RIBA J

# PIP

## Products in Practice
## Sept/Oct 2017


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# So the Garden Bridge Trust. . .

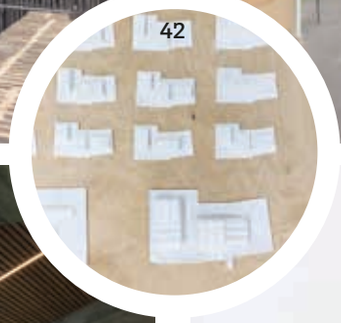
. . . has finally wound up and the bridge itself disappeared beneath the Thames' tides – but this should not be a time to gloat at its demise. This vanity project would have done nothing to relieve the everyday commute of Joe Public and, if anything, would have caused more congestion in the area due to tourist influx. With no credible case for infrastructure need, serious questions should be asked about how £37 million of taxpayers' money could have been committed to this effectively private scheme.

Former London mayor Boris Johnson was a vociferous cheerleader for the project, having promoted such schemes as the Arcelor Mittal Orbit and Emirates Air Line in Greenwich. But this really took the biscuit – at £546,000 per linear metre as opposed to the Orbit's £197,000. By comparison, his Air Line – a white elephant in anyone's book – looks cheap at a mere £60,000/m. The irony is that however you look at the Garden Bridge, arithmetically or aesthetically, and despite its sunk millions – we have got off lightly.

But just by way of contrast, consider Moxon Architects' understated intervention at London's King's Cross, springing 38m over the Regent's Canal from Argent's site to land lightly in Camley Street Natural Park (see page 5). Formed of 15mm steel plate, this delicately engineered pedestrian bridge is so pared back it is almost a diagram of its own static loads. It starts to connect the hemmed-in Somers Town area with the new Granary Square and has done so with the active involvement of both the Canal & River and London Wildlife Trusts, and moored residents of St Pancras Cruising Club. Lovely. ●

**Jan-Carlos Kucharek, Editor**

ROBERT GRESHOFF



MORLEY VON STERNBERG

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**Theoretically the time to get 170 litres of pure water from a rooftop 'Amazon': ribaj.com/miniamazon**


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Cover image: Centro Botín, Santander, photographed by Enrico Cano

# Compendium

UPCOMING
**Eco Showcase** 19 Sept-31 Oct, Manchester, Bristol, Birmingham, Leeds
**London Design Festival** 16-24 Sept, various venues
**Construction Expo** 6 Oct, Maidstone
**Timber Expo** 10-12 Oct, Birmingham
**Lean Construction Summit** 26 Oct, Birmingham

**Single malt, double glazed**
Architect Archial Norr has proved itself more than capable of arranging a booze-fuelled social event in an alcohol production facility with its bold design for the Chivas Brothers' new £30m Dalmunach distillery, the famous whisky firm's 15th. Designed to showcase the inner workings of the distillery, the design uses Kawneer's AA 110 dry-glazed, externally capped curtain walling at both ends of its pitched-roof structure, its 65mm profile allowing for the necessary movement of the 11m$^2$, 36mm thick double-glazed units. The distillery produces over 1m litres of whisky a year with water drawn from springs of the River Spey.

**Copper bottomed**
Architect Barr Gazetas has been busy at its Regent Street Mezzanine project for The Crown Estate in London, a flexible workplace design providing meeting, presentation and exhibition spaces in the heart of the West End. As part of the high spec fit-out, the firm worked with lighting designer FUTURE Designs to produce this striking COPPA lighting for the spaces, in which everything – conduit, beza boxes and spot lighting – are formed of highly polished copper. To maintain its characteristic look into the future, the whole lot has been polished and powder coated with a clear lacquer. The effect is finished with etched glass disc diffusers generating a soft illuminance from the LED light sources.

**Mortar and pestle**
Not content with designing premium ceramic surfaces to prepare food and eat off, Caesarstone recently worked with food design studio Arabeschi di Latte which produced a menu based on the launch of its four new 'raw and tough' colours. Chef Francesca Sarti created a 'black crunchy bread' based on its 'Rugged Concrete' and 'Pashmak cotton candy' based on its 'Montblanc' marble white. Quite what she rustled up for 'Turbine Grey' and 'Moorland Fog' wasn't stated; but grey and damp… some kind of porridge perhaps?

