



Timber Cladding for Wales An Introduction

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How to increase timber cladding

- Understanding material
 - Timber selection
 - Timber Quality
 - Performance
 - Stability
- Marketing
 - Environmental benefits
 - Pricing



Typical species used in Wales

- Majority of work:
 - Sitka spruce
 - Norway spruce
 - Douglas Fir
 - Larch
 - Oak



Possible Welsh species

Softwood species	Area (10 ³ ha)	Hardwood species	Area (10 ³ ha)
Scots pine	5	Oak	43
Corsican pine	3	Beech	9
Lodgepole pine	6	Sycamore	7
Sitka spruce	84	Ash	19
Norway spruce	11	Birch	13
European larch	1	Poplar	1
Japanese / hybrid larch	22	Sweet chestnut	1
Douglas fir	11	Elm	0
Other conifer	6	Other broadleaves	18
Mixed conifer	0	Mixed broadleaves	8
Total softwood coverage	149	Total hardwood coverage	118

Recent UK cladding market (2004)

Material	Surface coverage (m²)	TVE (m³) 14mm thickness	TVE (m³) 19mm thickness
Wood	202,000	2,830	3,840
Composite	4,844,000	67,800	92,000
High Pressure Laminate	259,000	3,630	4,920
Precast Concrete	285,000	3,990	5,420
Fibre Cement	225,000	3,150	4,270
uPVC (Plastic)	293,000	4,100	5,570

Issues for successful product

- Is the material suitable?
- How does it look?
- How will it look?
- Will it need repair?
- How can we dispose of it?
- What is the cost?

Suitability

- Want a product that will last
- Number of issues that need to be considered
 - Selection and preparation of material
 - Timber movement
 - Durability
 - Treatment
 - Profiles

Timber movement

- Variation in size due to water uptake

Timber species (English)	Timber species (Latin)	Tangential movement (%)	Radial movement (%)
Western red cedar	<i>Thuja plicata</i>	0.9	0.45
Western red cedar (UK grown)	<i>Thuja plicata</i>	1.9	0.8
Douglas fir (UK grown)	<i>Pseudotsuga menziesii</i>	1.5	1.2
European larch	<i>Larix decidua</i>	1.7	0.8
Scots Pine	<i>Pinus sylvestris</i>	2.1	0.9
Sitka spruce (UK grown)	<i>Picea sitchensis</i>	1.3	0.9

Implications

- Thinner boards – greater movement
- Room for expansion
 - Buckling / lifting
- Single fixing v double fixing

Durability

Durability class Hazard class	1 Very durable	2 durable	3 moderately durable	4 slightly durable	5 not durable
1 Above ground and covered (dry)					
2 Above ground covered (risk of wetting)					
3 Above ground, not covered (periods of wetting)					
4 In contact with ground or fresh water					
5 In salt water					

Inc. need for treatment

Durability of cladding softwoods

Timber species (English)	Timber species (Latin)	Natural durability
Western red cedar	<i>Thuja plicata</i>	2
Western red cedar (UK grown)	<i>Thuja plicata</i>	3
Douglas fir (UK grown)	<i>Pseudotsuga menziesii</i>	3-4
European larch	<i>Larix decidua</i>	3-4
Scots Pine	<i>Pinus sylvestris</i>	3-4
Sitka spruce (UK grown)	<i>Picea sitchensis</i>	4-5

However....

- Assume UK grown softwoods to be at lower end of durability scale
- ALL sapwood is non-durable
 - No matter the species
 - If present, must be treated

Durability of cladding

- Hazard class 3
- Expect durability class 1-3 to be suited for service life of 15-60 years
 - Correct maintenance
- Need to protect less durable timber species
 - Wood preservation
 - Wood modification

Use of preservatives

- Cladding regarded as external joinery
 - Hazard Class 3
- Repair considerations for cladding regarded as moderately difficult or expensive
 - Category C under remedial treatment categorisation

