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Glass & translucent materials Supplement

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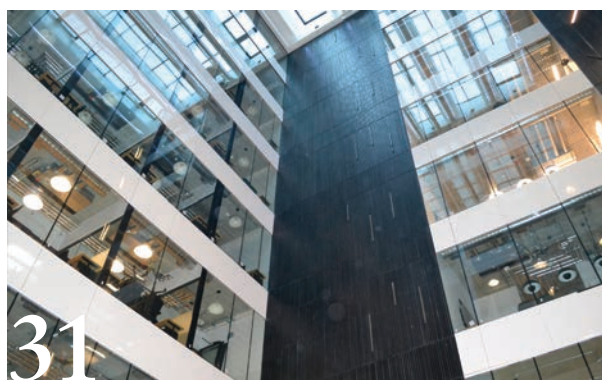

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FROM THE EDITOR

If there's one thing that the last few months have taught us when it comes to our internal environments, it's how important the quality of light is to our work. Anyone computer based is now working largely in a home environment, and like me you may have invested in a startlingly bright daylight bulb in order to help you try and stay focused during these long, gloomy winter days.

It's a truism to say natural light is also fundamentally important to the quality of our lives as well as our work, but the pandemic has brought it home, quite literally. Many of us don't enjoy huge swathes of glazing at home (and if we do, it might be painfully inefficient vintage single-glazing!), but we all have windows, and all function based on how we relate to them.

Circadian rhythms, ie how our bodies respond to the cycles of day and night, are important; it's believed we feel better with a changing light during the day to help support this. Indeed where the right natural light can't be accessed, such as in hospitals, lighting manufacturers have produced systems which can replicate this. But the best solution is probably the right kind of glazing, in the right position.

As our contributor Charlie Sharman of Cantifix comments on page 10, the power of light for wellbeing needs to be carefully moderated in order to ensure that wellbeing isn't hampered. As he says, low-e glass can be the answer to reduce not only heat gain, but also harmful UV. On the other hand, the visual appeal of glazing can be damaged by the greenish hue of iron in thick glazing, so low-iron options are available, if the client is prepared to invest.

If wellness is truly as valued as we are all now saying it is, however, clients will also recognise the higher light transmittance of low-iron glass too, which will benefit users practically as well as psychologically.

Light is fundamental to life, and as we continue to be based in our largely dark, traditional (as well as modern) British homes, designers need to do everything they can to bring that crucial resource into spaces. Glazing innovation may be placed at the core of the raft of domestic refurbishment projects we're likely to witness as Covid refuses to disappear, which is a glimmer of light for the industry.

James Parker
Editor

ON THE COVER...

Designed by Serero Architectes, the Bayeux Mediatheque is a highly transparent, modern multimedia library flooded with light, a building that feels at home in historic Normandy.

For the full report on this project, go to page 20.

HEADQUARTERS

Post-Covid passive design for not-for-profit

The Scott Brownrigg-designed headquarters for the international not-for-profit agriculture and environmental organisation CABI has completed in Wallingford, Oxfordshire, combining biodiversity with flexible space.

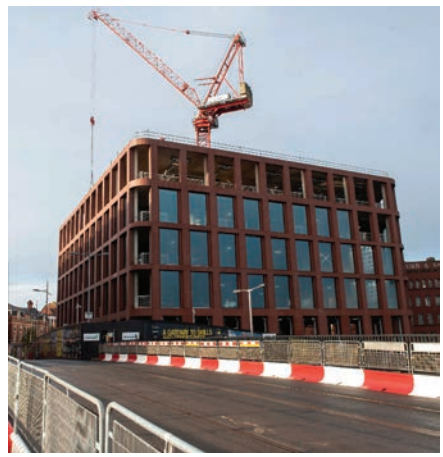
Scott Brownrigg worked alongside project managers and lead consultant Ridge and Partners to complete a low energy building that provides two storeys of office space, with the aim of "integrating an experimental bio-diverse landscape with a new collaborative flexible working environment," said the firm.

Designed for "passive sustainability," the building has been positioned to minimise solar gains by orientating it east-west, and will provide shade in the summer while allowing sunlight in via substantial glazing in the winter. The materials used for the building fabric will reduce energy consumption to embrace the aim of low carbon use in operation.

Due to the pandemic, the design "had to incorporate a shift in priorities for office space users," said the architects, "who have placed increased importance on clean air." Natural ventilation was a key design factor, and was achieved by perforated metal elements of the facade, which permits cool air into the building throughout day and night.

Former CABI CEO Dr Trevor Nicholls, who played a key role in bringing the new CABI headquarters to fruition before his recent retirement, said, "We now have an office that we can truly be proud of, which is fitting for an international organisation visited by guests and staff from around the world. It is truly in keeping with our mission and values to protect the environment and biodiversity."

Situated in an Area of Outstanding Natural Beauty, the building's design "responds to its surroundings with a living roof, which will attract insects and birds and enhance biodiversity," said the architects. Inside, it hosts up to 180 members of staff. Staff and visitors are provided with amenities such as a cafe restaurant, meeting rooms and a conference room/auditorium.



CURVED GLAZING

Glenn Howells' Wolverhampton office facade completes

The City of Wolverhampton Council's office development i9, which has been designed by Glenn Howells Architects and features curved glazing, is progressing towards completion later this year.

The brick-faced, precast external facade on the six-storey building has now been completed by contractors Graham. The next phase of construction will see roofing, internal partitioning and further glazing, mechanical and electrical works.

The development is part of the Wolverhampton Interchange scheme that recently won the Royal Town Planning Institute (RTPI) West Midlands Award for Planning Excellence 2020. i9 follows the award-winning i10 complex, constructed on the opposite side of Railway Drive.

The finished building will provide up to 52,000 ft^2 of Grade A office space, which has potential for 5,600 ft^2 of retail or leisure space, and is planned for completion in summer 2021.

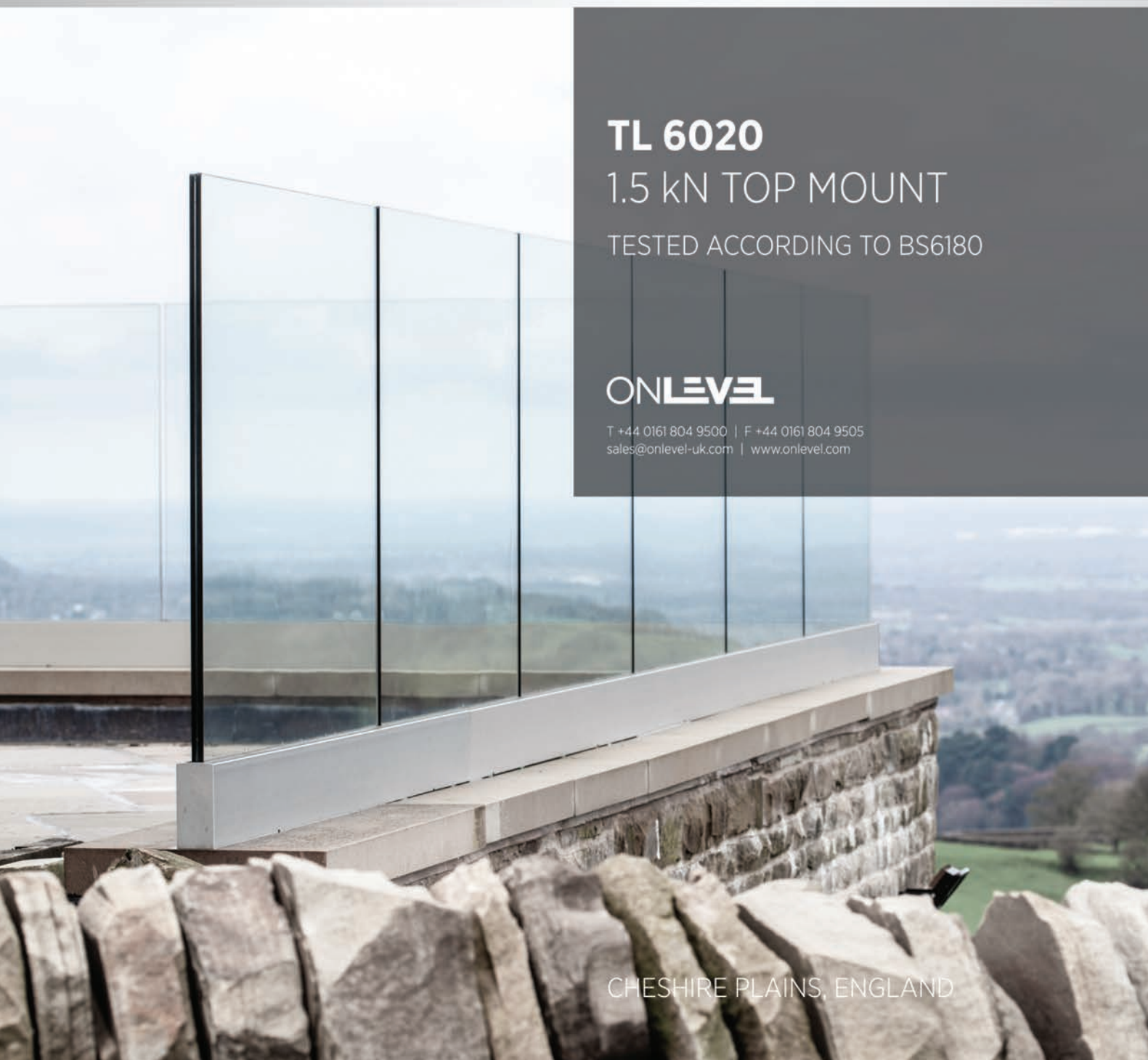
City of Wolverhampton Council and leading property developer, Ion, selected Glenn Howells Architects' design for i9 as the winner from a shortlist of 10 UK leading architects and urban design practices within a national design competition.

