TIMBER IN ARCHITECTURE

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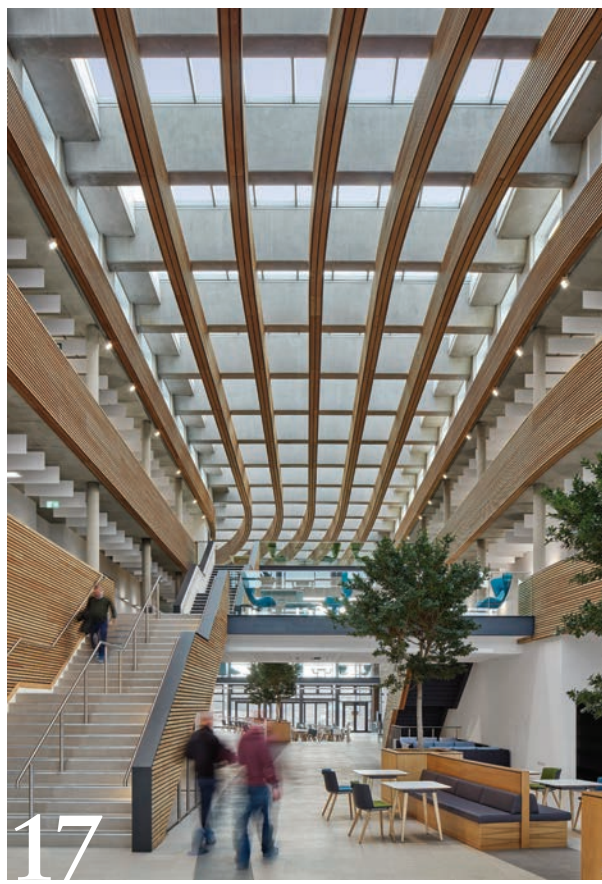
Timber in architecture supplement

CONTENTS

PROJECTS

FEATURES



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FROM THE EDITOR

Timber is undoubtedly the only all-natural material we currently know of that has such a wide range of applications in construction. Its unrivalled combination of beauty, sustainability, wellness, durability, strength and versatility means that it remains at the top of the list for many architects, and that's despite the recent setback of CLT being placed under threat for taller structures post-Grenfell.

As our contributor from the British Woodworking Federation confirms on page 7, there's no reason why most materials in a modern structure can't be made of timber. When it comes to CLT for example however, it would be useful to have some UK production to enable specifiers to shop around more locally, particularly as we confront the challenge of Brexit and a weaker pound forcing import costs ever upwards.

Many of the projects shortlisted for this year's Wood Awards feature intricately designed structures which demonstrate the potential of timber technology combined with advances in CNC machining to produce exciting and structurally robust forms. The timber may be sourced from Europe or further afield, but often the architectural and engineering expertise that's being employed to push it to new limits is home-grown.

Examples from the shortlist include architects Haworth Tomkins' ornate timber ceiling for the refurbished Battersea Arts Centre, providing great acoustics as well as a highly unusual but still fitting new look. Cambridge Central Mosque by Marks Barfield Architects sees the architects finding an alternative to stone vaults using engineered spruce, and albeit less high-profile, but no less impressive, Gianni Botsford Architects created a funnelling, grid-formed timber ceiling for a house in London that is simultaneously high-tech and organic.

In total, 20 impressive structures (as well as 12 new timber products) have been nominated for the Wood Awards 2019 shortlist. The shortlisted entries will be displayed at 100% Design, which takes place from 18-21 September, at London's Olympia. The winners will be revealed at the annual Wood Awards ceremony at Carpenters' Hall, London on 19 November.

I encourage you to visit the event to see examples of what can be done in timber, as well as delving into the case studies and news story subjects featured within this special supplement.

James Parker
Editor

ON THE COVER...
The interior of Polyvalent Hall in the Swiss village of Le Vaud is constructed exclusively from locally sourced white pine treated with a UV protected solution which will maintain the wood's bright colour.
For the full report on this project, go to page 12
Cover Image © Matthieu Gafsou

STUDENT ACCOMMODATION

A ‘new typology’ from WilkinsonEyre

WilkinsonEyre has completed a series of buildings housing undergraduates at the Dyson Institute of Engineering and Technology in Wiltshire. The landscaped village of modular timber housing pods, with communal amenities and a central social and learning hub, is based within the Dyson Malmesbury Campus. As well as establishing a “new typology” in student accommodation, according to the architects, the project breaks ground in the design, masterplanning and precision engineering of “truly modular prefabricated building technologies for rapid construction.”

Dyson Institute of Engineering and Technology is being hailed as a new model of learning that integrates a higher education campus into the context of commercial industry, research and development. The village will house a “new generation” of engineering students who will work alongside the Dyson Global Engineering Team and study for an engineering degree. The pioneering approach to materials and construction, and fresh thinking on student wellbeing echoes the ethos of innovation that runs throughout the campus.

The village is designed to accommodate up to 50 Dyson Institute of Engineering and Technology students plus visiting Dyson staff. The “living pods” are fabricated from cross-laminate timber (CLT) in a factory for rapid on-site assembly. The pods are arranged in units two to three stories high, to create a welcoming social space and an appealing addition to the campus alongside the larger industrial buildings.

Certain clusters involve some pods being cantilevered by up to three metres, “pushing the structural properties of CLT,” said the architects. The pods are also designed to harness CLT’s thermal mass, and provide high quality and energy efficient living spaces.

In terms of aesthetics, the timber has been left exposed throughout the pods’ internal spaces, including the kitchens and bathrooms, to create “warm and natural” living environments.

With wellbeing as a prime design consideration, each pod has been designed with natural ventilation and large, triple-glazed windows, individually angled to give each resident a view across the campus. The pods are clad externally with aluminium rainscreen panels, and, depending on their position within each unit, have sedum-covered roofs.

Dyson Institute of Engineering and Technology © Peter Landers

Measuring 8 metres by 4 metres, each pod has open-plan accommodation comprising an entrance zone with an adjacent shower and toilet, a central bedroom area and a work/living space, positioned to optimise the generous levels of natural light. The pods were manufactured offsite and each unit was delivered to site fully fitted with bespoke furniture and built-in storage, before being craned into position.

The pods are arranged in a variety of cluster configurations, within the crescent-shaped site, following the curve of a surrounding landscaped embankment. Each cluster consists of up to six units, including a shared kitchen and laundry space at mid entry level, and an entry area with reception and storage. To create the feel of a student village, each pod has its own front door, with lower pods opening onto landscaped gardens, and higher ones accessed by paths on curved earth ramps and stairs to the upper level.

The dynamic variety of configurations lends an “informal, residential character” to the village, said the architects. Green spaces and pathways “determine user movement through the village and mediate connections between the residential accommodation and the communal clubhouse – named the Roundhouse – at the centre.”

The Roundhouse, designed as a social space for students, is conceived as a freestanding, transparent and outward-facing circular pavilion. The lightweight steel structure is formed of two stacked cylinders, surmounted by an oversailing brise soleil roof. “Designed to mediate between the accommodation clusters and the wider Dyson campus, it is divided into the southern side – “transparent and social,” and the northern side, which is “metal-clad and functional”. Its facilities include a café, bar, lecture hall and study space.

Yasmin Al-Ani Spence, director of WilkinsonEyre, said “We are delighted to have worked with Dyson to develop this new typology for high quality student accommodation, creating an innovative community where students can learn, work and live on site.”

AWARDS

2019 Structural Timber Awards finalists are announced

A key industry event, the Structural Timber Awards is hailed by the organisers as "a celebration of innovation, best practice and expertise in timber technology." Taking place on 9 October at the NEC, Birmingham, the awards will showcase "innovative solutions and ground-breaking developments" from across the UK timber industry.

With over 200 entries representing "outstanding, pioneering projects, products and people" this year's panel of award judges have reportedly had a tough job shortlisting entries for each category. "The judges have been overwhelmed with the high standard and variety," said the organisers.

The finalists for this year's awards can be found at www.structuraltimber awards.co.uk/2019-finalists.

The awards will be presented to the at a high-profile dinner that is hoped to attract over 550 "national business leaders and high profile decision makers" from across the construction industry. The organisers report that half the tables have already sold, so it is shaping up to be a big networking event in the industry calendar.

To book tickets to the Structural Timber Awards please visit www.structuraltimberawards.co.uk

STRUCTURAL TIMBER AWARDS

RESIDENTIAL

Paul Cashin Architects' cladding of contrasts

Paul Cashin Architects have completed a extension to a Grade II listed property in the village of Twyford, near Winchester.

Marshall House dates back to the 17th century, although it was remodelled and extended during the late 18th century.

The brief was to replace an existing lean-to and 20th century conservatory with a new contemporary extension.

"The design was developed in close consultation with the local authority, in order to respect the existing property and work to achieve a positive planning outcome," said the architects.

The extension is accessed via a small link that provides a "clear distinction between the old and new structures." The design concept is centred on "the idea of contrasts." The link has been designed to give the effect of "walking through a portal into a seemingly different dwelling, that is modern, bright, light and airy with clean lines and white walls."