Durability class (heartwood)	Service life prediction (years)
4	15
3	30
2	60

Treatability of softwoods

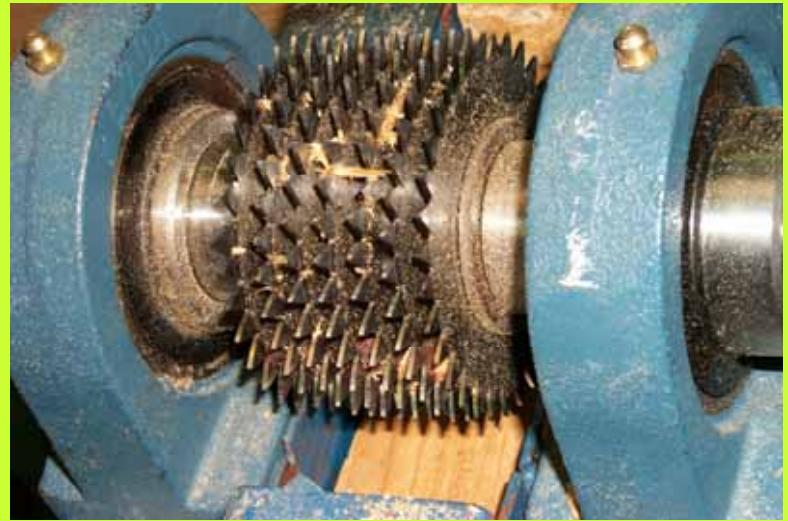
Timber species (English)	Timber species (Latin)	Heartwood treatability	Sapwood treatability
Western red cedar	<i>Thuja plicata</i>	3-4	3
Western red cedar (UK grown)	<i>Thuja plicata</i>	3-4	3
Douglas fir (UK grown)	<i>Pseudotsuga menziesii</i>	4	2-3
European larch	<i>Larix decidua</i>	4	2
Scots Pine	<i>Pinus sylvestris</i>	3-4	1
Sitka spruce (UK grown)	<i>Picea sitchensis</i>	3	2-3

Treatments

- Traditional preservatives no longer permitted
- Need new systems
 - Next generation preservatives
 - Incising
 - Chemical modification
 - Thermal modification

Incising

- Method of increasing uptake of preservatives
- Punctures holes into wood
- Rear side of cladding
- Good results
 - Sitka spruce
 - Douglas fir
 - Larch



Modification methods

- Thermal treatment

- France
- Finland
- Germany
- Netherlands
- Wales



- Chemical treatment

- Netherlands
- Sweden
- Norway



Thermal modification

- Already commercialised
- Growing acceptance with architects and specifiers



The Princess Royal Sports Arena, Boston, Lincs

- **Built:** Spring 2004
- **Raw material:** Thermo-D Pine
- **Product:** 20 x 117 UTK planed profile
- **Fixings:** Stainless steel nails
- **Fixing method:** Nails applied by air gun
- **Surface coating:** Yes
- **Base coat:** Akzo Nobel Sikken's Cetol Novatech Light Oak. Applied by brush prior to fixing.
- **Final coat:** Akzo Nobel Sikken's Cetol Novatech Light Oak. Applied by brush after fixing



Acetylation

- Recently commercilised
- Marketed under brand name Accoya
- Sold in UK through BSW
- 40 years laboratory studies



Coatings

- Range of possible coatings
 - Organic based (reducing in use)
 - Aqueous based paints (more common)
 - Powder coatings
 - Wax / Oil coatings
- Trend towards factory finished
- Multiple coat (primer + 2)
- Base coat factory applied
- Routine maintenance
 - Follow recommendations



COST Climate index

- Pan-European evaluation of behaviour
 - Effect of local climate
- Scots pine
 - L-joint
 - Lap joint
- Annual decay assessment
- Link to local weather



Whole life costing (WLC)

“The systematic consideration of all relevant costs and revenues associated with the acquisition of an asset”

- WLC provides means of financial assessment
 - Initial costs
 - Continuous operational costs
 - End of life costs
- Need to make several assumptions
 - Regularity of maintenance
 - Develop a ‘standard wall’