The design has "drawn influence from Wolverhampton's family of red-brick Victorian buildings – providing a complementary, contemporary addition fit for 21st century working life," said the architects. Its bull-nose, curved glass corners "address key approaches," and deep brickwork piers help to shade the building and "articulate its tripartite proportions," Glenn Howells Architects added.

The building is set to house a mix of retail and leisure on the ground floor as well as a rooftop amenity space, with views towards the city centre conservation area and Interchange. The project has targeted a BREEAM Excellent rating.

TRANS LEVEL

FRAMELESS GLASS BALUSTRADE



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GLASS FACADE

Renovation of Rome HQ brings transparency

A renovation of the offices of Italian electricity and gas distributor Enel in central Rome provides new glazed facades that will "radically change the building," said the architects.

Designed by Milan-based architecture firm Antonio Citterio Patricia Viel (ACPV), the layout and design of the new headquarters on Viale Regina Margherita aims to develop a "building-city," with new glazed walls which "balance the towers of the central structure." The new facade's glazing offers a "view through the sequence of architecture and surrounding greenery," said the architects.

Covering a total surface area of around 80,000 m^2, the project has also been designed to increase users' wellbeing through the provision of "modern, comfortable workspaces conceived around the concept of a more agile organisation." The distribution of the rooms "alternates working environments with green indoor and outdoor spaces and areas dedicated to mental and physical wellbeing." The project will add wellness facilities, including a new gym, and the design has targeted LEED and WELL Gold certifications for sustainability and comfort.

"The project facilitates the redesign of a building from the 1960s, reimagining it according to completely new functional principles in line with emerging professional requirements," said architect Patricia Viel, co-founder of architects Antonio Citterio Patricia Viel. "Enel is thus achieving two objectives: regenerating the building, and renewing its relationship with the city."

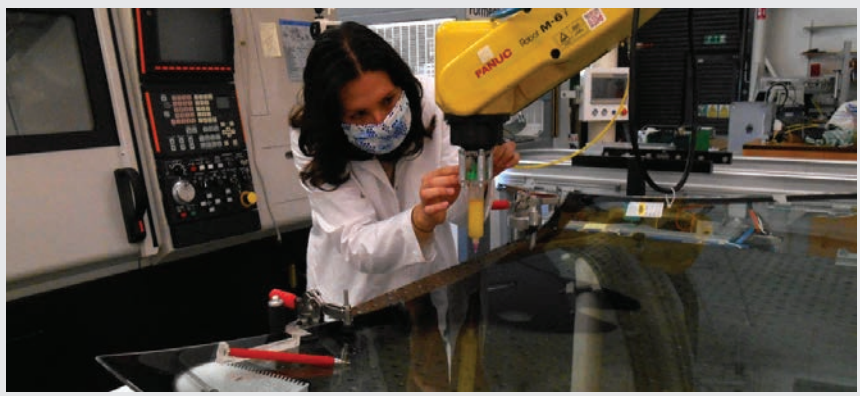
PRINTED GLASS

Collaboration pursues curved innovations

China-based NSG (Nippon Sheet Glass) Group is collaborating with the University of Cambridge on innovative new glass applications, such as printing conductive materials onto curved glass.

NSG, which owns Pilkington UK, is currently working with the university's Fluids in Advanced Manufacturing team (FIAM) to establish a way of printing conductive materials onto wide areas of curved glass surfaces.

Currently, conductive materials can only be effectively printed onto flat glass surfaces. If successful, this innovation is set to enable the printing of metallic nano inks at high precision across curved glass, commented NSG. It will "introduce new applications for glass in architectural sectors by increasing the potential functionality of glazing."



The research aims to see the conductive materials applied to curved glass surfaces, using inkjet printing technology at the final stage of the manufacturing process. This process will help make high tech curved glass more cost effective to manufacture, said NSG.

For the first phase of the research, the partners are using virtual reality to model and design a laboratory that uses robotic technology to print the conductive materials onto curved glass surfaces. With the use of robots, printing the nano inks will be done with high precision and speed, while accounting for the curvature of the glass.

Dr Su Varma, programme director of the NSG Group European Technical Centre's R&D incubator academic programme, said, "This is an exciting project that has the potential to extend the boundaries of glass' use in building design. It allows high-tech applications of glass to not be limited to flat surfaces, expanding opportunities for architects."

COMMENT

The natural solution

Charlie Sharman of Cantifix discusses how the recent months have reminded us how much we need sunlight, and how glass technology innovations can help architects design for maximised natural light

There are many lessons we can take from 2020 about how we live, but, for some of us, it's also demonstrated that we may also need to rethink where we live.

Cooped up indoors for months on end and cut off from our friends and the world outside, the way our homes work for us, or didn't, has often been at the forefront of our minds.

Whether upping sticks to the countryside, extending for a little more space, or making simple changes to renovate and spruce up what we have, most people found themselves doing something to improve the space they live in.

Having spent even more time indoors during the winter months, it's the perfect time to consider a crucial, but often improperly understood, element of our indoor environment – natural light. To understand why it's vital to have access to natural (as opposed to artificial) light, it's important to understand a bit about our physiology.

Our circadian rhythms, those finely-tuned fluctuations in hormone levels, brain activity and a host of other bodily functions, roughly map onto a 24-hour period (hence 'circadian', from the Latin 'circa' meaning 'approximately,' and 'dies' – meaning 'day'). Over millions of years of evolution, our circadian clocks have learnt to calibrate themselves using fluctuations in light colour and intensity. Simply put, your body responds to sunlight in order to fulfil your particular needs at the time.

We evolved in Africa, right by the equator, and our circadian rhythms are still more or less set by light conditions there. In the mornings (relatively low light, more reddish in hue than midday sun), our melatonin (sleep hormone) levels are lowest and our cortisol (the so-called 'stress' hormone) peaks, making us more alert.

In the afternoon, our co-ordination, muscle power and reaction times peak, just in time to miss the worst of the equatorial midday

What's often less understood is that the 'type' of light we receive is crucial to our proper biological functioning

heat, but still get out and rustle up some dinner. By the evening, where light levels are low and its colour is more red than blue, our body temperature rises to combat the cold and our melatonin levels rise, preparing us for sleep.

Although humans now live in diverse environments with wildly diverging light conditions, the optimum light levels for peak conditioning are something similar to those found on the equator, where there are 12 hours of light and 12 hours of dark every single day of the year.

The further away you are from the equator, the more light levels fluctuate with the seasons. A reduction in natural light during winter has been linked to weight gain, increased incidence of heart attacks and strokes and seasonal affective disorder (or SAD), a temporary form of depression associated with lack of sunlight in the winter months.

While it's firmly established that we need natural light in order to function properly, what's often less understood is that the 'type' of light we receive is crucial to our proper biological functioning.

This is a relatively new area of research, as it was previously taken as a given that 'light is light.' Not so – there are certain wavelengths of light in sunlight that are harmful and others that we want to maximise in order to unlock the benefits of natural light.

By now, we're all aware that ultraviolet (or UV) light is harmful to our skin, contributing to premature ageing, sunburn and even cellular damage and skin cancer. Blue light is critical in regulating hormone secretion.

As previously discussed, in full daylight, which has a blue tinge, melatonin (the sleep hormone) secretion is reduced, and cortisol (the hormone that makes us more alert and active) levels shoot up. In the evening, when sunlight has less blue and more red in it, the opposite is true, making us sleepy and lethargic, just in time for bed.

