“Most wood products perform well not only because growing trees absorb CO₂ but also because of low energy inputs for processing and good thermal properties in use... Generally wood products, from timber frame to joinery, can help designers improve on their EcoHomes ratings.”

BRE, *Building Sustainably with Timber*, 2004
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"For every m³ of wood used instead of other building materials, 0.8 tonne of CO₂ is saved from the atmosphere."

-European Commission DG Enterprise, 2003-

"Forestry practices can make a significant contribution by reducing greenhouse gas emissions through increasing the amount of carbon removed from the atmosphere by the national forest estate, by burning wood for fuel, and by using wood as a substitute for energy-intensive materials such as concrete and steel."


Sustainability and Government policy
Sustainability is now a major theme at the heart of Government policy, not least in relation to the building and construction industry, as buildings contribute 46% of the UK’s annual CO₂ emissions. They also have a significant effect on demand for water, land and transport resources.

Already many developments require high sustainability standards, usually expressed as BREEAM or EcoHomes ratings, and the introduction of the Code for Sustainable Homes and the new, more demanding, Part L of the Building Regulations in 2006, will accelerate this trend, forcing developers to look at a range of new solutions.

Sustainability and materials
Although materials are just part of a building's sustainability, they can have a considerable effect on CO₂ emissions, not just over the lifetime of a building, but also during the building phase, due to their embodied energy. Careful choice of materials can also minimise any environmental effect on finite natural resources.

Apart from its aesthetic appeal, wood is increasingly recognised for its environmental benefits: its thermal properties, its low embodied energy, natural renewability and recyclability.

These benefits are reflected in the ratings systems used for BREEAM and EcoHomes. And, now that PEFC certification has been granted equivalence to FSC and CSA by CPET, the Government’s Central Point of Expertise on Timber, there is ever greater availability of certified timber in the UK.

This publication aims to demonstrate some of the ways in which architects have used wood as a contribution to the sustainability of buildings across a number of different sectors of the UK construction market.

Sustainability and wood
- Wood has the lowest energy consumption and the lowest CO₂ emissions of any commonly used building material
- Wood’s thermal insulation properties mean timber frame houses can use less energy
- Wood is uniquely renewable
- Wood products act as a carbon store
- Using wood products encourages forestry to expand, increasing the carbon sink effect and reducing the CO₂ in the atmosphere.
Glulam portal frames, split into two equal halves and erected back-to-back to form a sequence of M shapes which cantilever upwards and outwards

 Boiler fuelled by local timber fellings and offcuts

 Western red cedar cladding

 European maple veneered plywood panelling (internal)

 Solid bamboo flooring in main entrance
Created as an exemplar of sustainable design and construction, from its orientation on site, to the selection of natural materials, use of natural ventilation and daylight, and renewable heating.

The visible timber structure creates a strong practical and symbolic aesthetic inside and out, and allows pupils contact with this natural material. Winter gardens create pleasant spaces for study or rest. Every classroom has uninterrupted views of green space. Rainwater is harvested for toilet flushing.

The use of timber glulam beams has enabled continuous structural members to extend from exterior to interior without the need for a thermal break. High thermal insulation in roof and walls, photovoltaics, solar hot water panels, a biomass boiler and an automated natural ventilation system combine to reduce energy consumption to 40-60% below that of conventional new buildings – enough to pay for an extra teacher every year.

- Winner of the Small Building Project Award, British Construction Industry Awards, 2005
- Winner of the Best Practice Award, British Construction Industry Awards, 2005
- Shortlisted for the Prime Minister's Better Public Buildings Award 2004.
Douglas fir structure, on a concrete frame, supporting the external envelope
- Larch cladding
- Timber automatic windows
- Timber doors
- Timber laminate corridor floors
- Internal timber acoustic cladding
This teaching and administration building, the new heart of the school, was designed with the latest environmental management principles in mind.

The two blocks are south-facing, while classrooms face north to benefit from constant light and avoid excessive solar gain. Although a concrete frame was used for thermal mass and structural stability, extensive use was made of renewable materials: the external envelope is supported by a Douglas fir timber structure, which required only shallow perimeter foundations and the external surfaces are clad in larch, untreated and intended to fade.

