We saw the rocks, we saw the stones,
For pine it's only use.
"It's better than it looks" he said,
I think we'll try some spruce.

Delegates to this year's Institute Conference in the Lake District will have noticed in the forest and, more so, in the BSW mill at Carlisle, the dominance of spruce in UK timber production. But why spruce? Doesn't pine have a better timber, Douglas fir larger timber and larch stronger and more durable timber? Yet today some 60% of our coniferous woodland is spruce.

But it is for its use that spruce is particularly favoured. Mostly we think of it as sawn timber but up to and sometimes more than half the wood in a stem is used for pulp or particles. For these purposes the 'white' wood of spruce is much preferred to the 'red' wood of pine, larch and Douglas fir, timbers which are harder to process and require more bleaching if used for pulp. As sawn wood spruce provides acceptable yields of carcassing and structural timber to C16 grade, boards suitable for pallets and packaging and it is only for purposes where stem form, from genetic selection and by crop management, could do much to improve timber quality, though pruning is unlikely to be worthwhile for carcassing timber as knots are mostly small (compared with those in pines and Douglas fir) and are not the major factor determining structural performance. Thinning, where possible and provided that it is done selectively and not by the removal of whole lines, could much improve final stand form and stem quality, and age at felling warrants attention, as older growth timber has a finer texture and is stronger than that from nearer the middle of a log.

Examples of strength grading marks on British-grown spruce from 2 UK companies

It is mainly Sitka spruce, a tree first introduced to Britain in 1831 but not grown extensively in plantations until after the Forestry Commission was established in 1919. A maritime tree in its natural habitat of western Canada and Alaska, it is well adapted for growth in much of western and northern Britain, where it transplants and establishes readily from the nursery and grows rapidly. On most sites it has a higher yield than pine and larch and is much more tolerant of site conditions and especially exposure than is Douglas fir.

durability is sought and it must be treated with preservative that it is at a disadvantage compared with the more durable or more permeable pines, larches and Douglas fir.

British-grown Sitka timber, mostly cut from 35-45 year old trees should not be compared with that from Canadian trees, sometimes hundreds of years old. Nevertheless it is firmly established on the British market, though an improvement in its quality would aid its wider acceptance and increase in market share. Better

44 year old plantation Sitka spruce in Devon

It is doubtful whether British-grown spruce can compete with imported wood and MDF for interior joinery but if, by a combination of means, quality improvements were such that it gave consistently high yields of C16 timber and marketable yields of C24, this would do much to enable British timber to compete better with Baltic and Canadian spruce for a wider range of structural uses. Spruce is, today, the most valuable resource in British forests; tomorrow it could be even more so!

Beneath the birch a grassy slope
We'd thought we'd introduce
Some Douglas fir to make a change
He said 'What's wrong with spruce?'?

Dr John Brazier FWSc

*Two, from eight, verses, written by a Head Forester to his District Officer in 1965 on the then-current planting policy.
USA TIMBER-BRIDGE CONSTRUCTION

Timber-bridge initiative
In the USA, the use of wood materials in bridge construction is extensive. Perhaps 90 percent of all bridges, new or existing, have a wooden component. The economic and environmental benefits of using wood bridges are significant. Wood bridges are lightweight, sustainable, and cost-effective.

Advantages of timber bridges
- Properly designed timber bridges provide many technological advantages. Compared to concrete and steel, the energy of production of wood products is considerably less for timber. The advantages of lightweight, ease of handling, lower skilled labour for fabrication and assembly, renewability of the tree resource and natural appearance also are evident. High strength-to-weight ratio and impact energy-absorbing properties are two important performance characteristics of timber.
- Service lives of 50 years or more can be expected when treated timber is used, and field cutting or boring is prevented. Protection of connection details from moisture also greatly enhances longevity. Timber has a favourable durability against chemical de-icing agents versus concrete and steel. Traditional concerns about wood were the longevity in exposed environments, fire resistance, susceptibility to decay and an image as the low technology material. Decay and longevity are primarily aspects of poorly conceived connection details, which entrap moisture.
- Concealing metal parts between paired members greatly deters such problems, and reduces fire-spread concerns and improves fire ratings. Large timbers do not support combustion, and charred members can be refurbished. Fire ignition and spread in timber structures essentially is related to the contents of the structure and heat transfer through metal construction and ducts.
- Mixed concrete-wood composite construction is feasible and affords additional protection against exposure to moisture, fire and sound vibration. Correctly designed and detailed wood construction has been approved in parking garages, too.
- New concepts allow high-strength connection details to be made using only ring-shank nails, small screws and lag bolts with thin plates, even sheet metal. Compatibility of wood to the use of fibreglass connection details, in lieu of corrosion-sensitive steel details, offers promise, too.

Timber-bridge technologies
- High technology and innovation of the 1990s, the only modern timber-bridge system being fostered was the glulam (glue-laminated) stringer bridge. However, its high cost kept it noncompetitive with other materials. So, no dramatic market development, even when industry developed a patentable version featuring prefabricated components ready for assembly.
- The structural analysis of timber structures is highly advanced. Systems analysis, involving the complexities of wood, is possible for structures. Factors such as slip behaviour of connections, inclusion of partial composite action, statistical simulations and probabilistic analysis also are possible.