Glass solutions

As architects and designers of spaces, we need to ensure we're creating buildings that cater to human beings' need for the right quantity and type of light. Using glass elements to light up frequently-used spaces can make a huge difference in quality of life, and these days glass can be used to create all sorts of structures. Glass roofs, walls, floors and even staircases can be used as part of a clever light-creating scheme.

However, just as not all light is the same, not all glass is created equal. There are coatings and films that can be applied to glass that change the quantity and quality of light transmitted. Low-e coatings, primarily used to reduce solar gain, also cut out harmful UV rays. This makes them useful in spaces like conservatories, where you'd expect lots of sunlight, but wouldn't necessarily want to get sunburnt.

Low-iron glass, where trace amounts of iron are removed from the glass, is often used for its cosmetic appeal, particularly in thick glass, where iron can produce a greenish tint.

However, it's also more effective at transmitting light, allowing through some 5 or 6 per cent more than standard glass.

More importantly, the type of light that's transmitted by this type of glass is the all-important blue light in the spectrum of 450 nm to 485 nm, which research shows increases health and wellbeing benefits.

There's plenty to consider when thinking about natural light and design and, as with most things in life, the most important factor isn't quantity, but quality.

Charlie Sharman is CEO of Cantifix

COMMENT

Seeing a smart future beyond the pandemic

Neil McSporran of NSG Group discusses how 'smart' antimicrobial glass for tackling infections beyond the pandemic, and how smarter building materials will help designers to create safer environments

Curbing the transmission of diseases will be a priority for those who design and manage buildings for many years to come. Covid-19 has exposed many countries to the human and economic cost that harmful new infections are capable of. And society has responded by throwing all of its ingenuity behind defeating this foe, with innovation stretching beyond the race for a vaccine.

The next crucial step will be 'pandemic proofing' many points in our everyday lives. We've already made great ground, with technology facilitating an unprecedented shift in digital transformation – laying the digital infrastructure required to keep the world moving without physical interaction when needed.

But physical infrastructure and the built environment has an important role to play too. Architects, developers and the supply chain can each be influential in driving effective change.

Architecture ultimately shapes how we interact with materials and one another, and inadvertently, it can affect the risk of infections being passed on. Managing this risk stems from simple retrofits specifying innovative building materials, to the proliferation of post-Covid urban design and development.

Smarter materials

'Pandemic-proof' cities are already taking shape in China, where entire neighbourhoods are being built with the aim of helping residents to live comfortably under lockdown and confinement.

Large balconies that give residents more outdoor space, and which are also accessible for deliveries via drones, form part of the plans of Barcelona-based Guallart Architects behind the Xiong'an New Area – a 'Covid-proof' city. The practice's founder Vicente

Smart materials like antimicrobial glass add an additional step to the measures capable of steadying the spread of harmful diseases

Guallart believes that we can't continue designing cities and buildings "as if nothing's happened."

Of course, existing cities can't easily be torn down and replaced with a new post-pandemic standard of buildings. We need to make our existing shared spaces – where transmission is more likely – safer, while finding solutions that make our shared spaces work better.

This is where technical architects are looking for innovation in the supply chain, providing them with new materials that can help developers to upgrade and create spaces with enhanced protection.

We have fast tracked our research into antimicrobial coatings in the wake of the Covid-19 outbreak, supported by funding from Innovate UK as it sought to invest in virus-beating innovations. Pilkington SaniTise is the first result of this research, a flat glass with a coating designed to break down viruses, bacteria and fungi on its surface.

New materials like this can help to reduce the chances of contact transmission. In the right conditions, microbes can live on unprotected hard surfaces like glass for weeks. As such, 'high touch' applications including the doorways and windows in shared spaces like hospitals, shopping centres, schools and restaurants, can carry a high risk of contact transmission without constant cleaning or treatment.

In these environments, antimicrobial glass helps to provide a higher level of infection control that building design professionals are increasingly looking to offer developers.

Innovating in antimicrobial coatings

The new product's coating is activated when exposed to UV radiation from natural daylight or by artificial UV radiation and is designed to last for the lifetime of the glass. Firstly, it reacts with water vapour within the air, in a photocatalytic process that produces reactive oxygen species. This enables the breakdown of organic species and helps to provide antimicrobial properties and activity against 'enveloped' viruses (the envelope being the spherical shape shown in most representations of viruses) on the glass surface.

When compared to an uncoated piece of glass, use of the coating has been shown to result in almost 90 per cent less virus on its surface after 15 minutes in daylight, and more than 80 per cent less virus on the surface after 60 minutes in the dark after the coating is activated by light.

The coating has been tested to ISO Standard 21702 (2019), which measures antiviral activity on plastics and other non-porous surfaces. In November, it was recognised as Design of the Year by industry body British Glass.

No silver bullet

Of course, highly contagious infections are difficult to control – shown by the regular tinkering and changing of restrictions by governments around the world, as they work to get on top of Covid-19.

Strategy centres around breaking the chains of infection and preventing such an exponential rise in cases. The most high-profile examples of this have been the implementation of mask wearing, social distancing and track and trace programmes – none are intended to stop the virus in its tracks, but to take the wind from its sails.

Smart materials like antimicrobial glass offer the building design community a new way of contributing to the war against viruses, adding an additional step to our ways of steadying the spread of harmful diseases.

Revisiting Vicente Guallart's words, the industry can't carry on as we always have. Looking ahead, the more that 'chain-breaking' design standards or materials comprise our physical built environment, the more 'pandemic proofed' our lives will become.

Neil McSporran is global portfolio director at the NSG Group

Clarity for your specification – “At last, you can design glass balustrades again”

Since the changes made to the Building Regulations 2010: Approved document B in December 2018, it is no longer possible to design balustrades using laminated glass as a barrier on residential buildings with habitable floors above 18 metres (11 metres often used in Scotland). Some pioneers refused to accept the ban, knowing that they would have a solution. Q-railing is one of those innovators. The specialists in high-grade balustrades have introduced a new glass balustrade plus a glass Juliet balcony. These two currently are the only laminated systems in the market that satisfy the amendments and achieve fire classification BS EN 13501 class A2-s1,d0.

Laminated glass as a barrier was banned due to the combustible nature of traditional glass interlayers, such as PVB, EVA and Ionoplast (Sentry) when tested independent from the homogenous laminated pane. Now when specifying for a building’s envelope, only non-combustible materials can be used. Obviously, we all want to build safer buildings, but not being able to work with glass barriers for residential high-rise projects caused much heartache amongst architects/specifiers and clients. Plans that were based on glass benefits such as clean sightlines, wind mitigation, and a general premium feel had to be changed drastically.

Nothing beats glass

The ‘glass ban’ did result in various creative solutions. Q-railing for example added a more traditional system with vertical bars to its range. But none of it could compete with glass. So, the Q-railing team started researching compliant glass alternatives within the design of the glazed balustrade. Darryl Holloway, Architectural Sales Manager at Q-railing UK: “We have always prided ourselves in being market leaders in balustrade solutions for the industry, with many kilometres of our systems installed all over the UK and indeed the world. That is why we were determined to be first again and solve this problem for our architects and their clients. And I am proud to say that we have been able to develop two fire rated glass balustrades, one for balconies and one for Juliet balconies.”

Ticking all boxes

The new Q-railing balustrades both are fully compliant to building regulations and guidance documents BS 6180:2011 Barriers in and about buildings – code of practice and the newly introduced BS 8579:2020 Guide to the design of balconies and terraces, which came into effect 31 August 2020. The latter clearly states sightlines need to be taken into account along with wind mitigation, when designing balustrades for balconies or terraces. Something only glass can do! And in this case, the glass has to offer even more. Holloway: “The fire rated balustrades utilise a very specific laminated glass that achieves the required EN13501: A2-s1,d0 rating. Up to now, nothing like this has been available to the industry for use for balcony balustrades.”

Ready to use

The fire rated glass balustrades have been tested to achieve 0.74kN/m line loads for residential use and have been certified by a UK based UKAS accredited third party testing facility. All relevant declarations of performance are there, and the products have already been supplied on a live project that was given the nod by the local building control for conformance and NHBC to provide warranties.

Based on success

Q-railing based its fire rated glass balustrades on two of its success stories: Easy Glass Prime and Easy Glass View. Holloway said: “We introduced Easy Glass Prime two years ago. And already the base channel system is world renowned for its simple installation method and red dot award winning adjustable glass fixing innovation. Easy Glass View received much praise as well. Its slender aluminum profiles can be powder coated to match the frame or facade and can be mounted either on the facade, on the reveals or directly to the frame.”

