Building envelope

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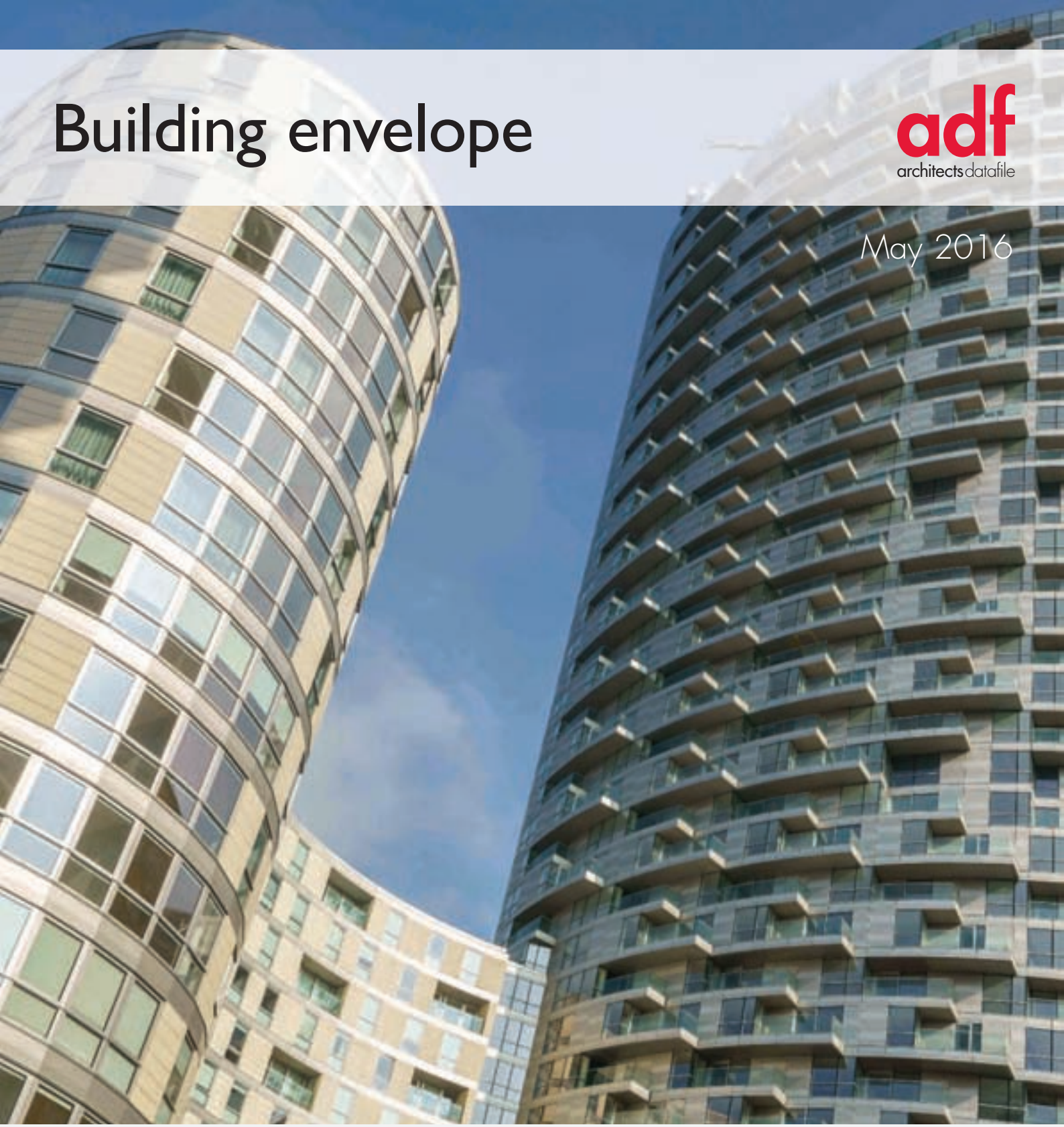
May 2016



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www.architectsdatafile.co.uk

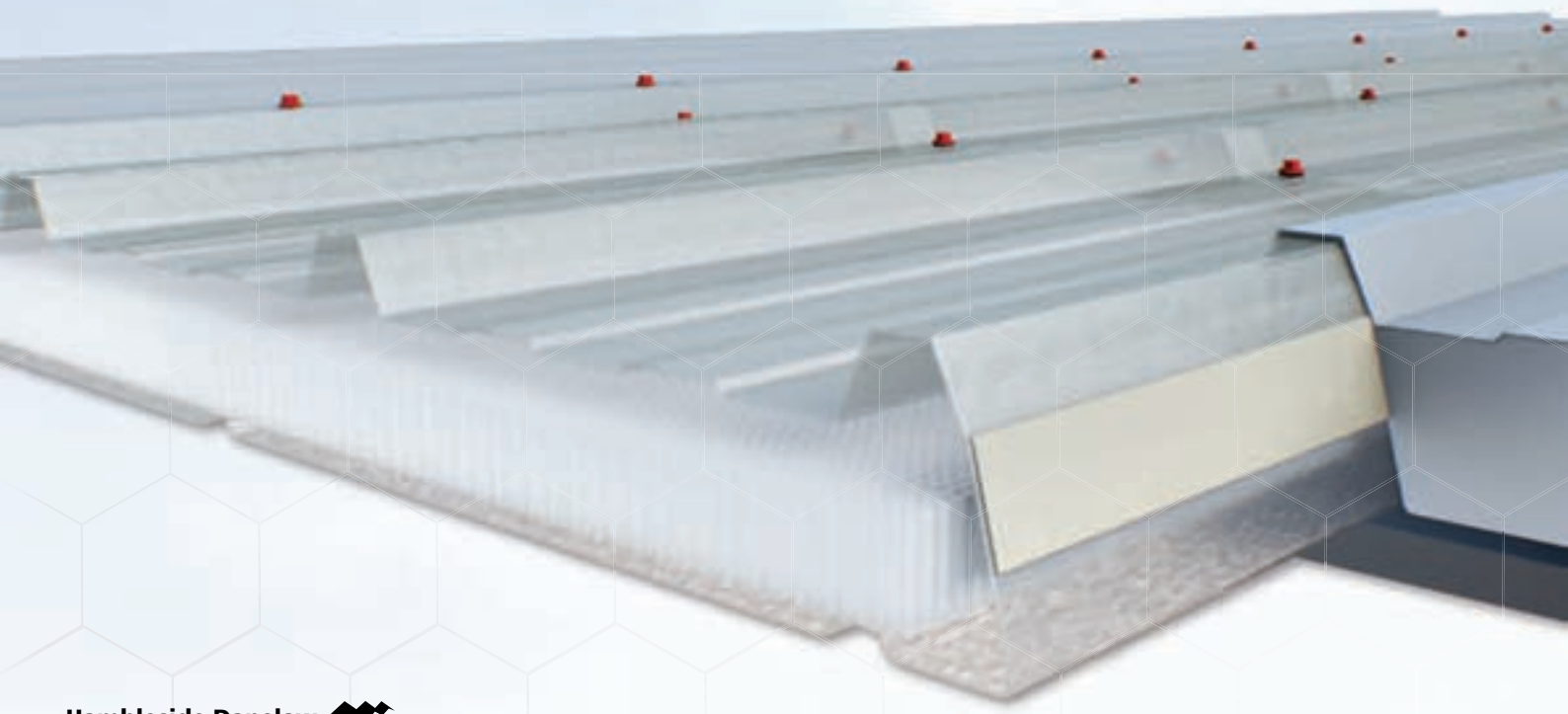
ZENON

RETHINKING THE ROOFLIGHT

Responding to customer feedback and the increasing demands of today's metal roofing and cladding envelope professionals, the design team at Hambleside Danelaw are pleased to unveil a package of improvements to the company's composite panel rooflight following the launch of their new Zenon range.

These improvements address key installation issues and can deliver a range of benefits to the metal building envelope, including:

- Increased light transmission
- Improved light distribution
- Lower U-values
- Reduced cold bridging
- Compression resistant fillers
- Enhanced spanning capabilities



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For more information please contact our Sales Department:
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The Building Envelope Authority

adf may 2016

Building Envelope supplement

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Editor's letter

Welcome to the 2016 edition of the Building Envelope Supplement.

Beyond its essential function to provide a weather, air and noise barrier, the Building Envelope must work effectively with the other components of the building. And, as a structure forming the outer-skin, its aesthetic and environmental impact are critical, while it must conform to strict legislative requirements.

By combining these elements, some of the latest construction processes and systems are aimed towards helping designers achieve better buildings with greater efficiency in the building envelope and, as a result, an overall more sustainable building.

Our contributing authors from companies involved in building envelope specification therefore examine some of the issues facing their own industry sector and how advancements are assisting architects achieve their vision.

Stone, one of the oldest building materials, for example, has been re-invented for modern construction purposes. We are grateful to stone cladding specialist, Szerelmey, for outlining not only the challenges but also the solutions that are allowing architects to design stone-clad buildings that overcome engineering and installation issues when using larger panels versus lightweight structures and fixing systems.

As structural facades are integral to the performance of a building over its entire lifespan, Aluk discusses the advantages of twin-wall facades for both new and older buildings and how a two-skin system can interact with other building components such as windows, doors and ventilation, to maximise climatic and energy control.

In a contribution from BTS Fabrications, we also look at how advancements in precision rainscreen cladding and smarter technology are lowering the risk of error in design and project delays, as well as enabling a high-performing building envelope.

We are also grateful to Gradient Roofing for a technical view on designing tapered insulation for roofing; to ISD Solutions for discussing single envelope construction for warehouse, cold storage and retail distribution and to CA Roofing Services for comment on the skills shortage in the roofing and cladding trade.

We have picked three very different, yet outstanding projects that demonstrate excellence in building envelope design to report on. Gort Scott Architects took on the challenge to transform Jesus College's derelict site in a conservation area into Cambridge's greenest office building with a BREEAM 'excellent' rating. IPT Architects ambitious and award-winning farmhouse with vision – literally over 9.5 hectares of farmland that it nestles in – caught our eye. And, last but not least, we feature the major refurbishment of the International Broadcast Centre on the London 2012 Olympics site, which is a triumph in building envelope design.

Sarah Johnson

WORKSPACE DEVELOPMENT

Skanska's The Monument Building: Countdown to completion as main architectural feature is fitted

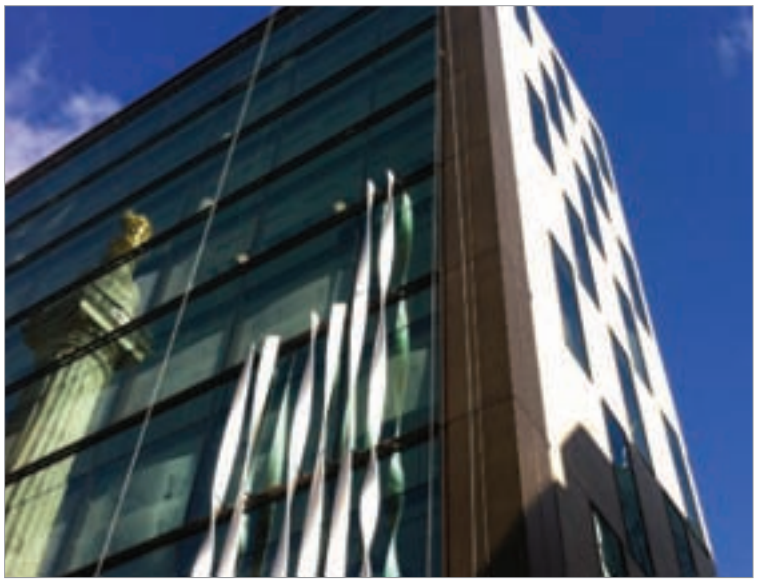
Construction at Skanska's The Monument Building, in the heart of the City of London, has reached the final stages with the fitting of its most striking architectural feature.

The main facade of aluminium fins provide a distinctive 'curtain' of rhythmic, repeating twists from the ninth to the second floor, delivering a stunning yet simple and restrained feature to the building, and a suitable backdrop for the nearby historic Monument to the Great Fire of London. They have been designed and placed to maximise the amount of natural light into the building, while at the same time providing shade and reducing heat gain.