Externally, timber larch cladding was used as the primary material. This was painted black with a heavy duty, long-lasting barn paint. The black finish of the extension contrasts with the white painted brickwork at the rear and side of the original house. The external colour palette of both structures "is in opposition to the reality of the interior spaces."

The architects commented on the design of the building's exterior: "Although timber cladding is a fairly standard, commonplace material, visual depth and distinction has been created through the articulation of the boards." The inclusion of timber fins changes the way shadows are cast across the external surface during the day, while at night, these are illuminated by external lighting.

A secondary entrance to the house is provided through a concealed door that was also finished to match the cladding.

Windows and roof lights have been strategically placed in order to cast light over walls and corners in the extension to create "little nooks and private views." The overall form is informed by the "awkward shape and uses of the site," resulting in the walls not being parallel in plan and splaying out at different, irregular angles.

COMMENT

Growing opportunities for specifying timber

Kevin Underwood of the British Woodworking Federation discusses the challenges as well as wide-ranging benefits of using wood as a construction material

Wood, the world's oldest and most traditional building material, is increasingly being re-evaluated as a modern-day first choice for both structural and interior applications across domestic and commercial buildings. For example, the structural frame of the building, the roof trusses, flooring, walls, stairs, windows, doors and interior furnishings could in theory all be made from wood. As a renewable material coupled with modern manufacturing, wood is proving to be the catalyst for architecture and construction professionals in creating spaces that promote lower carbon emissions, longevity, beauty, and a real connection to nature.

The ability to create both structural and aesthetic features from wood is due to the wide range of natural species and fabricated products available today. From natural hardwoods and softwoods, plywood and chipboard, to glued laminated (glulam) beams and cross-laminated timber (CLT), wood offers unique properties to architects which are all underpinned by the material's inherent health and wellbeing benefits, added to its sustainable and physical characteristics.

Benefits of timber

The global movement towards creating spaces that are functional, practical and support the health and wellbeing of the building's occupants, has driven up the use of wood as a building material. There is a growing desire among the occupants of commercial buildings to work in an environment with a high use of natural materials, with research finding that employee wellbeing was 15 per cent higher in office spaces where natural elements were incorporated. Natural building materials have also been found to improve both the mental and physical wellbeing of people by helping reduce stress, blood pressure and heart rates.

From a functional perspective, wood also acts as a natural humidity regulator, which can absorb moisture from the atmosphere during times of higher humidity, and release moisture back into the atmosphere during dry periods.

In addition, for commercial environments durability is essential, and this is where the specification of timber has proven benefits.

REDWOOD IN THE CITY
George Barnsdale & Sons manufactured timber sliding sash windows with arched heads to match the original appearance of the Rex Building in the City of London

Take timber windows as an example, the 2013 report 'Whole Life Analysis of Timber, Modified Timber and Aluminium-clad Timber Windows' by Heriot-Watt University looked at a timber casement window made to Wood Window Alliance standards and found that the window had an expected average service life of 56 to 65 years depending on the level of exposure; double that of a PVCu window, which was found to have an average service life of between 26 to 35 years. This presents significant lifetime cost savings and longevity of build for both the current and future building owner.

Wood is also the key component of in excess of four million timber fire doors manufactured across the UK each year, which help to save lives and protect property every day. Many Fire Door Alliance (FDA) members have taken part in the ongoing Ministry of Housing, Communities and Local Government (MHCLG) fire door investigation post-Grenfell, where the findings so far have shown that FDA member doors marketed to reach at least 30 minutes of performance have resisted fire for as long as 54 minutes, surpassing the 30 minute requirement by 24 minutes.

Considerations

When specifying any material, there are considerations that need to be addressed and this can also be said for wood in commercial spaces. Many factors will be specific either to the building itself, the timeline of the project, or whether it is desired that a particular sustainability standard is achieved.

For example, wood flooring is ideal for many commercial environments and can be used in conjunction with a concrete, steel or timber structural base. However, awareness and correct specification of uniquely engineered timbers is needed when accreditations, such as BREEAM, are desired. Ongoing innovation in manufacturing technology and engineered wood products has resulted in the material being used where previously it may not have been possible.

The opportunities for wood in commercial environments are vast, and with technological advancements creating innovative new wood products we only expect these to increase

A prime example is the Woodland Trust Headquarters in Grantham, where the building achieves a BREEAM 'excellent' rating by passively absorbing the excess heat generated by the office during the day. At the site, precast concrete "radiators" were bolted to the ceiling soffits of the CLT floor panels to enhance the thermal mass of the building while retaining the use of wood as the main construction material.

When considering specifying windows and doors, alongside the regulatory requirements associated with their use, such as anti-ligature guards, measures to prevent finger trapping or to protect people from falling, other characteristics of wood windows and doors need to be considered. This includes the product's mechanical strength and security, weather resistance, thermal and acoustic insulation, heat and light transmission, operating forces, and long-term durability.

Further to this an important consideration of any product specification is its ongoing maintenance requirements. All windows and doors require maintenance regardless of the material from which they are made. For example, the surfaces of the glazing and frame need regular cleaning and hardware requires lubrication. Within their service life many will also require re-glazing and seals may need to be replaced, so it's important that all windows and doors are periodically checked for any damage or wear.

For wood windows and doors, should any minor defects in the coating be detected during the inspection, these can be simply retouched with a spot repair. This means that only a renovation coating needs to be applied to maintain the coating's sheen, colour and durability, which effectively prevents the need for full redecoration.

A clear demonstration of the longevity of timber products is the results from a recent trial at the Building Research Establishment (BRE), which involved BWF member Stora Enso Timber UK. The findings show that wood windows made from untreated heartwood redwood (pinus sylvestris) with a water based acrylic coating have remained in excellent condition after 14 years of south facing exposure with no intermediate maintenance, and will need only a simple refurbishment coat to extend their serviceability further.

The opportunities for wood in commercial environments are vast, and with technological advancements creating innovative new wood products we only expect these to increase. For architects seeking support, guidance and expert technical insight, the British Woodworking Federation provides dedicated design guides and a technical advice line.

Kevin Underwood is technical director of the British Woodworking Federation

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COMMENT

Assured solutions in a crisis

Andrew Carpenter of the Structural Timber Association says that the timber solutions already exist for building the energy-efficient low-carbon dwellings the Government is calling for to address the housing crisis, now underpinned by robust assurances

Offsite construction presents many new opportunities for an industry looking to improve productivity, reduce waste and deliver better quality buildings at a fast rate. Offsite technology is hailed as the solution to resolving some of the most challenging problems facing the construction industry today, most notably the shortfall in housing supply and the skills shortage.

The Government, industry funders, insurers and stakeholders together with contractors, housebuilders and clients, recognise the role timber technology must play in this vital area. And, despite the Government's initial attempts to constrain the low carbon agenda through the closing of the Zero Carbon Hub and scrapping of the Code for Sustainable Homes, it is growing in prominence, thanks to customers. Environmentally conscious clients are demanding sustainable building materials be used wherever and whenever possible, and this of course favours timber.

Environmentally conscious clients are demanding sustainable building materials be used wherever and whenever possible, and this of course favours timber

The Government's recent change of heart was probably best realised in their Future Homes Standard. As part of his Clean Growth strategy, the Chancellor Philip Hammond announced plans in the Spring Statement to develop energy efficient, low-carbon homes with the introduction of the Future Homes Standard. This will require new residential builds to be future-proofed with low-carbon heating and energy efficiency to make homes better for

QUALITY ASSURED
In 2018 the Structural Timber Association's STA Assure quality standards scheme became mandatory for members

Fortunately, we do not have to invent the solutions to develop energy efficient, low-carbon homes. We just need to make better use of what is already available

the environment. Our response to this strategy is unequivocal – we welcome the introduction of the Future Homes Standard, but we have to ask, why wait until 2025 and miss the opportunity to take these important steps now?

Fortunately, we do not have to invent the solutions to develop energy efficient, low-carbon homes. We just need to make better use of what is already available. Structural timber technology is seriously reducing carbon emissions across our housing infrastructure, and reducing energy bills for homeowners and tenants. Against this backdrop, the structural timber sector is witnessing unprecedented demand for technically advanced offsite manufactured solutions. It is therefore crucially important to ensure that quality and safety standards, underpinned by robust procedures, are at the top of the agenda of those operating in the sector.

A responsible approach

However, with opportunity comes responsibility, and this has never been better communicated than as outlined in the Hackitt Review. Dame Judith castigated the UK construction industry for its 'lowest cost' culture and insisted we need to be more collaborative and better integrated using digitalisation to be able to manage our assets. She insisted we place far more emphasis on quality. I am proud to say that this quality journey is something the STA has been on for many years.

Back in 2016 we developed a Membership and Quality Standards Scheme – STA Assure was launched early the next year and the initial accreditation was based on an online self-assessment declaration process. To add further standing and credibility to this initiative, at the beginning of 2018, STA Assure became a mandatory independently audited scheme. Its purpose is to inspire confidence in our industry and means that our customers can rely upon members to do the job properly. It has been particularly rewarding to receive widespread stakeholder endorsement from all the major warranty providers including NHBC, LABC Warranty, Premier Guarantee, Protek Warranty, Build-Zone Warranty, Self-Build Zone Warranty and ABC+ Warranty.