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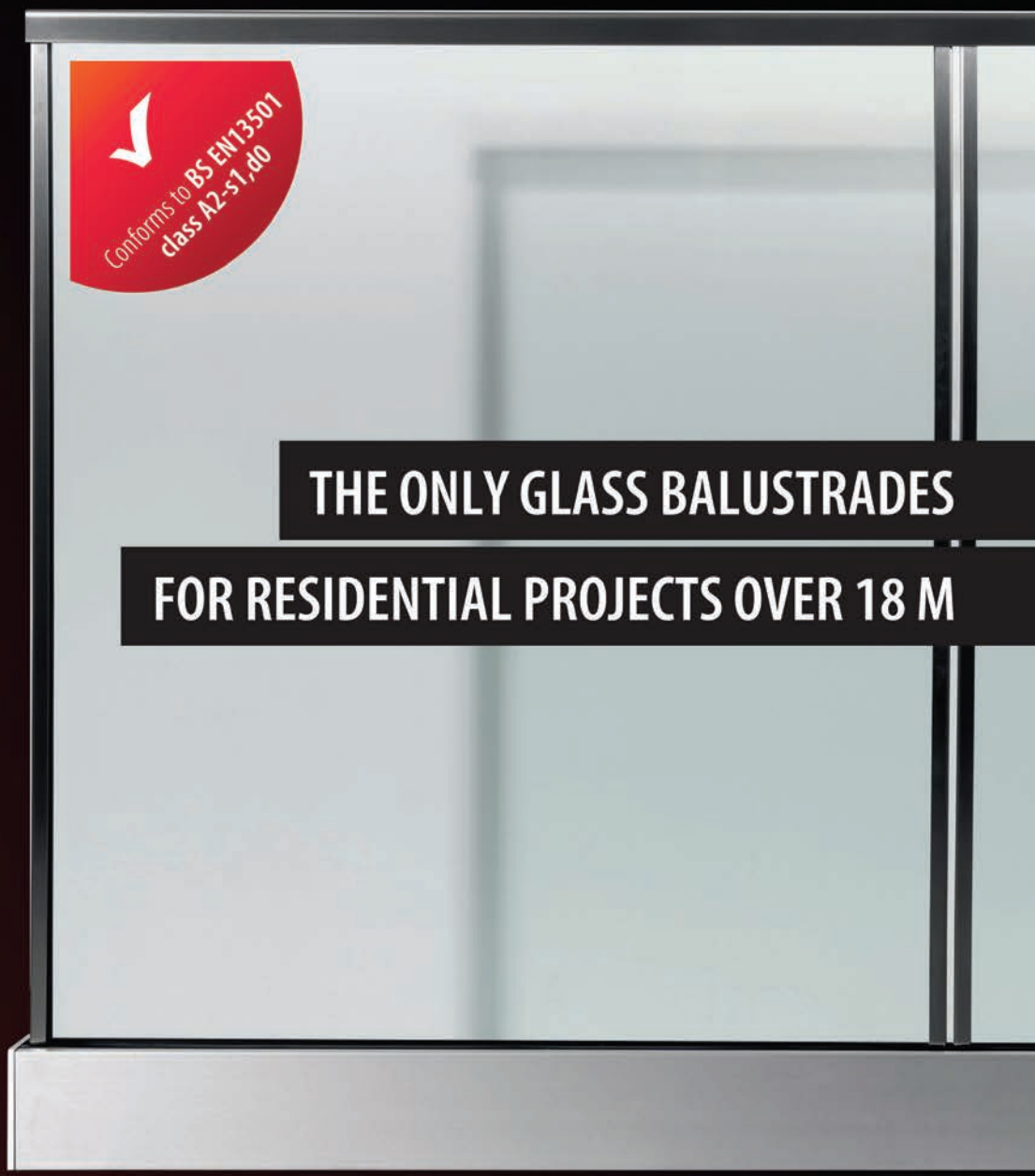

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Climate control

A new Canadian engineering faculty building will research and develop solutions for clean power innovation, as part of the Government's response to climate change. *ADF*'s Sébastien Reed speaks to its architect Venelin Kokalov about a project that uses glazing to engage with its surroundings

Images © Ema Peter

Revery Architecture was first approached by Simon Fraser University (SFU), which has three campuses in British Columbia, Canada, to design its new Sustainable Energy Engineering Building in 2015. The architects were initially requested to work on the functional programme and indicative design for the new centre, whose eventual construction was contingent on grants from the Canadian Government under the Federal Department of Innovation, Science and Economic Development Canada's Post-Secondary Institutions Strategic Investment Fund (SIF).

After receiving confirmation of funding in 2016, the client pressed on with interviews to find a suitable architectural lead to take the project from design through to construction. They did not have to look too far, as they selected Revery to continue the work they had already begun.

According to the project's original brief, the client envisioned "a five-storey, world-class, state-of-the-art, LEED Gold building designed to reduce emissions and energy consumption, situated on lands contiguous to the university's Surrey campus. The gross floor area of the proposed building is 14,445 m^2, plus one level of underground parking." The building was to represent the university's first expansion beyond the original campus, as well as being a vital new addition to downtown.

Beyond having completed initial feasibility work for the new building, the architects list some other core reasons why they were awarded the project; the first being their significant design experience in the city of Surrey. This includes planning work for the city centre, a library and an aquatic centre, all of which make Revery particularly attuned to Surrey's unique dynamic, and planning landscape. "We've developed a strong understanding of and relationship with the approving authorities," says Kokalov.

Another reason; the practice's alignment with the ethos of the project. Seeing eye-to-eye with the client in the "quest for innovation," they wanted to create a "community building" which would

INNOVATION IN SUSTAINABILITY
The new Sustainability Energy Engineering school housed within the building will develop solutions for harvesting, storage, transmission and use of energy, carefully considering socio-economic impacts

"engage the world" in addressing the most timely issues.

Responding to the brief, Revery's aim was to create a building that integrates with its urban context, engages SFU and the local Surrey community, and becomes a place that elevates user experience.

Flexible in function

The programme is organised around a central atrium space, oriented east-to-west on axis with the adjacent Surrey Central SkyTrain line – providing light, rapid transit, and opening onto University Drive. Wider in the east than towards the west, the full height 'flatiron'-style tapered atrium divides the building in two; to one side an L-shaped block and to the other a more regular rectangle-shaped block.

The atrium facilitates circulation between the ground and third floor, while the integrated spectator seating and a large, open, ground floor base provide functional space for both formal and informal gathering and activities. "It's become the living room of the building," says Kokalov, "it's where the cross-fertilisation of ideas can take place; it welcomes the public."

Because the building is in the heart of Surrey's downtown, the architects deemed it vital to somehow continue the public realm into the building, both to "activate" it and to illustrate the partnership between SFU and the city itself. In this vein, the most socially active parts of the programme are all found on the ground floor; the cafe, a pre-function area and a 400-capacity lecture hall – available to both SFU and the local community, student central services, common and recreational rooms, and the atrium base.

The upper floors are devoted to teaching functions with another 120-seat lecture hall and 'innovation space' housed on the first floor; library, lounges and process laboratories on the second floor; research, prep and classrooms on the third floor; further educational spaces on the fourth; and staff offices on the fifth.

When quizzed on changes to the design that might have interrupted the architectural process, Kokalov answers, "The schedule wouldn't allow it. SFU was clear from the outset." With the client stressing the "importance of flexible spaces," research labs had to accommodate a spread of topics and classrooms needed to support diverse teaching styles. This is perhaps best illustrated by the rooftop, which was designed to accommodate a research lab, should it be needed.

Inside, the building has a mix of exposed concrete and white painted drywall. Timber is also used liberally throughout. This includes wooden slat ceilings, maple accents to the atrium balconies, timber floors to the tree pods, and timber for the spectator benches in the atrium. Maple plywood and dark-stained plywood furnish the lecture hall there, along with dark fabric-wrapped panels. Additionally, perforated dark-stained plywood and paper-faced insulation are used to provide acoustic treatment.

SE3P's location directly across the street

WORK SPACES
The upper floors are devoted to teaching functions, including laboratories, research areas and classrooms

PROJECT FACTFILE

Architect: Revery Architecture
Client: Simon Fraser University
No. of students: 515 (approx)
No. of staff: 60
Gross floor area: 14,445 m²
Sustainability: LEED Gold

from existing SFU buildings enabled the architects to establish dialogue between the two. For example, the main entrance was placed towards the south-east to clearly bridge old and new.