Ken Shuttleworth of Make, the award-winning architect of The Monument Building, comments: "With Skanska, we have designed a building that not only meets its sustainable criteria, but also offers striking features while being respectful of this historic location.

"As well as the bespoke fins, the exterior of the remainder of the building, with a mix of alternating Jura stone and glazed panels, has been carefully considered to respect its surroundings."

Andreas Lindelöf, Managing Director, Development, says: "With an emphasis on place-making, sustainability, tenant profitability and creating the right working environment, The Monument Building has been developed as a place where City companies want to be. The wow factor that we wanted to create is now being revealed as we countdown to completion."



The Monument Building, comprising 94,000ft^2 (8,733m^2) of grade A office space and two ground-floor retail units, is Skanska's first 'Workplaces by Skanska' development in London. The scheme, which is due to complete in May 2016, boasts four feature terraces with spectacular views to the north and south, a large reception area, state-of-the-art cycle storage and first-class shower facilities.

The Monument Building is designed to achieve a BREEAM 'Excellent' rating, with features including LED lighting, a green roof, photovoltaic panels and an intelligent lighting control system.

'We have designed a building that not only meets its sustainable criteria, but also offers striking features while being respectful of this historic location'

Ken Shuttleworth, Make

Sika provides airtight solution

Sika-Membran has enabled thousands of windows to be installed at a spectacular London dockland development with an airtight seal to ensure its residents enjoy the perfect living environment. The versatile joint sealing system was specified for New Providence Wharf, a stylish residential complex in Canary Wharf, the heart of the capital's dynamic business and financial district. Sika-Membran, from global building product manufacturer **Sika**, is a versatile EPDM synthetic rubber waterproofing membrane, designed to provide an efficient method of sealing construction gaps in building facades. Thin and easy to use on site, the system offers long term performance.

AWARD

Wienerberger Brick Award 2016 shortlist!

'With its Brick Award, Wienerberger draws attention to outstanding examples of brick architecture'


Seven-Acres-Cambridge


Saw-Swee-Hock-Student-Centre

The Wienerberger Brick Award, which was first initiated in 2004, is a biannual architectural award that honours outstanding examples of modern and innovative brick architecture.

In 2016, Wienerberger is presenting this internationally established award for the seventh time. This year Wienerberger has slightly adapted the participation conditions. For the first time, architects could enter their best brick projects directly via the online tool.

After receiving over 600 projects from 55 different countries, a panel of architecture critics selected the 50 shortlisted projects for the Wienerberger Brick Award 2016. The award comprises five categories: Residential Use, Public Use, Re-Use, Urban Infill and Special Solution.

Among the 2016 shortlisted projects are Forest Mews by Robert & Jessica Barker (founders of Baca Architects and Stolon Studio), a redevelopment of an urban brownfield site and Herringbone House by Chan and Eayrs an urban development set amongst Victorian homes, both in London, which are nominated for the Urban Refill award. Saw Swee Hock Student Centre by O'Donnell & Tuomey a multi-functional building for the London School of Economics, is nominated for the Public Use award, and Seven Acres by Formation Architects a development of 128 dwellings in Cambridge developed with detailed master plans and design is nominated for the Residential Use Award. The full shortlist can be viewed on www.brickaward.com.

From this shortlist an international jury of architects selects the winners in the single categories. Assessment criteria include innovative exterior design and skilful use of brick as a material along with functionality, sustainability and energy efficiency. Possible applications range from building solutions with classic clay building blocks and facing bricks to the creative use of ceramic facade panels, roof tiles and clay pavers. Special attention is directed to how the building blends in with the surroundings as well as to the form, aesthetics and general quality of the architecture. The use of Wienerberger products is not a necessary condition of participation.

The winners will be announced at the Brick Award Ceremony on the 19th of May 2016.

This time, the jury consisted of: Laura Andreini (Archea Associati, Italy), Johan Anrys (51N4E, Belgium), Matija Bevk (bevk perovic arhitekti, Slovenia) and Alfred Munkenbeck (Munkenbeck + Partners, UK). The official Brick Award ceremony and press conference, where the winners will be announced, will take place in Vienna on the 19 May 2016, combined with an architecture symposium.

The award is endowed with prize money of 7,000 Euros for the Grand Prize Winner and 5,000 Euros for the Category Winners.

With its Brick Award, Wienerberger draws attention to outstanding examples of brick architecture.

As in the past years, Wienerberger together with the prestigious Callwey Publishing House will produce the comprehensive book entitled "Brick '16", featuring all 50 nominated and award-winning projects. This beautifully designed book will be published at the time of the official Brick Award ceremony in May 2016.

The Wienerberger Brick Award acknowledges innovative brick buildings of international quality that show the varied and diverse ways brick can be used in contemporary architecture. At the same time, the award, and in particular the accompanying architectural book, gives people with an interest in architecture, as well as experts, an overview of current developments and trends in international brick architecture with its remarkable range of applications.

The skills shortage – Building tomorrow's workforce

Peter Rowe

According to Peter Rowe, contracts director for CA Roofing Services, we are at a turning point and, unless we take decisive action now to encourage more people into this sector, there may be tricky times ahead

As the construction industry continues to grow, skilled, committed workers are more sought after than ever before, placing them in a strong position to earn a premium for a hard day's work. But with a myriad of factors altering the employment landscape the numbers seeking this type of work are diminishing.

The reputation we have built over more than 30 years in the industry means that, unlike many of our competitors, the large majority of our workforce is made up of operatives who have been with us for 5 – 10 years. They have been trained by the business and they know the standards we expect and work to them, under the close guidance of our site supervisors.

However, when the opportunity comes to increase our work load we look at what restricts us as a business and the biggest challenge we face is finding additional, quality manpower.

One of the key issues is that, for those involved in the roofing and cladding trade, the only practical training available is on the job. Anyone wanting to train as an electrician or a plumber, for example, can complete a recognised 3-5 year course complete with college attendance, while serving an apprenticeship, and come out at the end of their time with a qualification that actually means something.

There is no such course available to those wishing to gain a meaningful qualification or training within the roofing and cladding industry. And yet with manufacturers developing a range of roofing systems, which are made up of a wide variety of components that require a certain level of skill to navigate and install, surely there is a case for such a qualification?

Quality control

Our response to the problem has been to adopt a number of quality control systems, with multiple check points which have to be signed off before work can move to the next stage. With many sub contractors employed on a 'lump sum' price, the more material they can put down the more money they earn, so there is a danger that for them speed takes priority over quality. In order to mitigate this risk, our supervisors and site managers constantly oversee the quality of the work and, if it is not up to standard, the work has to be redone or ultimately we have to let the operative go.

Evidently, the role of the site manager and supervisor is critical and we work closely with our senior site operatives training them and helping to develop their careers to ensure they are fully equipped to manage the teams on site. We currently have around 16 site supervisors/site managers rising through the ranks, eight of which have no previous experience in cladding but who have all the necessary skills for this particular role.

Having such a robust framework in place for managing the site benefits everyone involved. The better organised we are and the more stringent our quality control, the less need there is for work to be repeated and the quicker work can proceed, meaning we can stick to our contractually agreed timings and the workers can get more work done, for which they will earn more money.

Fostering new talent

The changing nature of the UK jobs market also plays a significant role in effecting the number of potential candidates for the construction industry to draw upon. In the 60s and 70s industry was a key part of the UK landscape. Children would grow up in families of coal miners and factory workers and so it wasn't such a great leap for them to consider such a role for themselves. Today, many young people coming into the jobs market don't have that contact and don't want to work on a building site in the mud, wind and rain, opting instead for retail and office-based jobs. We end up a nation of pickers and packers.

To address this we have been doing some work with local schools to try to start the conversation and put construction on the radar of those pupils who do not want to go on to higher education. We have a number of apprentices at CA and a few have taken on the role of company ambassadors. They are going through the process so they are perfectly

Continued overleaf...

positioned to talk about why construction is a good sector to work in.

The message is clear: in construction you can earn a good living without the need for qualifications.

Of course, there is an additional challenge that some main contractors will not allow trainees under the age of 18 on site. So there is a two-year gap from them leaving school to when potential candidates are able to start earning money, by which time we have lost them to another industry, and so the cycle continues.

At CA we have been trialing a young persons risk assessment on site and we have a number of trainees under 18 years old working with us. A good building site, which is well managed and controlled, is a safe place to work. But not all main contractors apply the same high standards on site and this is a key factor when considering the employment of young workers as they have to be supervised at all times, which can be limiting when time is of the essence.

Companies generally teach the trainees in the way that they see fit. Like everything else in life, if they teach them well from early age they will go on to do well.

We have had a lot of success with trainees and have had people rise through the business from having no experience to being members of the senior team.

It is crucial that we address the current – and future – skills shortage issue in the industry. The loss of workers to retirement combined with the erosion of future candidates by other sectors will leave us with a very limited workforce.

Bespoke or accredited training for roofing and cladding installation could bridge the gap for school leavers, providing companies operating in this sector with access to vital fresh talent – and renewed optimism for a productive roofing and cladding industry moving forward.

Lunar refurbishment for children's art centre in Belgium

At the heart of the renovation and upgrading of 'the Moon' children's art centre in the Belgian city of Mechelen is a new, small theatre complex – a golden cube defined by its extraordinary, creased Nordic Royal copper alloy cladding.

The project's designers, Antwerp based import.export Architecture, were inspired by associations of 'the Moon' with the Apollo 11 Lunar Module and its crumpled golden metal underside. This aesthetic is presented as a contemporary reflection on the intricate stone tracery of the neighbouring medieval cathedral tower, despite being achieved within a modest budget.

The architects worked with specialist fabricators Ridder experimenting with pressing and folding flat metal over a blade, resulting in a series of gentle creases – almost, but not quite, 3D. Then, seven different designs of panels were produced using press moulds, each with folds running across at various angles and intensities. By rotating and intermingling different panels a rich, random effect was created. The verticality of the overlapping panels is retained, giving structure to the facades, but most transverse joints are not horizontal, further fragmenting the surface.

Image courtesy of Aurubis
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Why single envelope construction is driving the design of new warehouses and cold stores

A pioneering, single envelope construction technique using insulated composite panels as the construction medium is changing conventional warehouse design and bringing with it significant savings. Tony Wall, managing director of ISD Solutions comments

It is important for architects to think beyond insulation for optimal building performance and to look holistically at warehouse or cold store projects. By bringing together smart design, experience, expert delivery and proven know-how, a cost reduction of up to 20 per cent[1] can be achieved whilst delivering virtually airtight, high-performing buildings with low lifetime running costs.

Architects' design skills are needed to calculate the correct level and type of insulation to achieve optimal thermal efficiency and fire protection (if required). Other challenges for architects are to ensure that buildings remain virtually airtight while accommodating up to 40mm shrinkage and expansion, with air leakage levels below the guidelines set by the International Association for Cold Storage Construction.

At a time when utility costs are rising, inefficient facilities will need to be replaced or upgraded. For cold stores, supermarket distribution and logistics companies the energy-saving characteristics and reduced construction costs of insulation have never been so important.

Traditional cold storage warehouses effectively involve the construction of two buildings, one inside the other. The resulting void between the envelope and the internal cold store roof may require fire prevention, heating/cooling and air-handling, all of which will add to the capital investment.

A traditional build can be time consuming to construct and not particularly sustainable or thermally efficient.

A pioneering, single envelope construction technique using cold store specification insulated composite panels as the construction medium is completely changing conventional warehouse design and bringing with it significant savings to developers and operators alike.

Design efficiency

Careful attention to detail at the design stage ensures optimal performance of the building in the longer term. A careful assessment of location, wind loadings and temperature cycles is required to ensure warehouse design can safely accommodate normal shrinkage and expansion of up to 40mm and still remain virtually airtight. It is essential to minimise the effects of 'thermal bowing', the physical distortion of wall panels as the exterior metal skin heats up in the sun, while the cold interior face contracts.

With a potential temperature difference of 60 degrees on a hot summer's day, how the composite panels are fixed in place and the design of junctions, connections and fixings are critical. A fully-automated high-bay frozen warehouse, operated by Partner Logistics in Cambridgeshire, was designed to operate down to temperatures of – 25 degrees Centigrade. Containing a staggering 77,000 pallets of frozen food the warehouse, combined with the loading and picking building, required over 36,000m^2 of composite panels.