The STA Assure programme does not just cover the factory operations, but also extends to how structures are installed. This year saw manufacturing members make a firm commitment to using only accredited erectors that have completed the Timber Frame Competency Award Scheme. The assessment also includes a bespoke Offsite Award winning Site Safe audit – validating CDM compliance and Health & Safety Executive requirements for the protection and registration of timber structures during construction. This audit ensures that design and production processes and quality controls are in line with the customer's expectations for consistent, high levels of quality with continuous improvement at the heart of the manufacturer's culture.

Carried out by skilled assessors, the audit process is designed to be in-depth, supportive and informative. Not only does the independent audit validate the design, manufacturing and product realisation processes which offers reassurances to customers, it is particularly beneficial to promote areas of excellence and set standards for best practise principles.

STA Assure creates a clear distinction in the expected performance levels of member and non-members within the structural timber arena. By providing transparency, credibility and accountability, the STA safeguards the interests of end users, enabling them to partner with reputable member companies that will harness the multitude of inherent benefits that structural timber offers.

Andrew Carpenter is chief executive at the Structural Timber Association

HOUSING
The Government, plus industry funders, insurers and stakeholders, together with contractors, housebuilders and clients, recognise the role timber has to play in this vital sector of the industry

BUILDING PROJECTS

POLYVALENT HALL LE VAUD, SWITZERLAND

Climb every mountain

Challenged by steep topography, unspoilt alpine surroundings, and a devastating fire after its initial construction, the creation of a community sports and activity hall brought architect, client and locals together in the Swiss village of Le Vaud. Sébastien Reed speaks to architect Laurent Saurer

Situated just a stone's throw away from Lake Léman on one side, hugging the French border, and the Swiss Jura on the other, the village of Le Vaud is shrouded in natural beauty. It was this setting that predicted the commune's requirement for, above all, a sensitively packaged solution to its intensifying shortcomings in public amenity space. In 2013, the commune's local government opened the project up to competitive tender, paving the way for Lausanne and Zurich-based practice LOCALARCHITECTURE's first contact with the client.

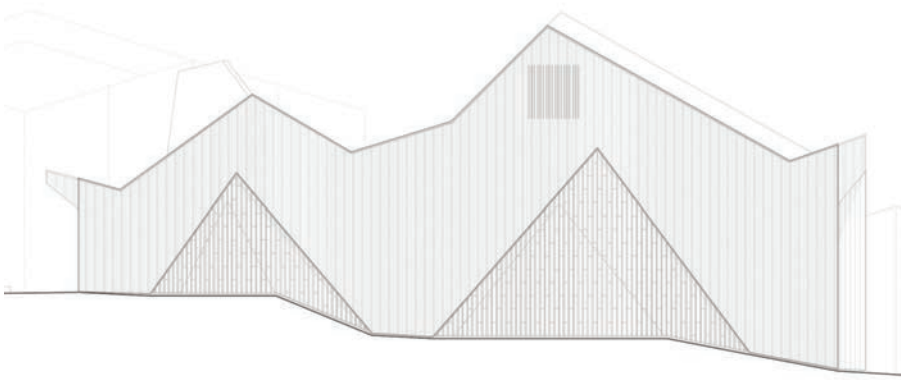
In addition to demands for additional space, the commune also wanted the design to make use of as many locally available materials as possible. Beyond that, entries were relatively free to experiment, explains Saurer: "Because it was a competition, they gave us a very small brief. We were very free to create something new and feel free, so each of the six projects submitted were very different." He continues: "The question of integration was key, though." According to the architect, it was the studio's sensitive design and placement of the project into site and surroundings that secured their selection to lead the design.

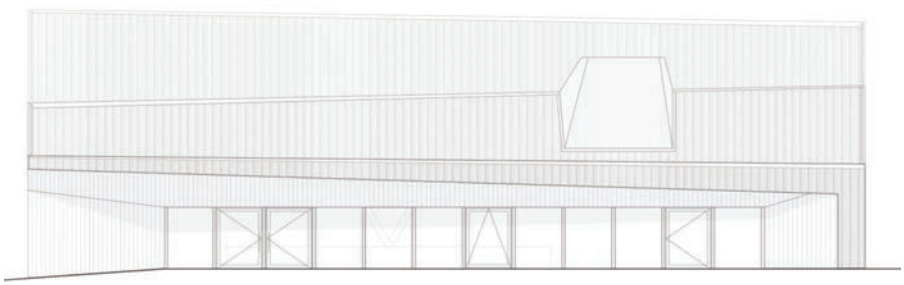
What distinguishes Le Vaud's new building from other villages is its unique story. Following initial completion in 2016 and one month before the building's opening, Le Vaud's Polyvalent Hall was entirely destroyed by a calamitous fire. While the event was a huge blow, it served to bring the architects, client – in particular Chantal Landeiro, president of the commune – and the local inhabitants, closer together. As a result of this, the architects gained a more profound understanding of the client's needs; essential to further fine-tuning certain aspects of the design for the rebuild.

A child-friendly form

The plot is situated adjacent to a path which also provides access to the neighbouring village church and cemetery to the west and a school sports field to the north. A concrete forecourt acts as a visual marker for the hall's entrance, and buffer to the road. Further removed are smaller residential units, largely in concord with the rural architectural language in that part of the world.

In plan, the building takes on a near rectangular shape measuring roughly 36 metres by 40 metres, however the eastern side of the building is marginally longer at both ends, forming a trapezium. The simple plan is balanced by the hall's relatively complex form characterised by two pitched roofs of varying height and





One of the client's requests was to incorporate as much local material into the building's construction as possible

width made up of seven planes which, according to the architects, make the scale of the building appear "ambiguous and abstract". A chimney structure also protrudes from the roof, nodding to the cottage typologies found in the region.

"Questions of form were very important," says Saurer. In terms of scale, the architects wanted the building to be "something within the measure of a child." It was important that the building's mass were restrained; firstly, to better integrate it into the village, which is made up of small buildings, and secondly, so it wouldn't appear intimidating to the younger demographic that make up a significant portion of users. The team was also keen for the building to react to the nearby mountains, and decided to orient the rooflines in parallel with the topography. The result "looks, in a way, like part of the landscape," remarks Saurer.

Drawing lines between the new hall and its context and as part of the client's brief, the architects specified only local materials for Le Vaud's new hall, with its exterior shrouded primarily in agricultural steel, like that used for farmhouses and agricultural buildings throughout the Swiss Jura. Triangular sections of slatted pine appear to sprout up from the building's east and west elevations, providing a shading system to the triangular window beneath, while the same slatted timber frames expanses of glazing recessed into the mass of the building right across the north and south elevations. Here, far-reaching views of the Jura mountains to the north, and Mont Blanc to the south are captured for users.

Uninterrupted space

"The interior works with the topography, too," says Saurer, "with some rooms hidden underground." The concrete forecourt doubles up as the roof slab of some of the accommodation on the lower ground floor of the building, housing numerous amenities such as lavatories, plant, small function rooms, a kitchen area, and storage areas for chairs, tables, and other equipment.

Set adjacently to the south of these dug-out spaces, the multifunctional sports hall is situated on the same floor. A stage is built into the body of the western wall to provide the necessary facilities for locals to enjoy live spectacles. An upper ground floor level acts as a balcony area spanning 18 metres by 16 metres which overlooks the hall from the northern side, as well as functioning as an entrance lobby for the entire building. Users can move easily between floors via a staircase on the north eastern side of the plan, providing access to the storage and plant rooms below.

Structurally, the hall's mass is supported by the load-bearing walls of the roof gables which allowed the architects to keep as much interior space as possible unobstructed. Aside from a minimal two-beam truss at the central ridge between the two pitched roofs, the interior is completely open plan. "You can walk 40 metres without encountering any pillars," remarks Saurer. In order to accommodate the various sporting activities and events programmed for the hall, the form of the interior shell deliberately diverges from that of the external envelope. Saurer explains: "Whereas the exterior reacts to the natural and built context, we designed the interior to best fit the norms of many different sports and activities."

The studio also worked in close collaboration with lighting designer Etienne Gillabert, who was particularly invested in minimising the clutter when it came to light fittings. "A traditional multipurpose hall would have a large light on the ceiling, but in this project," says Saurer, "we gathered all the lights to the main beam to emphasise the structure and offer a kind of purity." 80 spots, one every square metre, form a lighting grid which evenly illuminates the hall. Natural ventilation services the large spaces through hand-operable windows and openings on the north and south elevations which are situated to align with the prevailing winds in the region, while the smaller rooms on the lower ground floor benefit from mechanical ventilation.

Alpine source

With one of the client's requests being to incorporate as much local material into the construction as possible, the architects had only to look to the nearby alpine region for inspiration. "White pine is a very well-known Jura wood," explains Saurer, "it's very resistant and often used by farmers, so it was very natural to use in this context."

