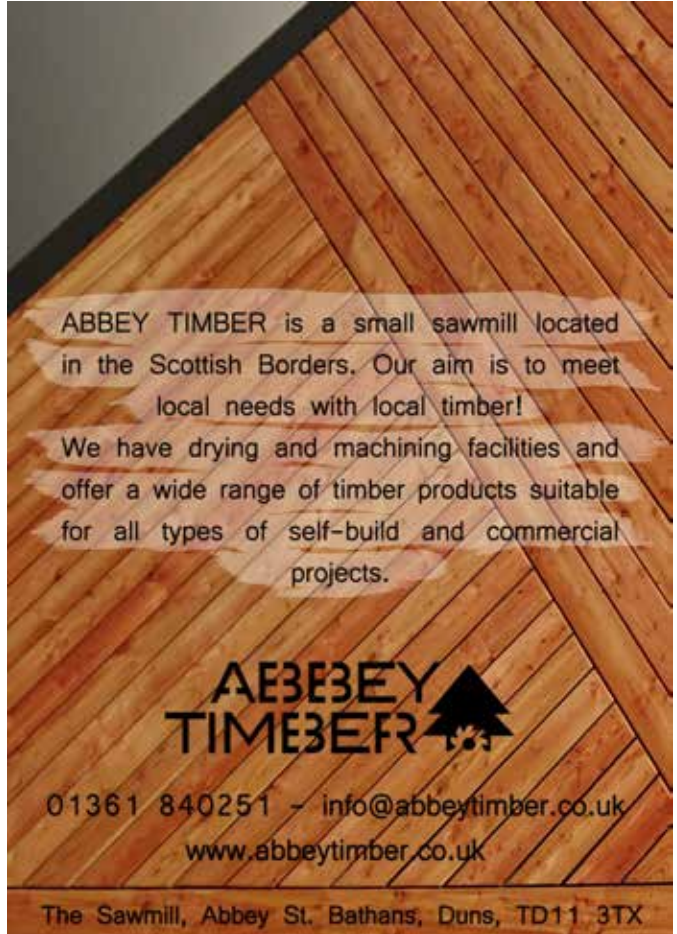


**TECHNICAL BOOKLETS FROM ASHS**

Up to date knowledge from experienced sawmillers


£2 - £4 per booklet incl P&P

Order through the ASHS website  
[www.ashs.co.uk](http://www.ashs.co.uk)

ABBEY TIMBER is a small sawmill located in the Scottish Borders. Our aim is to meet local needs with local timber!

We have drying and machining facilities and offer a wide range of timber products suitable for all types of self-build and commercial projects.

**ABBEY TIMBER** 

01361 840251 - [info@abbeytimber.co.uk](mailto:info@abbeytimber.co.uk)  
[www.abbeytimber.co.uk](http://www.abbeytimber.co.uk)