Natural ventilation and lighting are provided by opening windows and roof lights, which create a ventilation stack across the three storeys.
MOSSBOURNE ACADEMY, LONDON

Client: Mossbourne Community Academy Ltd
Architects: Richard Rogers Partnership
Main contractors: MACE
Structural engineers: Whitybird
Joinery: Construction Timber Manufacturers Ltd

- Glulam frame – European whitewood
- Two levels of parallel H frames
Developed as part of the new government initiative for City Academies, Mossbourne is a secondary school concentrating on Information and Computer Technology and a textbook example of low-energy design.

The main structural component is the timber glulam frame, consisting of over 1,000 m$^3$ of renewable European whitewood formed into paired columns and beams.

The timber was sourced, laminated and machined in Holland, arriving on site ready to be bolted together and erected. The main structure consists of two rows of parallel ‘H’ frames spanned by secondary beams. This structure frames a series of classrooms, with the secondary beams projecting past the frame to carry an internal walkway. Externally the beams penetrate through the building skin to form a series of external walkways. The use of timber has enabled continuous structural members to extend from interior to exterior, without the need for a thermal break. The timber is untreated internally and has only minimal applied external protection. To reduce maintenance, each external beam and column is covered with a capping of iroko hardwood, as a protection against the effects of standing water.

- **Short-listed for the Prime Minister’s Better Public Building Awards 2005.**

*Pictures courtesy of The Wood Awards 2005*
ST. ALOYSIUS NURSERY, CAMDEN, LONDON

Client: Camden Local Education Authority
Architects: Gollifer Langston Architects
Main contractors: DF Keane
Structural engineers: Michael Hadi Associates
Solid timber structure: Eurban

A fast-track project to provide a new 26-place nursery building on an existing school site. The nursery was designed as a prototype, using offsite prefabricated timber construction to minimise site work and enable the building to be erected during the school summer holiday period. A simple rectangular form with a timber glazed curtain walling screen at each end and intermittent full height glazed openings is tailored to the constraints of a narrow linear site. ‘Eternit’ sheeting is used as rain screen cladding to a highly insulated external envelope. The timber construction is revealed internally with exposed walls and ceilings of laminated timber. The superstructure was fabricated in Germany and erected by crane onto prepared foundations in 3 days. The nursery is 24m long by 6m wide. Floor to ceiling height is 2.6m and the height of the external elevation is 3.6m, including a parapet. Floor area is 136m².
A redundant public library building has been transformed and extended to create an inspirational new learning centre for the community of East London.

The old library space has been continued out over a roof extension at the rear of the building with minimal disruption to its neighbours, using an innovative and economic lightweight curved timber cassette structure that brings roof and walls together into a single curve.

The Finnish softwood LVL beams were designed and manufactured to bolt onto the existing concrete frame of the building with the least possible additional load.

It is an inspirational space, flooded with natural light, where the drama of the curved beams is complemented by the natural timber panelling.

Lightweight, with low embodied energy, excellent thermal and acoustic qualities, natural light and ventilation, the project was delivered on time and on budget.
ECOPARK, THAMESMEAD

Client: Gallions Housing Association
Architects: PRP Architects
Main contractors: Willmott Dixon
Joinery: Milbank Windows
Timber suppliers: Crown Timber

- Timber frame, with double insulation (U-value 0.25 W/m²K)
- Argon filled double glazed timber windows (U-value at pane centre 1.1 W/m²K)
- Water-based stains and paints
- EcoHomes ‘Excellent’
This mixed development of 39 houses for social housing rent and 8 flats for sale was designed to provide cost-effective, affordable homes using sustainable construction methods and environmentally-friendly materials and has been awarded an EcoHomes ‘Excellent’ rating.

Inspired by Dutch social housing, it was intended as a prototype for further UK developments and incorporates a number of practical, common-sense, rather than ground-breaking, design solutions, which are easy to use and maintain.

Central to the project is the highly thermally efficient timber frame and argon filled timber windows. Renewable red cedar was used for external cladding.

Additional features include conservatories to maximise solar gain, solar collectors for preheating domestic hot water, grey water recycling for WC flushing, rainwater collection and re-use, low flush WCs and spray taps, and passive ventilation.

The scheme originally featured a visitors’ centre that reverted back to flats a year after completion and a ‘naked house’ designed to demonstrate the construction techniques used.
Brampton Rural Housing Society’s millennium project was the first building in the UK to receive BRE’s EcoHomes ‘Excellent’ rating, with a score of 72.9 credits.

This 3-bedroom house was designed and built to prove that sustainable housing can be attractive, affordable and normal; a house an ordinary family would enjoy living in and a builder (or self-builder) could easily build.