TIMBER TREATMENT
The timber elements on the exterior have been treated with Lasure varnish, which will allow the wood's hue to fade gradually as it ages from light orange to grey
All images © Matthieu Gafsou

PROJECT FACTFILE

Architects: LOCALARCHITECTURE (Laurent Saurer, Manuel Bieler, Antoine Robert-Granpierre)
Wood engineer: Ratio Bois Sàrl, Ècublens
Civil engineer: 2M ingénierie civile SA, Yverdon-les-Bains
CVS engineer: Weinmann-Energies SA, Èchallens
Lighting: Etienne Gillabert, Paris, Aebischer & Bovigny, Lausanne
Geometric engineer: Bovard & Nickl SA, Nyon
Client: Commune of Le Vaud
Built area (footprint): 1,209 m²
Volume: 9,207 m³

Timber elements on the outside are treated with Lasure varnish, which will allow the wood's hue to fade gradually as it ages. "Currently," says Saurer, "the exterior timber is a light orange colour, but the wood will eventually fade to grey, which will compliment the grey and black steel plate material on the rest of the building. It's the natural life of the wood."

White pine is used almost exclusively throughout the interior, constituting both the walls and ceilings. The wood is treated with a UV protective solution on the inside, helping maintain the wood's bright colour and keeping the internal spaces light-filled naturally. Also conscious of the noise expected from large swathes of children playing and the hosting of local functions, keeping acoustics under control was also a priority for the design team who, in response, specified a lightweight timber solution – Lignatur.

The prefabricated Lignatur elements incorporate cavities and perforations which not only provide acoustic treatment for the hall, but structure and thermal insulation too, all the while cutting down on the amount of material required due to their hollow design. The result, in Saurer's words: "You don't get the impression of being in a sports hall. It's more like a traditional stable, transformed into a contemporary object."

The primary sustainability benefit of using white pine comes from the reduced transportation costs that go hand in hand with specifying locally sourced materials. Naturally, the white pine also locks in significantly more carbon compared to some other choices, a contributing factor to the scheme's Passivhaus certification. "We think that every building should be very well insulated and should correspond to certifications," says Saurer.

You don't get the impression of being in a sports hall. It's more like a traditional stable, transformed into a contemporary object

Laurent Saurer

Reaping the rewards

Setting aside the fire that ravaged the first construction in July 2016 and the soul-searching that followed, Saurer says the most difficult part of the project "was the installation of the main beam over the sports hall." The U-shaped ridge beam of the main hall incorporates all the technical equipment required for sports activities such as rings, movable basketball hoops, and lighting, which leaves the hall ceiling free from any visible technology. Between these main beams, secondary structures made of Lignatur panels support the roof. Because of the size of the main beam – measuring 2 metres thick and 40 metres long, it also had to be split in two for transportation purposes, then reassembled on site.

The completed project has been awarded the Swiss award Distinction Romande d'Architecture 2019 and the 2019 International Wood Prize, as well as receiving an honourable mention by Prix Lignum, a Swiss co-operative promoting innovation in timber design. Notwithstanding industry accolades, for the client and Le Vaud itself, its Polyvalent Hall will have a far greater impact as a place where the community gathers and innumerable beneficial experiences are had.

When building the second time round, only minor changes to internal fixtures were made, making the end product and the original design submission very similar. When asked if he would change anything about the final design, Saurer responds with a resounding "no." He expands: "In a way, we've had the luck to do this twice. I think the project is incredible." ■

BUILDING PROJECTS

UK HYDROGRAPHIC OFFICE TAUNTON

All hands on deck

The UK's official agency for shipping and Royal Navy data has a new headquarters in Somerset, designed to push collaboration to the fore, in an open and fluid structure enhanced by timber throughout. Jack Wooler reports on how the AHR-designed project helps workers engage in a 'one team culture'

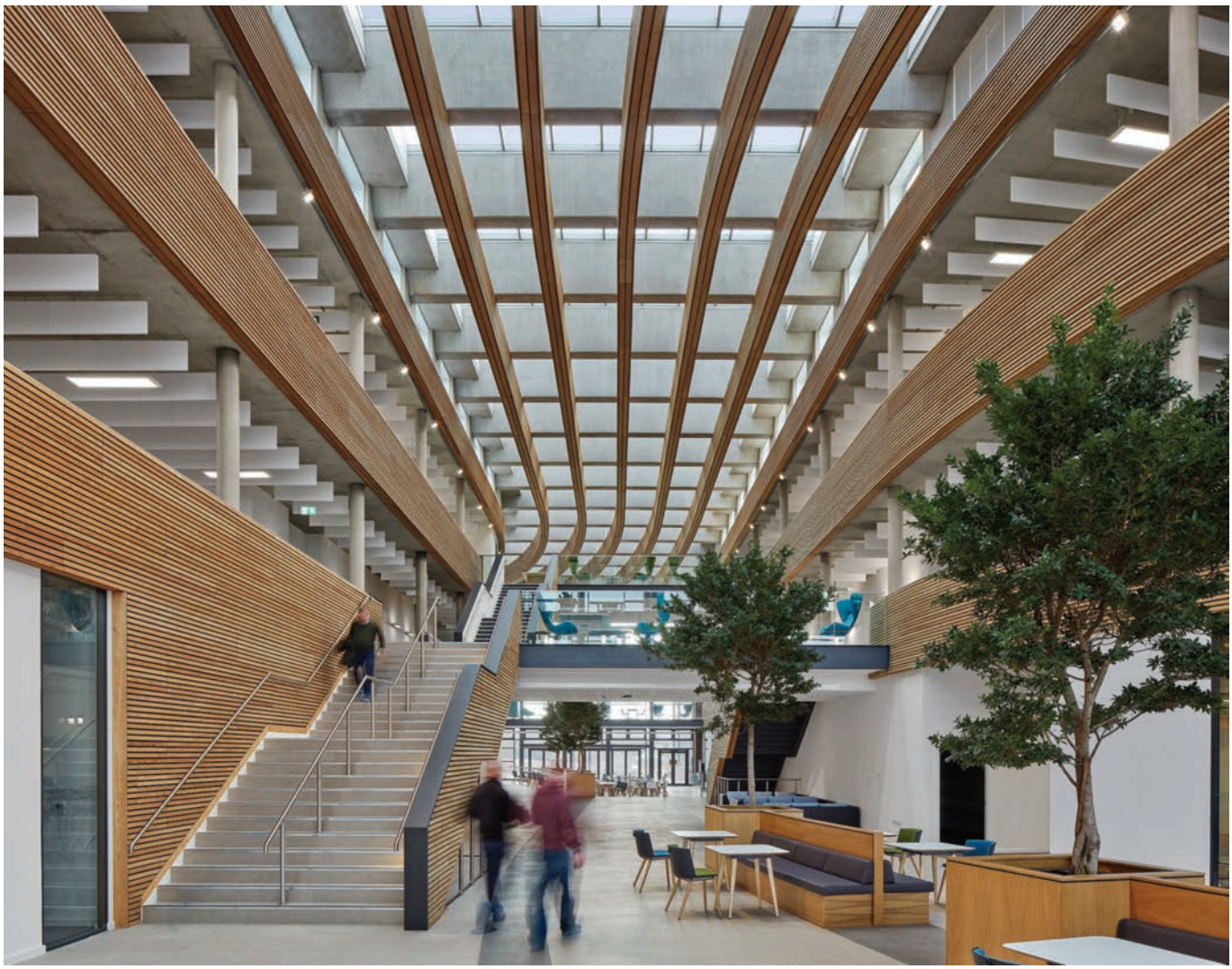
Based in Taunton, Somerset, the new headquarters for the UK Hydrographic office has reached completion, as what's claimed to be a unique timber-enhanced construction that provides an inspiring workspace for one of the world's leading marine geospatial information agencies.

The 11,000 m^2 building was created to deliver a specific vision of openness and movement, both in terms of its architecture and its functionality for its users. This has been realised as an open plan, collaborative environment, with key emphasis placed on increasing the ability of the staff to work together and choose how they do so, all within a healthy environment that heightens productivity.

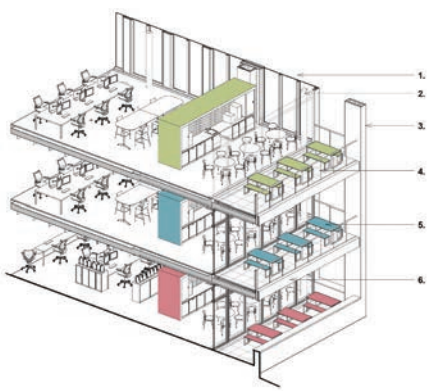
At three storeys tall, the building includes a range of amenities, including high specification office space, a staff restaurant, a gym, and meeting facilities for the Government agency.

A collaborative relationship

The UKHO wanted to replace its former buildings in Taunton, which were inefficient and expensive to maintain. As such, the



OPEN PLAN
The building's interior is an open, collaborative environment for the agency's staff to interact in



agency was looking to create an environmentally friendly new home for itself, which, as well as bringing financial benefits, they hoped would provide the up to date technology infrastructure and working conditions necessary to enable the organisation to sustain its long-term future.

Employed to enact this vision were architects AHR, engineers Hydrock, cost consultant Mace, and main contractor BAM, with the budget for the new office being met by the UKHO from business receipts as a self-funding agency.

AHR, awarded the design services contract in 2016, was reportedly chosen for its significant experience working on similar projects, in particular a new headquarters for Bath and North East Somerset Council – which had won a number of awards, including 'The best of the best' award 2015 from the British Council for Offices.