Build efficiency

Single envelope warehouses and cold stores can be constructed around 20 per cent faster than traditional builds when using cold store specification composite roof and wall panels.

Continued overleaf...

[1]Up to 20 per cent savings in building costs, faster project completion and reduced operating costs for the end client, with improved sustainability credentials: independently assessed by Davis Langdon, global construction specialists

The inherent strength and spanning characteristics of these modern composite panels significantly reduce the requirement for secondary steel-work, representing a real cost saving. The panels themselves are made from a low-carbon material. Another aspect of build efficiency is a high bay design resulting in a much smaller footprint which can reduce land requirements by 4-5 times.

Significant savings in build cost and maintenance

Apart from requiring lower capital investment at the outset, a single envelope cold storage facility requires an estimated 30 per cent fewer raw materials. It can also deliver significantly lower long-term running costs than a traditional build. This is due to increased thermal efficiency and air tightness of the single envelope, which minimises the need to run duplicate services for a 'building within a building'.

Fire and safety

The airtightness of a building enables reduced levels of oxygen to be maintained within the envelope, down from 21 per cent to 15 per cent. This means that personnel can work as normal – but fire cannot sustain momentum, so expensive fire prevention sprinkler systems are not needed.

Where required, steel-faced composite panels can be used in fire wall applications. Fire separation, between chambers of a warehouse with excellent fire resistance, can be achieved from 60 to 240 minutes.

Good for the environment

Aside from the environmental benefits of a smaller physical footprint, fewer raw materials used in construction, and higher levels of thermal efficiency, the cold store spec single envelope design achieves WRAP and BREEAM targets by using low carbon composite panels with a reduced 'global warming potential' (GWP). The thermal qualities of these metal-faced composite panels keep temperatures constant and virtually airtight, regulating heat loss and gains to reduce a building's energy consumption. Solar PV systems can be incorporated to improve energy efficiency even further, as was the case with Aldi's new 52,000m^2 distribution centre at Goldthorpe, designed to operate 24/7, 365 days a year.

With air leakage regularly achieved at below 0.1m^3 per hour per m^2 at a pressure of 50 pascals, the building far exceeds 0.5m^3 design guidelines set by the International Association for Cold Storage Construction. These environmental factors significantly improve carbon reporting.

In conclusion, with more cold store specification single envelope projects already underway, there is growing interest across the warehousing, cold storage and retail distribution sectors in these innovative and sophisticated, thermally-efficient, low-carbon storage solutions.

The importance of building envelopes to energy efficiency and combatting CO_2 Emissions

Simon Wild, European category marketing manager at Formica Group, discusses the importance of building envelopes in combatting CO_2 emissions and their role in energy efficiency

It is estimated that on a global scale residential and commercial buildings contribute about 31.5 per cent of CO_2 emissions each year. When it comes to the UK, buildings account for approximately 37 per cent of carbon emissions. To address this issue, the UK has pledged to reduce carbon emissions by 80 per cent come 2050.

In order to meet the target, it is imperative that during the development phase of new builds, ample consideration is given to the energy efficiency and performance of a building, rather than being an afterthought. Bearing in mind that the Carbon Trust estimates that 60 per cent of buildings that exist today will still be in use in 2050, it is also essential that existing buildings are refurbished to bring them in line with future UK carbon emissions goals.

Refurbishment and beyond the Green Deal

Figures suggest that of the UK buildings that need retrofitting to meet the carbon emissions reduction, the figure is split 60/40 between residential and commercial respectively.

The UK Government's Green Deal was committed to refurbish its social housing by assisting tenants, landlords and home owners with the cost of improvements; presenting the UK with a huge potential market in the refurbishment of existing buildings. Boiler upgrades, double glazing and exterior envelopes being prime examples of the improvements covered by the scheme. Adopting such measures results in considerable cost savings since buildings which previously had a zero energy star rating can qualify for a potential rating as high as 8 stars. Since the scrapping of the Green Deal, the 'Decent Homes' Programme and Minimum Energy Efficiency Standards go some way in filling the void but there remains a demand for an initiative embedded in legislation to replace the scheme.

Poor insulation is a contributing factor to a building's heat loss in winter and heat gain in summer. Therefore, a "fabric first" approach, ensuring the right building envelope specification can significantly influence thermal performance and reduce running costs.

Additionally, exterior cladding solutions, that use an external insulation, reduce loss of internal floor space and minimise any internal building disruption for occupants during the refurbishment process; they are also extremely quick to install. Well-engineered cladding will maintain its appearance and give consistent performance for many years, requiring little maintenance.

The introduction of stricter requirements for new builds

The government has introduced a number of policies to encourage the use of low carbon technology in buildings to address carbon emission issues and energy efficiency. There are also stricter requirements for commercial buildings and new homes constructed after April 2014.

Government measures also include the Energy Savings Opportunity Scheme which implements the EU Energy Efficiency Directive, which is an established set of binding measures to help the EU reach its 20 per cent energy efficiency target by 2020. Factors such as building envelope specification, double glazing and draughtproofing are some of the considerations for UK companies looking to comply with this directive.

Advancements in building envelopes

Advancements in technology present a wider choice of cladding materials, colours and finishes than ever before, from traditional materials such as wood and stone to modern composites like high pressure laminate and fibre cement. Cladding systems allow the combination of materials to complement and accentuate architectural design, with various fixing methods both visible and concealed to complement the overall building look.

Recent developments include the possibility to create custom colour matches and digital replication of images into cladding panels, for commercial buildings this can help to create a building identity, incorporating a brand logo or corporate colours into a scheme, or through the creation of design features or signage.

Furthermore building envelopes offer a cost effective alternative to demolition and rebuilding, with the potential to extend a building's useful life, increase its value and convert an outdated building into an architectural jewel.

'Exterior cladding solutions, that use an external insulation, reduce loss of internal floor space'

Architect: Red Box design

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COMPANY REPORT

RCM reports expansion and growth

RCM is delighted to announce an outstanding start to 2016 – with the business hitting a £1 million turnover for the month of January, with February and March building on this success – achieving in excess of the million mark over consecutive months. This milestone is an indicator of the improved business performance achieved through targeted activity and subsequent sales growth of its full product range, as well as a significant growth within their A1 range of non-combustible building boards including Y-wall™ and Multipurpose™, used in over 18 metre applications.

The results represent a split of product sales comprising 75 per cent building boards and 25 per cent made up from the enhanced range of facade solutions. Through increasing the facades product portfolio, RCM can now offer an extensive range to their existing customers and generate interest from new clients.

Highlights

Project CSSB (Clinical Services Support Building), which is part of a three phase redevelopment of the Royal Liverpool University Hospital – scheduled for completion by early 2017, was a great success for RCM and their client, Prater. This redevelopment was the first project where RCM were able to work with their customer and offer design elements on their through wall product, including Y-wall™, airtightness solutions and an aluminium support frame as part of the overall solution.

Another highlight for the period was securing the Rathbone Market project which will be worth half a million in turnover to RCM when completed. The 680,000 ft^2 Rathbone Market scheme, developed by English Cities Fund (ECF) – a joint venture between Muse Developments, Legal and General Property and the Homes and Communities Agency (HCA) – is part of the Canning Town & Custom House regeneration programme creating a new commercial district, new housing and a refreshed High Street within the Thames Gateway. RCM supplied Y-wall™, an airtightness solution, aluminium support frame and a Rimex composite cladding to the project.

RCM's first board and facade cutting machine

RCM have recently invested in a new state-of-the-art cutting machine. The benefit of the new machine has enabled boards and facades to be cut to size, minimising wastage and removing the need to cut onsite thus benefitting the client by saving time. By being able to supply key specialist contractors with bespoke buildings boards cut to size and facades to meet specific project requirements, RCM has seen a 20 per cent increase in sales turnover as a result.

Congress Theatre facade officially opened by superstar Palin

The restored front of the Congress Theatre was officially opened by renowned actor, comedian and writer Michael Palin.

The Monty Python star unveiled a plaque on the Grade II* listed building to mark the completion of the project at a cost of nearly £2 million.

Careful restoration and improvements to the iconic facade have enhanced the building's energy efficiency and will ensure minimal maintenance in the future.

Mr Palin unveiled the plaque, which is made of slate used in the original construction of the theatre in the early 1960s, in front of a small audience.

The actor took time out of his busy schedule for the opening before appearing on stage at the Congress Theatre in his two-hour show The Thirty Years Tour.

He said: "It is a pleasure to perform in this magnificent theatre which has undergone meticulous work on its frontage so that it looks the same now as when it was originally built.

"This project has been a huge success and it is great to see a council such as Eastbourne investing in theatres again, as this so rarely happens anymore."

The Congress Theatre is one of a very limited number of post-war listed theatres in this country, alongside the National Theatre, Royal Festival Hall, Nottingham Playhouse and Chichester Theatres, and is of national architectural importance.

Eastbourne Borough Council appointed heritage consultancy specialists Faithful+Gould to project manage the intricate work which was completed in a year.

The restoration work was the initial phase of the Devonshire Park masterplan to transform the area into a premier cultural and conference destination.

MAKING

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Transparent Building Materials

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Transforming the International Broadcast Centre into an attractive commercial development meant stripping off the entire facade and replacing it with a glass skin covered with over eight million tiny dots. Stephen Cousins reports

As large, generic, white buildings go, the International Broadcast Centre (IBC), located in the North West corner of the London 2012 Olympics site, near Hackney Wick, was one of the largest and least attractive.

The biggest structure in the Olympic Media Centre complex, at 280m long and 120m wide, it was easily large enough to fit the One Canada Square tower laid on its side, or six jumbo jets. yet it was just a white steel-framed box with no discernible identity.

This posed a problem for developer iCITY, a joint venture between real estate investor Delancey, and data centre operator Infinity SDC, when the Queen Elizabeth Olympic Park switched into legacy mode and it considered options to transform the building into a mixed use office block suitable for tech firms, artists and creatives.

The IBC was originally intended as a temporary building, only used during the Games, and as such it was supported on a fairly substantial series of portal frames. The facades had no windows, a result of the building being crammed with TV recording studios during the Olympics, and a basic steel composite cladding. In addition, an unsightly gantry frame, supporting several tonnes of aircon equipment, extended across its rear.

Richard Palmer, project director at Delancey comments: "Some people said it was a far more valuable asset as a piece of land and that we should sell it or knock it down, but for the

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IBC to have been just a one month gig for the Olympics would have been an extraordinary waste of resources and completely unsustainable from a recyclability point of view."

An initial design to transform the venue was rejected by iCITY for its lack of creativity, so the project went out to design competition. The winning proposal, by London-based architects Hawkins\Brown, is now under construction and exploits the simple concept of 'crust' and 'core' to break down the building's bulk.

A 16m-deep crust of office space, around the perimeter, aims to maximise daylight, ventilation and views by stripping off the existing cladding and replacing it with a double glazed unitised curtain walling system. The crust encloses a central core, comprising spaces for tenants requiring no natural daylight, such as the Infinity data centre, UCL's Bartlett School and departments of engineering and robotics and Wayne McGregor's dance studio.

Jennifer Dooner, project architect at Hawkins\Brown comments: "It is quite hard to repurpose a building whose purpose was previously so poorly defined. The Aquatics Centre was always going to remain a swimming pool, the Velodrome has not changed its typology, whereas we had an empty box, which was entirely open to new ideas."

The studio's concept was to unpeel the existing cladding and expose this homogenous sealed box to the true industrial and contextual heritage of the site, simultaneously creating physical routes and views through that connect it to the other buildings on the site.

The IBC redevelopment is the centre piece of a £100 million redevelopment of the Media Centre site, known as

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'The studio's concept was to unpeel the existing cladding and expose this homogenous sealed box to the true industrial and contextual heritage of the site'

Here East, which includes the adjacent former press centre and former media conference room. iCITY plans to fill it with a thriving community of tech firms, small-scale artists and creatives, many from the local Hackney Wick area, as part of the wider regeneration of the east London region.

Though Here East's presence is currently hard to miss, within three years it will be part of a thriving commercial district including The International Quarter, a mixed use development with four million square foot of new workplace and 330 new homes and the 11 acre UCL East campus, near the Olympic Stadium.