Anisotropic grid construction
- Presently in the USA, to have a chance to build new bridges for secondary roads, one must consider the economics and "mind set" of public-bridge owners.
- Almost without exception, rural bridges are already in place and are either off-the-shelf steel girder systems, prefabricated precast concrete systems or, for short spans, simple culverts (either corrugated metal or ordinary concrete).

Antisotropic grid bridge under construction
- One must develop a cost-effective bridge system that has the same repeatable use (i.e., not "site specific") and simplicity.
- The following bridge achieved that and is innovative and attractive in its low profile for a deep system. Shown above is a 57-foot (17.4 m) long, single-span...
experimental bridge incorporating an "anisotropic grid" floor system. It was built in 1993. The width of 52 feet (15.8 m) enabled a through-girder construction, whereby the girders and abutments allow two-way action of the interior system, supported on all four sides. The deck (longitudinally oriented panels of dimension lumber) suspends from the abutments, and the floor beams from the through-girder main elements via special steel hangers suspended from the tops of the girders.

Because of the lightweight design, the deteriorated concrete abutments (originally scheduled to be replaced) were retained. Laboratory and field load tests were also conducted. The hangers also provide for an I-beam behavior of the entire bridge under lateral loading of the bridge girders.

A key aspect is the movement-resisting connection of the hanger to the transverse floor beams. Each is a double beam whereby two side-by-side members (spaced slightly for ventilation) connect to the hangers. The beam uses two, smaller width members in lieu of the larger width, single member to reduce cost with a readily available size. The hanger was designed to connect to the top and bottom of the floor beams by outstanding legs fastened to them by many, closely spaced nails. This avoids large, concentrated bearing areas and the use of large bolts that are used that generally lead to either seasoning cracks or splitting under load. While proven as a movement-resistant connection method, the bridge owner was apprehensive about nails and an alternate connection was used.

Following the research on the "anisotropic grid" bridge configuration, full-scale laboratory testing was ongoing to the originally designed guardrail system (subjected to a standard vehicle-crash test) is considerably weaker than the experimental system. Static loads that demolished the conventional system caused no evident damage in the experimental guardrail. In static and dynamic tests of a 25-foot

Field load testing of completed anisotropic grid bridge
(7.62 m) long, full-scale section of the bridge configuration, failure was not achieved despite high loads being applied. It was evident the I-beam behavior was occurring and the load was shared by all transverse members. In high-impact pendulum tests, heavy forces simulated an automobile impact to significantly damage the specimen. It is anticipated that the alternate system will provide up to 10 times more load capacity than conventional systems. This is evident from comparative laboratory tests.

**Truss-frame in round pole**
In 1993 the Scott Lancaster Memorial Bridge was built in Idaho Springs, Colorado, by supervised community members as a memorial to a youth killed by a mountain lion. It, too, was conceptualized in Switzerland and the subject of studies at Colorado State University (CSU). This experimental bridge is in distinct contrast to the anisotropic grid bridge. It is neither standard, simplistic nor low profile, it is the only one of its type in the USA - a modern, covered bridge for a rural bike path. It has a 75-foot (22.9 m) span and was designed in round pole, truss-frame construction. The bridge is next to a major interstate highway, and visible to passing traffic. A high profile was desirable for scenic visibility of the structure.

Two parallel, pitched trusses, each framed of six round poles and three, vertical, steel tension rods interconnected by innovative curved, steel plate-connection detailing, comprise the primary system. The detailing of the six joints creates continuity of the chord members at four of these joints, and semi-rigidity at the top and bottom chord mid-span joints. The eccentricity of the curved-plate nailing and the longitudinal bolt of a special triangular end-bearing plate counteracts the inherent eccentricity of internal forces at the joints.

Wind is resisted by a transverse frame at mid-span, combined with diaphragm action of the roof and floor systems. The outriggers of the wind frame help support the long overhang of covered roof, thus shielding the superstructure and its connections. The flooring is round-pole floor beams supporting a grid of 1 x 2 inch (25.4 x 50.8 mm) lathing and 2 x 6 inch (50.8 x 152 mm) planks. Metal splices and tie-rods ends are recessed inside the underside of members for moisture protection. Curved plate fastening is accomplished using multiple ring-shank nails.

**Mixed-wood bridge construction**
A critical concern in the external use of concrete for bridge decks is the intrusion of chlorides into the reinforcement. Being weak in tension, concrete cracks in the tension zone and is the reason for placing steel reinforcement. However, the micro-cracking (hairline cracks) exposes the steel to chemicals dissolved by water or exposure to any contaminated atmosphere.

Besides the exposure problems, concrete decks have three, nuisance cost liabilities. First, the cracked concrete (extending through one-half the thickness or more) serves no structural purpose. Second, expensive steel reinforcement is needed. Third, cast decks have to be held in place by metal or wood form-work for shoring.

These costly aspects can be eliminated by using composite wood-concrete decking. In configuration of a mixed-construction slab bridge being tried in Europe, half logs are interconnected to the concrete overlay by use of a special dowelled shear key. The post-tensioned dowel maintains vertical interconnection of the layers. The upper end is sleeved to accommodate that need.