The Sawmill, Abbey St. Bathans, Duns, TD11 3TX

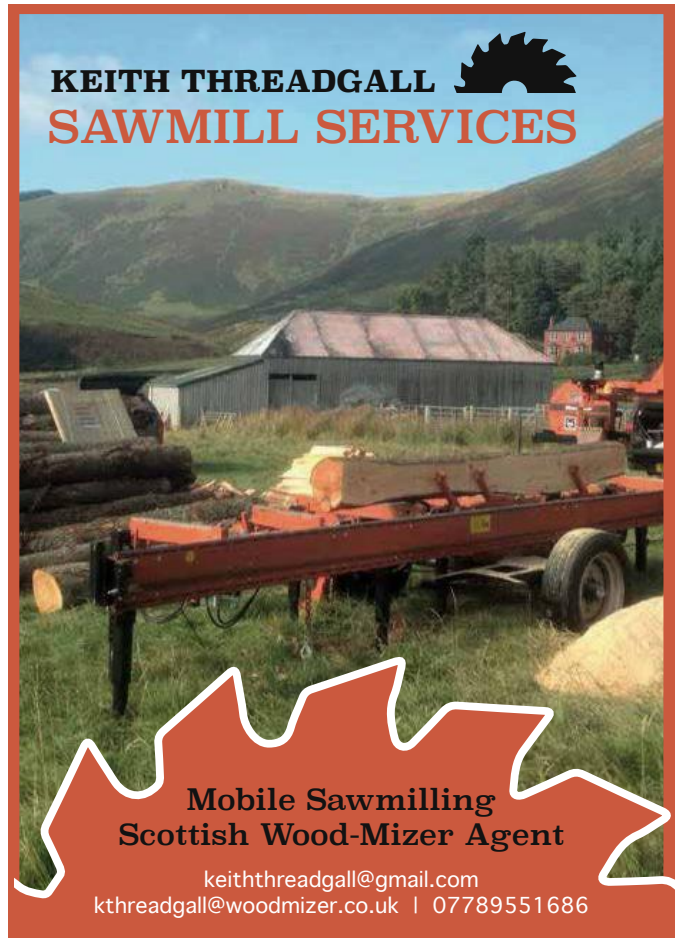



**Bithell**  
asset finance solutions

**FINANCE AVAILABLE ON NEW & USED MACHINERY. INDUSTRY SPECIALISTS.**

☎ 01387 259 678 ✉ [info@bafinancesolutions.com](mailto:info@bafinancesolutions.com)  
[www.bafinancesolutions.com](http://www.bafinancesolutions.com)

Bithell Asset Finance Solutions Ltd is authorised & regulated by the Financial Conduct Authority (FCA) under number 649139 for Consumer Credit purposes. You can check this on the Financial Services Register by visiting [www.fca.org.uk/register/](http://www.fca.org.uk/register/) or by contacting the FCA at 25 The North Colonnade, Canary Wharf, London, E14 5HS or telephone 0800 111 6768 (freephone)



**KEITH THREADGALL**   
**SAWMILL SERVICES**

**Mobile Sawmilling  
Scottish Wood-Mizer Agent**

[keiththreadgall@gmail.com](mailto:keiththreadgall@gmail.com)  
[kthreadgall@woodmizer.co.uk](mailto:kthreadgall@woodmizer.co.uk) | 07789551686

## STRUCTURAL TIMBER GRADING AND THE ASSESSMENT OF MECHANICAL PROPERTIES

*High time for greater inclusivity for artisan milling and craft-scale traditional and new-vernacular carpentry*

### Introduction

Recent articles in Full Circle & Reforesting Scotland magazines already cover much of the ground, and I do not propose to go into the history, the institutional and corporate politics of accreditation and certification schemes, role of the CE mark in stamped labels, or the corporate-for-profit provision of initial and refresher training.

Instead I want to focus on inadequate aspects of the current approach when it comes to artisanal and local structural use of sustainable timber. There is an inhibiting effect on the craft sector which otherwise could offer greater public benefits in CO<sub>2</sub> economy, conservation, ecology and biodiversity, affordable housing, quality of life, landscape beauty, community enablement, skill building, and rural employment. This in addition to reducing the waste and loss of added value when quality timber goes to firewood.

In FC7 William Dobie and Nick Marshall highlighted one area—a need for UK grown Douglas Fir to be calibrated to C16 & C24 and to the increasing demand seen by ASHS members, for graded timber of wider species variety. I can attest to this having used Western red cedar, Sycamore, Yew, Grand fir, Birch, Lawson cypress, Beech, Aspen, Black poplar, Elm, Rowan, Ash, Cedar of Lebanon, Western hemlock, Juniper and Sweet chestnut in structural applications. There has been movement with this, but the process of new 'assignment' and machine calibration for UK grown timbers is very slow.

Dan Ridley-Ellis explains much of the subject and gives an excellent review of the meanings of grading, characteristic properties, strength classes, the rapidly developing non-destructive acoustic technologies, and the pioneering role of Napier in developing the usefulness of and access to structural grading.

It is easy to get in a muddle by jumping between grading which is about giving statistical values to properties of volume/populations of timbers, and assessment which I am using to refer to individual pieces. Either might be visual, or by non-destructive machine. The first is most relevant to selling sawn wood on the open market, and the second more applicable to the end-user. However, regulatory development and technological advance are giving the prospect of a convergence between the two, and in the hybrid context of this article, the carpenter's role potentially extends back from end-use to standing timber. At each step of the way from tree to structural member the situation becomes more individual and specific to critical mechanical properties.

My purpose is to develop some these points from a low-cost craft building perspective and place them in the context of a spectrum of construction process, ranging in nature, from industrial to pure vernacular.