From the outset, there was an extremely close collaborative working relationship between the client and the practice, bringing UKHO staff into the design process and allowing the agency and its workers to contribute to the vision and eventual feel of the building.

When the practice first discussed the proposal with the client, Adam Spall, regional director at AHR, explains that the UKHO's aspiration was for "a 'one team' culture."

Spall explains how they approached this, telling that it was vital to create a "physical and visual connection between all parts of the building," which resulted "in an impressive sense of openness for such a large facility."

With this open facility now being completed, its success is testament to the collaborative approach undertaken. This is evidenced by its deliverance to an ambitious

timescale – completing exactly three years since initial work began in January 2016.

The speedy build process was enabled in large part by BAM, who achieved this by splitting the project into two phases, which allowed the car park construction required by the UKHO to be undertaken while the design and costing were completed for the headquarters building itself.

Agile workspaces

The building is in the main constructed as a system of two large interconnected floorplates, which bend gently in a controlled geometry in constant motion.

These two floorplates are connected on the ground floor by a dramatic 800 m^2 atrium. The fluid motion of the floorplates is continued in this space, with timber panels running along the twisted linear design. Looking upwards from the ground floor here, users see curving timber elements, adding to the sense of fluidity, ample daylighting coming between them from rooflights covering the atrium roof.

Connecting both sides physically and visually on the first floor are open balconies and bridges. The central atrium's large staircases lead users up to these levels, which provide access to the two symmetrically placed wings.

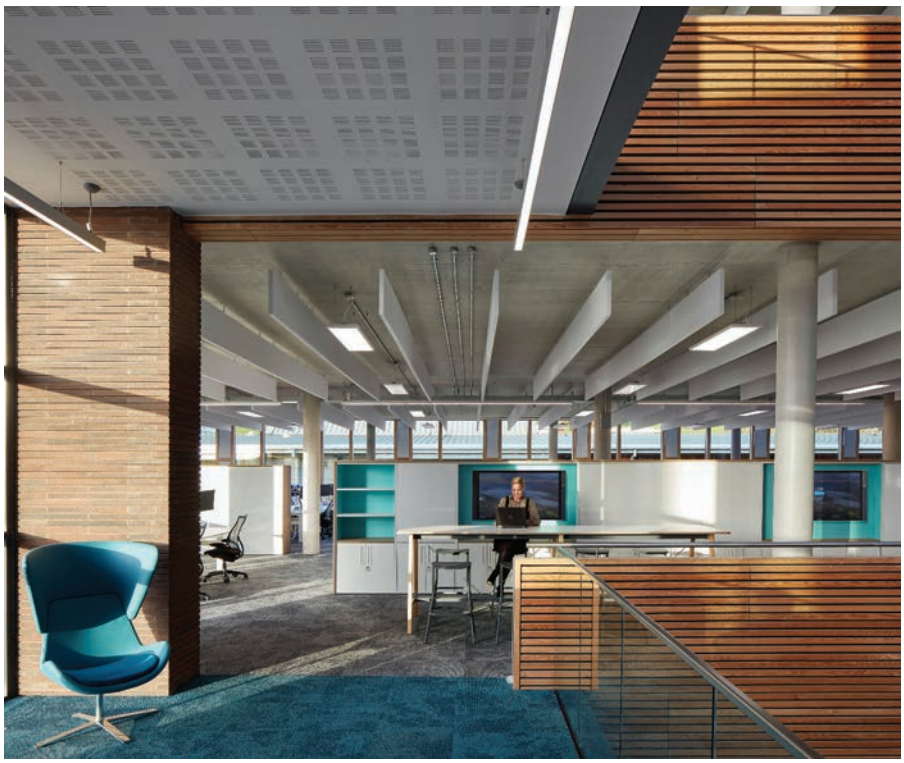
The occupants are encouraged to engage with this atrium as they move around the building, with provisions created for stimulating and creative encounters between colleagues. To facilitate this, there is a gradient of activity types with breakout and social spaces within the atrium, including collaborative and agile workspaces around the balcony edges on the first floor, and individual desking towards the perimeter.

Arranged around the atrium on both sides are the rest of the building's various amenities, including 700 desks across flexible work spaces, broken down into 10 smaller neighbourhoods with a range of work settings, including team tables, 'scrum' areas (as part of the agile working concept), height adjustable desks and quiet work zones.

These wide open working environments were a vital step in meeting the client's brief, creating the feeling that workers are all as part of the same space, able to interact and co-work with each other to make up a workforce that is more energised and synchronised to achieve their daily tasks – with acoustic and lighting barriers allowing for more private spaces where necessary.

CURVING BAFFLES
The ceiling of the atrium includes curving larch baffles to enhance the feeling of fluidity and contribute to acoustic control

This brief was intended by the agency to promote a cultural shift within the UKHO itself, prioritising the wellbeing and functionality of the 850 members off staff working in the building. As such, it required a building which cultivates this kind of collaboration, and provides a modern way of working with the ability to accommodate future business needs – and the design and engineering behind the new building allowed this to be achieved both subtly and efficiently.



SCREENS
Timber screening is found throughout the workplaces

Structure & design

The structural engineering design for the site is based on a concrete flat slab structure, chosen to fit the grid shape of the building, and for effective thermal mass and services distribution.

Hydrock's structural design solution ensures that, by day, heat generated by people and IT is absorbed in slab. At night, the vents then open up, allowing the heat to leave the building. The resulting exposed soffits have been designed in order to fit into the aesthetics of the structure itself.

Another interesting piece of structural engineering is the atrium, which is covered with 203 rooflights. The unique V-shaped pre-cast concrete beams that form the gutter to the atria roof support this extensive array – the beams spanning 10.5 metres to 16 metres. According to Hydrock, the advantage of using pre-cast concrete beams is that no access is needed inside the building for repair or maintenance, while on the outside it is possible to stand in the gutter to clean the roof lights.

Dermot Parkinson, project manager at BAM, explored the construction of the atrium further: "The atrium roof showcases our use of innovative, modern methods of construction within the delivery of this new headquarters."

He continued: "Designed as a kit of precast concrete elements and cast off-site only 5 miles away, it was installed using a 300-tonne crane in just 6 weeks. The 200 modular rooflights were installed safely from above, without the need for scaffolding and delivered significant time efficiencies."

The facades are a key part of this considered structural design, the brick work including 600 mm long bricks and horizontal larch panels which reinforce the linear concept that is present in all aspects of the design. This natural wood and brick finish conceals the concrete smoothly, and joins together precisely.

The holistic design concept of both the exterior and the building's interior reportedly took inspiration from the hydrographic office's work, following the theme of 'Seabed to Surface,' with images of strata, contours and water current influencing the aesthetic design throughout. This has been highly thought-out, with a bespoke artwork and graphics package having been developed with UKHO staff to follow this theme.

These bespoke graphics cover much of the building's interior functionality, carried through the signage, the IT facilities, lockers, furniture, and the graphics identifying a room's purpose, such as for meeting.

Throughout the design process, the team aspired to a high level of specification, always exceeding the 'minimum standard' in order to ensure the building is highly durable, agile, and will deliver for decades to come.

The whole project was modelled to BIM Level 2, with detailed inputs from the BAM supply chain that ensured all the exposed services were fully coordinated. This was achieved in part by the simple palette of materials employed, as well as early input of the supply chain – all in order to create a robust and well detailed building that could deliver a high quality throughout – and to a deadline.

Wellbeing

The brief was largely structured around not just the functionality of the building for its users, but on the wellbeing of the employees, and the necessity to achieve this in a highly sustainable, low energy format.

Being central to the design ethos, the team has succeeded in this through the adoption of a robust approach to sustainability, and by utilising natural light and ventilation sources where possible.

Thermal comfort models were undertaken by Hydrock to ensure that this ventilation strategy was sufficient to meet current and future climate demands, while meeting workers' wellness needs.

Chris Bowie-Hill, technical director at Hydrock, says that this adoption, "with the headquarters prioritising the wellbeing of the staff," has enabled the building's users to "be in control of their environment and access to fresh air on demand."

This is exemplified in the Building Management System which controls the opening and closing of the top half of every window in the building, with occupiers able to control the opening of the bottom half to give them an immediate sense of control over their environment – while the overall temperature of the building remains automated.

Copious amounts of natural daylighting compliments this ventilation, owed to the porous atrium and the 3.5 metre floor to ceiling heights, which both allow for significant levels of glazing, helping to reduce the need for artificial lighting.

Another aspect of wellbeing particularly important in an office space is noise distractions. The sinuous larch clad baffles hanging from the atrium roof – atria being areas that attract echo – are key in providing acoustic absorption. According to Hydrock, the acoustic design allows the workers to be able to comfortably speak at a normal volume throughout the open plan office environment. Alongside this – the baffles being an integral part of the passive environmental design – they also eliminate glare to the offices below by diffusing low angle sun.

As a result of the services strategy employed, the sustainable, low energy operation of the building means that the costs for installing, operating and maintaining fans, pumps and chillers were significantly reduced. This is helping to push the building's standards, with the project being on course to achieve BREEAM Excellent.

The project is also following the Government's Soft Landings (GLS) process, which provides a post-handover period to enable the UKHO to get the best out of its building and optimise environmental systems for both the building's expenses, and the workers' wellbeing.