The interlayer shear transfer puts the wood in bearing (at a small angle to grain) and the concrete in bearing and shear. The concrete overlay also protects the wood from moisture and fire. The structural wood system serves to shore the cast-in-place concrete. Full-scale laboratory tests at the Swiss Federal Institute of Technology in Lausanne, Switzerland, have shown the success of this concept. Studies are in progress at CSU to use mixed construction in layered bridge decks, employing dimension lumber or small timbers for logs. An array of shear key specimens (differently cut dimensions, two connector types and embedment, etc.) was load tested for interlayer force transfer. They prove that the shear key can transfer 3-4 times the force that conventional mechanical fasteners (bolts and lag screws) can transfer. Many rectangular beam specimens were prepared for initial determination of preferred placement of shear keys along the member. These were followed recently by load tests of reduced-size laboratory bridge-deck specimens.

The bridge specimens are available from the development work on the anisotropic grid experimental bridge. With a background in analysis and testing of partially composite layered wood system, CSU has made available rigorous computer-based mathematical models for studying incomplete composite action.
The study tour took place of Friday 16th April and comprised three separate visits all of which were related to the production and processing of softwood.

The first port of call was at the Whinlatter Forest Visitor Centre. Delegates were first told about the planning, planting and extraction policies for the immediate forest area. In particular it was explained how the forest management was seeking to ensure a profitable yield of timber from the area and at the same time to ensure a positive and adequate re-planting programme. The management were very much aware of their responsibility towards the general public in this area of natural beauty. The outcome was a very good example of a commercial forest that provided for and maintained recreational facilities (forest trails etc) and informative leaflets and displays about the area, the tree, other plants and the wildlife. The tour continued to an area in which BSW Timber plc was currently extracting timber.

The study tour then proceeded to the BSW sawmill at Cargo, just north of Carlisle. Here a team of directors and managers, lead by Sandy Brownlie, took the delegates round the sawmill in small groups of 5 to 7. As a major sponsor of the conference it was especially interesting for delegates to witness the size and autonomy of the company’s sawmill and to see how the mill was set up to manage a throughput of 38000 logs per week.

BSW then entertained the group to a very welcome lunch before departing to the last phase of the tour, the forest products operations of A.W Jenkinson near Penrith. After a short welcome and introduction given by the company secretary, Dr David Wood, delegates were again split into modest size groups for the tour of the extensive and very modern wood and wood residue processing plant. The scale of the operations took many by surprise. This scale is in part relative to the range of residue received. This includes sawdust, chips and bark as well as recycled wood waste and in part to the wide range of end use application to which the carefully processed products are bagged, marked and despatched.

The papers and presenters at the 1999 Conference were:-

TIMBER RESEARCH IN CONSTRUCTION AND ENGINEERING
Presented by Martin P Ansall, FWSc
Department of Materials Science and Engineering, University of Bath

FOREST INDUSTRY DYNAMICS - IMPLICATIONS FOR PRODUCTION AND MARKETING
A paper presented by Johal Hedin
Marketing Manager of Iggesund Timber

TREES, TIMBER, TECHNOLOGY: MARKETING CHALLENGES FOR THE UK
Paper presented by Duncan Poindexter
Development Manager, Scottish Woodlands

WASTE MANAGEMENT OPTIONS IN THE WOOD PROTECTION INDUSTRY
Presented by M. Connell of Hickson
Timber Products Ltd

TIMBER PRODUCTS IN HOUSE CONSTRUCTION - A CONSUMER'S PERSPECTIVE
Presented by David Lowther, Group Health and Safety Director, Bovis Homes

GETTING YOUR MESSAGE ACROSS
Presented by Tim Most of Headline Communications

EDUCATION AND TRAINING
Presented by Martin Wall, Isle of Wight College

The Institute gratefully acknowledges the support from the sponsors of the 1999 Conference, in particular key sponsors:-

BSW Timber plc
Bligh Hunter
Continuing Professional Development (CPD)

The question of CPD has been raised in the Newsletter and the Journal in the past and the Institute has a fully documented system for what constitutes CPD, how it should be recorded and its value in respect of the individual and as a means of meeting some of the AIWSc criteria.

Reprinted below is the list of CPD options:

- Attendance at the IWSc Annual Conference
- Attendance at IWSc regional or joint venture seminars
- Attendance at IWSc branch meetings
- Attendance on external/internal courses related to wood science and technology
- Writing and publishing material related to wood science or timber technology or the preparation of lectures
- Organizing/attending educational visits to manufacturing or industrial sites etc.
- Structured reading (see below).

Reading of technical literature, conference papers or journals can count for up to 20% of recorded CPD that is being accumulated for progression within the Institute’s grade structure. The subjects studied must be itemized and related to the individual’s development plan.

In an article that appeared in a recent issue of the Clerks of Works Journal (February 1999) John Lawrence, CPD officer for the ICW, raised several interesting and very relevant points. Points that could apply equally to IWSc members.

He raises such issues as the problems that mature people find with the “normal” route of study due to work and family commitments. A structured approach to CPD could, to a large extent, overcome this problem.

He also points out that the CPD Certificate is often seen as irrelevant and does not lead to “added value” in a career path.

Furthermore he says that for CPD to work it should be seen as an on-going system rather than a series of “one off” technical seminars.

To provide the “added value” CPD needs to be undertaken over a wide range of styles (conferences, preparing in-house courses, reading, etc.) and to be recognized by the employer as a very real and practical way in which staff can improve their skill and knowledge. This ultimately benefits everyone.