### *Grading in the dominant environment of industrialised milling and construction*

The present system is geared towards the convenience of large-scale production sawmills which supply the mass market with smaller dimension rectangular section lumber in lengths adjusted to market fluctuations, and for construction industry designers specifying to Eurocode 5. This involves numerous assumptions and simplifications regarding both the importance of certain mechanical and other properties over others, and of the end-users of volume product. The result is a probabilistic-based approach which grades population distributions of sawn lumber in relation to large reference populations of the same species before placing them into generic classes.

The allocation to standard strength classes is the end result of many steps, from engineering science and data set collection, the choice and description of properties and their prioritising into primary and secondary, relating the scatter of correlation between recognised (ie often outdated) measurement technologies, and the test results from individual samples from national populations. Not to mention, setting standards across a hierarchy of bodies and designing grades and classes. Lastly, but not least, at the mill we have batch selection, machine measuring, statistical analysis, and grading for low failure/high yield before pallets of stamped product go out on the road.

Each and every step, for both understandable and unfortunate reasons, involves erring towards conservativeness. In the industrial context each particular stick has low marginal value and does not justify much personal attention. At the end of which it still has to be assumed that the very worst/most defective section of all the timber supplied at a particular class might well be placed in a structure at the most critical location for a particular property- and, even then, for those properties passed with a 5th percentile methodology, that worst bit under consideration can be expected to be 'sub-standard' (ie lower than characteristic value for given property) on one in twenty occasions.

The industrial process from the forest to construction is a linear one, from one business area of responsibility/liability to the next, linked by transaction and the paper trails which carry on through schematic architectural design, detailed design and timber specification including grades, the structural engineering stage of tweaking dimensions and connections, procurement, project management and finally to construction and carpentry itself. At the end of the chain are the hands-on individuals actively building, the assumption being one of a low or at least unquantifiable skill level. The 'subjective' ability of contractors and employees to judge structural situations, timber quality, defects and take mitigating action with suspect or critical timbers tends to be prejudicially viewed from a professional standpoint as being irresponsible, unproductive, or at least unmanageable.





## Properties

Bending stiffness is generally grade limiting for UK Spruce and Larch and uses mean values of *Modulus of Elasticity (MOE)*. First determined by static testing under load and then conservatively correlated to dynamic measuring machines. Local stiffness along the timber's neutral axis, a more relevant property, is conservatively estimated from global stiffness which is more frequently measured. The difference in larger timbers being end-shear effects, and in smaller timbers being the type and position of defects. (The end beam retention/shear situation in jointed carpentry, another whole topic, has a large variability both with joinery type and in comparison with static test-beds.)

Bending strength, using 5th percentile, indicated by the grade C-number (generally limiting in UK Douglas) -*Modulus of Rupture (MOR)* is determined initially by destructive loading where generally it is the tension strength limit which is exceeded. However which edge is placed under tension, ie the orientation, is randomly allocated rather than selected as a carpenter should. In softwoods this is also relevant to reaction wood as well as knots and other defects. Then there is the relationship and division factors used for estimating effects of long-term applied loading from short duration behaviour.

*Density* at a reference MC of 12% also uses the lower percentile as its characteristic value. It is decreased by 0.5% for each % higher MC up to 18% above which one would describe the timber as green. Some individuals in the graded class will have high and unknown self-weight which could be critical but unpredicted. (eg in the case of a large span tiebeam). MOR is not adjusted for *MoistureContent*, while MOE is by 2% for every %MC, and for *compression parallel to grain*, a secondary property, values adjustment of 3% is used.

The values for three above primary properties are the EU basis for assigning grades of specific species to strength classes. Other jurisdictions use more of the secondary properties as primary, different VSG *knot area ratio* measurements, and other assumption details, data sets etc. These approximations and levels of conservativeness are not set in stone! Where local national populations are a small part of the range of the European data sets a further conservative, in effect 'under-grading' can occur.

*Cross-grain/Slope of Grain* in sawn timber (contrast to the different and complex relationship for spiral in *roundwood*) is a result of microfibril angles which are extremely high in the, so called, *juvenile* rings, decreasing over 40 years by which time the wood is considered mature. Well, from the perspective of short-rotation industrialised plantation forestry that may be a consistent view, but for species whose real maturity is a matter of many centuries, where spiral direction may reverse after around 40 years growth, and the timber used in larger dimensions, the situation is not well modelled.