The building's facade is covered with around 3,000 unique panels of unitised curtain walling, weighing a total 450 tonnes. Most panels feature an innovative and complex digital frit pattern, made up of over over eight million ceramic dots, and dots-within-dots, intended to break down the massive scale of the building into readable sections, as well as add visual excitement.

The dots cascade diagonally across the facades at different angles, drawing visitors towards the locations of three themed main entrance atriums along the west facade, known as the steel mill, the timber yard and the fabric factory – a nod to the factories and warehouses that once occupied the site.

The frit design was inspired by dazzle pattern camouflage, a technique invented by the British artist Norman Wilkinson and used during World War I to protect battleships. This form of camouflage used bold shapes and violent contrasts of colour to confuse the enemy, making it difficult to discern the type of battleship and therefore the level of threat.

Bright orange paint applied to the building's exposed steel frame provides another military reference, inspired by the interior lining of reversible flight jackets, and will be clearly visible behind the glass. The facade is further articulated through the inclusion of several large projecting balconies and recessed areas punched into the glass.

The ceramic frit was printed onto the glazing by Polish glazing manufacturer Press Glass, using a large digital Diptech printer measuring 2.6m x 3.7m. Martin Saltern, project manager at cladding subcontractor Lakesmere comments: "This type of printing has never been done at this scale, using this size of machine, to create a continuous pattern that flows across the entire surface of a building. The technique is much faster than traditional screen printing, which requires the creation of thousands of individual printing templates."

Hard graft was still required from the design team who spent many hours preparing and checking 2D pattern drawings for each panel in AutoCAD, and tweaking them so the dots appear to run uninterrupted across the facade, over 20mm silicon joints between adjacent panels.

Each unitised cladding panel is 39mm thick and comprises two 11.5mm-thick panes of heat-strengthened laminate glazing, separated by a 16mm-wide space filled with argon gas. The frit, and a layer of Sunguard intended to reduce solar gain and improve the performance of the glass, are incorporated within the outer pane.

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Here East is designed to BREEAM 'Excellent', the clear cladding panels have a U-value of 1.0 W/m2K, and spandrel panels, with black opaque glass, insulation and a metal panel inner face, a U-value of 0.385 W/m2K.

The density and location of the frit pattern responds to solar gain requirements. Grasshopper parametric modelling software was used to calculate dot density and distribution based on both work functions going on inside the building and the geographic location. The pattern is less dense on the north side, where there is more shade, and increases along the west and south elevations.

To prevent employees from going 'dotty' looking at spots all day, a clear 'vision band' is included at seating height so that people sitting at desks in office spaces can see out. The pattern was omitted entirely at ground floor to enable retailers to fully display their wares.

Entirely glazing the facade should draw attention to the scurrying activity going on behind the glass as workers move around floors and between different levels. This "ant farm" effect is already visible inside the offices of BT Sport, iCity's anchor tenant, which occupies about a fifth of the building, where researchers can be seen walking between banks of flickering TV screens on a main floor and mezzanine level.

Further dynamism will be injected into the long east elevation, where the steel gantry structure will be retained and populated by a variety of creative studio spaces, built in timber using the WikiHouse open source building system.

Palmer comments: "Part of the idea behind gantry is to provide affordable rented units for artist studios, sculpture, printmaking and photography. Many people can't sustain the rents being asked for in nearby places like Shoreditch."

With the unitised cladding now fully installed, and fit out work underway inside, Here East is already a more vibrant proposition than the generic white blob it replaces. Like a chameleon, the glass skin changes appearance at different times of day, and in different seasons. Early morning sun on the north elevation creates a crisp contrast between the white spots and dark office interiors, and at dusk the effect is reversed as artificial light from the building's interior shines through and the spots are cast in shadow.

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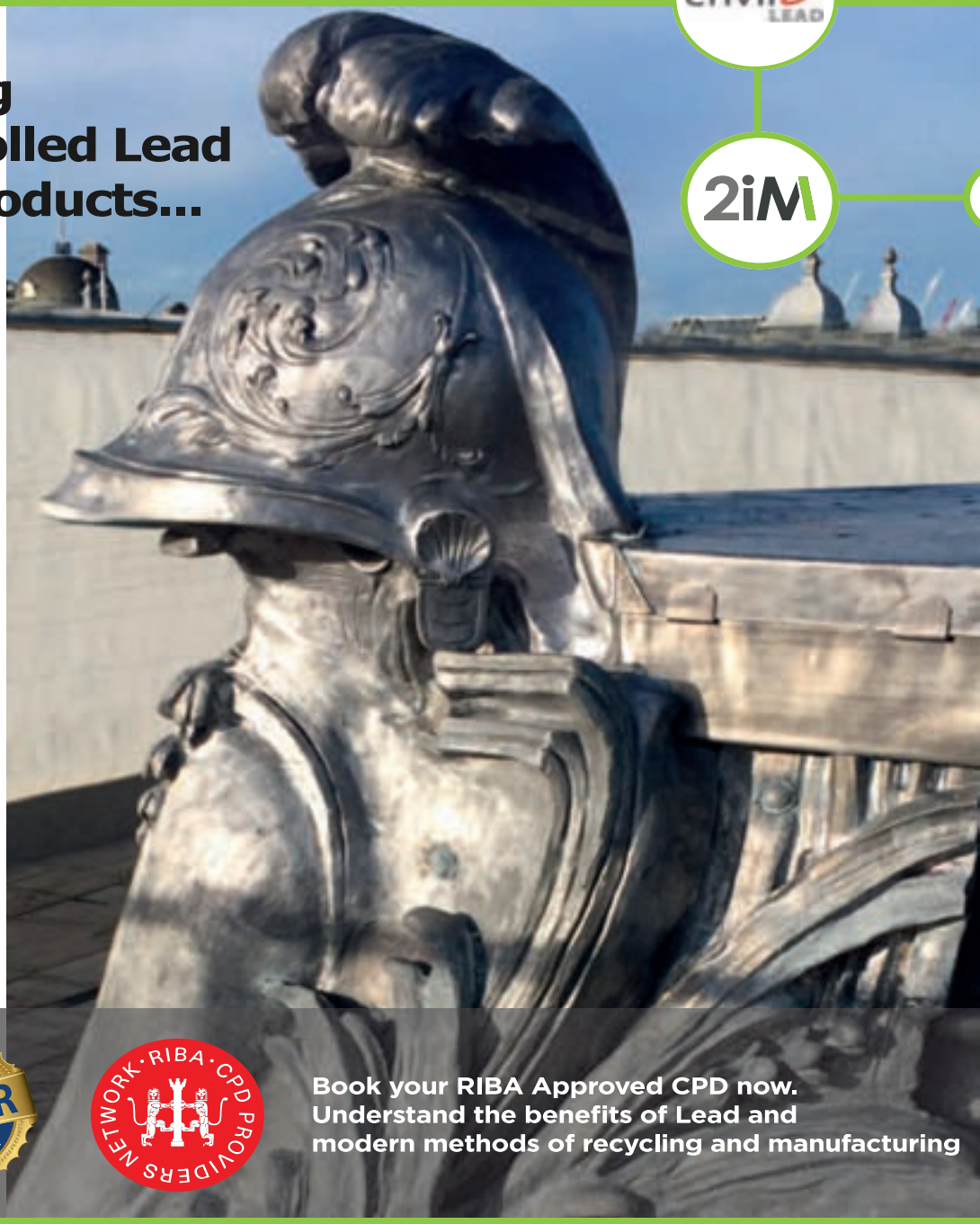

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Not quite 50 shades of grey

Cambridge's greenest office building uses varying grey brick to fit in with its listed neighbours, Mark Smulian reports

Brick is the key to how the environmentally conscious city of Cambridge, with its university and numerous historic buildings, has just acquired a newcomer nestled among listed buildings that boasts of being the greenest office building in town.

Named 51 Hills Road, it has filled in a site on the main link between the city centre and the railway station, pulling off the difficult trick of creating a modern and sustainable structure that fits harmoniously into a conservation area with listed buildings to three sides.

All this had to be achieved on a comparatively modest budget of £1.5 million, which did not allow for anything unduly elaborate in the way of sustainability technologies.

It is lost in the mists of time how and why Jesus College came to own a site quite some distance from its own campus on which a large villa stood but was demolished in the post-war period.

Whatever the cause, the college wanted the long-derelict site used for a speculative office development. The distance from the college itself meant that it was not suitable for academic use.

The result is a brick clad building that is claimed as being Cambridge's greenest office block, and which has been designed to use predominantly grey shades of brick so as to blend in with the surrounding listed buildings while also having a distinctive look all of its own.

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Variations on the brick around a concrete frame use subtle changes of colour to create interest and avoid a uniform appearance, with random brick patterns used on the building's two chimneys.

The job went to London practice Gort Scott, whose work ranges from leisure, retail, education, cultural and residential buildings to urban masterplans.

Gort Scott Architects has secured a BREEAM 'excellent' rating for the 880 square metres building and it has been nominated for a series of awards including by the Royal Institute of British Architects, the Royal Institution of Chartered Surveyors, the Cambridge Design and Construction Awards and the British Council for Offices Awards.

The site lies within Cambridge's central conservation area and several previous attempts by others to develop it had failed to secure planning permission due to concerns about their visual impact

Director Jay Gort explains that he had to design something that would relate to the surroundings.

On one side is the modernist Highsett, a residential complex built in the early 1960s and designed by the noted architect Eric Lyon.

Behind it are the Claremont model houses built in the 1850s, and at the other side a former Victorian hotel, now in retail use.

51 Hills Road is the resulting L-shaped building, which uses a warm grey brick cladding, blending with the surrounding built environment.

The entrance is via a colonnade and through a landscaped walled garden, and all four storeys are designed to be naturally ventilated, allowing high levels of control for the occupier and greatly reducing running costs.

"The site is in the main road and I was very interested in how our building relates to that street," Gort says.

"There are listed buildings on three sides, and basically the design proposal continues the garden frontage of Highsett and relates to the hotel next door."

He says the relationship to Highsett is shown in the tonality of the grey brick work, "but there is also liveliness in it, with paler colours that change in different lights.

"It rhymes nicely with the texture and tonality we see in the tiles in the front of Highsett and relates to the Cambridge stock brick in the other buildings next to it, which have a soft wash over them from years of ageing.

"There are also darker things in the brickwork, with an almost aubergine colour to them, and that kind of richness was carefully chosen."

The older adjacent buildings, as is common with Victorian structures, have substantial chimneys.

Since the potential for sound pollution from the noisy street made traditional cross ventilation unsuitable, Gort Scott designed natural ventilation stack chimneys for 51 Hills Road that complement their neighbours and draw fresh air across the floor plates.

Gort says: "One of the key architectural features is the two chimneys on the building. These anchor the building and

relate to the historic chimneys next to it, they are of similar proportions but punctuate it.

"The chimneys are picked out by a random arrangement of bricks giving it almost like a quarried texture with both carved statue smooth bits and rough hewn ones too, almost 'hit and miss' brickwork".

These chimneys are not just a visual feature, but a key part of 51 Hills Road's claim to be Cambridge's greenest office building.

Gort explains. "It is rated BREEAM 'excellent' and secured a very high score in that category.

"What happens is that the chimneys draw air from the garden to the rear through the whole building, in the same way a chimney with a fire works, through the 'stack effect."

The chimney 'stack effect' may evoke vague memories of school science lessons for some. It depends on different densities between hot and cold air creating a flow up through the chimney as natural phenomenon.

Gort adds: "We really wanted to avoid mechanical ventilating and so it has no air conditioning, which is really rare for an office building.

"You can open the windows but that is for emotional effect if it's really hot, you do not have to open them to keep cool, not even in summer time."

Concrete in the building is the key to how it is heated and cooled without air conditioning. At night cool air can be drawn in from the garden through vents that automatically open during warmer weather and inside the exposed concrete

used absorbs this and then in day time the concrete lets cool air out again to the offices.

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"The concrete also gives a robust feel, and there are oak-lined windows with aluminium frames to the outside giving a 'raw and cooked' feel."

Gort says 51 Hills Road "has a really great thermal performance and in air tightness it's really extreme, it passes all tests". Windows are set back two bricks depth and blinds allow for solar shading.

The building is on a concrete frame floor with a raised access floor below which all the services run.