Within our Institute we should be exploring CPD opportunities much more intently. A very obvious way of achieving some CPD to one’s credit is to attend the extensive and varied range of educational topics and experiences offered in the Institute Branches’ annual programmes.

A full set of CPD notes and model recording sheets are available from the IWSc office, you only have to ask!

David Woodbridge

For your diary

IWSc Conference and Study Tour 2000

Venue: The Marriott Goodwood Park Hotel Chichester
Dates: Study tour 28 April
National Conference 29 April

The Study Tour will build on the success of previous years, especially the 1999 tour, and will focus on key timber and timber related activities in the area.

The Conference will contain an imposing line up of speakers from the UK, the Continent and Canada. The topics will be challenging, thought provoking and forward looking. Environmental issues and Value Adding will be but two of the topics to be featured.

For wives and partners a cultural feast is in store with visits planned to Chichester City Centre and the Cathedral as well as one of the notable National Trust Properties in the vicinity.

The location for this conference should suit both residential delegates and those who wish to attend as day delegates. Access by road to Chichester is excellently served by the Motorway system and dual carriageway roads to within a few miles of the hotel.

For recreation the hotel offers a fine golf course, swimming and gymnasium facilities. It is set on the edge of the downs in a pleasantly wooded location that forms part of the 12000 acre Goodwood Estate.

Visit the IWSc web site for further information.

The brochure and enrolment details will be mailed to all members with the Winter issue of the Journal in January.

For further information please contact the IWSc head office
COMPANY PROFILE – Carver (Wolverhampton) Ltd

The business began in 1896 in Willenhall and became the largest independent single site builders merchant in the West Midlands.

Over one hundred years on the Carver Group is now owned by the fourth generation of the Carver family. Over the years, with the development and expansion of the business the company has moved premises a number of times. From 1974 the company has operated from the eleven acres site off Littles Lane. An area which used to belong to the Great Western railway and on which some of the original railway buildings still stand, but have now been fully converted and integrated into the offices, warehouses and showrooms of the company.

With the death of Roland Carver in 1975 his two sons, John and Roy, continued to run the company. In the 1980’s their sons, Henry and David, joined the company from university. In 1995 the senior members of the family stood down in favour of their sons with Henry becoming Managing Director and David as Deputy Managing Director. John Carver remains as Life President and Roy Carver as Chairman, thereby maintaining their interests in the company’s activities and growth.

Since 1994 the company has forged links with the Baltic States and now has an office in Riga. It is from here that the company sources and arranges the shipment of softwood direct to the UK ports, ensuring a continuity of supply and a consistency in quality standards as demanded by the UK markets. Much of this work is overseen by Henry Carver who, along with other senior members of staff, visit the Baltic office and supplying mills on a regular basis, approximately every six weeks throughout the year.

On the way to reaching a sales turnover of £21.5 million (of which £9.5 million was in timber sales) in 1999 the company has taken a number of bold trading initiatives. The kilns operating at Wolverhampton, see the capacity being extended this year, with the re-siting of a pair of kilns originally installed at one of the company’s importing locations, to volumes in excess of 1000 m³ per month. These kilns are in addition to the company’s kilns already operating in Riga. An extension of the ability to treat timber is made possible by the recent opening of a CCA plant in Riga.

To meet the quality standards for timber used in the construction industry, especially that which is used for structural purposes, the on-site milling facilities at Littles Lane have been substantially redesigned. In particular structural capping is kiln dried, surfaced to size, regularised, strength graded, grade stamped and packaged.

The growth of the business is reflected in materials other than timber with, this year, a fundamental re-designing of the kitchen and bathroom design centre and the spacious self sélection building materials sales area and the establishment of a tool hire centre. The company actively supports the local community through its youth training programme and the Wolverhampton Marathon, the proceeds of which are helping to fund the new headquarters of St. John Ambulance Services.

With this type of track record one can expect the company to continue to develop their business. For the timber industry the initiatives taken, together with the professionalism with which the business is managed, can only do good for the image of wood. The company is committed to training having achieved Investors in People Status. This year they have put 9 members of the timber sales and administration team through the IWS Certificate course. run in conjunction with tutored, In-house, workshops and resulting in commendable examination results.

Carvers’ Klin in Riga with a capacity of 1500 m³ per month

The on-site milling facilities at Littles Lane

Softwood extraction in Latvia

Carver Board members, Left to right (standing): David Carver (BSc(Hons)) Deputy Managing Director, Ivan Savage (MIWSc) Sales Director, Neil Kendrick (BSc), A.C.A. Finance Director. Left to right (seated): John Carver Life President, Henry Carver BA(Hons) Managing Director, Roy Carver JP, Chairman.

In 1986 the company purchased the Mallinson Denny branch at Featherstone and with this, plus two treatment plants (CS and CCA) being set up at Littles Lane in conjunction with Hickson Ltd the company could be said to have truly entered the timber business. This development was further consolidated when the company acquired the stock, staff and machinery of S. Jackson & Co Ltd of Walsall. The former Sales Director of Jacksons, Ivan Savage joined the Carver Group and with his substantial timber trading and importing experience helped to expand further the timber activities. He was appointed Sales Director at Carvers in 1984. The Board
Protim Solignum and Environmental Care

Dr. L.D.A. Saunders FWSc
Research and Development Director

The treatment of wood products with chemical preservatives to confer durability to otherwise perishable timber is sometimes seen as the most environmentally sensitive part of the timber supply chain. Together with the issue of the sustainability of forest management, more criticism is levelled at the timber industry regarding the use of wood preservatives than from any other aspect of presenting timber products to the market.