## Economic timber use + sectional dimensioning

When craft builders build under the umbrella of the industrial sector and the ever increasing regulatory regimes they frequently feel forced to overdimension scantlings against their better judgement, to the detriment of structural or aesthetic proportions, and of using local or onsite timbers. This is due to the grading simplifications and assumptions already outlined

but is also cumulative with the input of structural engineers, only a small minority of whom understand the pegged joinery of traditional carpentry, the empirical evidence of traditional framing systems, or can apply more sophisticated (eg Finite Element methodologies rather than simple statics) modelling, at least at an affordable price. Most are more comfortable with cautionary over-specification, metal connections and costs which are often huge for low-cost projects. The grading link in the chain only serves to amplify rather than mitigate this tendency.

I have seen frustrated carpenters replacing traditional Scottish 6x6 purlins on close bay principals, with much larger sections, and 4.5m span DF purlins specified @ 360mmx240mm. A recent self-builder using closely set earth-tire footings reports being forced to construct glued box sills from graded 8x2s despite having large DF and a Woodmizer on site! Grading wasn't available, and in any case large ungraded dimensions (way outside the range and assumptions of industrial grading) should have been perfectly justified and appropriate to long term durable support of the thick wall. The use of large sections is also facilitated by the fact that knot defect effects generally become much less significant.

The *economic* use of the material is often quoted as one of the two primary purposes of assessing timber mechanical properties and if economic is used, in the narrow sense, to mean either profitable, or minimal in-building timber volume, then current grading regimes may be competent. However, this becomes increasingly questionable as one widens the consideration of costs and benefits to include waste, transport, energy, housing, forestry, let alone those of local and community resilience and sustainability. Although today's mainstream *stick-framed* construction turns out very timber-lite consumer products unlikely to last a century, it is an ironic fact that in the small scale/bespoke/traditional carpentry sector the multiple linear links in the certified professional chain frequently lead to overdimensioning. Each actor needing to cover potential liability by not accepting that any of the subsequent actors can use good judgement to rise above simplistically defined minimum levels of quality or skill or attention.

## COIGNAFEARN BRIDGE

In the spring of 2008 NorBuild Timber Fabrication & Fine Carpentry Ltd. was commissioned by Geoff Freedman, then a civil engineer with Forestry Commission Scotland, to manufacture two bridges made from Scottish Timber for the Coignafearn Estate near Tomatin, Inverness-shire. One was a 20m Landrover bridge constructed partly in steel with decking, posts, and rails made from Scottish grown European Larch. The other was a 16m long arch and deck bridge built to carry a large water pipe for a micro-hydro scheme, and made in Scottish grown Douglas Fir. In both bridges the timbers were laminated, glued and screwed. The pictures here are of the 16m long arch and deck bridge.

For any questions about the construction and installation side of this project, contact Sven Skatun at [sven.skatun@gmail.com](mailto:sven.skatun@gmail.com). For design and engineering of bridges made with Scottish timber, contact Geoff Freedman at [www.geofffreedman.co.uk](http://www.geofffreedman.co.uk)

Written by Betsy van der Lee





**Specialised tooling for woodworkers**

- Router cutters
- Spindle tooling
- CNC tooling/collets/toolholders
- Bandsaw blades, jigsaw blades
- Circular saw blades

**WEALDEN TOOL CO. LTD.**  
 2 Clinton Business Centre  
 Lodge Road, Staplehurst, Kent TN12 0QF  
[www.wealdentool.com](http://www.wealdentool.com)




# Reforesting Scotland



## Restoring the land and the people


We work for progress on sustainable forestry, land issues, rewilding, huts and hutting, foraging and much more.

Join us to be part of our work and receive our renowned magazine. You'll also be invited to our Annual Gathering: two days of talks and walks with a host of like-minded woodlanders.

Reforesting Scotland  
 39 Corstorphine Hill Avenue,  
 Edinburgh EH12 6LF, Scotland  
 +44 (0)131 334 1220  
[heartwood@reforestingscotland.org](mailto:heartwood@reforestingscotland.org)



[www.reforestingscotland.org](http://www.reforestingscotland.org)




### SUBSCRIPTION TO THE FULL CIRCLE

We are delighted to be able to offer a subscription to anyone interested in the many aspects of the Scottish Timber Industry.