Circuit board

Inspired by the geometric pattern of electrical circuit boards, the facade's design is clearly and symbolically linked to the technological themes that make up the pedagogical content taught within the building. White precast concrete sandwich panels alternate with reflective glazing which is framed by white precast fins outlining the entire facade.
This precast box is elevated several metres from the ground, and appears to float thanks to a band of transparent glazing at its base. Together, the different areas of glazing increase visibility and connection, providing a sense of public realm to both the interior and the exterior of the building.

Kokalov continues, "The juxtaposition of the heavier precast elements versus the reflective glazing helps to animate the facade while symbolising the opposing forces commonly encountered in engineering; tension and compression, positive and negative." Throughout the scheme, glass was used as a means of making the building seem more porous. Clear glass at ground level "allows for the interior public space to extend from the street and engage the neighbouring community," says the architect.
The same materials were used on each of the elevations except for the cut-out on the south west corner. Here, insitu concrete was used as a cost-saving tactic. The architects expected the cut-out to eventually be filled in as the facility and university continue to expand and develop, so material specification wasn't seen as pivotal.

Less is more

"Through careful sculpting of space, selection of muted and natural materials, and the introduction of natural light and views to the outside," says Kokalov, "we tried to create spaces within the building that elevate and enhance the user experience."

Kokalov remarks that the ratio of opaque solid wall to glazed wall is approximately 70 per cent to 30 per cent respectively, making it a relatively lightly glazed building. "Having said that," Kokalov qualifies, the visual dominance of translucent material "is due to the strategic placement of the glass that it gives that perception." He continues, "It is very successful in this regard – it gives an open feeling to people which meets SFU's philosophy of a 'community engaging a school'."

The architects faced some difficulties in achieving their desired exterior aesthetic, most notably in the construction phase. The precast panels and curtain wall infill panels were made independently, rather than being prefabricated together, and all of the mounting brackets were located on the slab edge. The main challenges, according to Kokalov, came from the installation sequence, the achievable tolerances, and the glass fabrication lead time.

The orientation of the precast and glazing systems is not entirely vertical. Instead, they weave left and right as they climb the building. This required the gap between the two systems to be increased in order to accommodate both horizontal and vertical movement due to expansion and contraction originating from temperature fluctuations. "Simply caulking the joint was not an option because of the load transfer between the system," insists Kokalov.

OPEN UNIVERSITY
The 400-capacity lecture hall is available for use by the local community as well as the university

As a consequence, meticulous on-site quality control of precast concrete panels was critical to the curtain wall installation; for example the 2 cm gap established between the precast panels and glazing panels. The glazing contractor had to meet and install the panel accordingly otherwise the panel had to be rejected.

Two main types of glazing were specified by the architects. Highly reflective glazing was used functionally; to reduce heat transmission, and also aesthetically; to reflect the sky and create visual interest for passers-by. Secondly, to draw as much natural light as possible into the building, high VLT (Visual Light Transmittance) glass was used for the storefronts at street level, for the atrium glass wall, and at the south east corner on level five where the staff lunchroom and open office are located.

LEED-ing in sustainability

In addition to specifying durable materials and designing long-lasting and flexible places into the scheme, the building had to embody the sustainable ethos underlying the facility's function. To do so, the architects sought to achieve LEED Gold certification – awarded by the Canada Green Building Council (CaGBC).

Reductions in car parking spaces needed by the local municipality, the provision of extensive vegetation – including native and local species – throughout the site, the implementation of a stormwater catchment system, and a passive ventilation approach taking advantage of the atrium's natural draughts and minimising the need for mechanical ventilation. These were just some of the measures taken to sensitively meet the certification requirements.

The approach produced significant praise from the client, as Ian Abercrombie, architect and director of campus planning and development for the university, who admits, "SFU was a demanding client. We required an architect that understood the complexities of an academic and research facility, yet also understood its need to provide a high standard of urban design in the emerging Surrey City Centre." He concludes, "Revery Architecture responded to these challenges and took direction from SFU facilities staff, academics, and researchers, in shaping a functional, yet inspiring building." ■

BUILDING PROJECTS

BAYEUX MEDIA LIBRARY NORMANDY

Light reading

Creating a highly transparent, modern multimedia library flooded with light that feels at home in historic Bayeux

The new 'media library' or 'mediatheque' serving the 30,000 citizens of Bayeux. Normandy, was opened in early 2019. Inspired by a famous French author of children's tales, and notwithstanding a very transparent, clean aesthetic, its architects designed the building to assume its place in a city with a rich history.

The high-profile location was an open area to the west of the old city centre which connects it with areas of new and planned development, and overlooks the 11th century cathedral half a kilometre away. To respond to the challenge of creating a highly contemporary glass building alongside a historic location, Grenoble-based Serero Architectes proposed the notion of a 'building landscape,' whereby users could access books, multimedia and entertainment "in the middle of a garden," with the glass edifice opening up to landscaped, usable exterior areas.

The key design intervention to alleviate what would have been a very deep-planned building is a square patio courtyard cut into the centre of the building. It's landscaped to bring natural colour as well as light in, and also provide an external relaxation and reading space. This 10 m^2 area helps the interior blend with the exterior, its glazed walls bringing light in to augment that already brightening the large open plan space from external facades. Exterior covered reading terraces to the south further help the library harness the

functional as well as holistic potential of external areas.

As a result of the highly transparent design, each space within the building has copious amounts of light, a mix of artificial light from LED tubes overhead, borrowed light from the central patio, and "softened" light coming in from the main north facade thanks to a brise soleil design. This helps the building offer "great clarity and legibility of interior space," commented the architects.

External form

The client had what the architects described as a "fairly fixed" brief for the project, in terms of the fact that there was a "very precise building footprint to respect to meet budget requirements." Within that overall constraint, the key words behind the design, for client as well as the architect, were "space, light, transparency and simplicity."

However, as architect David Serero explains, his firm decided to depart from the client's original intention of a higher building to accommodate its various needs, to something more low-profile, and elegant. "We placed all of the programme on a single floor, instead of three floors as asked in the brief."

The project is almost completely transparent thanks to its mainly glazed facades and the absence of partitions across its 2,500 m^2 floor plan. Only three spaces within the building have opaque cladding – in Caen stone – the reception, plus an entertainment room, and a quiet study space. The structure is an "innovative steel frame with very skinny steel square tubes of 14 x 14 cm," on a 5 metre grid, says Serero.

The building's envelope opens up in other places, including glazed bays to the east, south and west facades – which are equipped with motorised roller blinds. The entrance, to the north east, opens onto a forecourt, an "entrance square" combining paving and grassed areas in a similar way to the adjacent military cemetery to assist pedestrians crossing the road. The green roof, "conceived as a fifth facade," includes skylights which help with ventilation in summer thanks to motorised opening, as well as adding further light to the interior.

There is a much smaller upper storey containing quieter spaces, plus a roof terrace, however overall the building presents a chiefly rectilinear profile. The white uprights across the length of the transparent facades give the building something of the look of a giant bookcase from a distance, however one key design

intervention provides a dynamic horizontal rhythm to the building's main elevation.

With the building referencing history in a number of ways, in its exterior appearance there's a nod to the Bayeux tapestry in the brise soleil design within the north facade. The facade, which runs along the main boulevard, is fully glazed, but light is moderated by an internal 'filter skin' made up of 1200 horizontally arranged aluminium tubes coloured in the natural shades used in the 11th century wool tapestry. In eight colours (beige, brown, green, bronze, blue, deep blue, black, and yellow), these structures filter the light and provide a "luminous ambience" in doing so, says Serero.

The roof overhangs to the south facade "make it possible to filter views between the reading spaces," say the architects, and combine with the transparent facades to create a "porosity, a series of rich transition spaces between the building's interior and exterior."

Structural glass was used on the north elevation to create a five metre high facade with no vertical supports. Solar control glass was used for the skylights, and the south elevation features a high transparency glass. Free cooling is provided by motorised glass louvres above the entrance and exit doors in the glass facade. At night, or in hot conditions, they automatically open to create natural cross ventilation to the interior spaces.

Internal arrangement

Following a "reflection on uses" at the outset of the design process, the architects decided to place virtually all public spaces on an open-plan ground floor for "ease of access and optimal functioning." The architects commented, "The library is designed on a free platform with no enclosed boundaries." However it is still a "finite space," yet one which "assembles an infinite number of organisations of subspaces." Those 'subspaces' are a simple, repeating pattern of 5 m^2 square zones, containing storage shelves, work tables, reading chairs and storage 'bins.'