A slightly recessed top floor of white pre-cast concrete slabs is built on structural glulams and creates a moment of contrast.

Space in the building has been taken by local property firm Tucker Gardner.

Despite the praised design and sustainability features, the project was not all plain sailing, and there were objections to be overcome, although ultimately this proved to be possible.

Conservation area status, and the existence in Cambridge of an articulate population protective of the cityscape, had seen a petition launched when the project first went for planning

Project details

Client:
Jesus College, Cambridge
Architect:
Gort Scott
Project Manager:
Bidwells
Brick suppliers:
Coleford, BEA Clay Solutions
Concrete supplier:
Haddonstone
Windows supplier:
Velfac
M&E/sustainability consultant:
Max Fordham
Quantity surveyor:
Quantem
CDM coordinator and building inspector:
MLM
Structural engineer:
Solution Consulting Engineers
Main contractor:
Ashe Construction
Landscape architect:
JCLA
Low carbon consultant:
Orchard Estate
Clerk of works:
Andrew Merrick
Planning authority:
Cambridge City Council

permission which objected "to the insertion of a high density office development into a sensitive conservation area comprising primarily residential uses.

It went on to describe the height and massing as giving an appearance that "will appear overbearing to Highsett residents", with loss of light and rooms overlooked.

Client Jesus College has praised the new building. Its bursar Christopher Pratt says: "Jesus College is delighted with the appearance, the green credentials and the economic outcome of the building.

"Both informed observers and passers-by as well as neighbours have praised the quality and variety of the brickwork and the restrained but stylish facade materials, while professionals and tenants alike have warmed to the natural ventilation and the excellent internal layout."

For those not in Cambridge, a look at Google Maps will show that Hills Road is quite an architectural mixture of the old and new, distinguished and undistinguished. Its latest addition will surely be seen as a striking improvement to the townscape.

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Howe Farm

The site is located in a 9.5 hectare farm in Buckinghamshire, UK. The client's brief to IPT Architects was to create a functional farmhouse, private on approach, then opening to extensive views of the farm. The result is an award-winning project. Michael Willoughby reports

Architects with aesthetic ambitions never forget that planning is a branch of the law. In the most capable hands, designers can satisfy local authority requirements while also generating the conditions that lead to striking structures.

Take IPT Architects' Howe Farm in Buckinghamshire. It is beautiful and striking and has been nominated for several awards since completion including the BD Architect of the Year Awards and the World Architecture Festival Awards. It has won the "Supreme" overall and "Housing Exterior Surface" Awards at the 2016 Surface Design Awards.

Planning consent for the site stipulated an agricultural dwelling. And this is not *not* an agricultural dwelling, it's just not your typical agricultural dwelling. Because the home was to be on a greenfield site, Buckinghamshire County Council planning department needed the designers to prove that it was being erected as part of efforts to create a sustainable business. And this was indeed the case. The couple who commissioned IPT Architects for Howe Farm did, indeed, move to the Buckinghamshire countryside from London to farm livestock.

They were very serious about the desire to raise livestock on the land, says IPT co-owner (with Amira Idris-Town), Lee Town: "They had to prove that they could make a living from the farm, it had to be in keeping with the environment and it had to be one storey and have no more than three bedrooms." And the space available was 20m by 10m.

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So, those were the demands of the site, but what did the client want? The wife in the couple was brought up in California, so her initial ideas came in the form of an image of a villa constructed in that State. "It was originally a very considerable building," says Town. "It would cost double the budget [of £250,000]."

To get to the fundamental reasons behind the choice, Town drilled into exactly why she liked that particular image and discovered she was focused on very open-plan living environment and a property that would be open to the farm.

As well as a tight budget, time constraints were exceedingly challenging. In true Grand Designs style, the couple were living onsite in a mobile home in which they had no desire to spend the cold seasons. Accordingly, IPT had to complete everything in 12 months, or by the next winter.

However, there was another requirement, the client wanted a roof deck on the property. The architects requirement: that it was required as a viewing platform to oversee farm activities. It might also be a great place to hold outdoor parties in the summer.

The client's desires and the council's stipulations met in a property faced in dark-stained larch timber – a reinterpretation of the traditional farmyard outbuilding or barn, while the roof deck has a balustrade of the same material. The client's desires for a property focused on the farmyard were certainly achieved.

In fact, even though the design of the building is eye-catching, the practice went to some lengths to ensure that the landscape remained the star of the show. The single-story set-up helped as did the modest facade.

"The project has a relatively simple exterior. Everything is linear and the land is flat and level," says Town. "We wanted to draw attention to the farm itself."

50 per cent of the resulting building is oriented towards the farm, with extensive views, and the rest of the property is private bedroom spaces. These private spaces – seen from the driveway – are closed off by a wall of the cladding, only punctuated with a series of squares and thin oblong windows.

It is in the design of these squares, which sit at each end, where things begin to get interesting and where we can begin to recite IPT's poetry in wood. Each square has a reveal of lighter wood in the same timber finish as the interior of the house, so the inside seems to bleed out into the environment. It is a tantalising glimpse into the private interior, which any visitor may or may not be allowed to enter.

However, the greatest triumph in the exterior design of Howe Farm results from another idea: the cladding of the building is "extruded" to form the balustrade. By that, I mean, it is as if alternate batons have been extended above the roof line to form the horizontal boundary of the roof deck.

On one side, overlooking the private domain, the guard rail of the balustrade is at full height. On two of the other sides, it also continues parallel to the ground for a way, before dropping down at an angle to meet the roof. Where the bungalow overlooks the fields, it drops away altogether.

'Because the home was to be on a greenfield site, Buckinghamshire County Council planning department needed the designers to prove that it was being erected as part of efforts to create a sustainable business. And this was indeed the case'

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It's something of an appealing visual – one could almost say a postmodern-pun about permeability and impermeability and the function of wood: a home built of balustrades. But it has also helped the architect to meet the requirements of discretion from the building.

"It helps mediate between the land and the sky by becoming more transparent as it forms the balustrade," says Town. "And then it gradually tapers down to create a sloping form. The hills are in alignment with the building."

Yet, the design has another trick up its sleeve: "Depending on the vantage point, the hit and miss arrangement of the cladding can be more or less transparent," says Town.

And there are two delightful inside-outside features at ground level on the partially-private side where the same formation, as in the balustrade, forms a rolling screen for a seated area and a kind of semi-porch enclosure, which is sited next to the back door.

But how did the designers meet the temporal and financial targets of Howe Farm? Luckily, as well as being architects of vision, Town and Iris-Town, are also devoted to the theory and

practice of modern methods of construction (MMC), or off-site construction.

The pair operate a sister company in rural Kent, called Ecospace, which specialises in the design and manufacture of buildings from structurally insulated panels (SIPS).

"Traditional procurement of projects is long-winded and complicated," Town tells me. "Ours is a more seamless process from inception to construction. We are challenging traditional procurement methods."

The 1.2m x 4m panels which went into Howe Farm were constructed in the company's carpentry workshop and assembled on site in 12 weeks, 15 if you include the kitchen and bathroom. It's only the size of the panel that is standardised. The client and team chose the dark cedarwood and light wood interior from a wide variety of available finishes.

Due to the lightness of timber-frame construction, the foundations were less substantial and cheaper than on a steel frame building. "Site labour time was significantly reduced," says Town. "There is more cost-certainty and less wastage.

"Offsite manufacture is particularly valuable on a timber

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framed building because," adds Town, "a bespoke project of that type can often go wildly over-budget after going out to tender, and everyone has to go back to the drawing board."

Because the component parts of Howe Farm were constructed in a precision workshop, the fit was naturally tighter and the air permeability was particularly low – just 2.1 on Ecospace housing projects. That made overheating the main potential issue to be overcome. The property is kept sufficiently warm by air-to-source heat pumps.

Solar gain can also cause warping and cupping in the cladding and the panels start to push each other out, so the design allowed for the sufficient expansion and contraction of timber and ventilation voids were left behind the facade. There was 25mm behind cladding, 5mm allowance up to the roof, and a 50mm ventilation void between the membrane and the deck. Plus, the frame is moisture-resistant to prevent water getting into the timber.

IPT-Ecospace has taken the decision not to design and build schemes for other architects, however, they are currently teaming up with selected trained and approved contractors to co-bid on housing projects.

"We want to create affordable housing with a high level of design integrity and build quality based on a system-build approach," says Town.

As well as Howe Farm, the practice has produced several other independent houses that Town calls prototypes, or "housing typologies used as a reference point that developers can tailor and configure to sites."

I posit that few would object to the Towns' vision – versions of Howe Farm but individually tailored by the endless possibilities provided by mixing and matching different modules – liberally scattered throughout the UK.

Project details

Design team –
Architects: IPT Architects
Project managers/ Contractor: Ecospace Ltd
Engineer: John Kettle Associates
Photography: Andy Spain

Data –
Contract: Design & Build
Contract duration: 15 weeks
Contract value: £264,000
Floor Area: 160m^2

Timetable summary –
Design development: November- December 2013
Planning submission/Approval: January - March 2014
Technical design/tender: March - May 2014
Ground works: June 2014
Superstructure completion: August – November 2014

Suppliers –
Structurally insulated panels (main structure): Sips Industries
Glazing: NorDan/Tanums Fonster
Timber cladding: Vincent Timber
Roof: Bauder

Complex stone cladding solutions

Tamsin Pickeral, business development manager, Szerelmey, explains how a combination of technology and tradition is overcoming the challenges of stone cladding for the 21st century

Kings Gate House

Client: Land Securities
Contractor: Lend Lease
Architect: Lynch Architects

External cladding in German Jura limestone, imposing stone fins, offset floor on floor and supported on precast concrete columns. The fins are 3.5m tall and were shipped from Germany to Portland to be assembled and taken to site in single units. Due to space, time and cost limitations all the work was done using mast climbers

The relationship between a contemporary visual aesthetic and fulfilling structural and legislative requirements is one that is becoming increasingly complicated. Stone, the age old building material and the most traditional, certainly in this country, is still in many cases a preferred material for architects and one often demanded by planners.

Taking this traditional material and making it work in fantastic, contemporary designs can be part challenging and part exhilarating – the latter more common on completion of the building! As stone specialists, it is essential to us that solutions are found to facilitate the design intent of today's architects and that show how stone remains aesthetically relevant in the current marketplace.

One of the most frequent challenges facing engineers and installers is measuring the visual expectation of architects requiring increasingly large stone panels, against the technical issues of fixing to lightweight building structures. Lightweight construction systems speed up construction significantly and reduce the load on foundations, in turn reducing sub-structure costs.

The development of increasingly sophisticated materials testing programmes has helped to overcome this particular challenge. Software platforms can facilitate finite element analysis applied to fixings and standard structural analysis for lightweight structures. And by inputting parameters such as loads, flexural strength, break out around fixing points, material proof strength and modulus of elasticity, the stress and deflection of building materials can be demonstrated, which in turn dictates the stone size and thickness, as well as that of any supporting bracketry.

Designs incorporating large stone elements projecting from the building envelope with a seemingly weightless appearance are currently 'on trend'. The often apparently simple aesthetic of these buildings when finished, belie the extensive, or even exhaustive, materials testing and engineering that facilitates them.