A one year subscription will cost £15 and entitle you to two editions of the Journal delivered to your home or business. See our website for details of how to sign up.

[www.ashs.co.uk](http://www.ashs.co.uk)



**ASHS now has 4 levels of membership...**

### BECOME AN ASHS MEMBER

**Full Member;** Sawmills of all sizes.

**Associate Members;** Anyone working in the Scottish Timber Industry - Land Owners, Foresters, Tree Surgeons, Fencers, Furniture makers, Architects, Builders and anyone in between.

**Affiliated Group Members;** This covers existing groups like the Royal Forestry Society, The Argyll Woodland Group and other established groups.

**Retired Members;** Those who have been full members for at least one year, can remain with us at a reduced cost.



**ASHS**

For a list of reasons why you should join us visit the website [www.ashs.co.uk](http://www.ashs.co.uk) and **CLICK 'JOIN ASHS'**

# RF Brown CONTAINERS

R.F Brown LTD  
 Leckie Drive,  
 Allanshaw Industrial Estate,  
 Hamilton, ML3 9FN

*For all storage container enquires call us on*  
**01698 537747**



 Find us on facebook [www.rfbrown.co.uk](http://www.rfbrown.co.uk)

*...continuing from p32*

Further to the question of what is economical, and despite the above comments about the annoying tendency for inappropriate overdimensioning, there are a number of arguments as to why the goal of minimum timber volume is often inappropriate in construction and particularly that of craft building. Firstly, the modern perspective on the carbon benefits of wood being sequestered into the heavy timber structure of long-lived buildings, along with other factors such as thermal mass and breathability, are part of the rationale of massif holz, cross-laminated walls, and incidentally, of horizontal logwork. Secondly, these structural frames and log shells, both traditional as well as those more creative and common in today's small scale bespoke projects, may well carry huge structural redundancy. Good reasons for this being, minimising conversion, utilising locally available timber, aesthetic values, and long-term durability. Of course, carpentry without metal connections has an imperative of providing sufficient heartwood bearing surface areas, relish along the grain, and shear stress gradient profiles for joinery detail - such as mortice and tenon thicknesses and shoulders, haunches, lapps, peg locations, scarf assemblies, jowl posts etc - and the lower the grade/quality or the less 'optimal' the species, the larger the sectional dimension needed to provide this.

### Traditional understanding of other timber characteristics Shape, moisture content etc

Dimensions are but one aspect of the craft carpenter's material which are outwith the mainstream. Timbers may be roundwood, flitched roundwood with wane, boxhearted with wane, halved or quartered log, cleft, hewn, sawn and hewn, have unusual non-straight form either in the round or converted along the grain. As well as being larger scantling, timbers are milled to all sorts of sectional shapes and rectangle proportions- beyond what is usual for grading to standard classes which typically assume edgewise orientations of two-by proportions ranging from nominal 1½x3 inch to nominal 4x8+ inch. ie the range which might be found in a stick-framed house. These commonly include nearer-to-square rectangular, thick/wide structural boards, half-logs with pith removed, or simply backed sections for plates, purlins, hip-rafters etc. Many varied but less common forms such as Japanese hewn octagonal section ties, or Russian trapezoidal ridge beams might also be found.

Heavy Timber Framing carpentry is normally undertaken with green, or largely green, timber and raised/erected with moisture content levels somewhere ranging down to an uncovered outdoor equilibrium level. Shrinkage of shoulders is compensated for by draw-pegging. If serious drying defects become apparent a timber replacement is occasionally necessary. In Log carpentry, almost invariably with green timber, most of the significant shrinkage (as opposed to settlement) occurs after roofing and occupation, and timber replacement is very problematic, great care is taken not, for example, to use spiral grain in inappropriate positions. The values and range of values, of radial and tangential shrinkage to be expected from particular species from a particular locality are very much part of the vernacular traditions where they exist and are incorporated into mechanisms of transmission such as rules of thumb.