The Bayeux municipality, the client behind the project, had a concept of 'seven places' to engage users of the new library, inspired in part by the mythical 'seven-league boots' described in the tales of 17th century French author Charles Perrault, including 'Puss In Boots.' With the centre being named Les 7 Lieux (Places) to reinforce the notion, the client hoped the centre's different zones would further follow the theme by "allowing visitors to access culture by leaps and bounds!" Users will be able to find something to suit them in one of the zones, "just as the seven league boots follow the shape of the foot of the one who wears them."

Continuing the concept, the design provides seven distinct areas. 'The Platform' is the open plan 1000 m^2 ground floor which houses most of the 'free-to-access' documents for readers. Located on the ground floor behind the reception area, 'The Gallery' is an area for hosting exhibitions and events, and 'The Forum' is a soundproof room for more specific events with 80 seats mounted on a telescopic ramp.

Also on the ground floor, at the furthest extreme from the reception, are 'The Workshop,' a flexible space accommodating

An internal 'filter skin' made up of horizontally arranged tubes is coloured in the natural shades used in the 11th century tapestry

The project is almost completely transparent thanks to its mainly glazed facades and the absence of partitions

PROJECT FACTFILE

Architect: Serero Architectes Urbanistes
Client: Bayeux Intercom
Acoustics: Pasquini
Floor area: 2,550 m²
Cost: €5,020,000

workshops, and 'the Work Room,' which is reserved for "calm and studious activities," and contains a selection of heritage documents. The final two zones are the cafe and patio, an "indoor green garden" where users can read and relax.

Interior design

The design, as per good practice for libraries, transitions from the naturally often busy reception and open spaces to quieter, more internal areas, where concentration is a must. David Serero explains that the functions required in the open-plan ground floor "are only made possible by the 400 pieces of furniture that have been designed and assembled inside the library." The open plan design leaves the building "adjustable to future evolutions of reading, sharing, playing and learning."

The carefully-designed furniture items "define the functions and usage of each part of the library more than the architecture itself," says the project architect. They include double-width armchairs, for working with laptops, double sofas for video gaming using headsets, and adjustable leather stools for piano and guitar playing. There are also oak storage cupboards intended for "agricultural seed sharing," and round tables with counterbalanced feet for "all in one" computer working, as well as soft items like bean bags for quick stops to read magazines and comics.

The interior design concept was to create a "living room-like space," therefore a comfortable environment for reading, working and listening to music, but also playing video games, reading a newspaper, surfing the web, or activities like sewing.

The key internal materials are limestone (floors), white-lacquered steel, Corian and Oak, combining with the ever-present glass. The internal patio provides the finishing touch to the feeling of calm relaxation, echoing a cloister of the nearby cathedral, with a range of planting common to Normandy including apple and cherry trees.

With ventilation being crucial in a large, glazed building, a "double-flow" mechanical ventilation system supports the dominant natural ventilation. While not being sustainability certified, the building, which has underfloor heating throughout, has been designed to be high-efficiency and low energy, delivering less than 20 kW.h.m².

Conclusion

This building provides a strong statement in glass within a sensitive, historic context, but its careful, high-quality design provides for the varied functions it accommodates, while adding a new subtle urban landmark. It provides as much natural light as it can, alleviating carbon costs, but also providing the best possible environment for concentration and study.

The proof is in the pudding with a municipal asset such as this, i.e. is it being used to the levels expected? The statistics are impressive, since opening there have been 6000 subscriptions to the library, and the population of Bayeux is only 4000! Of course this is partly due to the city's popularity with tourists, but also speaks to the demand for a multi-faceted public resource like this, and one who's impressively transparent skin helps it relate to its surroundings. ■

The visible future

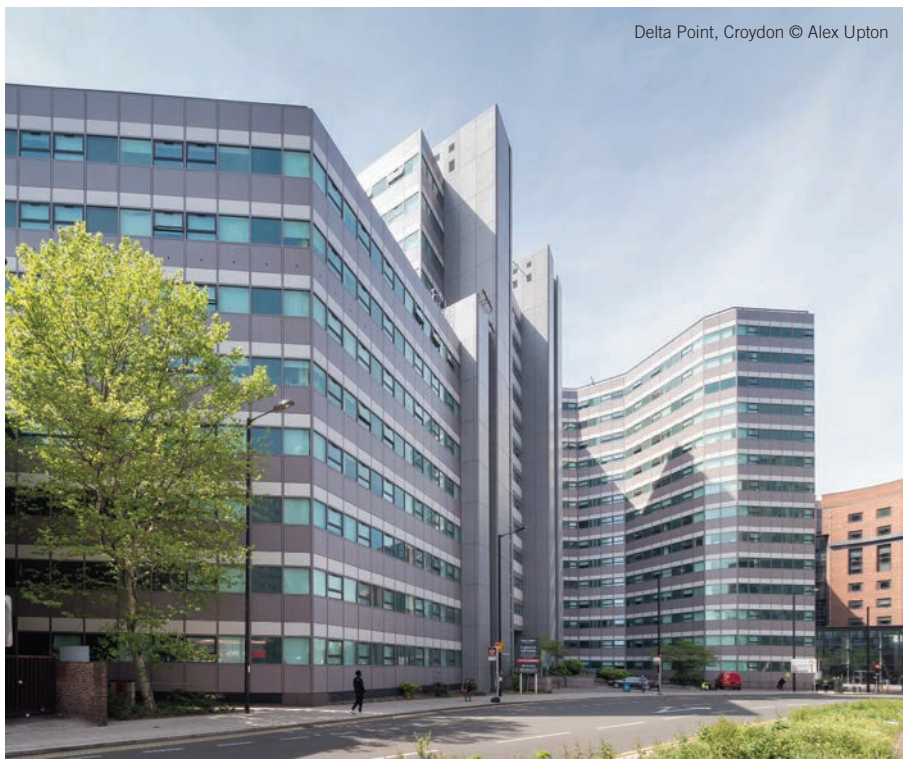
Conversions from office to residential under Permitted Development Rights are becoming more commonplace as we move to widespread home working. Structura UK's Manny Patel looks at the implications for facades

Life has changed radically under Covid-19. The epidemic is changing the way buildings are used. One of the most obvious changes has been the lockdown and the enforced 'working from home' policy. Many companies have now realised their workers are as productive and as committed when working from home as when commuting to an office. This has led to a fundamental shift in policy, with many companies moving away from large expensive offices to smaller sites with 'hot desking' for meetings. This has led to a happier workforce not having to commute, and so much time saved.

With the move to smaller offices and companies seeking more self-contained buildings, the traditional large office block is suffering big dents in demand. This started before the pandemic, but the impact of Covid-19 has accelerated the trend. In 2018/2019 for example, 51 per cent of all new homes in Harlow were office conversions, and the CBRE are now reporting even larger swings.

The conversion of old offices to residential is nothing new, but the update to Permitted Development Rights in August last year means that now you don't necessarily need planning permission so long as certain obligations are met. Some of the key requirements revolve around quality, location, size and light – i.e. have light and ventilation standards been adhered to? In the post-Grenfell world, standards are also important given the different regulations around products and fire ratings.

Many projects have illustrated how different disciplines can collaborate to provide a one-stop-shop for the complete renewal of facades. The ability to design, fabricate and install replacement glazing, along with cladding refurbishment and refinishing, can create a seamless project management workflow, and reduces costs and time spent on site. Importantly, it negates the need to use several different contractors with the associated problems that can entail.



Delta Point, Croydon © Alex Upton

Changing curtain walling on existing buildings is not always easy, yet can be critical when it comes to adapting older buildings. This can be to take advantage of improved energy efficient glass, for repairs or remedials or to make the buildings more suitable for residential conversion. It is also important in terms of newer building regulations around wind loads and fire resistance.

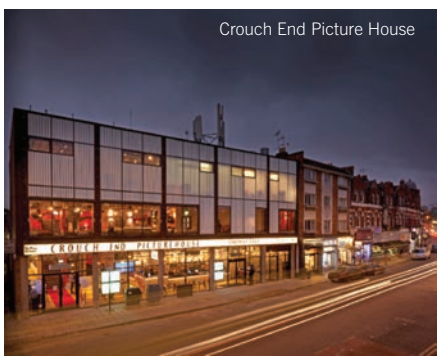
Fortunately, there is a precedent when companies have earlier vacated their own office building, in such cases much can be learnt about how the envelope was changed. A good example is Delta Point, the 28,500 m² former BT office building in Croydon whose entire facade was refurbished and refinished. This complete

Different disciplines can collaborate to provide a one-stop-shop for the complete renewal of facades


DPTC, Sheffield

overhaul saw the building transformed into 404 apartments and other units.