Features include reclaimed bricks and Welsh slate, Warmcel insulation (recycled newsprint), as well as stack ventilation, flow restrictors on taps and shower, low flush WCs, and low energy lighting.

At a cost of £67,000, in June 2000, the house was more expensive than the developers planned; however if more than one plot had been developed, economies of scale would have driven costs down.

www.brampton-ecohouse.org.uk
This scheme was the winner in a competition to produce a practical and imaginative design for housing which would comply with PPG3, Parts L and E of the Building Regulations, achieve a ‘Very Good’ or ‘Excellent’ EcoHomes rating and provide high quality, flexible accommodation for a family through its various lifestages.

The house layout, open plan between 2 party walls to allow flexibility and adaptability, creates a dual frontage with a ‘Light Court’ in-between which ensures all rooms benefit from natural light and ventilation and minimises sound transmission. This will also allow different family members to ‘escape’ from each other in the two distinct halves of the building.

A ‘Living Wall’ forms a dedicated zone to accommodate storage and distribute building services, giving residents the flexibility to upgrade their IT and other facilities.

Prefabricated timber frame cassettes provide efficient construction combined with excellent insulation. Factory installed joinery reduces site operations and ensures quality.

The two private zones on the 1st and 2nd floors are clad with a timber slatted rain screen system and timber shutters open up parts of the façade to reveal ‘Rationel’ sliding doors and inward opening windows.

The ‘Light Court’ provides passive solar gains, while the most frequently occupied space of the ground floor incorporates underfloor heating, with small radiators for top-up heating on the upper floors.

The houses can be opened up to the double height ‘Light Court’ to provide natural stack effect cooling and ventilation to the bedrooms and living zones.

Although a formal EcoHomes assessment cannot be undertaken at this stage, it is estimated that these homes will achieve a rating of at least 72%, which is above the threshold of a ‘Very Good’ or ‘Excellent’ rating.

- Closed panel timber frame
- High performance timber and aluminium composite windows
- Timber slatted rain screens
- Pre-fabricated bathroom pods
- ‘Living Wall’ dedicated services and storage zone
- Timber from certifiable managed sources
This scheme, developed by Gwalia Housing Group within tight public subsidy constraints, keeps running costs low for tenants while maintaining an environmentally sustainable approach.

Occupying disused industrial land, and with good transport links, it includes a Day Centre and 38 self-contained flats in two blocks linked by the main communal area, a ‘glass garden’ combining entrance hall, focal meeting point and internal garden. The building fabric consists of high performance timber frame, breathing wall construction, with recycled cellulose insulation, and durable, zero-maintenance external timber cladding. Windows and doors are low maintenance aluminium and timber composites with low-emissivity, argon-filled double-glazed units.

Heating and hot water come from a twin bio-mass boiler community heating system, while solar panels contribute 60-70% of the scheme’s average hot water requirements year-round, so that residents spend just £5.44 per week for all their heating and hot water.

The glass garden provides a passive solar collector, with preheated air distributed throughout communal areas as background heating. Photo-voltaics power ventilation systems, while the lighting design features energy-efficient light fittings, responsive controls and the extensive use of roof lights and sun pipes.

- Western Mail Property Awards 2005, winner in Best Residential Development category and Innovation category
- RSAW Welsh Housing Design Awards 2004, award winner
- National Eisteddfod of Wales 2004, Architecture in Wales Exhibition, runner-up for Gold Medal Award
- Civic Trust Awards 2005, awarded a mention.
Fairmule House is the biggest solid timber building in the UK. Built on a classic brownfield site in Shoreditch, East London, the scheme incorporates 11 flats and 7 business units. Instead of steel or concrete, it uses solid timber laminated panels for its walls, roof and floors, providing a minimum saving of 700 tonnes of CO\textsubscript{2} through both sequestration and substitution.

Eurban, a design and build company specialising in solid timber construction, supplied the superstructure of the building. The sustainable laminated softwood panels are 115mm thick for the walls and 170mm thick for the floors and roof and made from sawmill offcuts. The first panel to be craned onto site was 2.7m wide, 14m long and 115mm thick. Even the lift shaft is created from timber panels.

This system has a number of advantages:
- Speed. There was just a 6 week contract period for erection of the whole development
- Carbon-neutral sustainability
- Super tolerances on highly engineered panels
- A solid feel
- Good acoustics
- Excellent thermal efficiency through relatively thin walls
- A ‘Modern Method of Construction’.