This is a specific example of the deep understandings of relevant timber properties which are present in all vernacular building traditions, and which are sometimes still alive and accessible to the craft carpentry sector today. The new-vernacular craftsmen also have more modern resources to compensate for tradition loss, and to apply to eclectic building across tradition boundaries. Many of these consist of informal trade resources such as the International Log-Builders Association standards and span tables, of academic and engineering analysis of historic framing such as available through the UK Carpenters Fellowship and the Timber Framers Guild of North America, of historical reconstruction, experimental archeology, and physical testing eg of scarf joints and pegged joints in tension.(Uni of Bath)

### The pure vernacular process, the new-vernacular craft-build sector and associated sawmilling

In its purest traditional form the informal vernacular process is characterised by a circular, iterative, feedbacks of increasing information and choice-making between the stages of design, timber selection and re-selection, cutting lists, timber allocation and carpentry. Variable factors of budget, client circumstances, weather, transport and handling options, skill and labour availability all evolve and inform the physical result throughout the process in a way which is far too complex, nuanced and flexible to be either practicable, or low-cost, at anything other than the personal and small scale.



The vernacular way of building is expressed locally within the context of a cultural pattern language which is the subtle framework built up from all the pertinent relationships between community building requirements, climate and environment, the availability and characteristics of timber and other resources, skill traditions etc. This framework does not require architects, engineers or planners, indeed was normally applied by illiterate and part-time craftsmen/farmers. The physical results have appropriate and often very high durability, are well designed, adaptable, and beautiful buildings. Each structure is a unique individual within a type, and its quality is a result of vernacular process not of mimicking a certain vernacular building style.

While informal carpentry, mostly rural, was always conducted at this pure end of the spectrum, the more formal traditions of timber frame carpentry had sophisticated guild structures for skill education, knowledge preservation, and guidance in making judgements on design, technique and material selection.



therefore looking to sort and grade to best yield without cross-cutting to shorter lengths. Grade stamp marks on timber would be necessary for this general market, as would the possibility of regrading sub-lengths without reconversion.

**2)** Or they may be cutting to a list which includes a contingency in the numbers, where categories of scantlings are required at certain grades corresponding to their allocation to structural locations.

**3)** Or they may be part and parcel of the construction project, whereby design and carpentry will be informed and adapted at various stages.

**4)** Other individuals may be performing roles in between those of milling and construction such as hand peeling roundwood or cleft conversion, handsawing, or hewing, and thus also intimately involved in a vernacular process.

**5)** The carpenter might place a lower quality individual timber from the group into a less critical location eg a rafter internally adjacent to a load bearing gable, or one of the tie beams which carries no additional loads.

**6)** Framing timbers will invariably have extra length on the cutting list than strictly required. One of the reasons for this is the flexibility it gives to the carpenter in being able to longitudinally shift the monument marking of the cuts and joinery positions so as, among other considerations, to optimise strength and reduce strength loss from defects. These may be removed altogether eg by arranging them into a mortice or to be cut away in a lap, or minimised in their effect by ensuring that they are placed in the neutral axis or other low stress zone of the timber. Such 'class increase' or mitigating actions can only be contemplated when the individual timber has been selected for a specific location. A simpler example would be a grade failure in the common rafter scantling batch which when cut to jack rafter length loses its defect.

**7)** Any ASHS member who has seen old-school log grader and living treasure, Gavin Munro armed only with girth tape and decades of experience assess an individual log, will appreciate how much information and estimation of risk and uncertainty can be reliably made even before bark removal or opening up the piece. Log and Timber Framers



The new-vernacular process, similarly, lies variably somewhere towards the informal vernacular. Thus it may involve specifying timber early in design and ordering it regionally (eg large girth/long logs for modern style log-building) or even further afield (eg European oak) but in subsequent process and its craft base it may be relatively pure vernacular. This trade sector usually involves full time self-employed craftsmen whereas self-build and community build teams are more likely to operate closer still to the pure end of the spectrum by using onsite or local timber and with fuller interaction between design, timber selection, conversion and building where it is all about iterative feedbacks in decision making to integrate the goals and budget of the client, the availability of various local natural resources, the schematic design, the detailed design, the access/ transport options with the carpentry. It is more likely to grow organically and be responsive to circumstances and uncertainties unfolding than to be fixed into Gant charts and critical paths at an early project management stage. Despite these process differences within the craft sector, all stand out by their ability to deliver a wide range of local benefits.