**Normal for Norfolk**
The University of East Anglia campus has witnessed a mixed bag of styles. It all started so simply with Lasdun's ziggurats in the landscape, complemented by Foster's hi-tech. Then came Mather's modernism followed by a flurry of ropey po-mo. More recently there's been the lovely Adapt low carbon enterprise centre. Now LSI Architects' Blackdale student halls is adding some bling, clad in Proteus HR cladding's elZinc Rainbow Gold. It's said to be so bright it reflects on to the student blocks next door – how's that for enlightenment?

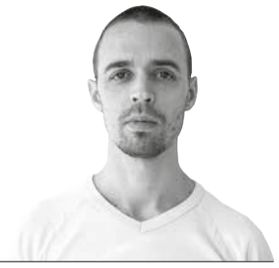
**Space lighting**
It's not a bird, although it might be a plane (the nose cone of one at least), or it may be a giant designer shuttlecock; whatever it is, it caught PIP's attention. The Segni lamp, installed here in a private villa somewhere outside Venice, is designed by Italian lighting firm SIRU and encases an egg-like oval of heavy white glass within a fine cage of twisted steel filaments in what could be described as a sexy take on the craft of art deco. Either that or it's a throwback to the CCCP's Sputnik I satellite, which first broadcast to planet Earth 60 years ago this October.

**Bridge of size?**
Moxon Architects has created a wonderful bit of infrastructure at the Argent King's Cross development with this bridge across Regent's Canal to the Camley Street park, east of Sir John Soane's final resting place at St Pancras cemetery. Spanning 38m, the trough of the bridge and the U shaped fins that give it its strength are all formed out of 15mm painted steel plate which, modelled by Arup, has generated an extremely elegant example of 'lean' design. 'The span to depth ratio is usually 1:20 or 1:25, but here we managed to make it 1:35,' says Moxon director Ben Addy. 'The bending moment of the bridge has been literally translated into the structural form.' It's so fine, in fact, that the central, boxed out portion of the bridge contains additional steel to dampen the live deflections created by its users, counterpointing massiveness with delicacy. Soane can rest easy...

**Through a glass, sparingly**
If you want to make 26m$^2$ of space appear twice as big, look no further than Spheron Architects' Urban Hermitage, a small flat on the first floor of a Victorian house in Clapham, London. The firm was asked by the artist owner to transform it into a tranquil, hermetic cell, less bustling city and more 'remote monastery in Belgium'. The folding mirror wall hiding the bed and storage, positioned opposite the discreet kitchen wall, is the understated but transformative centrepiece of the room. Atkinson & Kirby supplied its Concept range of stained, engineered flooring to complement the dark painted wall finishes and counterpoint the diffuse light from the floor to ceiling curtains, helping generate this sparingly Cistercian space.

**Squaring the circle**
Of course the point about Duravit's DuraSquare range is the fact that if you look closely, it isn't actually square. In that regard, it's a bit like the Lutyens' Cenotaph in Whitehall, which most people assume is rectilinear until they find out that its sides are subtly curved to a radius of 1,000ft. Of course, that's where the resemblance ends; the latter honouring the glorious dead while the former merely indulges the living. That said, the range, including this deep bath, is formed of DuraCeram, a weighty, mouldable ceramic material than can taper to a rim of no more than 5mm without any deflection from a reclining back. If your luxuriant soak is making you feel slightly guilty, spare a moment's thought for those who endured the waterlogged trenches of the First World War.

# Keeping track



The State Government of Victoria in Australia is finally building rail to meet population growth. Money is being invested to improve train frequency, reduce travel times and increase the number of stations. I was fortunate enough to be involved with Continuum, a consortium bidding for five underground stations and two towers in a public private partnership (PPP).

Victoria commissioned Grimshaw and a suite of engineers to develop a reference design scheme as a basis for the PPP tender. The team produced a detailed scheme and programme that synthesised eight years of stakeholder negotiations and land acquisitions. The reference design contained structural and service assumptions, an aspirational architectural proposal and hundreds of supporting studies that refined design criteria and sought to minimise negative impact on the community.

PPP tenderers were asked to develop a fully costed, detailed scheme in six months. This was no small task. Every design assumption and supporting study from the reference design was analysed and reworked to suit the bid team's proposal. Our team numbered 100+ consultants at its peak.

Every element of the design was coordinated in 3D and referenced to a single Australian height datum. The team established a federated model with a single Naviswork file with links to all consultant information. The five station and two over-station tower models were clash detected and periodically checked against revised track alignments and existing condition surveys. Model elements that required servicing or maintenance had embedded metadata specifying the necessary characteristics to the facility management team.