Provisional findings WLC

Material	Estimated cost without windows (24 m²)	Estimated cost with windows (21.84m²)
Spruce	£1300	£1350
Western red cedar (Canadian)	£1270	£1350
Western red cedar (home grown)	£740	£810
Larch	£740	£810
PVC-u	£1430	£1570

End of life

- **Ease of disposal – costs**
 - Preservatives – chemical waste
 - Plastics – Long term pollutants for landfill
 - Modified wood – no disposal issues
- **Want product with high recycling potential**
 - Use in other products
 - Composting

SWOT analysis – strengths

- Home grown material
 - Excellent environmental profile, low energy material, CO₂ neutral, FSC
 - Resource is close to market place
 - Potentially large resource
- Good paint performance, stable product
- Economies of scale
- Proven throughout Europe

SWOT analysis – weaknesses

- Durability – difficult to treat/ impregnate with chemicals/ preservatives
- Faster growth rate than imported softwoods, lower density, lower hardness, reduced screw holding potential
- Maintenance a perceived problem compared to uPVC
- UK Architect and Designer preference for Western Red Cedar
- Industry preference for slow grown timber

SWOT analysis – opportunities


- Large market previously untapped
- Set-up partnerships with cladding companies
- Moderate to High value adding potential
- Market a Welsh product
- Market environmental advantages of home grown, sustainably produced wood
- Market that defects have been removed, not that glue lines have been added
- Sorting by growth rate and defect removal – market that this is “select grade material”

SWOT analysis – threats

- Market resistance to use of timber for cladding (competition with uPVC)
- Quality must be right, any rejects would severely damage future markets
- Any set-up costs for Welsh / UK sawmills
- Price must be right to access the market
- Limited existing market or partnerships

Getting information

- Possible to get good information
 - BRE
 - TRADA
 - CTE
 - Coed Cymru



bre
digest

Using UK-grown Sitka spruce for external cladding

Digest 500

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UK-grown Sitka spruce is a fast-grown softwood. Its use in the UK has been relatively low, although recently this has changed with increasing interest from architects and designers. Cladding offers an aesthetically pleasing way of enhancing the outside features of a building.

This Digest reviews work within projects funded by the Northern Periphery Programme and the Forestry Commission. The project has considered and combined information about the properties and treatment for Sitka spruce, so that selection of a suitable material for the required service life of cladding may be possible. The end product will potentially have a service life beyond that which is currently achieved.

Introduction

Timber cladding has long been recognised as a means of finishing the external of a construction, especially in alpine countries and in Scandinavia. To make the cladding last for considerable lengths of time, a thorough understanding of materials, their sourcing, available treatments (whether they are pre-construction or post-construction) and design need to be considered.

Two options exist for the use of UK-grown Sitka spruce for external cladding:

- coated material, with regular maintenance of the coating
- uncoated material, where some applied treatment or modification could increase the service life of the product.

Requirements for timber cladding

Timber selection for cladding is a subject that has received considerable attention in recent years with an increase in demand for suitable material.^(1,2,3,4) Table 1 outlines the properties that are important for cladding.

Each of these properties listed in Table 1 plays a significant role in the application of Sitka spruce for cladding.

Table 1 Cladding properties

Timber property	Property specific to Sitka spruce
Movement	Moderate
Strength properties	Equivalent to other cladding timbers
Natural durability	Slightly durable (class 4 according to BS EN 350-2) ⁽⁵⁾
Application of coatings	Lower uptake compared to other cladding timbers, fibrous surface of wood
Quality aspects (BS 1186-3) ⁽⁶⁾	Class 3, easily worked, recommended preservative treatment before use

Conclusions on cladding

- Cladding seen as low value market
 - Need to reassess
 - Better material, better product, higher price
- Selection of right quality timber with correct treatment
 - Aim to compete against imported WRC and alternative materials
- Architects want to use timber
 - Give them what they want