### The on-site or yard process of the craft sector

**1)** The smaller-scale, often mobile, artisan sawmiller operating locally both to source logs, and to supply end-users. They may be cutting for sale without a client cutting list, and

have always selected by eye, both standing and then with more information, from the pile, with a mind on the critical characteristics of the job in hand. That relevant property might be bending strength, shear strength, parallel or perpendicular compression, tension, stiffness, likely drying distortions, straightness and form, knots, size, size range, proportion of sapwood, or cambial texture.

8) Unsupported elements such as tie beams, roof members, rough opening lintels may be more critical in strength terms but especially in modern north American-style roundwood construction are generally dimensioned (for aesthetic style) with huge redundancy. Old-world logwork, like vernacular timber framing tended to use more carefully chosen dimensions with less redundancy, although still considerable in comparison to modern engineered timberwork. The informal carpenters operated with collective and sophisticated traditional knowledge, rules of thumb on timber dimensions and local characteristics within their pattern language framework while the formal carpenters had their experience and education within the guild structures.

Still, when in doubt about a particular timber member, corrective action could be taken, illustrating that ongoing design change during construction was often a feature of the process. A spanning element might be replaced during the lofting layup, doubled, bolstered or have extra bracing added without great palaver. It is also quite helpful that traditional frames and frame/log hybrids generally fail progressively enabling repair or alteration as necessary through the passage of time.



Similarly, though less obvious in the finished frame, might be a situation where the stock felled for long wallplates or purlins was found to have butt-rot necessitating the use of shorter lengths and a design change with extra scarf locations. Many traditional buildings, frame and log, were cut and raised on a minimum of rock founds, the remaining foundation stonework being infilled after raising- so we will never know how often even the building plan may have been adapted during the construction process, nor how bay widths and wallplate heights may have been adjusted during the build.

The total number of timbers are normally manageable and although some elements such as braces are more likely to have been stored, green extras can often be procured at relatively short notice. The variety of tree resource used can be considerable. Larger

sections, natural branch forms, variety of sectional shape, variety of surfaces and conversion textures, variety of sapwood and wane inclusion. There is nothing which can be ruled out as never making sense for structural use!

### Obscure, but existing, opportunities under current grading regimes

Mechanisms, such as those below, already exist and are potentially very useful in application, but I am unaware of anyone in the craft sector having made the investment of applying them as yet? Developing these by providing advice and resource packages covering methodologies and technologies of visual, and small-scale machine-assisted assessment would be extremely encouraging and useful.

- New general strength classes can be defined for use in the context of craft new-vernacular as they have always been for the industrial sector.
- Bespoke or tailored, user-defined classes (grounded in data analysis) can be employed.
- Standard classes can be used with additional declaration of secondary properties.

Declaration of Performance paperwork can be used to directly declare individual and/or secondary properties of individual or batches of timber where these are more relevant and critical to the application, and result in either more 'efficient' dimensioning, or crucially allow the use of a local resource which would otherwise fail, or fall into a lower C/D class, based on properties which are not critical in the actual structure. Clearly, the closer this occurs to the finished timber stage, the more refined the process.

- Proof testing such as ISO15206:2010 for poles cantilevered and in compression exists for certain applications. Engineering assessment of old timber bridges increasingly uses measurements of elastic and residual deflections under load to reach a 'shakedown limit'
- In-situ grading is sometimes used for historic timber fabric in restoration



- and structural stabilisation projects
- The EU allows additional standards to be used nationally ( eg UK BS, Polish PN, and German Din) if they don't conflict with 14081.
  - Where resawing or resurfacing removes more than 3mm from 4" timber or 5mm from larger section it is considered to be reprocessing and needs regrading. This can be an opportunity rather than a burden.

### Grading/assessing systems for greater inclusivity and practical efficiency

Academic research could be speedier and better funded, not only for species variety (even including lodgepole pine!), but also for timber properties of larger roundlog, cleft and hewn timbers and a wider range of sectional shapes, in order to establish correlation datasets with affordable and practical measurement and assessment parameters- both visual (defect methodologies and spatial ring density) and from the newer generation of acoustic machines. (Balharry,R)

### Conclusion

Dan Ridley-Ellis of Napier's statement that "There is a strong case for developing, new, very relaxed and easy to apply visual grading rules with high yield in order to allow small producers to use timber from a wide range of species for simple buildings..." is very encouraging.