Specialist preparation, spraying, venting and curing facilities were set up so the refurbishment could continue with minimum disruption. Work on panels was also carried out in situ from cradles suspended around the building. An added complication was the fact that, with the building changing use from commercial to residential, the paint needed to achieve Class 0 on spread of flame in accordance with BS 476.


Crouch End Picture House

Cladding innovation

Obviously, the character of glass and the design of curtain walling will change in the future. As Dr Ronan Daly, head of FIAM and senior lecturer at the University of Cambridge, is quoted as saying "Smart technology applied to glass has the potential to perform a number of important tasks – from identifying the presence of bacteria on a hospital window to performing as a touchscreen display."

"Conductive materials can already be printed onto flat surfaces, and alongside the NSG Group we're now overcoming the physical challenge of completing this for curved applications – this opens up new opportunities for designers to use glass technology to solve their modern design challenges."

Historically traditional glazing has been the key to admitting daylight into a building be it residential, commercial or leisure. However, in other situations, translucent cladding holds the key. These allow for light transmittance but also offer quite different, and enhanced, material and performance benefits.

Companies have now realised their workers are as productive and as committed when working from home as when commuting to an office

An example is Kalwall, an insulating cladding system developed in the US to transmit 'museum quality,' diffused light evenly into an interior without the harsh contrasts of light and shade. Avoiding hotspots, glare or shadows, it can remove the need for any blinds or shutters, while reducing solar gain and reliance on HVAC systems and artificial lighting. U-values as low as 0.28W/m_2K, equivalent to a cavity-filled solid wall, are achievable by including translucent silica aerogel within the panels.

The recent redevelopment of the food court at Kings Mall Shopping centre, on a five-acre site in Hammersmith, London, highlighted some interesting and complex challenges. The new residential apartments above the shopping centre were being adversely affected by light pollution and lack of privacy from visitors walking through the food court atrium.

Owners and developers Schroders decided to install the translucent cladding around the whole of the atrium. This screened the external courtyard above, thereby mitigating the issues around privacy, while maintaining the maximum levels of interior daylight. The panels complement the industrial feel of the redevelopment and its hard concrete and stone surfaces, while providing benefits for shoppers and residents alike. These include line-of-sight protection, maintaining privacy for the residents and controlling light pollution, while bathing the interior with diffused daylighting, year-round.

So, as the urban landscape continues to evolve around us and the working patterns of millions of employees fundamentally changes, architects and designers have many innovative and forward-thinking companies offering the very best solutions in modern materials.

Manny Patel is managing director of Structura UK

Sliding versus bifold

Edward Stobart of ID Systems looks at how recent trends in residential glazing are affecting the sliding versus bifold doors debate

For the past two decades, the trends in home design and customer demand have seen significant shifts when it comes to glazing requirements. While the same can be said for commercial buildings and even public sector projects, the trends have been even more obvious and more varied in the residential sector.

Driven equally by the aspirations of end-clients, the innovation of architects and the development of glass technology, the specification of glazed doors have shifted backwards and forwards over the past two decades.

At the heart of the trends has been the growth of the open-plan kitchen and living space. Whether it's achieved by extension, renovation, remodel or complete new-build, the desire for larger, more spacious kitchens have had a significant impact well beyond the choice of cabinets and layout of appliances.

For an increasing number of people, a modern lifestyle means staggered working hours and less time together as a family, meaning that catching up all together around the dinner table happens less and less. Add into the mix modern technology and wifi connections and watching TV, listening to music or being online can be done from anywhere in the home.

This has contributed to the rise of

The past decade has very much seen the trend switch to sliding doors

open-plan house layouts, as occupants make an effort to stay connected to one another. Having settled upon an open-plan living space for the whole family, the next steps are to fill these spaces full of natural light and to break down the boundaries between inside and out.

For the first 10 years of the 21st century, the trend in achieving this was focused on large glazed folding doors. The concertina design allowed for larger openings filled with glass that slid and stacked to one end to create a seamless transition between the home and garden.

Originally an import from continental Europe where the long, consistently warm and sunny days are perfectly suited for having the doors open, the limitations of folding doors comes with the changeable British climate and particularly when the doors are closed, because with narrower panels and larger frames there is more obstruction to the view out and the light let in.

For this reason the past decade has very much seen the trend switch to sliding doors, where the huge panels (up to 3 m across and minimal sightlines down to an incredibly slim 20 mm) make them far more suited to being closed. The slender frames provide an almost completely unobstructed view helping to breakdown the boundaries between inside and out and to create contemporary, light-filled spaces in the house.

What we have seen over the past decade has been a more educated and informed end-client. They are much more comfortable with the products that are available to them and we know from talking to architects on a regular basis that has allowed the style of door to play a greater role in the briefing process and the design of the project. We are now in a position where it is very rare for an architect-specified project to contain bifold doors, which would never have been the case 10 years ago.

In recent years the choice between door systems has been expanded to include slide and turn doors with systems. With narrow frames like sliding doors but with the ability to slide and stack the panels at one end just like bifold doors, this style of door provides an innovative third option. Without the requirement for a fixed frame like a sliding door, slide and turn systems can maximise the opening when the doors are stacked to one end and yet with slender 45 mm sightlines they allow for larger panes of glass with less visible frame.

Edward Stobart is head of projects at ID Systems

Reinforcing the message

William McDowell of Hambleside Danelaw puts the case for why GRP rooflights in metal roofing systems can help solve the many problems such as light levels that face architects when designing industrial buildings

Think rooflights and you might think of glass or even polycarbonate. But when it comes to specifying rooflights for metal roofing systems in modern industrial buildings, recent technological advances mean that GRP (Glass Reinforced Polyester) rooflights now offer the solution to many design challenges.

Zero carbon

An increasingly tough regulatory environment and a growing focus on zero carbon means innovative products, along with clear and reliable technical information, are critical to architects. Some systems can actually enhance performance compared to other rooflight systems, while also offering a market-leading contribution to the reduction of both operational and embodied carbon.

Providing a dedicated calculator of embodied carbon, for example, can allow for any configuration of components in the rooflight, according to the requirements of the project – meaning that whatever configuration is used, the embodied carbon will always be clear and measurable. There is a dearth of embodied carbon data in the manufacturing field at present, so this is an important development.

The large new build or refurbishment warehouse projects in which GRP rooflights tend to be used usually need high levels of diffused internal lighting. Bringing free, 'renewable' natural light into a building during daylight hours significantly reduces the cost and environmental impact associated with artificial lighting – even when lower energy-consuming LED systems are used.

The right light level

Achieving the right level of light is critical to the working environment, health and wellbeing, productivity, safety and sustainability.

Not only is low light often a problem in industrial buildings, so is the lack of light diffusion typical with polycarbonate rooflights. This can cause significant safety issues resulting from both glare and poorly-lit areas, and it's a problem recognised in BS5427. The standard states, "The distribution of daylight within a building should also ensure that there are no dark areas and no direct solar glare; use of diffusing rather than transparent rooflights is recommended for this reason."

Light surveys have shown that, even in new buildings with roofs 18 metres or more above the floor, some rooflights can achieve the all-important 'daylight factor' of between 4 per cent and 8 per cent at floor level. This level of illumination is well above the recommendations of 2 per cent from BREEAM and the 3 per cent guideline from CIBSE guidelines.

Not only is low light often a problem in industrial buildings, so is the lack of light diffusion typical with polycarbonate rooflights

Strength & safety

First things first: industrial rooflights should not be walked on. This is not only a safety issue, it may also damage the performance and structural integrity of the roof.

The safety performance of a rooflight must be tested as part of the whole roof assembly, including all components needed to install it and the roofing system it is installed in. Hambleside Danelaw's high-strength Evolution GRP rooflight, through rigorous testing in accordance with Advisory Committee for Roofsafety (ACR) recommendations, is designed to deliver systems achieving Class B non-fragility for 30 years – the highest standard a rooflight installed in a metal roof system can achieve.

The service life of a rooflight is dependent on several factors, most importantly the rooflight assembly or configuration. Technological developments have led to the introduction of thinner, lighter GRP sheets which can give an expected service life of 30 years without compromising light performance, while it is generally accepted that the current market standard for service life is a minimum 25 years. Unfortunately, there are systems on the market that fall below this requirement as they either use configurations developed decades ago or materials that are not as durable as GRP.

The combination of a long service life and long period of non-fragility offers real benefits to building owners and those accessing the roof, enhancing safety and reducing lifetime costing.

In order to realise all the potential outlined above, the importance of choosing the optimum rooflight configuration for your building and your requirements cannot be overstated. It's good practice to speak to your rooflight manufacturer for information on all the factors listed here, as well as to get a clear statement on both non-fragility classification and service life expectancy.