Other green features include a sedum roof, sitting on a layer of insulation above the solid timber roofing, and double glazed windows made from composite aluminium / laminated timber, using super Low-E (low emissivity) glass which reduces maintenance and energy costs.
Stewart Milne Timber Systems were commissioned by Bellway Wessex to design, manufacture and erect the timber frame for a private flatted development in the Bedminster area of Bristol.

The project consists of three blocks of flats ranging from 4 to 7 storeys, built on a very challenging brownfield site close to the centre of the city. The first two blocks are 4 and 5 storeys tall and comprise 77 units over a total floor area of 5,700m². The third block comprises a total of 179 flats over 12,500m² floor area. Together the buildings represent the largest single timber frame development in the UK.

Timber frame was specified, rather than concrete or steel, for financial, environmental, and practical reasons. As flats had to be affordable for a mix of private and housing authority buyers, the building had to be highly cost-effective.

The timber frame system offered benefits in terms of speed of build, as well. This, coupled with the reduced time needed for remedial works, led to the framing works finishing 2 weeks ahead of schedule, in just 14 weeks, within the total project build time of just 9 months. As a result, developers saw a faster return on their investment.

The timber frame structure represented a big CO₂ saving on steel and concrete and its lighter weight reduced the amount of energy used in foundation construction.
This sustainable INTEGER (Intelligent and Green) development consists of 27 houses and flats built on a brownfield site, where the demolition of the existing redundant garages provided crushed hardcore for later use.

The timber frame package was delivered to site complete with factory double glazed and fitted window frames, ensuring better workmanship and fixing conditions, and reducing the site programme. Future projects will incorporate fully insulated and closed timber wall panels.

Prefabricated combined bathroom and kitchen pods were used and the flats and houses are designed with a vertical services core which allows all bathroom and kitchen plumbing, electrics, drainage and communications networks to be pre-installed within the prefabricated pods.

Each house has a south-west facing, two storey solar space off the living room, providing a thermal buffer in the winter and assisting thermal air movement of the passive stack ventilation system in the summer.

Exteriors are clad in low maintenance Western red cedar.

The scheme generates up to 20kW of electricity from photovoltaic panels, with surplus electricity sold back to the grid. Hot water is supplied from roof mounted solar panels. Heating is supplied from a central boiler.

Remote monitoring of meters and diagnostic monitoring of plant is available at the client’s offices.

Bree Day Partnership’s INTEGER schemes exceed current Building Regulations and fit comfortably within Energy Efficiency Best Practice in Housing’s (EEBPH) Best Practice Specification (www.architech.co.uk).

Picture credits:
Top: Bree Day Partnership
Bottom: Solar Century
**SCOTTISH PARLIAMENT, EDINBURGH**

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<th>Client:</th>
<th>The Scottish Parliament, Holyrood</th>
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<td>Architects:</td>
<td>EMBT/RMJM Ltd.</td>
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<td>Main contractors:</td>
<td>Laing O’Rourke</td>
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<td>Structural engineers:</td>
<td>ARUP</td>
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<tr>
<td>Joinery:</td>
<td>Cowley Structural Timberwork Ltd, Mivan and Timber Engineering Connections Ltd</td>
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- Laminated European oak trusses
- Scottish oak ‘well’
- Wood panelling / cladding
- Bespoke joinery Items
- Timber doors and screen
Drawing inspiration from the surrounding landscape, the flower paintings of Charles Rennie Mackintosh and the upturned boats on the seashore, Enric Miralles developed a design that he saw as “growing out of the land” where sustainability plays a key role.

Wood is used throughout the complex but is particularly prominent in the main debating chamber. With no internal supports, the roof of the chamber is supported on giant glue-laminated trusses, which span up to 22m from a curved steel tri-girder on the eastern façade to a series of tall concrete masts on the western edge. Secondary elements support the roof above the trusses so that the curved timber-clad ceiling appears to float.

With an ‘Excellent’ BREEAM rating for environmental performance in the areas of health and well-being, energy, transport, material selection and water usage and high scores in biodiversity, ozone-friendly design, and efficient use of water on site, the building’s sustainability credentials are equally impressive.

Elsewhere in the building there is extensive use of wood, whether in the bespoke furniture, the 600 or more solid timber doors, or in the roof lights featuring bow trusses made from laminated oak.