The GSL process is beneficial because, while moving into a custom built structure should be a great experience, far too often there is a large gap between what the client expects of a building and the end product.

The Government process promotes early engagement, providing a framework from 'before the beginning,' where a construction project can fulfil a need, right up to annual post occupancy evaluations for three years after occupation to ensure the end users' needs are being met.

Strong reception

The project has been extremely well received by the wider community, including achieving the RIBA South West Award 2019, the RIBA South West Sustainability Award 2019, and the RIBA Awards South West 2019 Winner of the Commercial Category.

The building's users, too, have been vocal in their approval. Jo Funnell, new build project manager at UK Hydrographic Office, for example, lauds the project team's work: "I am delighted with the outcome of the project and the standard of the building. The collaboration between all parties has been the key to the project's success.

"The new environment will support smarter ways of working at the UKHO, using new technology and modern office practices, which is hugely exciting for our business. The design and quality of the building is something we can all be very proud of having delivered in Taunton."

With critics and users happy with the building, the AHR's designs are set to provide a significant legacy for the UK Hydrographic Office – not just in terms of a striking and fluid use of timber and brick, nor its porosity or heavy focus on wellbeing, but in its role as an exemplar in how offices can be run; it is open, engaging, comfortable, and even inspirational. ■

AWARDS
The project has won several RIBA awards since its completion at the start of 2019

Modification, innovation and sustainability

Dr Andy Pitman of Lignia Wood Company discusses how the UK timber industry is embracing change and innovating – for the benefit of the environment and the customer

All over the world we are surrounded by wooden structures of all ages, shapes and sizes. They range from the ancient temples of Japan and oak framed medieval buildings of Europe constructed from intricately jointed timbers sometimes fixed with timber pegs, through to more contemporary structures constructed from laminated timbers. Its excellent mechanical and thermal properties, beauty, ease of working and widespread availability has made timber the material of choice for construction across the centuries.

However, the popularity of timber in construction has placed huge pressure on the planet's natural resources. According to the FAO (the forestry department of the United Nations), seven million hectares of forest were lost between 2000 and 2010, much of it for timber, but most for agriculture. Satellite monitoring has enabled deforestation to be monitored real-time just as we have become aware of the important 'eco-services' forests provide, including carbon capture and storage.

To help combat this problem, timber used

to manufacture construction products is increasingly sourced from sustainably managed forests. Timber qualifying for Chain of Custody certification is harvested from legal and well-managed forests and timber is traceable from 'forest through to product'; the Forest Stewardship Council (FSC) runs one such well-known scheme. The industry has embraced certification and has worked to improve use of available resource.

Changing face of timber

In the past, where products were required to resist decay, be strong, stable, or beautiful, these were manufactured from a small number of timbers possessing one or more of these properties. For this reason, many of these timbers have been overexploited and their continued use is no longer sustainable. This led to a search for methods to improve the properties of more readily available species.

Timber modification provides a solution to this issue. Studied since the early 20th century, wood modification technologies started to be commercialised in the 1950s, competing at that time with high-value timbers, which had not been overexploited. Commercialisation re-emerged in recent years, driven by need for alternatives to unsustainable tropical hardwoods.

Modification differs from preservation in that biocides are absent in the process. This is addressed in Callum A.S Hill's comprehensive review text 'Wood Modification,' in which he states that the process "should not release toxic substances during or at end-of-life".

Primarily, species to be modified are sourced from rapidly-growing softwood trees from certified plantations resulting in an environmentally friendly, more-than-worthy alternative to its established predecessor. The modification process improves one or more properties. The objective is that these softwoods have properties that are valued, primarily for their beauty, durability, strength and stability.

Currently a number of modification technologies have been commercialised. One such well-established method is acetylation, a form of chemical modification which alters bonding of water to wood, thus improving its resistance to decay and stability. Another, thermal modification, as the name suggests involves heating the wood to change its chemical structure and properties.

An overarching benefit of these modified woods is that they are, in a sense, 'designed' to have less variation in terms of their properties. There is stringent control over the quality of materials used and in the process of manufacture. This is apparent in modified woods' resistance to decay. The variation of heartwood – the central wood of a tree – in a single species may vary in the extreme dependent on the source of the material. The modification process significantly reduces this level of variation.

The future

The versatility of modified wood means it's applicable to almost all areas of traditional woodworking, in both internal and external projects. Its durability makes it ideal for cladding and exterior decking, its stability and hardness for flooring and its aesthetic appeal and thermal properties have seen it used for building interiors and furniture. These factors are essential, and modification technology means resources are now plentiful and readily accessible. Rather than simply aiming to operate within the confines of sustainability regulations, industry leaders can now look to create an environmental blueprint for the timber trade for years to come.

Manufacturers' green credentials are under the microscope now more than ever and the market is set to grow exponentially in the coming years, as the demand for sustainable material ramps up. An increase in the variety of timber species available for modification is expected – including those that grow in the UK.

Dr Andy Pitman is technical director of Lignia Wood Company

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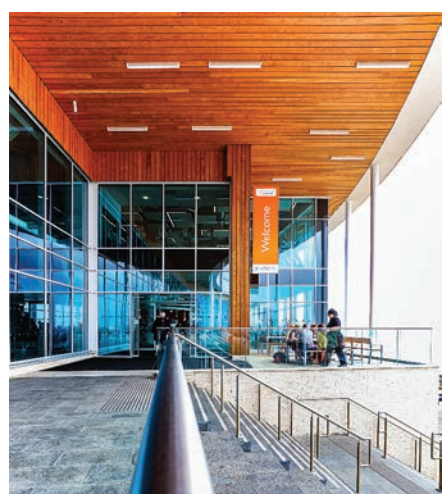


Is your timber specification fit for purpose?

Janet Sycamore of the Timber Decking and Cladding Association discusses why and how the details of timber protection needs to be embraced to ensure specifications are always fit for purpose

Knowledge of fire protection terminology in the design and build sector is woefully low. That's according to a recent survey of architects by the Wood Protection Association (WPA). The findings of this survey came as no surprise to the Timber Decking and Cladding Association (TDCA), which has long held the view that poor specification of preservative and fire protection treatments leads to compromised timber performance.

The TDCA and WPA exist to support architects and specifiers in their correct choice of timber. This specialist knowledge and expertise must be embraced throughout the industry to ensure specifications are always fit for purpose.

The extent of natural durability

How to correctly specify timber for durability is a common question asked of the TDCA. Some timbers (mainly hardwoods) offer natural durability. They can withstand outdoor and ground contact for a determined service life without coating or treatment.

BS EN 350: 2016 provides durability classifications for different timber species. There are five classes, Class 1 being the most durable. A table detailing the expected service life of different species for various locations can be found in BS8417 (the British standard for wood preservation).

When to specify preservative treated timber

If you're intending to use a softwood timber outdoors, some level of factory preservative treatment will most likely be necessary. For outdoor use, timber is generally treated to Use Class 3 or 4 dependant on application, be it above or in ground contact.

A proven method for decades, pressure treatment involves impregnating the decking or cladding timber with a wood preservative (most commonly, copper-based). It's a tightly controlled procedure with checks for the level of treatment and how far the preservative penetrates. BS8417 details the specific requirements for timber preservation.

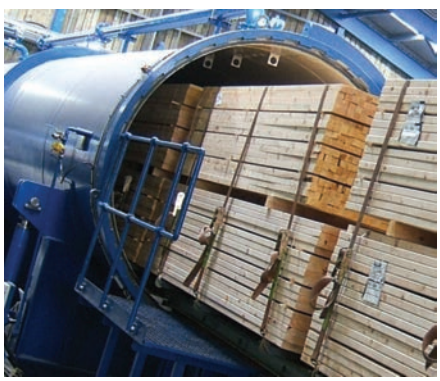
Not only will the right specification of treatment achieve the desired service life, it will also lock up carbon for longer and enable less durable timbers to be effectively used for longer-term applications; an environmental boon.

Modified woods are a more recent innovation gathering pace. They employ processes that physically alter the timber

VODAFONE BUILDING
Glenalmond Abodo cladding to the building in Christchurch, New Zealand is made from thermally modified softwood

Euroclass	For all construction products excluding flooring
Class F	Products for which **no reaction to fire performances** are determined or which cannot be classified.
Class E	Products capable of resisting, **for a short period**, a small flame attack without substantial flame spread.
Class D	Products capable of resisting, **for a longer period**, a small flame attack without substantial flame spread.
Class C	As D but satisfying more stringent requirements and showing **limited lateral spread of flame** under thermal attack by a single burning item (SBI).
Class B	As C but satisfying more stringent requirements and showing **very limited lateral spread of flame** under thermal attack by a single burning item (SBI)
Class A	As B for SBI reaction plus no significant contribution to fire load and growth (**A2 – limited combustibility**) or no contribution in any stage of the fire (**A1 – non-combustible**).

EUROCLASS
Reaction to fire test results are expressed as Euroclass classifications to EN 13501-1



to improve durability and many other characteristics. The result is a much wider choice of materials for specifiers to consider.

Documented evidence is available from all accredited timber treatment providers. Architects must ask and retain this proof to demonstrate the product will meet the anticipated service life.