Given good sense sense, the future will see improved forestry, woodland and silvicultural management as well as a much greater total area under trees. This will result in more scope for bio-diverse multi-use managed forest ecosystems containing varied timber resources well suited to the craft building new-vernacular sector.

Leaving the EU creates an opportunity for reform of grading, classes and standards, but in any case more can be learnt from, and by liaison with those European countries which support and encourage their small forestry, artisan sawmills, and sustainable craft traditions with greater understanding than we are used to. The London Grading committee and the BSI might look at ways to make grading for

this sector less unfit, more affordable and more useful given its very different modus-operandi. This could include direct representation from the sector as well as structural extension to the system itself.

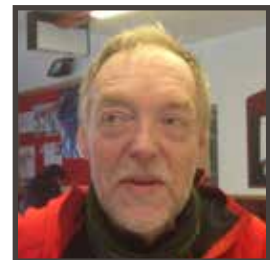
There is a need for reform to the certification system (without for-profit high prices and unnecessary renewal subscriptions!) to expand the numbers grading and assessing properties at and near end-use. To increase inclusivity it is likely that two role types need to be acknowledged.

- Firstly, that of the sawmillier, the conversion-builder and the travelling grader who is bought in to help specific projects. She is characterised by confidence and experience of visually assessing timber properties, can understand and apply scientific methodology, and can make a paper/photo records of the assessment process. Such judgement justifications for choosing which properties are relevant and then assessing for them would be recorded in the context of the particular stage from tree to finished building at which the assessment or reassessment is being made.
- Secondly, the carpenter at end-use who is able to apply experience, common sense, tradition, and visual assessment in combination with record keeping of decisions and the selection of timber from the batch for particular elements. We need to be able to demonstrate the validity of that which we already appreciate, and when we are uncertain or the situation is judged particularly critical, we need help selecting and in defining dimensions during the conversion stages.

Other modern paperwork exercises such as risk assessment, near-miss reporting, and safety kit inspection, when at their best, can reflect the real rather than the corporate reality world and can focus the minds of those at the sharp end while respecting their experience and skills.

Record keeping might help to bridge the cultural divide between informal and formal assessment. Technological advance will no doubt help bring the two much closer. In this happy future, grading might be structured as a progressive sequence from standing tree to in-situ structural member, taking full advantage of the two increasing certainties. One being the step by step increase of information about firstly the probability and finally the actuality of the individual timber's properties. The other being the increasing certainty of its specific structural use/location and therefore its critical properties and their minimum values. Each stage of assessment refines the scope for judgement about the piece's suitability, conversion, and carpentry options. It also informs such choices as to whether to achieve desired values with higher class smaller section, or with lower class larger section, and what level of redundancy is appropriate - a consideration which is wider than applying an accepted safety factor.

An extension of the current situation in which grading and structural codes often seem to add unnecessary cost and difficulty without contributing anything useful, to one in which artisan milling and craft carpentry are supported and facilitated, would demonstrate a commitment to encourage a sector which being both locally based, and widespread, can deliver great public interest benefits at good value. It would also show superb vision.



Written by,  
**Cormac Seekings**  
cormacseekings@gmail.com

### REFERENCES

- Alexander,C (1979) The timeless way of building. OUP
- Bacher,M, Krzosek,S (2014) Bending and Tension Strength Classes in European Standards Annals of Warsaw University of Life Sciences - SGGW, Forestry and Wood Technology 88, 2014: 14-22
- Balharry,R (2017) Predictive Capacity of Visual Parameters to Improve Estimates of MOE and MOR Round Tapered SS. Unpublished thesis Heriot Watt Univ.
- Gil-Moreno,D, Ridley-Ellis,D., Mclean, P. (2016) Using the right modulus of elasticity to get the best grades out of softwood timber species in GB. 2016 World Conference on Timber Engineering
- Ridley-Ellis,D, Adams, S. & Lehneke, S. (2016) Thinking beyond the usual strength grades-with examples of British spruce and larch. Centre for Wood Science & Technology. Edinburgh Napier University (UK)



Scottish Forestry / Coilltearachd na h-Alba

***ASHS Journal - 'The Full Circle' is printed twice a year and is supported by Scottish Forestry***

Disclaimer: While all the information in this document is accurate to the best of our knowledge, neither ASHS nor contributors can be held liable for any errors or damages resulting from use of this information.

© ASHS & Contributors