*Pictures courtesy of The Wood Awards 2005*
SERPENTINE GALLERY PAVILION, LONDON

Client: Serpentine Gallery, London
Architects: A. Siza and E.S. de Moura with C. Balmond
Main contractors: Bovis LendLease
Structural engineers: ARUP
Joinery: Finnforest Merk
Timber suppliers: Finnforest Merk

The Serpentine Gallery pavilion for 2005 was a dramatic 400m² arching grid of laminated spruce elements designed by the famous Portuguese architects Alvaro Siza and Eduardo Souto de Moura in association with Cecil Balmond.

An innovative reciprocal structure was used, in which interlocking elements of two grid-unit lengths were arranged in a mutually supporting pattern. This allowed each element to have simple mortice-and-tenon connections, yet maintain overall grillage bending stiffness. The grillage was clad externally with translucent panels that incorporated autonomous solar-powered lights.

The vaulted grid is reminiscent of the lamella barrel-vaulted roofs of 1920's Germany, but, while traditional lamellas were built from identical elements, each element of this pavilion has a different length and angle.

Requirements for high strength and dimensional stability led to the use of Kerto-Q, made from laminated veneers of Finnish spruce. Each element is numbered and put together in a specified sequence.

Top picture courtesy of The Wood Awards 2005

Grillage of laminated timber (Kerto-Q Finnish spruce)
The design approach deployed in order to meet the BREEAM ‘Excellent’ target and the Assembly’s constitutional responsibilities for sustainable development, involves a design life of 100 years, the use of indigenous materials, minimal energy consumption and waste, the application of renewable technologies and the ability to use the building as a sustainability ‘exemplar’.

This approach has yielded an environmental design which uses natural ventilation and passive systems to heat and cool the building which will reduce running costs by 30-50%.

Central cooling is provided by an earth heat exchange system, while a wood-fired boiler generates efficient carbon neutral heating using locally sourced wood chips or pellets.

The complex roof geometry incorporates six elliptical domes, whose undulating contours are covered internally by a slatted Western red cedar panel lining. Constructed directly over the debating chamber and continuing up to the roof level, is a stunning 12 metre high ‘funnel’ structure, also clad in pre-formed cedar panels that exactly follow the profile of the structure.

Western red cedar was selected both for its appearance and its flexibility once the individual slats were fabricated into panelised form - some of the panels were required to ‘flex’ to a radius of less than one metre. By laminating together a variety of cedar thicknesses, the entire installation was completed without the use of visible fixings.

A total of 60,000 linear metres of cedar was used on this 4,000m² project, all of which was supplied under the FSC chain of custody certification scheme through a specialist Cardiff-based company.

Top picture courtesy of The Wood Awards 2005
SOUTH BANK UNIVERSITY, LONDON

Client: The South Bank University
Architects: Building Design Partnership
Timber suppliers: Finnforest Merk
Structural timberwork: Cowley Structural Timberwork Ltd
Timber engineers: Parkman Ltd

- Glulam columns
- Glulam props
- Kerto LVL mullions and transoms
- Timber cladding
This building has several structural timber innovations. The curtain wall is 33.4m high and 30.1m wide. The mullions and transoms are made from Kerto Laminated Veneer Lumber, stabilised to the building frame by 250mm diameter glulam props.

There are two 6-storey Kerto-based pods serving as rooms for lectures, meetings, offices, coffee, etc. which are secured laterally to the building frame and supported by glulam columns.
THE SAGE, GATESHEAD

Client: Gateshead Council
Architects: Foster and Partners
Main contractors: Laing O’Rourke
Structural engineers: Connell Mott McDonald
Joinery: Abrahams & Carlisle Ltd, Benchmark, M&M Plasline, Watson-Brook

- American ash & European birch panelling (Hall one)
- Stained European birch panelling (Hall two)
- European birch panelling (Rehearsal hall)
Providing accommodation for three auditoria and a regional music school, the £70 million Sage, Gateshead is a key element of Tyneside’s regeneration.

Wood was used primarily for its aesthetic appearance, but also because it is easy to mould and has good acoustic properties. American ash for the main hall and European birch for the smaller hall and the rehearsal room are complemented by moulded plywood and sumptuous fabrics.