Further challenges within this design requirement of achieving a monolithic appearance include the desire by architects for minimal joint sizes and fewer movement joints. Installers will provide a joint size range, normally between 3-5mm for stone cladding. Smaller joint sizes can be achievable, but in this case it is probable that the movement joints will need to be larger to compensate. One option is to disguise joints as much as possible by colour matching the grout or mortar to a very close end. Movement joints, which are an absolute

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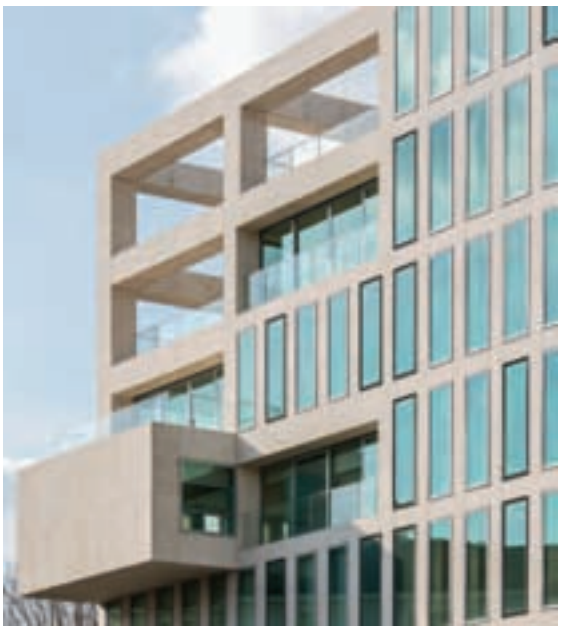
Holland Green

Client: Chesterfield
Contractor: Mace
Architect: Allies and Morrison

All external cladding is German Jura limestone including the protruding "skyboxes" which are clad in 2m x 1m stone panels



Nova 5

Client: Land Securities
Contractor: Mace
Architect: Flanagan Lawrence

External cladding is Fancy Beach Portland stone, including the giant cantilevered fins to either end of the building which measure 6m wide by 9 storeys high. These fins are supported by a single cross beam at the bottom and two steel beams at the top. They are the result of extremely complicated structural engineering

requirement, can also be 'hidden' under string courses and within the context of the design.

Another 'cladding challenge' has arisen due to increased performance requirements under BREEAM, leading to much larger cavities between the substructure and cladding to account for insulation requirements and prevention of thermal heat loss – this has seen cavities increase to up to 500mm in some instances. This means that the stone cladding is being fixed back on fixings that are having to span a large distance, therefore the fixing systems undergo rigorous testing. One solution for this is the use of a secondary metal framework within the cavity to facilitate the fixing system and reduce the distance the fixing has to span. However, this of course has added cost implications.

Another solution, and one favoured by stone specialists, is a return to the traditional method of construction using load bearing, self-supporting stone facades.

A further implication of BREEAM is the thermal performance of the building envelope, which is commonly quoted as a U-value and is adversely affected by large steel bracketry. These areas, where heat is potentially conducted out of the building through the fixings or other projections, are called 'cold bridges'. Full thermal analysis of the complete wall build up, from substructure out to determine the areas where cold bridging might occur, can be undertaken. Once identified, this issue is overcome through the use of thermal breaks – non-conductive pads placed behind the fixings. There is currently extensive, ongoing research and development into less-conductive materials suitable for use as fixings, although this is still in its early days.

The development of 3D modelling and BIM represents a significant (and not wholly accepted) technological change in the construction process, particularly for clash detection and to aid the prevention of any construction issues.

An increasingly popular modern aesthetic is the requirement for stone columns and fins – fins in particular provide both exciting visuals and can act as solar shading. Fins, despite their apparent simplicity are extremely complex to design and install. They may cantilever out from the building, supported on one side only. This brings into play eccentric and substantial loading and the potential for movement – both these challenges are overcome through extensive engineering and structural design. Fins are typically built onto a steel supporting framework, clad in stone or as a pre-tensioned unit. The more slender the requirement of the fin, the harder it is to engineer given that space must be allowed for the framework within.

Another popular design seen in several new buildings is that of a stone 'exoskeleton', a slender stone frame and columns that 'embrace' the glazed building within. These again present technical challenges in engineering, fabrication and installation. One of the biggest challenges with columns is modulus of gyration, which is essentially twisting movement. This is overcome through detailed engineering work using programmes such as Inventor as well as traditional hand calculation methods.

The obvious other issue with the column is the size, width and composition (solid stone, stone on precast, stone on metal) which is based on calculations of load and the compressive strength of the material itself. A popular construction method, due to time efficiency, is to install prefabricated columns that are post-tensioned off site and installed in one piece (fixed top and bottom). This does require substantial lifting equipment.

To conclude, the balance comes in achieving the architect's vision within an engineered and workable framework. Stone specialists will strive to find a solution to accommodate the visual intent.

Buyer beware

Designing a roof requiring tapered insulation is beset with challenges, with consequences for the contractor and specifier. Andrew Rowley, tapered design manager for Gradient Roofing, explains

Designing tapered insulation for a flat roof used to be relatively simple. The Building Regulations offered a defined target that the roof (among other building elements) needed to achieve. The only debate was whether to meet that target based on the minimum depth of the tapered insulation or to set the tapered thicknesses so as to average the performance over the whole roof.

That might sound like a straightforward choice but it belies how long-standing the debate was – and how confusing specifications eventually became due to uncertainty over which method to work with.

The calculation of U-values is defined by an international standard – BS EN ISO 6946 – and in 1997 it included for the first time guidance on how tapered insulation should be calculated. The annex containing this guidance has become synonymous with the calculations issued to demonstrate the U-values – they are known as Annex C calculations.

Across England, Wales and Scotland the Building Regulations relating to energy use and thermal performance take a holistic view of the whole building. U-value targets for floors, walls and roofs are just one part of the overall picture, and that picture is flexible, allowing freedom in design and specification subject to meeting a set of minimum criteria.

The required U-value performance is determined by SAP (Standard Assessment Procedure) calculations for domestic properties and SBEM (Simplified Building Energy Model) calculations for non-domestic buildings. It is possible to accept trade-offs in performance, where one building element can achieve lower U-values to compensate for another that might be constrained.

It is critical to ensure the building design and specified U-values can be achieved on site, otherwise the finished building will suffer a shortfall in performance. While Annex C calculations for tapered roofs have improved clarity for the insulation designers, they are less easy to understand for specifiers, contractors and some suppliers – and that can be an issue in itself.

So what is Annex C exactly? Most insulation in a building is specified at a uniform thickness. In the particular construction where it is being used, it therefore achieves a consistent U-value throughout. So it stands to reason that where tapered insulation is used the U-value will vary as the thickness varies.

While it may sound simple to take this into account, for an accurate calculation it is necessary to account for the roof pitch and length of fall as well as the minimum thickness of insulation. Consider a basic rectangular roof, with a 0.18 W/m^{2}K U-value target and a 1:60 fall required across the width of the roof:

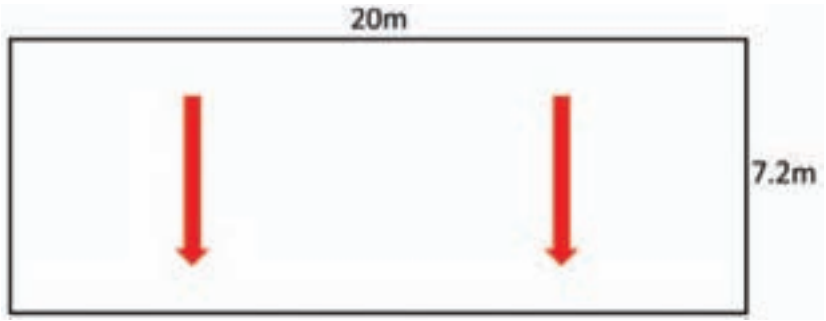
If the fall was to be created using firrings (or a similar method) then the required thickness of flat, tissue-faced board is straightforward to establish: 130mm.

A calculation for average thickness would result in a tapered range of 70mm to 190mm. The Annex C calculation works out that the thickness range should, in fact, be 80mm to 200mm.

This may seem close enough but bear in mind it is the simplest of roof designs. And even the smallest discrepancy from the designed thermal performance could result in the as-built SAP or SBEM calculations failing to meet the regulations, and costly remedial measures being required at the end of the build.

In addition, most roofs are more complex than a basic rectangle, featuring hips and valleys and varying lengths of falls. For an Annex C calculation, the roof design has to be broken down into a series of rectangular tapers, flat rectangles and triangles (both thinnest and thickest at apex).

The more elaborate the roof layout, the more laborious the tapered insulation design becomes, and the more time-consuming the calculations become –



Flat board:	130mm
Equivalent average thickness:	130 (70-190)
Annex C:	Average 140 (80-200)

Continued overleaf...

even in appropriate calculation software. The excerpts from BS EN ISO 6946 illustrate how roofs should be broken down.

The considerations don't stop there either. Thought must be given to the position of rainwater outlets and whether the gutters will be flat or recessed. Table 2 illustrates the effect of different gutter designs on the tapered insulation for a simple roof.

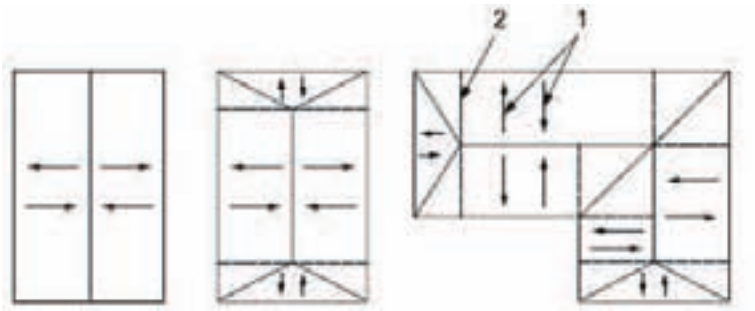
When all of the constituent pieces and shapes are accounted for, a definitive Annex C calculation can be provided to demonstrate compliance as part of the overall building design. The excerpt on the right illustrates a typical example:

So with calculations this complex, how can specifiers and contractors hope to understand whether a tapered insulation scheme complies with the U-value target established for a project? And where does any liability for non-compliance rest?

Tapered insulation designers can only interpret the scheme and specification given to them, highlighting the need for good communication and collaboration throughout the design and construction process – and as early as possible in that process.

Conscientious manufacturers support the scheme for competent U-value calculations that is administered by the BBA. Although Annex C calculations do not currently form part of the scheme, it is no less important that designers preparing calculations have a good grounding in basic calculation principles and be considered competent.

It may not be possible to go back to the days of simple roof calculations, as evidenced by the many schemes in the market that may not comply with Annex C, but we can help to ensure that the construction of complex, correctly-calculated roofs is as simple and painless as possible.



Key

1. direction of pitch (can be either direction)
2. alternative (supplementary) subdivision to enable use of Equations (C.1) to (C.4)

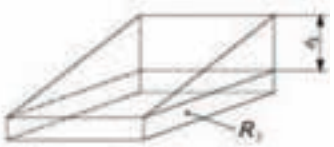
Figure C.2 – Examples of how to subdivide roofs into individual parts

The thermal transmittance of common shapes shall be calculated by Equations (C.1) to (C.4) for pitches not exceeding 5%

NOTE 2. Numerical methods can be used for greater pitches

C.2.1 Rectangular area

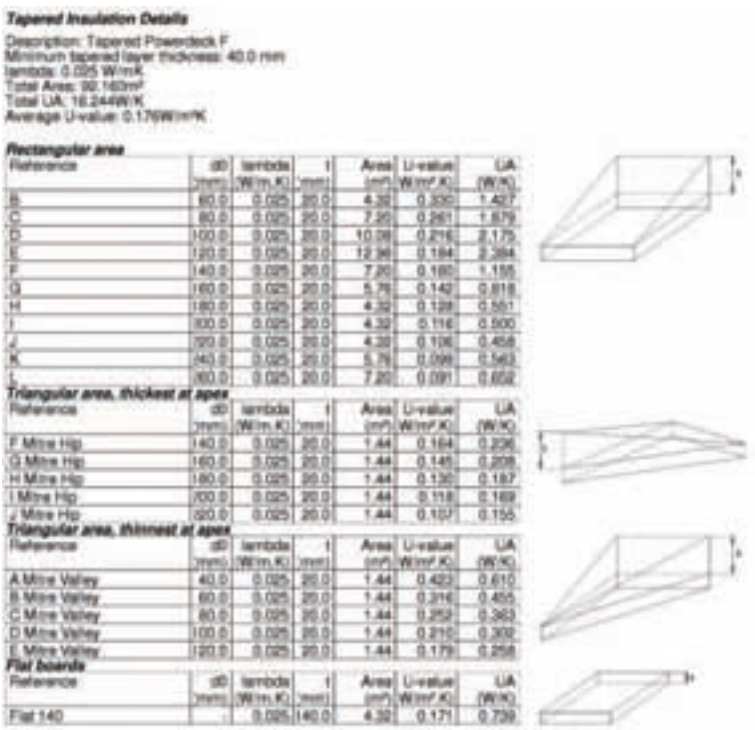
$$U = \frac{1}{R_2} \ln\left[1 + \frac{R_2}{R_0}\right]$$