Getting to grips with improved fire performance

A risk assessment or Building Regulations usually prompts the need for flame retardant treated timber. Fire (or flame) retardant treatments work by making the wood more difficult to ignite and by slowing the spread of flame, smoke and burning droplet generation, giving more time for evacuation and lessening damage to the structure.

Wood and wood-based panels are generally treated to Euroclass C (limited lateral spread of flame, like a BS476 class 1 rating) or Euroclass B (very limited lateral spread of flame, like BS476 class 0). Treatment involves the impregnation of timber under controlled conditions.

The smoke rating will be given as an 's' value, and the burning droplets rating as a 'd' value.

Classification Reports exist to verify performance. They will detail timber species, thickness, substrate e.g. plasterboard, and whether the tested assembly incorporated an air gap or not. Deviation from any of these test specifics – e.g. thickness of the wood – will make the performance certificate invalid.

Timber treatment is a complex and essential aspect of specification. By knowing what you're looking for, and appreciating what documentation should be available, you'll ensure effective specification every time

When specifying flame retardant timber, always check the material description in the Classification Report against the material to be used in your project. Species, size and intended use should match exactly. Only then do you have the right evidence to confirm your product's ability to perform and to comply with the requirements of Building Control officers or insurers.

CE marking and Declaration of Performance

Timber cladding and wood-based panels are subject to CE marking. CE marking compliance is the responsibility of the organisation that brings cladding and panels into the marketplace, and means the product must be accompanied by a Declaration of Performance (DoP).

Usually drawn up after treatment of a wood product against fire, insist on a check to ensure your specification matches the DoP. If you need more detail, ask for the product's Reaction to Fire Classification Report. This is issued by an independent fire test certifying organisation such as Exova.

Where to seek help

Timber treatment is a complex and essential aspect of specification. By knowing what you're looking for, and appreciating what documentation should be available, you'll ensure effective specification every time.

The WPA has a series of fact sheets to help you, in addition to a CPD accredited course. Telephone helpdesks are available at both the TDCA and WPA. When it comes to timber protection, there's no reason to make poor specification decisions.

Janet Sycamore is the director of operations at the Timber Decking and Cladding Association

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Looking past the uncertainty

Gavin Knowles of Howarth Timber & Building Supplies on why scrutiny needs to be applied to ensure correct product specification, which is also being applied to the industry

The construction sector is the second largest consumer of plastics behind retail, however the industry is now starting to focus on ways in which it can improve its sustainability and green-credentials.

A way in which this can be achieved is replacing plastic and PVCu products, such as doors and windows, with timber alternatives. However, there is potentially a real danger of unintended consequences from making the switch, especially if the replacement products don't reduce the environmental impact.

One way in which to check the sustainability of timber products is through life cycle analysis and Environmental Product Declarations, as well as chain of custody certifications.

Technology can now be used to target the tracking of timber as it moves through the supply chain to guarantee authenticity of the timber's origin, while other technologies focus on aggregating, analysing, visualising and verifying supply chain information. However, both are still quite rare within the industry.

More is now being done to highlight the importance of using sustainable products within construction. The WWF (2020) accord on biodiversity has gained significant traction within the EU, and has resulted in stepped up efforts when it comes to implementing strong nature and environmental laws, including timber logging.

The new reality is that wooden windows and doors are kinder to the environment, biodegradable and absorb CO_2 from the atmosphere. Recent studies have found that when properly protected with paint or woodstain, timber windows and doors last

Technology can now be used to target the tracking of timber as it moves through the supply chain to guarantee authenticity of the timber's origin

twice as long as PVCu. Reducing the number of windows and doors that become landfill is good for the planet and they sport top-end, performance double glazing; ensuring that any loss of energy is further minimised – keeping heat inside the home where it is most beneficial.

Reaching new heights

One area where timber products have come under particular scrutiny is cladding, following the Grenfell disaster. New legislation has shaped how timber cladding can be used, with it no longer being allowed to be used more than 18 metres above the ground.This has had a significant impact and means there is no definitive answer on the next steps. What we do know is that the only materials allowed will be those classed as A1 or A2 under the European Reaction to Fire classification system, which includes materials such as metal, stone, glass and plasterboard.

Any product that is combustible cannot be used within anything classified as a new building, while anything above 18 metres has to be fully non-combustible, which will rule out all current timber products. Testing is currently underway to try and find a solution which will allow timber products to meet the new stringent fire regulations.

Timber doors make their mark

While internal doors have nearly always been timber, there has been a shift into requiring an internal timber door that is both sustainable and adds value and saleability to new builds. Increasingly specified by leading housebuilders, doors such as the Suffolk door from Howarth Timber are chain and custody certified, while aesthetics can be significantly superior to pine or white moulded doors.

Regarded as the new 'wooden door effect,' this style of doors is proven to make a property more sellable, while offering it as an upgrade offers an extra revenue stream for homebuilders. Available at three separate price points depending on the specification level, even the most affordable option still offers the same levels of green credentials, giving peace of mind to both the builder and their buyers.

Gavin Knowles is marketing manager at Howarth Timber & Building Supplies

Brimstone poplar: perfect cladding for sustainable homes

Brimstone poplar, the innovative, British-grown cladding from Vastern Timber was the natural choice for twelve affordable and sustainable homes in Shropshire.

The project required a timber cladding product that was British grown, durable and stable, and one with a lifespan of over 50 years. Vastern Timber supplied 2,000m² of Brimstone cladding, produced from thermally modified British grown poplar. Thanks to the modification process, Brimstone is ideal for outdoor use and a great alternative to imported hardwoods. This beautiful cladding greys naturally, helping the buildings to blend in with the landscape without the need for any ongoing maintenance.

Affordable, sustainable and locally-sourced

Built to Passivhaus standards to reduce ongoing fuel costs, these homes are at the forefront of sustainable residential development. Commissioned by South Shropshire housing association, they were designed by Architype, the award-winning sustainable architectural practice and built by SJ Roberts Construction. The homes sit comfortably in their rural surroundings, thanks to the use of locally sourced natural materials - including roof tiles from a nearby quarry, locally produced lime render, and Brimstone poplar, a British-grown timber cladding.

Brimstone: thermally modified cladding

Beautiful, versatile and modified to last, Brimstone is a new breed of thermally modified timber for external applications. The natural, toxin-free modification process removes moisture, resin and other extractives from the wood. The result is a durable, stable and consistent material – with Class 1 Durability and low risk of bending or warping.

Perhaps most importantly, Brimstone is produced from the UK's own fast-growing hardwood species. Using homegrown wood helps to cut carbon emissions, but more importantly it supports the management of our native woodlands. The Brimstone range is GIB certified, which means that architects, builders and their clients can be sure of local provenance and good woodland management.

01793 853281 www.vastern.co.uk

Historic building retains regal charm

Number One Queen Anne's Gate is a prestigious development of 27 luxury private residences situated adjacent to St James' Park in London. **George Barnsdale's** experience of working with different types of retained facade and steel framed systems was invaluable in managing this fenestration project. A range of like for like timber sash and casement windows were manufactured, some with single glazing and acoustic glass. Putty glazing beading and Grandis Hardwood doors were recreated and installed to complement the existing door sets. Acoustic laminated glass was incorporated into the design.

01775 823000 www.georgebarnsdale.co.uk

High quality timber engineered products

Established in 2003, **Deckbuilders UK Ltd** are a leading member of the Timber Decking and Cladding Association, designing and constructing high quality timber engineered products including: Decking, Balconies, Cladding, Timber Buildings, Bridges, Walkways, Viewing Platforms, Pontoons and Jetties. The company offers a full design and installation service, and can carry out a full survey, giving you assurance that you are working with experts who will carefully manage every aspect of your project up until the final sign off on site. Please call Deckbuilders UK Ltd if you have a project in mind.

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The Future of CLT Construction

Buildings are the sum of many parts and we need a full portfolio of materials to achieve the best outcomes in terms of, performance, sustainability, safety, durability, efficiency and cost. Since the new Building Regulations came into force on 21 December 2018, much has been written about cross laminated timber (CLT) – here Andy Goodwin shares with ADF how B&K Structures have planned for such an event and have taken a pragmatic approach to embrace the new protocols

B&K Structures are not engineered timber purists. Our business model focuses on hybrid construction solutions – however, CLT is by far the most exciting revolutionary building material of the 21st century and will be significant in our future development plans. Only now are we truly realising the full capabilities of this strong, sustainable and technically advanced structural solution and the new regulations will not stifle innovation.

The UK has a magnificent heritage of timber architecture dating back to the thirteenth century. We are now building on this legacy using ground-breaking engineered timber systems. We develop high quality, low carbon projects for a wide range of clients throughout the UK and through our robust, integrated supply-chain, B&K Structures are dedicated to finding the best solution.

Putting the changes in to perspective

Changes in the Building Regulations have restricted the use of engineered timber in the external wall elements over 18m, that is circa six-storeys. To put the changes in to perspective, we have constructed in excess of 50 cross laminated timber projects over the past 15 years, of which only three would have felt the impact of the regulatory change and a cost neutral wall solution would have been simple to implement.