William McDowell is national business development manager at Hambleside Danelaw

Multi-functional glass

The conversation around fire safety glass tends to focus on fire protection alone. However as Andy Lake of Pyroguard explains, when specified correctly, this glass can be combined with other products to create a multi-functional system that offers so much more

In an industry with high expectations, architects and specifiers are often looking for ways in which they can push the boundaries of design and deliver more on a project. In order to achieve this, they will look to building products and solutions with innovation at their core and those with multi-functional qualities. But, how does fire safety glass fit into this?

When discussing fire safety glass, it can be easy to think of it as a product with a sole function. However, while its primary purpose is indeed to protect people, property and possessions in the unfortunate event of a fire, this can just be the start of a specification. In fact, with the correct technical guidance, it is possible for a glazing system to deliver high levels of fire protection, but so much more.

Fire safety glass is manufactured by alternating layers of toughened glass with intumescent gel interlayers, it is these interlayers that deliver the protection, causing the fire safety glass to react in the event of a fire. Yet, through the careful and technical selection of additional specialist glass panes to be interchanged within the system – or, in the case of a double-glazed unit, the installation of a specialist counterpane – additional performance qualities can be achieved.

Glass itself is already favoured by architects, specifiers and interior designers, bringing transparency to buildings and creating open, light and contemporary spaces. However, with this demand for aesthetics also comes the requirement for fire safety, good acoustics and energy efficiency – to name but a few.

Acoustics

Take acoustic performance and office developments as an example. Modern office buildings will commonly feature a bright, open-plan layout – designed to help improve productivity levels and aid communication. Glass can be integral to achieving this, whether through the specification of glass partitions between work spaces or even glass boardrooms. Schools are a similar story, often featuring glazed partitions within classrooms to help create a light and airy learning environment. However, this can all present architects with a dilemma, with the need for a glazed system that satisfies the fire safety regulations and also offers sound-deadening properties.

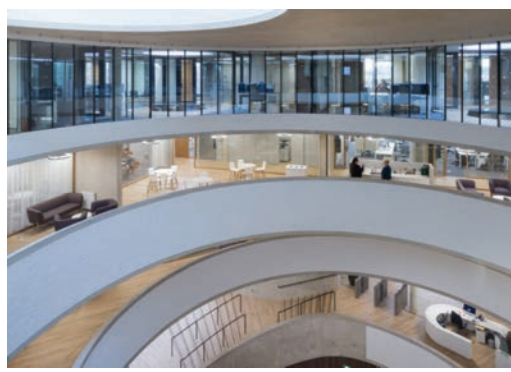
Through the specification of laminated toughened fire safety glass and use of calculations regarding the number of glass layers used within a system, it can be carefully engineered to reduce the amount of sound that is able to pass through the material, offering an enhanced acoustic performance.

Solar control

Another concern for architects when specifying glass is the issue of energy efficiency. This is particularly the case on high-rise buildings with glass facades, where glass forms a considerable percentage of the building envelope and can present the risk of it acting as a large greenhouse. Here again, the multi-functional capabilities of fire safety glass can help. Incorporating a glass pane with a solar control coating within the larger glazed system can prove highly beneficial, helping to reflect the UV light away from the glass. This coating can also work to keep the heat inside the building in colder months, rather than it escaping through the glass.

Aesthetics

As well as ensuring a building's future occupants are kept comfortable, it goes without saying that architects also want to make a building look good. With the correct technical advice, it is possible for a screen-printed glass pane to be incorporated within a fire-rated glazed system, opening up additional design avenues for interior spaces. With



coloured, etched and printed glass interlayers available, architects can push the boundaries and bring more colour and art into a building, whether for the purposes of aesthetics, or to create an 'on-brand' appearance.

Privacy

The use of a screen-printed glass interlayer can also be taken even further, with wider potential applications. For example, healthcare buildings can demand a multitude of properties from building materials and, while the use of glass can contribute to the creation of a light and welcoming space, it does also raise issues around privacy.

Just as incorporating a coloured interlayer within a glazed system can open up the design doors for architects, so too can it be used to engineer enhanced levels of privacy. For example, it is possible for integrated blinds to be incorporated within the glazing system, or an additional glass pane with a mirror or obscure finish – or even a screen-printed glass pane – to be interchanged between the toughened glass layers.

Rather than limiting a specification to one function, fire safety glass should instead be seen as a means of opening the doors to other design opportunities and performance capabilities

Rather than limiting a specification to one function, fire safety glass should perhaps instead be seen as a means of opening the doors to other design opportunities and performance capabilities. In fact, its fire protection can be just the start of a specification, helping architects to push the boundaries of architectural and interior design and contribute to the creation of buildings that are safe, comfortable and attractive.

Andy Lake is UK sales director at Pyroguard

Acoustic windows keep the peace at former US Embassy

When it comes to luxury redevelopments, they don't come much more complex than former US Embassy building No 1 Grosvenor Square with its rebuilt stone facade, SFS on springs and listed building status. The design and installation of sympathetic timber windows and doors for such a project is far from straight forward which means it is ideal for George Barnsdale.

Having seen the work Barnsdales carried out at 20 Grosvenor Square, Lodha decided from a very early stage that the Lincolnshire based manufacturer would supply the fenestration for their own "presidential" project.

Set in the heart of Mayfair with its replica Oval Office, No 1 Grosvenor Square is a prestigious development of high end luxury apartments. One of the key requirements was to mitigate for the underground noise using a complex internal rebuild on giant springs to absorb vibration and sound.

One of the biggest challenges the Barnsdale team had to overcome was installing the windows before the external envelope was completed. This meant that windows were effectively located mid air using gridlines. This was a highly complex process as window one might be 300mm in front of gridline while window 2 was 1500mm. The result of this was nearly 70 interface drawings!

Early involvement enabled George Barnsdale to provide a detailed programme through the tender stage to ensure that the contractor had a good understanding of the critical timeframes and could make the right decisions at the right time. As time progressed, such collaboration with the architect and the wider project team proved invaluable to the process of overcoming issues as soon as they arose minimising disruption.

The windows themselves were specified to meet the octave specific noise reduction and

the whole window's acoustic performance was validated not just the centre pane glazing data. "Unlike other manufacturers, we don't just rely on glass manufacturer data because as soon as glazing is put into a frame, it's performance is affected. Instead we have a vast array of tested technical and acoustic data as well as the installation detail to ensure accurate calculation of acoustic and thermal performance of the entire window." Commented Tom Wright, MD at George Barnsdale.

Alongside ultra high acoustic performance, the project demanded a very high level of security with integrated security contacts and fitted custom handles to the doors.

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Kalwall sheds light on cargo handling

Air services provider dnata has opened a new £30m high bay facility at Manchester Airport to help its expanding cargo handling business in the UK. Designed by architects RPS, the 13,500 sqm BREEAM-rated building includes an innovative mix of flexible Grade A office accommodation, workspaces and meeting facilities along with a dedicated gym and fitness centre. For part of the scheme, the architects specified **Kalwall®** translucent cladding to provide natural daylighting for the offices and gym. This building's tall ceiling space required the 100mm self-supporting Kalwall panels to span freely across 4.8m x 2.8m apertures. While it is unusual to have such a tall span with no support, the inherent strength of Kalwall in a lightweight frame meant it could be achieved and add to the overall aesthetic appeal of the design. Furthermore, the integration of higher density insulation within the Kalwall panels means they are achieving an impressive U-value of 0.83 W/m^2K – half that of traditional double glazing. Kalwall panels can achieve a U-value of up to 0.28 W/m^2K for the most demanding of applications. This reduces the reliance on HVAC systems and artificial lighting.

www.structura-uk.com/kalwall

Structura brings Shakespeare's first theatre back to life

Structura UK, the fabricator and installer of glass curtain walling and specialist refinishing expert, has completed an intriguing project at 'The Box' on New Inn Broadway, London and it's a project full of firsts! The location is the site of 'The Theatre', Shakespeare's first polygonal purpose-built theatre and precursor to The Globe. It is also the first site where Structura has combined curtain walling with Accoya wood panels. Combining five floors of exhibition space and offices, the whole front facade has been supplied and installed by Structura. In order to test fully the innovative use of timber and glass, Structura had to build a rig for CWCT air, wind and impact tests. A series of experiments were then conducted using wind generated from an old Spitfire engine and wrecking ball impact. Supplying everything from entrance doors, sliding doors and the entire facade, Structura worked closely throughout with main contactor 8Build. This is a stunning example of how architects, contractors and suppliers can come together to help realise a client's dreams, helping to embrace the future while celebrating the past. Case studies and technical information are available from Structura.

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