The station design was driven by track alignment and land acquisitions at ground level. These items can be connected in many ways, allowing designers to carve out volumetric sequences as desired. Melbourne Metro begins on-grade in rail networks north and south of the city and was designed to connect them underground to the current five-station city loop. The new connection will ease congestion and provide the beginnings of a robust grid. The stations were conceived using either cut and cover or a specially designed tunnel boring machine deep underground, the more expensive of the two.

The excavation type is determined by track depth below ground and existing assets and is the biggest influence in shaping the spatial possibilities inside a station. After the excavation method, structure, vertical transportation (lift and escalators) and essential services (mechanical and fire services) are the critical elements to coordinate. Mechanical fans can be as tall as a six-storey building. The government established design principles to maximise natural light deep into the stations and green spaces. These concepts permeate through the architectural entry canopies, ground planes, concourses and void spaces. Tunnelling has begun and contracts have been signed with the winning tenderer. Next train arriving in five years.●

**Alan McLean is an architect at Bates Smart Architects in Melbourne**

## Books

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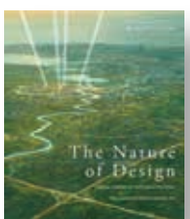


**The Nature of Design**
M Scott Lockard, Oro Editions, PB 272p, £22
Author Scott Lockard loves drawing. He contends that 'whoever draws, first designs'. But he doesn't believe anyone understands design, not in any fundamental way. Where is the listening? How prepared are architects when they go into the process? Do they get that the client's criteria are what it is all about? 'A surprising number of designers just muddle through,' says Lockard. If that's you this book might help. It is the accumulated wisdom of many years in architecture and all the better for the questions it continues to raise about the design process. Sometimes it feels a little undirected and repetitive and the multitude of images alongside the text can seem like eye candy but they can also be illuminating; as when he points out the 'lies' in the context of a skyscraper's CGI. EY

**Better Buildings: Learning from buildings in use**
Richard Partington and Simon Bradbury eds, RIBA Publishing, PB 192p, £35
Given 'Soft Landings', ahem, 'vocational' nature, most architects are too busy chasing the next commission to follow up what exactly is going on operationally with the buildings that they have completed. But hopefully new thinking around this is finally starting to sink in; and the editors here are helping the rest of us along the road by providing a book that actually revisits 10 built projects in detail to tell us what the design aspirations were and then following it up with monitoring results and post-occupancy feedback. The case studies are preceded by a first half of seven essays from architects and engineers, who are all positioning their practices definitively in Stage 7 of the Plan of Work. It's clear and well-illustrated throughout. CK

**Making Things Right**
Ole Thorstensen, MacLehose Press, HB 256p £16.99
The builder/client relationship is often regarded as an antagonistic one. This journal, in the Norwegian confessional tradition of Karl Ove Knusgaard, examines how a loft conversion affects a skilled craftsman and the family who have commissioned the work. Through the complexities of initially frosty discussions with the project's architect and engineer to the minutiae of the building work itself, Thorstensen outlines both the universalities of the building process and its particularities in Norway. Despite the prevalence of drawings and technical descriptions this is much more a meditation on the place of a skilled craftsperson in an increasingly Ikea'd world than a manual. Critically he demonstrates how problem solving arises both out of client involvement and discussion and the tapping of deep personal experience. RK

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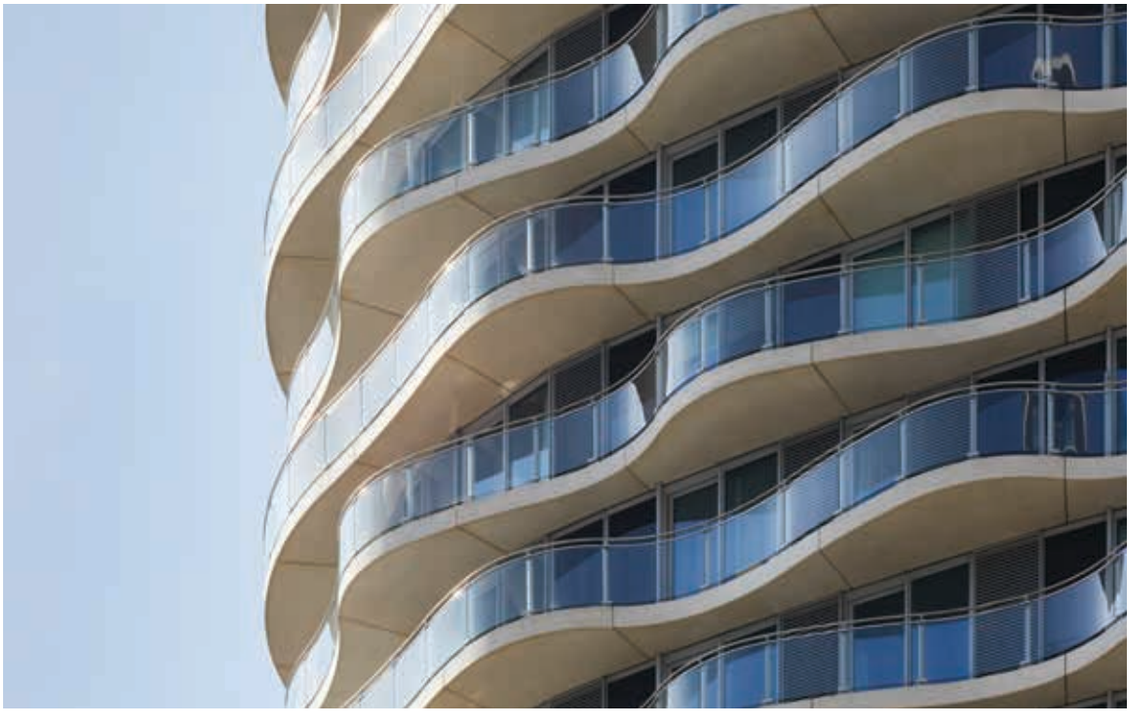