Much of the criticism is emotionally or politically motivated so it is appropriate that responses are soundly based on the best criteria available. Protim Solignum Limited is the first wood preservative manufacturing company in the United Kingdom to achieve accreditation for its Environmental Management system to Environmental Standard ISO 14001:1996. It is anticipated that accreditation to this standard will become as vital for companies, in order to demonstrate environmental responsibility, as is now the case with the quality management standards covered by the ISO 9000 series.

Accreditation to ISO 14001 was achieved by a process of establishing a Protim Solignum Environmental Management System (EMS) in 1994. This system provided a formal way of defining environmental risks from all aspects of the Company's operation. The environmental features monitored include energy, water and waste disposal costs, environmental effects of raw materials and finished products and site effects such as spillage containment. Unlike the ISO 9000 series of Quality Management System, where the same management practices can continue, if appropriate, for many years, continuing accreditation to ISO 14001 requires that targets for continuous improvement must be set and achieved.

The company achieved accreditation for its Marlow production site in March 1997 and for its Darlington production site in November 1997. Since then regular audits by BSI have been carried out and commitment to a programme of improvements has been continued. This has contributed to the Company's decision to embark on long term strategies to develop micro-emulsion preservatives, and also to modify LOSP application processes to reduce VOC usage.

Protim Solignum's demonstrated commitment to best environmental practices was a factor in the decision by Osmose to purchase the company - a transfer of ownership which became effective on 1st July 1999. This move creates a major new international force in timber protection. This new partnership offers a complete range of products, including traditional CCA preservatives, new generation CCA alternatives, LOSP for both remedial and pre-treatment, and the most highly developed range of water based micro emulsion preservatives available. Integrated with these preservatives is a comprehensive range of Industrial and Trade decorative and protective finishes and even a range of timber-deck fastenings. Design software is also supplied.

The broadening of the Protim Solignum's product range makes more widely available to treaters of wood destined for high hazard (e.g. garden, fencing and marine) situations the benefits of the company's pro-active approach to environmental issues and customer services.

BOOK REVIEW

100 Woods - A Guide to Popular Timbers of the World
Peter Bishop: The Crowood Press, 324 pages, hardback ISBN 1 86126 167 5 £20.00

100 Woods describes both softwoods (18 entries) and hardwoods of which 51 entries relate to tropical hardwoods. Each timber is presented on two facing pages with its Latin and common name, plus alternatives. There is a short description of the areas of growth, the size and habit of the tree and the appearance of the converted timber. The properties of each timber covers durability, density, resistance to decay, shock resistance, hardness, sawing and usability, splitting, gluing.

On a world map the growth area of the species is outlined and finally there are three 48 x 58 mm close-up colour photographs of radial, tangential and cross sectional views of the timber.

For each timber there is a 'ready reference' chart with simple symbols to illustrate the basic properties (weight, durability, bendability, hardness, sawing and usability, splitting, gluing).

On a world map the growth area of the species is outlined and finally there are three 48 x 58 mm close-up colour photographs of radial, tangential and cross sectional views of the timber.

In the introduction there are four pages dealing with the basic features and anatomy of wood with line drawings to illustrate a typical softwood and hardwood radial section.

The selection of timbers would appear to reflect current usage but with a noticeable bias towards some of the more decorative and exotic timbers and fruit woods. This could be accounted for in that the author is a qualified Advanced Craft Wood Machinist and that he is a furniture maker. As such the book has much to offer for the craftsman, the furniture maker, the wood turner and cabinet maker.

For the student of wood science the book would be helpful as an easy to use reference book on the key characteristics of timber species but it would not be a "stand alone" alternative to, for example, the Handbook of Hardwoods or the Handbook of Softwoods.

Whilst great care would appear to have been taken to achieve as faithful as possible colour rendition of each timber, the usefulness and clarity of the colour plates for the timber technician is debatable. Some have reproduced structural, figure and grain detail well, merbau and American mahogany for example, but others like Brazilian rosewood and apple are unclear. More importantly there is no consistency in which way the grain runs. In the tangential and radial views this varies between vertical and horizontal and with the cross section (transverse) only occasionally is the accepted convention of the grain running vertically (North and South as in a map) observed. There are a few spelling errors, Populus spp for example. Another oddity, but one perhaps explained by the traditional practices in the craft industries and specialist uses of hardwood, is the prominence given to weights in pounds per cubic foot.

Wisely for those working in wood, there is a short appendix explaining some of the health hazards associated with wood machining and reference is made to HSE literature on the topic.

The paper weight and quality together with the hardback binding and print quality are all excellent.

David Woodbridge FWSc

Editorial Note

This, the first issue of Wood Focus, replaces the former Newsletter. Wood Focus is aimed at providing a range of articles and reports of interest and value to WSC members, especially those in the timber industry. For future issues we will be pleased to have drafts of informative articles that may be suitable to print. Your feedback on this first issue will also be most helpful. The Institute's Journal will continue to publish refereed papers of scientific and technical content.