The engineered timber sector by its very nature, is founded on innovation – we are pioneers of sustainable construction and with modifications, B&K Structures will ensure building highly sustainable CLT structures over six-storeys is not only possible but also highly practical.

The restriction applies to the external walls of residential accommodation, care homes, hospitals and school dormitories over 18m. The rest of the building including internal walls, floors and roof can therefore be formed in CLT. This equates to approximately 80-90 per cent of the overall structural frame.

In anticipation of the government

announcement, we have been working in close collaboration with our supply chain partners to develop alternative through-wall solutions that can be implemented with a primary CLT superstructure.

Our non-combustible unitised wall panel systems have been developed with leading industry supply chain partners. These systems replace the cross laminated timber elements from within the external wall line with a hot rolled structural steel carrier frame and non-combustible SFS infill wall panels, the remainder of the structural frame will be constructed in CLT, which is totally compliant with the regulatory changes.

As part of the research and development of these compliant solutions, careful consideration has been given to the design interface between the CLT superstructure and the SFS walling system. The SFS system and associated connection details have been designed to take in to account increased load cases attracted by traditional brickwork, heavier brick slip systems and balcony locations. Importantly the system is cost and programme neutral.

We have been instrumental in the development and growth of the CLT market in the UK, and through continued collaboration with our supply chain and industry stakeholders, this will continue. The latest Building Regulations merely change the way we construct the external walls to residential schemes above 18m. We will continue to work with our clients to ensure that any new projects are designed and delivered in accordance with the new Building Regulations.

Over the last 10 years CLT has been emerging as a sustainable and cost-effective building material of choice and a vital component in the battle to reduce carbon emissions in the construction sector. We must consider the specification of materials when constructing large scale developments to ensure we minimise the impact on the environment, not just for us but for the health and wellbeing of generations to come.

Products and Services

Operating since 1974, B&K Structures has worked with some of the UK's renowned clients to develop outstanding buildings with green credentials. For more information on their product portfolio and full range of services, please contact the company.

01773 853 400 www.bkstructures.co.uk

Design Flexibility & Performance from Scotframe

Val-U-Therm® PLUS Future Proof Solutions

Val-U-Therm PLUS® wall panels achieve 0.08 W/m²K – probably the best U-value wall in the world. Couple this with Scotframe's expertise & track record and the sky really is the limit when it comes to design of buildings that tick all the boxes on your clients' wish lists.

Key to achieving this extraordinary performance is that the insulation is injected in off-site, quality-controlled factory conditions. The foam expands into every nook and cranny, providing a best-in-class BR443 U-value correction factor of zero. As well as excellent thermal insulation performance, details are available to minimise thermal bridging and give excellent airtight fabric levels.

The Scotframe Val-U-Therm® building system was originally launched in 2011 and has been used in over 8,500 homes with an excellent track record. A UK market leader in full timber frame packages for new housing and commercial projects, Scotframe exclusively offers the Val-U-Therm PLUS® closed panel building system. This is accepted by financial institutions, NHBC, Premier Guarantee and Checkmate – the panels have a 60-year minimum service life.

Because it's a hybrid of the best aspects of SIPS and timber frame technology, coupled with the latest advances in material science, it offers much flexibility and innovation in the design and build process. The unique combination of design opportunities includes:

- Can be used for walls, roofs and floors
- All types of design and architecture, even curved walls and roofs
- Can be thermally engineered to perform as an optimum combination
- Unrestricted elevational treatments – brick, stone, render, cladding, tile, timber, etc.
- All interior finishes and treatments
- Large-span roofs with vaulted ceilings, if required
- Dramatic open-plan layouts offering lifestyle flexibility
- Extensive glazed features and uninterrupted roof-space living areas
- BBA accredited building system, including in-fill panels in other building systems

Couple this with its exceptional thermal performance and sustainability, Val-U-Therm PLUS® provides a straightforward and cost-effective way for architects to hit energy efficiency, air permeability and other environmental targets. It offers a fit-and-forget, future-proof solution, whatever level of environmental specifications are required – for example, 'A' rated Energy Performance Certificates, PassivHaus or the highest levels of energy saving and carbon neutrality.

The patented Val-U-Therm PLUS® is also inherently sustainable due to careful sourcing of raw materials with a minimal environmental impact. Scotframe's timber is sourced from FSC and PEFC sustainably managed forests and the insulation in Val-U-Therm PLUS® panels is based on renewable vegetable oil, has zero ozone depletion potential and is CFC, HFC and HCFC-free with a Global Warming Potential of less than 5. This means it has a BRE Green Guide A/A+ Rating – the same as straw bales or sheep wool yet is hydrophobic offering flood mitigation.

From the UK's first PassivHaus for rent (which won a Green Apple Award) to examples that significantly exceed the PassivHaus standard, Scotframe has been leading the way using Val-U-Therm® technology in energy efficient building for many years.

The Maryville PassivHaus delivered a total primary energy demand of 69 kWh/m²a (exceeding the PassivHaus requirement of 120 kWh/m²a). This 'Fabric First' approach is also suitable for commercial buildings – the Rocking Horse Nursery at the University of Aberdeen, which caters for 78 pre-school children. achieved an air tightness of 0.475 ACH.

Hence Scotframe homes and buildings are warm and draught-proof in winter, cool and well ventilated in summer, healthy for all the family and enjoy remarkably low energy bills. Scotframe Val-U-Therm PLUS® allows the construction of typical family homes that can cost less than £95 a year to heat.

The great news is that building to these high standards is not necessarily more expensive or time consuming using Scotframe Val-U-Therm PLUS®. Edinburgh Napier University compared the cost per square metre of superstructure using 10 different building systems.

Scotframe Val-U-Therm® cost £1092 when built to PassivHaus standards, while the other nine systems ranged from £711 to £1138 when built only to existing Building Regulations. It took 65 days to build a Scotframe home to PassivHaus standards; the other 26 homes ranged from 49 to 126 days to build, again only to Building Regulations.

So, if you are looking to design a dream home or superlative building – think Scotframe Val-U-Therm PLUS®.

Scotframe Timber Engineering and Val-U-Therm are proud to be part of the Saint Gobain Group of Companies.

01467 624 440 www.scotframe.co.uk

‘Extreme’ wall membranes deliver Class W1 performance for severely exposed sites

Protect Membranes, UK producer of construction and roofing membranes, has introduced two new waterproof breather membranes designed for use externally on timber frame, SIPs and CLT wall panels, achieving a Class W1 resistance to water penetration.

Launched in tandem with the STA Advice Note 18 published by the Structural Timber Association and NHBC, the products are designed for buildings sited in severely exposed locations which are typically high altitude, open to high winds and on westerly coastal sites in England, Ireland, Wales and Scotland.

Protect Thermo Extreme is a low emissivity, insulating breather membrane with microporous film and microperforation technology to ensure high watertightness and vapour permeability. This protects the outer sheathing from moisture and allows vapour to pass into the external wall cavity. Featuring a highly reflective surface, Protect

Thermo Extreme helps deliver low overall U-values when the foil faces into an unventilated airspace, achieving an aged thermal resistance R-value of 0.77m²K/W, incorporating printed branding.

Protect TF200 Extreme is a high performance membrane used on the cold side of the insulated panel to minimise the risk of interstitial condensation, with microporous film technology to ensure high vapour permeability and exceed requirements recommended by TRADA and NHBC. It offers a temporary, first line of protection to the whole of the external wall.

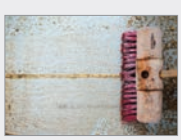
John Mellor, Product Manager comments, “We are delighted to introduce these two product additions to meet the need for a Class W1 external wall membrane in severely exposed areas, based on the new advice from the STA. With our market leading Protect TF200 Thermo and TF200 ranges continuing to be used widely throughout the UK where in the majority of cases Class W2 is acceptable as stated in STA Advice Note 18, it now means that we can offer a comprehensive range of membrane options to our customers throughout the UK and Ireland.”

Both membranes are CE marked, available ex-stock in 3m widths and 100m lengths and produced in the UK.

For more details, please email info@protectmembranes.com.

0161 905 5700
www.protectmembranes.com

Benefits of using CaberShieldPlus



CaberShieldPlus, from **Norbord**, is a chipboard flooring panel, available in 18mm or 22mm, with a permanent waterproof, protective layer on the top and bottom of the panel. It has been specifically designed for construction when the roof still hasn’t been placed, or before the building is watertight. With a permanent, waterproof coating on both sides, the flooring is BBA-certified for exposure to construction work and the elements for up to 60 days when fixed with Caberfix D4 adhesive. After work is complete, the floor can be wiped clean so that it is ready for finishings such as carpet and laminate.

www.norbord.co.uk

Eco-friendly solution for timber fire treatment

Experts in timber treatment, **WJ**, have teamed-up with an innovative Danish business to bring a natural and non-toxic fire retardant to the UK. The company has invested in a new high-pressure timber treatment and kiln drying facility. The treatment performs to the highest European fire standard; Euroclass B and retains an s1 smoke rating, meaning the smoke emitted in a fire is greatly reduced and non-toxic in nature. Treatment certificates, classification reports and DoP’s are provided with each job, documenting that the treatment meets the required European fire classification, in accordance with EN 13510-1.

www.wj-group.co.uk

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