Key

d_2 maximum thickness of the tapered layer
R_0 design thermal resistance of the remaining part, including surface resistances on both sides of the component

Figure C.3 – Rectangular Area



Tapered Insulation Details

Description: Tapered Powerdeck F
Minimum tapered layer thickness: 40.0 mm
lambda: 0.025 W/mK
Total Area: 92.160m²
Total UA: 16.244W/K
Average U-value: 0.176W/m²K

Rectangular area

Reference	dD (mm)	lambda (W/m.K)	l (mm)	Area (m²)	U-value (W/m².K)	UA (W/K)
B	60.0	0.025	20.0	4.32	0.330	1.427
C	80.0	0.025	20.0	7.20	0.261	1.879
D	100.0	0.025	20.0	10.08	0.216	2.170
E	120.0	0.025	20.0	12.96	0.184	2.384
F	140.0	0.025	20.0	7.20	0.160	1.155
G	160.0	0.025	20.0	5.76	0.142	0.818
H	180.0	0.025	20.0	4.32	0.129	0.561
I	200.0	0.025	20.0	4.32	0.116	0.500
J	220.0	0.025	20.0	4.32	0.106	0.458
K	240.0	0.025	20.0	5.76	0.098	0.563
L	260.0	0.025	20.0	7.20	0.091	0.652

Triangular area, thickest at apex

Reference	dD (mm)	lambda (W/m.K)	l (mm)	Area (m²)	U-value (W/m².K)	UA (W/K)
F Mitre Hip	140.0	0.025	20.0	1.44	0.164	0.236
G Mitre Hip	160.0	0.025	20.0	1.44	0.145	0.209
H Mitre Hip	180.0	0.025	20.0	1.44	0.130	0.187
I Mitre Hip	200.0	0.025	20.0	1.44	0.118	0.169
J Mitre Hip	220.0	0.025	20.0	1.44	0.107	0.155

Triangular area, thinnest at apex

Reference	dD (mm)	lambda (W/m.K)	l (mm)	Area (m²)	U-value (W/m².K)	UA (W/K)
A Mitre Valley	40.0	0.025	20.0	1.44	0.423	0.610
B Mitre Valley	60.0	0.025	20.0	1.44	0.316	0.455
C Mitre Valley	80.0	0.025	20.0	1.44	0.252	0.363
D Mitre Valley	100.0	0.025	20.0	1.44	0.210	0.302
E Mitre Valley	120.0	0.025	20.0	1.44	0.179	0.258

Flat boards

Reference	dD (mm)	lambda (W/m.K)	l (mm)	Area (m²)	U-value (W/m².K)	UA (W/K)
Flat 140		0.025	140.0	4.32	0.171	0.739

Table 2

Design	Thickness Required for Annex C 0.18
Tapered fall across width (no gutter)	80mm to 200mm
Tapered fall across width (600 wide gutter no recess)	90mm to 210mm (90mm gutter)
Tapered fall across width (600 wide gutter, 20mm recessed)	90mm to 210mm (70mm gutter)
Tapered fall across width (600 wide gutter, 50mm recessed)	100mm to 220mm (50mm gutter)

Perfecting the building envelope

Graham Hurrell, commercial director at AluK, discusses how structural facades can optimise the performance of the building envelope

In order to achieve optimal building envelope performance, the envelope itself should integrate and work with other elements of the complete building. By doing so, the building envelope satisfies functional demands such as offering protection against weather, noise and air pollution, all of which have an impact on the interior environment and occupant comfort.

Structural systems such as facades are integral to the performance of a building over its entire life span, which means life-cycle costs must be considered. The materials used should minimise the impact on the environment, taking into account global warming, resource depletion and toxicity. Aluminium has many unique properties that make it an ideal building envelope material. Characteristics such as durability, flexibility, strength and low cost recyclability make it the primary framing material within architecture and the built environment, with the latest research giving it an 81 per cent market share.

The commercial building sector is responsible for around 18 per cent of all UK carbon emissions, with heat loss through air leakage and a lack of natural light identified as the two biggest causes of energy waste . It is estimated that the total UK non-domestic floor area will increase by 35 per cent by 2050, with 60 per cent of existing buildings still in use. As legislation and green building advocates push for more sustainability, a building envelope that can control and manage a property's energy demand is a crucial component to achieving high building performance.

Thermally broken aluminium curtain walling systems are energy efficient and can achieve enhanced building envelope performance levels as they are tested for airtightness to minimise and control air permeability. These features have the potential to reduce a building's energy usage and occupational running costs as well as improve the productivity of its occupants.

Research by the World Green Building Council has established that access to windows for daylight and views is one of the most important determinants of an occupant's level of satisfaction. The health and wellbeing of users must be highly considered bearing in mind that Europeans spend at least 90 per cent of their time indoors . Products offering a choice of opening configurations and manual operability are key as they allow users the option to further manage ventilation. The best systems offer slim framing sightlines and expanses of glass that can increase natural light transmittance.

Twin-wall facade

One type of building envelope system that can offer high performance, is sustainable and meets distinct design requirements is the twin-wall facade. The innovative solution comprises of two skins, usually an aluminium curtain walling system to form the internal wall; with the inclusion of access doors and controlled actuated sashes to manage openings, and an outer skin formed of safety, laminated or insulating glass, with an interstitial space between them.

Although mainly specified in new build developments, the transparent nature of a twin-wall facade allows it to be specified for extensions and refurbishment projects for its ability to conserve the original scale and features of the building fabric it adjoins. This feature makes it ideal for extending properties with heritage, historic or listed status.

Interaction with other building components

The Whole Building Design Guide (WBDG) highly recommends the use of operable windows for natural ventilation and occupant control to manage airborne moisture so that it is not transmitted through the building envelope, compromising indoor air quality. Furthermore, it advocates maximising

Continued overleaf...

the use of daylight and the use of movable shades or blinds for glare control to maintain a healthy visual environment .

To ensure that building envelope performance requirements are being met, it is important to identify areas of concern that can negatively impact a building's energy usage and indoor environment quality such as air infiltration and leakage, moisture diffusion, surface condensation and water ingress. Systems should be able to work in conjunction with other building components to achieve and maintain the required quality levels, so interfaces need to be well designed and proven.

A high performing twin-wall facade for example, should introduce a number of opportunities for passive climatic control. By utilising products such as an air exhaust louvre at high level and an air inlet louvre at the bottom to create a 'chimney' effect, the gap between the internal and external wall of the twin-wall facade can be used to control the flow of air and temperature within the building interior.

In winter, solar gain can be collected in the buffer zone, and brought into the building to offset the heating costs, while in summer, when overheating can be an issue, windows can be closed and heat rejected using mechanical ventilation. High performance aluminium systems should also offer the option of manual operation, allowing users the ability to introduce more air.

The best systems must be able to incorporate solar shading systems in order to reduce glare and overheating. When

designed and engineered well, with specialist and knowledgeable manufacturers, these systems are flexible enough to meet the climatic changes for most types of building use. Collaborating with supply chain partners at the design stage is crucial as it allows for modifications to be easily incorporated, as oppose to during construction when alterations may add substantial costs.

As the emphasis on sustainability and occupant health strengthens, constructing buildings that offer positive benefits to inhabitants will invariably be good for the bottom line for architects and their clients.

The importance of precision rainscreen design in facade cladding

New technology has improved both the aesthetics and performance of rainscreen cladding systems. Philip Atkinson, managing director, BTS Fabrications, tells us what the main benefits are to specifiers

Rainscreen systems have been in use for centuries. However, in recent years, innovation and smarter technologies have allowed the market to advance rapidly.

The latest precision rainscreen technologies improve both the aesthetics and the performance of a building envelope. With improved design flexibilities, architects and specifiers employed on building projects can work increasingly collaboratively to create a facade that is cost-effective and delivers the architect's vision.

Throughout the design and construction process, using a precision rainscreen system ensures that a project is delivered timely, on budget, and with minimal material wastage. With precision technology that reduces the risk of error, contractors can be assured that the panels they receive on site are exactly as specified by the architect. This minimises the risk of project delays and allows the design and construction to remain a cost-effective process throughout. In addition, using a precision rainscreen system also enables the design of an ethically-conscious building, as aluminium, steel and timber rainscreen are all 100 per cent recyclable at the end of their lifetime. This provides the end-client with further lifetime performance guarantees.

The wide variety of choice of metals, in a vast selection of colours, available with precision rainscreen design allows for a bespoke finish to the building. As the rainscreen forms the outer layer of the building alone, the building's energy performance is primarily dictated by the structural backing that forms the external envelope wall, giving architects an increased flexibility in external facade design options.

Further, structural advantages to the rainscreen systems allow, should needs arise, for a panel to be removed and replaced with ease, without impact upon the wider building envelope. In fact, the entire facade can be replaced with new

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'The wide variety of choice of metals, in a vast selection of colours, available with precision rainscreen design allows for a bespoke finish'

colours or materials with no impact on the structure, support system or building envelope membrane – providing a wealth of design possibilities for the architect.

Using a dedicated software system ensures the utmost accuracy in design and construction. As industry-leading rainscreen system manufacturers produce a 3D-visualisation of the building envelope, it is typical to require further modelling or prototyping. In addition to the aforementioned cost saving benefits, advanced precision rainscreen design systems allow any possible installation issues to be highlighted ahead of manufacture. With the system's ability to consider loadings, thermal factors and environmental conditions, the building envelope facade can be designed to the exact millimetre.

3D rainscreen design will also allow production of an exact image of the finished facade. This not only enables the designer to visualise the aesthetics of the finish, but also highlights any areas of potential problems with installation. The performance of the building can be accurately calculated, allowing for improved consistency across the building envelope's design and construction. Areas where materials meet are clearly identified; this not only provides assurance that the building will be fully protected, but it also ensures that the architect's vision and the final finish are perfectly matched.

Quality conscious manufacturers of precision rainscreen systems also give utmost consideration to the fabrication of their systems. By using the most modern intelligent manufacturing equipment such as Alu-Ranger CNC Controlled machinery coupled to the 3D drawing tools, perfect manufacturing tolerances are achieved.

Such advanced precision rainscreen systems also provide assurance that both the design and construction are meeting both the architect's needs and the latest Government legislations. Early 2016 saw the introduction of Building Information Modelling (BIM). Facilitating a seamless process from design to construction, BIM allows for further collaboration between professionals across the entire construction industry. The majority of the rainscreen BIM content currently available in the UK for architectural and engineering professionals serves their needs well; however, it is offered in a format that provides little in terms of functionality and benefits for the contracting companies. Fortunately, new developments by industry-leaders offer BIM content and support in a format tailored to making the design, documentation and project management process increasingly seamless. A unique design, and options for the panels to be demounted one at a time, gives your project lifetime flexibility, whilst also ensuring that it is compliant with the Government-mandated Level 2 BIM protocol.

Precision rainscreen cladding systems have been prevalent in the construction industry for many years. However, rapidly advancing technologies have welcomed to the market systems that facilitate a seamless process from initial design to final construction. With flexible design options, exceptionally accurate measurement technology and swift and cost-effective installation, the use of the latest precision rainscreen technology enables a high-performance building envelope, with an aesthetic facade in which the architectural vision is fully realised.

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Lightweight materials show their appeal as Vertigo delivers distinct aesthetic in London

As the trend for dry, lightweight construction continues to grow, so has demand for lightweight construction solutions. One such solution is Vertigo, the first range of fibre cement slates on the market that have been specifically designed for use on vertical facades.

A recent project in London demonstrated how the innovative Vertigo system from Marley Eternit has helped to create a distinctive, contemporary dormer conversion.

The home owner specified the Vertigo fibre cement slates to create a clean cut, precisely engineered, slate panel aesthetic for his dormer loft conversion and roof extension, forming a contrast against the riven tiles used on the existing roof and differentiating it from other roof extensions in the area.

The first of its kind in the UK, Vertigo consists of small 600mm by 300mm slate like panels which can be quickly fixed onto battens, with the desired amount of insulation in between. The fibre cement slates perfectly adapt to the contours of the building, providing a second protective skin.