David Woodbridge FWSc Editor
RAISING THE PERFORMANCE STANDARD FOR COATED TIMBER

By Geoff Taylor AWStc, Technical Services Manager RONSEAL TRADE

Introduction

What are the many factors that are beyond the control of timber producers, coating manufacturers and end users?

One answer could be the timber component’s design, installation and use, its exposure conditions and its maintenance planning.

However, are we not getting ahead of ourselves? That answer assumes an understanding of the timber substrate and how it influences the selection of exterior coating systems. In the past, component manufacturers (at the expense of the end users) have been favoured, when it comes to information provided by both British and European Standards.

To reduce the risk of failure and enhance the performance of these materials, one should look to the raising of standards.

- select suitable materials that are fit (inherently durable) for their intended use and maintenance cycle, not just for their “normal” working life with no maintenance


- adopt an appropriate performance-based quality material and design method

FOR GUIDANCE: BS EN 942: 1998 Timber in Joinery – General classification of timber quality

- also make effective use of highly-trained and knowledgeable personnel within our industry; many of whom have a sound understanding of the minimum performance standards

FOR INFORMATION CONTACT: Institute of Wood Sciences/BR/EWST/TRADE/Coatings companies

Part One – Standards for the Exterior Timber Substrate

In certain exterior exposure conditions, moisture and light cause degradation of timber. This can be exacerbated by the growth of microorganisms, leading to biodeterioration, which can cause disfigurement and fungal decay in service. Consequently, in using timber for joinery, we are often exposing a naturally non-durable and recyclable material to the risk of degradation.

- select suitable materials that are fit (inherently durable) for their intended use and maintenance cycle, not just for their “normal” working life with no maintenance


- adopt an appropriate performance-based quality material and design method

FOR GUIDANCE: BS EN 942: 1998 Timber in Joinery – General classification of timber quality

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What Are the Influences of Timber on Exterior Coating Systems?

The end user seldom appreciates the various properties of the timber substrate and its relationship with the overlying coating systems. Such unfamiliarity has led to coating systems incurring premature and excessive maintenance costs.

Most of the following examples of some of the influences are readily accepted and dealt with as symptoms. However, they should be regarded as causes, to be identified, treated and minimised prior to the start of the construction process.

- Natural Extractives

These give timber its colour as well as a degree of natural durability. Consideration should be given to this degree of colour, as in the presence of moisture, these extractives may ‘bleed’ through the dry film. This can subsequently result in the

- Natural Exudates

The presence of resin both within and on the surface of certain softwoods and gums oils in certain hardwoods will have an effect on the degree of adhesion that a coating system will obtain.

- Natural Durability

An alternative to naturally durable timber species is the use of preservative treated timber. Currently this pre-treatment is normally achieved by vacuum pressure impregnation. However, in the future, novel treatment methods may become important. If vacuum pressure treated timber is not correctly dried a further effect on coating system adhesion is possible.

- Moisture Content

Excessive movement of timber in service is a common problem. Too fast a drying rate can give rise to the occurrence of checks, splits or open joints. Too slow a rate may result in the onset of disfigurement, discoloration and even fungal decay. Once decorated, coating systems can only control “normal”, not excessive movement in timber. Defects linked with the excessive movement of coated timber are blistering, cracking, flaking and loss of adhesion.

In Part 2 we will look at the appropriate use of the latest coating standards and link them with the performance and protection strategy required by low maintenance coating systems.

Part Two – Standards for Exterior Coating Systems

What appearance will the coating system have?

What will be the life of the coating system?

How do I maintain the coating system?

Those are simple questions; yet they are often inadequately answered.

With the increasing profile and inventive use of the latest coating standards these and many more relevant questions can be answered appropriately.


BS EN 927-1 defines the technical, functional and end use categories for coating systems on exterior timber. Therefore, in compiling a specification...
document that links timber with the protection strategy of low maintenance coating systems, one should refer to the following selected criteria:

- **End Use Categories**
  One of several properties in a coating system is its ability to control the entry and exit of moisture and the accompanying movement in timber. These variations are reflected by the different end use categories, which have distinct requirements for dimensional control.

- **Selection Criteria**
  The appearance (and degree of resistance to the damaging effects of light) of a coating system can be classified by hiding power:
  - semi-transparent (partially obscured timber, such as a wood stain)
  - opaque (totally obscured timber such as a paint)
  - transparent (clearly visible timber, such as a varnish)

- **Exposure Conditions**
  These conditions are classified as severe, medium or mild. The direction of exposure, inclination and degree of shelter, along with the local climate, to which any timber construction is to be exposed, is a necessary consideration in order to establish the performance of any coating system.

- **Coating System Maintenance**
  The objective of a long term, low maintenance protection strategy is to reduce lifetime costs by using and raising the standards in every element of the process. The performance of the coated timber should never be seen in isolation. As a "protective envelope" it is a part of the integral fabric of the constructed building. Accordingly, it should be maintained while still in sound condition otherwise this might result in costly maintenance and repair.

In addition to the staining of knot margins there are other natural characteristics to be considered. For instance, resin from *Pinus sylvestris* (European redwood) and gums in *Cordia odorata* (cigar box cedar). Accordingly, the latest cleaner coating technology makes it possible to "lock" these natural chemicals within a water-borne coating material and so greatly reduce discoulourisation of the dry film.