Based on the classic ‘shoebox’ shape, Hall one was designed to provide the optimum acoustic for a symphony orchestra, with surfaces shaped for the best sound diffusion and timber that is either very thick and/or directly bonded to the concrete structure to obviate low-frequency sound absorption. Wall surfaces incorporate a convex curvature (for low frequency distribution) and the timber battens diffuse the middle and high frequency sound. All other surfaces, including the balcony fronts and ceilings, also incorporate curvature and shaping to help promote sound diffusion.

*Pictures courtesy of The Wood Awards 2005*
THE FACULTY OF EDUCATION, CAMBRIDGE

Client: University of Cambridge
Architects: Building Design Partnership
Main contractors: AMEC
Structural engineers: Whitybird & Merk
Joinery: BCL Special Projects
Timber suppliers: Finnforest Merk

- Glulam timber frame
- LVL floor deck
- Red cedar gable cladding
- Larch panelling
Finished in 2005, the library and cafeteria building at the Cambridge Education Faculty has a glulam timber frame, which lends itself well to the curving forms and reflects the warm character and associations of the much-loved wooden libraries and communal halls of the University’s medieval colleges. All elements of the timber structure are exposed, from the soffit of the LVL floor deck through to the glulam joists and primary frames. Larch was specified for its warm, dark colour, and Western red cedar for the gable cladding for its durability.

As BREEAM did not include education or institutional buildings, a new set of criteria was developed by BRE which it is hoped will be used in the assessment of future university buildings.

All the timber is from sustainably managed sources and the building’s sustainability is enhanced by the timber’s low levels of embodied energy and good thermal efficiency.

Other features include natural ventilation, cooling by chilled beams filled with water, rather than air conditioning, automatically controlled high efficiency lighting and green tariff energy.

Public transport links are excellent, local amenities are close and provision has been made for cyclists. Water is conserved through low flush / flow fittings and an automatic leak detection system, while a Sustainable Urban Drainage System (SUDS) achieves a reduction of 50% in water surface runoff.

The impact of these features represents a significant cost benefit to the University, with reduced energy and water use, and reduced waste.
## PRINCESS ROYAL STADIUM, BOSTON

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<th>Client:</th>
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<tr>
<td>Architects:</td>
<td>BGP McConaghy Architects Ltd</td>
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<td>Construction managers:</td>
<td>Peter Griffiths Associates</td>
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<td>Structural engineers:</td>
<td>Finnmap Oy</td>
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<tr>
<td>Timber suppliers:</td>
<td>Finnforest Merk</td>
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</table>

- Glulam beams up to 30m long
- LVL beams up to 22m long
- Multi-faceted hollow-cored LVL columns
- ThermoWood® cladding
- External grade plywood
- Timber clad walls
- Laminated timber flooring
The Princess Royal Sports Arena, a competition arena combined with state of the art training facilities, is a showcase for the use of engineered timber. Extensive use was made of pre-fabricated elements, like the hollow-cored multi-faceted Laminated Veneer Lumber (LVL) columns, to achieve the required quality. The design incorporates a central glazed ‘street’ made up of curved glulam beams, glazed with 20% opacity polymer sheeting. Roof beams of solid LVL, weighing 2.25 tonnes each, achieve a span of up to 22m, while glulam beams achieve a span of over 30m to create the main roof structure.

Externally, the building is clad in ThermoWood®, which gains its hardness, durability and colour through heat treatment rather than chemical preservatives. Although no surface treatment is necessary, it has been coated in a light oak wood stain. The rest of the external cladding, used at a higher level, is external-grade ply finished in a lighter coloured stain.

The aerobics studio has timber-clad walls, a soffit of Finnish softwood and a sprung laminated floor that uses the properties of the timber elements to provide the ‘bounce’, rather than needing to support the floor on springs. This consists of an oak veneer on a laminboard of timber boarding on ply. It is the precise composition of this sandwich that provides the desired flexibility.
WHAT MAKES A BUILDING SUSTAINABLE?

A building that leaves as small an environmental footprint as possible, is economic to run over its whole life cycle, and fits well with the needs of the local community.

A building that is energy and carbon efficient, designed to minimise energy consumption, with effective insulation and the most efficient heating or cooling systems and appliances.

A building built with good access to public transport in mind.

A building built with a minimum of waste in its construction and the maximum re-use of on-site material, such as waste soil.

A building designed and constructed to enable its occupants to use less water, through, for example, the installation of more efficient fittings and appliances.

A building designed to make recycling and composting easy for the occupants.

For your free copy of BRE’s Building Sustainably with Timber, e-mail info@woodforgood.com

www.woodforgood.com