As the home owner explains: "There are hundreds of similar roof extensions in Chiswick, all determined by the same stringent local planning requirements. We appointed PRS Builders to carry out a flat roof dormer conversion for us but we wanted something different, we didn't want a 'me-too' extension. The idea was to create as modern an aesthetic as possible, using an innovative material, not the same type of vertically hung tiles used on other conversions in the area, but still working within the planning constraints.

"We originally chose zinc but it proved to be too expensive and not eco-friendly enough. When we heard about Vertigo, we changed the specification as it offered the stand out aesthetic we were looking for but was a more cost effective and sustainable option."

The Vertigo slate range is very easy to fit and has three different installation methods to give more design flexibility and freedom. On this project, PRS Builders fitted the Vertigo fibre cement slates using a panel installation, so that the regular bond panels give geometric precision. However, it can also be fitted using a traditional method of installation, which gives a natural slate appearance with slate hooks or another option is broken bond, where panels are staggered to give a close boarded effect.

The home owner adds: "We're really pleased with the finished effect, the extension blends in with surrounding roofscapes but at the same time, the Vertigo finish offers something a little bit different - a distinctive, yet under-stated, aesthetic that sets ours apart from all of the other similar dormer conversions in the area."

Charlotte Hughes, marketing product manager from Marley Eternit, comments: "As architects, specifiers and self builders look to create stand out residential designs in urban areas, fibre cement is becoming an increasingly popular material, not only for the roof but also for vertical slating as it offers a striking aesthetic, is lightweight and easy to fit. We developed Vertigo to give more flexibility to specifiers and designers who want to use fibre cement slates across the whole building envelope. This innovative method of vertical slating uses invisible fixings to provide clean lines and a modern aesthetic and is perfectly suited to new build or refurbishment work."

Lightweight, weather and temperature resistant and available in eight different colours from blue/black to terracotta, Vertigo slates can be used to create beautiful, distinctive and elegant vertical cladding solutions for a full range of building types. Perfect continuity between the roof and facade can be achieved by using Vertigo in combination with Marley Eternit's Birkdale or Rivendale fibre cement roof slates.

Vertigo also boasts superb sustainability credentials, helping to achieve environmental credits with a 'very good' BES 6001 Responsible Sourcing accreditation and its own Environmental Product Declaration (EPD). Fibre cement also offers sustainability benefits throughout its whole life cycle, as it can be fully recycled at the end of its use. Waste fibre cement can be ground down and used to replace limestone and shale in clinker production, the essential ingredients for Portland cement.

The options for architects using lightweight materials are becoming greater, and in this case Vertigo has proved its versatility, blending a non-traditional material into a traditional aesthetic. Fibre cement, alongside other lightweight materials will continue to be seen in greater frequency on buildings across the UK, as architects continue to seek effective ways of achieving stand out results.

01283 722588 www.marleyeternit.co.uk/vertigo

Bradstowe House

Located in the northwest of London, the building's unique facade surface has transformed it into a luxurious apartment building

Comer Property Group designed "Bradstowe House" to be a new town centre development in a historical district of Harrow. Positioned in a prime location, 144 exclusive units, featuring high-level interiors, 24-hour concierge service and security, rooftop gardens and a conservatory offering panoramic views, have been created and set in leafy surroundings with numerous restaurants and shopping centres nearby.

A unique facade was devised to enhance the property's concept and to act as a striking outer envelope. In the course of the development process, the decision was taken to use stone structure cladding. However, instead of real stone, different replica options were shortlisted. The method used by ALUCOBOND® design to customize aluminium composite panels, and the fact that the processing period was four weeks shorter than real stone were enough to win over the project leaders. The stone serving as a model for the facade was taken from the site of the 10-storey residential block, which was at that time only a concrete shell.

First of all, the surface structure of the stone was digitized using a scanning process, then its colour was matched by the graphic finishing process and the pattern was scaled to suit ALUCOBOND® 1.500 x 5.000 mm large design formats and to avoid the undesirable effect of repetition in large dimension panels. On request, the decor effect can also be visualized on a simulation of your building.

Stone pattern for ALUCOBOND® design surface

Facade construction

Subsequently, the aluminium composite panel was primed in white and printed with the reproduction stone structure. The use of high quality paint systems in the coil coating process protects the decorative print and guarantees long-term durability. In addition, the panels' diverse processing options ensure exceptional architectural scope. Panels can be folded into complex, multidimensional shapes, and angular and precise geometries created by routing and folding. The extreme durability and weather resistance provided by ALUCOBOND® design composite panels mean they outperform natural stone. Due to the panel's low weight, it requires a relatively simple substructure, which leads to a massive reduction in costs and time needed for installation. As a result, the Comer Property Group as well as architects, planners and fabricators were whole-heartedly enthusiastic about the printed stone surface.

Paul Herbert,
Specification Manager **07584 680263**
Richard Geater,
Sales Manager **07584 680262**
www.alucobond.com

Bradstowe House, Harrow

Detailed image of ALUCOBOND® design

Zenon – rethinking the rooflight

Responding to customer feedback and the increasing demands of today's metal roofing and cladding envelope professionals, the design team at **Hambleside Danelaw** are pleased to unveil a package of improvements to the company's composite panel rooflight following the launch of their new Zenon range. These improvements address key installation issues and can deliver a range of benefits to the metal building envelope, including: increased light transmission; improved light distribution; lower U-values; reduced cold bridging; compression resistant fillers and enhanced spanning capabilities.

Ionic Art Centre's winning performance

New fenestration for an iconic listed arts centre at the University of Sussex presented a particular challenge for architects RH Partnership but the successful outcome has been achieved thanks to close collaboration with steel window experts **Crittall**."RH Partnership have worked very closely with Crittall Windows to reproduce the patterns and profiles using W20 sections and to incorporate double glazed units," says architect David Sweeney. Corporate W20 windows and doors offer designers great versatility including the ability to create or reproduce many styles. They deliver very slim sightlines, are English Heritage approved, and find widespread favour with planners and conservationists.

01376 530800 www.crittall-windows.co.uk

A material surface for the facade of the University of Hertfordshire's Science Building

Like a castle that dominates its territory, the new building of the School of Life and Medical Sciences at the University of Hertfordshire, located in Hatfield roughly 35km north of London, rises symbolically in College Lane....The Science Building, on the one hand, fully expresses its function through a maximum reduction of the elements, while on the other, the choice of an 'emotional' coating, linked to materials that resonate with revisited local traditions, addressing the facade's theme with suggestive implications. The building's 'skin' – with the exclusion of the north wall – is composed of a double facade (pictured) whose external part is composed of rectangular modules of drilled metal panels, which, in addition to acting as solar shades, create a 'waved' effect thanks to the disposition "open/close" of the rectangular panels. The internal wrapper is a glass parallelepiped with exposed steel stringcourses. The southwest corner marks the entrance, obtained by a hollowing out both the parallelepiped in bottom half as well as the top half, in which a symbolic tree will be placed. The characteristic coating of the drilled metal panels is obtained with a special powder coating- Patina collection by **Adapta Color**, color Turquoise Cooper – accentuates the facades dynamic 'wave' effect which varies with the incidence of the light and the perspective of the observer.

0034 964 46 70 20 www.adaptacolor.com

VMZINC for facades and roofs

As part of a £30 million project to provide self-catering accommodation for 645 students at the University of York's Langwith College, CJCT Architects specified **VMZINC**® facades in QUARTZ-ZINC PLUS ®. Buildings with pitched roofs such as the 'Glasshouse', which houses a cafe, bar, common room and launderette, also have the same compact warm roofs and facades, helping the scheme to achieve a BREEAM 'Very Good' rating. The QUARTZ-ZINC contrasts with VMZINC PIGMENTO facades in varied shades on another project on the campus by BDP Architects. These very much replicate the University's Computer Science Building through use of interlocking panels.

01992 822288 www.vmzinc.co.uk

Advanced manufacturing in Sheffield

Factory 2050, the latest development within the University of Sheffield's Advanced Manufacturing Research Centre (AMRC), has a striking, ultra-modern appearance, partly thanks to an external Solar Shading solution from **Levolux**. The development comprises a main rotunda building and an adjoining rectangular building. Levolux was approached to develop a passive solar shading solution, to be applied to both buildings. Solar shading is essential to help maintain occupant comfort levels throughout the year, particularly in the summer, without relying on expensive air conditioning systems.

The solution proposed by Levolux comprises oval-shaped aluminium louvres, arranged horizontally between vertical aluminium carriers.

Envirolead – BS12588 lead from car batteries

Envirolead is BS12588 lead produced using only material recovered from car batteries, the recovery process extracting and reusing over 95 per cent of the constituent parts. Envirolead is covered by the 50-year Lead Sheet Association warranty and at last gives architects the opportunity to specify a product with the lowest possible environmental impact. Envirowales has the only such plant in the UK which also greatly reduces sulphur discharge, a major component of 'acid rain'. With demand for lead in construction again on the increase Envirolead is set to increase significantly the 50 per cent of worldwide consumption currently met by recycled material.

07000 256467 www.associatedlead.co.uk

AluK systems help future proof Welsh school

The Welsh Government's 21st Century Schools Programme aims to deliver effective learning environments and to develop best practice in school design. The scheme's main target is to create a sustainable construction system of education buildings in Wales. **AluK** systems were specified for Block 21 of the Ysgol Maes Y Gwendraeth, a new secondary school in Llanelli, South Wales, which incorporates the school's new Design and Technology building, designed by Lawray Architects. In total, approximately 340m^2 of aluminium profiles was used, with 105m^2 used in the AluK SL52 curtain walling system, 215m^2 for the AluK top hung 58BW window systems, as well as 20m^2 in the AluK single GT55 TB door systems.

01633 810440 www.aluk.co.uk

New rapid floor paint from Bradite

Bradite, one of the UK's longest established quality paint manufacturers, has launched a new high performance, single-pack, moisture-cure polyurethane floor coating designed for professional application. Aimed at professional painters and decorators, contractors and specifiers, new Rapid Floor Paint PW74 is recommended for use on interior concrete, wood or steel floors, and for use over existing epoxy and polyurethane coatings. Rapid Floor Paint PW74 delivers a gloss coating that is surface dry in two hours, with a minimum overcoating time of eight hours and a maximum overcoating time of 16 hours: after 16 hours, the coating should be abraded.

info@bradite.com www.bradite.com

Inside-out – Scotland's first external facade

In the first application in Scotland of DuPont™ Corian® as a rain screen facade, architectural practice Chambers McMillan has created an elegant exterior 'shell' as part of an architecturally sympathetic extension to a much-loved period home. Maximising the multiple benefits of DuPont™ Corian® high-tech surface, this high-performance rain screen has an enduring beauty. Corian® Quality Network Industrial Partners, RMC Worktops delivered the precise fabrication, preparation and installation of approximately 35 sq m of the material, supplied by **CD (UK) Ltd**. The 45 degree angled corners and junctions help create a seamless effect between the walls and the roof, which has concealed guttering.

0113 201 2240 www.cdukltd.co.uk

Hambleside Danelaw welcomes a new rooflights Specification Manager

Mark Winstanley has been in the construction industry for over 35 years and brings a wealth of experience with him. His role will involve identifying and securing project specifications for low carbon GRP daylight solutions.

On joining **Hambleside Danelaw**, Mark commented; "I am very interested in being part of the design process listening to Architects and Consultants requirements to find if an appropriate solution can be provided. My years of experience have taught me that rather than waste anyone's time to be honest and walk away if that solution does not sit in what I have to offer. This technical approach and ethos of specification is reflected by Hambleside Danelaw and the exciting prospect of guiding Specifiers through the tricky waters of balancing daylight, insulation, fragility and sustainability in a low carbon GRP daylight solution."

Hambleside Danelaw's aim is to provide a balanced daylight solution to fulfil a clients' practical, energy efficiency and sustainable aspirations. For more information please call Mark on 07710 573017 or email him at: Mark.Winstanley@hambleside-danelaw.co.uk.

01327 701900 www.hambleside-danelaw.co.uk

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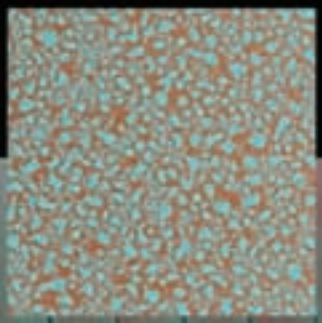

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