- **Substrate Condition and Preparation**
  Individual timber species vary in their receptivity to coating materials and in their influence on performance in service. In order to specify accurate surface preparation instructions the substrate condition should be established.

Occasionally problems, such as discoulourisation of the coating material, may be experienced when using species high in water-soluble, natural extractives. *Thuja plicata* (western red cedar) and *Entandrophragma utile* (utile) are such examples.

Elmia Timber of Jönköping have joined the Institute as Corporate Members.
Next year they are organizing an International Wood Products and Components Trade Fair

For details see below.

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**Elmia Timber**

Elmia-Timmermässan & International Wood Products and Components Trade Fair

4-7 October 2000, Jönköping, Sweden

**The Event**

This biennial trade fair is totally focused on the material wood. With over 230 companies and 5,000 visitors it is already the largest trade fair of its kind in Northern Europe.

**Elmia Timber**

is where you can carry out all of the following activities

- Vitalize and deepen your existing client relationships, service them and close sales.
- Diversify and broaden your client base by initializing new contacts and open new sales leads with prospects.
- Reach out and inform important decision-makers and material specifiers.
- Promote and sell your existing product or service range.
- Present new products or services, new sales or marketing personnel.
- Market testing or market research for new products or services.
- Explore new partnership or joint venture opportunities.
- Keep an eye on your colleagues in the trade and their activities.

Under one roof cost effectively.

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Photo courtesy of the American Hardwood Exports Council
THE IWSc COURSES

In addition to regular tutorials, comprehensive and straightforward notes are provided. Students can contact their tutor for assistance and support, by phone or fax, at any time.

BUCKINGHAMSHIRE CHILTERN UNIVERSITY COLLEGE

The College recognises the desire of individuals to progress in education and is constantly exploring ways to meet those needs. The development of distance learning and part-time attendance has enabled many students, who have difficulty attending college on a residential basis, to pursue their education and enhance their job prospects.

The University College supports its distance learning programmes with evening tutorials, in-company tutorials and contact by telephone, facsimile and email.

It is planned that in the near future we will be announcing a part-time mode of study for the third level of the BSc (Hons) Forest Products Technology. This facility will enable successful students of the Associate of the Institute of Wood Science to be considered for entry into the third level studies.

IN-COMPANY TUTORIAL SUPPORT

A variation of distance learning which has proved to be not only successful in exam achievements, but also for candidates and employers alike, has been the course that incorporates IN-COMPANY workshops run at regular intervals during the course and usually of one day’s duration. These workshops provide excellent opportunities for practical work in timber identification, assessment of defects for grading, recognition of the types of decay and insect attack as well as the project work on preservation and the Strength of Wood.

THE ISLE OF WIGHT COLLEGE SUMMER SCHOOL

The first summer school for the Institute of Wood Science Certificate course was held on 12 - 15th July at the Isle of Wight College. This was an integral part of the Distance Learning structure of this course and was attended by 7 students from as far as Castelford.

The objectives of this event were to undertake the practical elements of Project books 3 & 5 (strength testing and hardwoods). The first two days were spent undertaking 3 point bending strength tests on 6 species of hard and softwoods, recording the data on a spreadsheet and producing the required graphs for the calculation of the Modulus of Elasticity (MOE) and the Modulus of Rupture (MOR). The third and fourth days were spent producing the required diagrams for the Hardwood project. A video microscope was used to allow the students to view the structure of 18 different species of hardwood whilst looking at a television monitor.

The weather was good and so each lunchtime a local refreshment house was visited!

The Isle of Wight is a superb place to visit especially in the summer. So if you or a colleague feel that you would like to undertake the Institutes course and have a break for four days on the “island” why not give it a try!

The Isle of Wight College, tutor Martin Wall, can be contacted on 01983 625531.

TRADA Technology Ltd, tutor Susan Farrow, can be contacted on 01709 720025.

Buckinghamshire Chilterns University College, tutor in charge Barry Matthews can be contacted on 01494 950557.

A full list of the course providers for both the Certificate and the Associate levels can be obtained direct from the IWSc office 01494 563374.
EDUCATION AND TRAINING

An edited version of the Paper presented at the Annual Conference by Martin Wilt AWTSc, April 1999

COST OR BENEFIT

INTRODUCTION

This paper sets out to explore the attitudes that exist in timber education and training. This has been done by looking at the way things have been undertaken in the past, the existing attitudes and methodology as well as speculating on the future developments.

The range of courses covered in this paper are Wood Technology, Forestry & Arboriculture, Carpentry & Joinery (C & T), Furniture and Boatsbuilding.

There are three levels to the structure of education and training. These are Vocational, Professional and Higher Education.

VOCATIONAL

Vocational timber based courses have traditionally been offered by City & Guilds of London on day release from employment. These have been completed by a series of end of year examinations, covering 3 or 4 years.

Since 1992 the traditional courses have changed to NVQ & GCSEs. These were primarily assessed on continuous assessment. These courses are now offered on day/ block/ full time and on site assessment. There are presently 7209 C & J and a few hundred Furniture & Boatsbuilding students undertaking NVQs. The GNVQ & NVQs are Government based initiatives, so they will evolve into training courses that will meet the needs for the future.

HIGHER EDUCATION

There are Higher Education courses at Degree and HND level at the following Universities:

- Forest Products: Bangor, Buckingham Chiltns University College.
- Forestry: Aberdeen, Bangor, Buckingham Chiltns University College, Central Lancashire, De Montfort BSc & HND, Edinburgh, Brighton HND, Spasholt College HND.
- Arboriculture: Aberdeen, Central Lancashire, New College Durham HND.
- Biotechnology: Aberystwyth (wood).

The Higher Education offer will continue as long as the funding and research projects continue as well as having enough students.

PROFESSIONAL

HISTORICAL

The Institute of Wood Science, as one of its founding philosophies, has always offered Education and Training courses in Timber Technology. This was undertaken on an evening class basis. This created 'Centres of Excellence' throughout the UK including High Wycombe, Liverpool, Leeds and many more including, in 1968, the Isle of Wight.

By the 1980's the method of attending courses changed to day and block release.

PRESENT

The Institute’s Certificate and Associate courses are now offered on Block release and Evening Class modes, as well as distance learning by the colleges at High Wycombe, Leamington Spa, Liverpool and the Isle of Wight as well as TRADA and other individual training providers.

FUTURE

Where is the market for wood based education and training?

1) NVQ students generally come straight from school to undertake a practical based course. They must be encouraged to develop an interest in wood technology.
2) HE students arrive with A levels or more through the vocational route.
3) Existing timber users who have an interest in wood.

What is the future of Timber based Education and Training?

Do we need to develop feeder courses?

What is going to happen to the Timber Technology courses and do they have a future?

Will they feel that their time has come and just roll over and die?

WHY NOT TRAIN?

The main reasons for not training are:

1) COST - this includes enrolment, examination and travelling costs, the loss of staff for the length of time they attend the course.
2) NEED - the employer cannot see the need for education and training “What can they tell me about wood I have been working with it for many years”!
3) MOTIVATION - or more realistically, the lack of motivation of the employee.
4) LOGISTICS - you want to do the course but the college is at the other end of the country. Or that you feel that you will have difficulty in fitting it in around all the other things that you do.

SOLUTION - THE ISLE OF WIGHT MODEL

1) COST - the cost of the Institute of Wood Science Certificate course is £280 for the Institute’s work books and exam fees plus the Isle of Wight College evening class attendance fee or the distance learning fee which includes personal tutorials and a one week summer school on the Isle of Wight.

2) NEED - the range of subjects covered within the IWS courses are attractive to a wide range of timber users and people in the timber trade. Three companies on the Isle of Wight and the mainland all realise the need and have sent employees on the IWS course.

3) MOTIVATION - if a student is not motivated, it will be the training provider’s duty to give that person an educational experience that will challenge, stimulate and ultimately motivate them.

4) LOGISTICS - For those on the island or adjacent mainland the Isle of Wight College offers evening classes or in-company sessions. For those further away there is the Distance Learning option. All have the opportunity of attending the Summer School.

CONCLUSIONS

Education and training in timber is not dead. There will always be a demand for Vocational and Higher Education. The IWS has developed courses that are up to date, flexible and offered by dedicated and enthusiastic providers.

Is the Isle of Wight Model the way forward offering, as it does, the IWS courses on an evening class, in company training or by distance learning? If it is, then there needs to be a more complete network of Colleges and training providers to offer the courses country wide.
Western Counties Branch Report

The second half of the 1998/99 meetings programme began with a visit to Woodberry Brothers and Haines, Furniture Manufacturers, of Highbridge, Somerset. A capacity audience of twenty was hosted by John Shiers who provided an entertaining and humorous introduction to the company which is the largest manufacturer of timber furniture in the UK. A million pound glass processing plant has just been commissioned. We toured the huge factory and were able to observe all stages of manufacture of dining room, bedroom and kitchen suites based on chipboard and MDF, faced with a wide range of very effective foils.

On a rather chilly February Sunday, David Perring, Forest Consultant, led a tour of the Stourhead Western Estate forest and introduced us to silvicultural, harvesting and forest management issues. The estates are owned by the Hoare family who developed the famous Stourhead gardens. Very large trees can be supplied to order for one-off building or restoration projects whilst smaller diameter thinning are supplied to the panel products industry. The geography and geology of the site is complex and there is a broad species mix.

Our final meeting in March, on a fine warm day, took us to the Climbing Hill site of Timbmet Ltd, near Oxford. We were able to observe the kilning operations and were fascinated by a very effective, innovative solar kiln. A very wide range of hardwoods is stocked outdoors, sawn and in stick, for seasoning and a selection of products was laid out for our inspection. We were introduced to many stock products including composite timber products such as vandal-resistant fire doors. The visit concluded with a presentation by Simon Fineman on environmental policy which is being gradually and realistically developed to embrace the introduction of certification. We were delighted to meet the founder of Timbmet, Dan Kemp, over tea in the staff canteen.

Western Counties branch are very pleased to acknowledge the support of the three organisations above who provided IWSc members with a fascinating insight into their industries.

CORPORATE MEMBERS

The Council of Management wish to record its thanks to those listed below for their support as Corporate Members:

ACWI Ltd
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Premil Solignum Ltd
Rentokil Ltd
Rosseal Ltd
Timber Trade Federation
Timber and Wood Products
Timbmet Ltd
TRADA
Travis Perkins plc
Willamette Europe Ltd

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South Coast and the IOW - Martin Wall FIWSc (01983 52663)
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