**What:** McMullen Facades
**Where:** Portadown, Northern Ireland

It's not very often you get pulled back to the same company for a second factory visit. It's only 18 months since PIP's last visit to McMullen when we wrote about what an unlikely place Moira in rural Northern Ireland was to find a specialised unitised facades manufacturer pumping out some of the UK's tallest buildings. But it shows how quickly businesses can and do evolve. It's both the sign of a still buoyant market and of an incredibly well-oiled corporate machine whose cogs are ever turning, making the most of opportunities by keeping up with technology, design and the pace of change.

The last time we were here, McMullen was celebrating recently joining the roofing and building envelopes group Lakesmere. It was out to talk about its unwavering belief in prefabricated construction, its design assist services and increased financial security. While all those subjects remain as important, within this short time frame the company has taken some astonishing steps up. McMullen's former managing director Ted McMullen has become the Lakesmere Group CEO. It has poached six of the most experienced manufacturing professionals from the most advanced industries in Europe to join its senior management team to push production line innovation. And, most impressively, it has moved to a new 34,000m$^2$ factory that has more than three times the capacity and space of the previous one.

Remember our previous mention of the 455 towers in planning in London? Well, in a little under two years – and only 15 or so since the company even began manufacturing unitised systems – McMullen seems to have geared itself up to deliver as many of those buildings' facades as possible. Last year in the capital it completed Tidal Basin, two 25 and 24 storey towers in east London for Carillion, designed by CZWG; Tribeca Square, a residential tower in Elephant & Castle; and The Pinnacle in Battersea by Broadway Malyan; as well as Leeds Central Square by DLA Design.

Four years ago the firm began heavily investing in the design and engineering team, enlarging it from 51 two years ago to 70 today. That increased pipeline of work reached the factory last year when McMullen decided to expand production. Now located in the equally unassuming location of Portadown, 10 miles from the former 8,500m$^2$ factory in Moira, McMullen has boosted the number of production lines from four to nine and integrated materials storage with the manufacturing plant to allow the whole team to operate together more seamlessly and maximise efficiency. It's increased the number of employees from 202 to 274 – 153 of whom work on the factory floor – and invested £1m in additional CNC machines and other tools. At the same time, new expertise has transformed the everyday running of projects from an already efficient process into an even more efficient one.

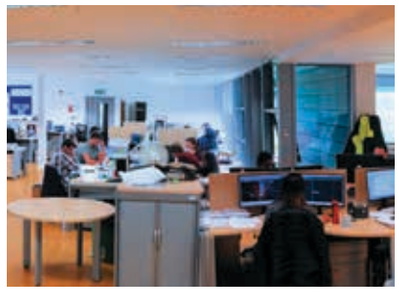
**Above left** Tidal Basin in east London, completed last year.
**Above** Eileen House, at Elephant & Castle, is in production at the moment.

London is still McMullen's largest market. Passing through the factory at the moment is a 32 storey tower by AHMM; a 41 storey residential building by Allies and Morrison; Southbank Place, a 30 storey tower next to the Shell Centre,

by Patel Taylor; and Mossessian Architecture's 23,200m² commercial building at King's Cross. But the company is making the most of regional investment too, with potential projects in Birmingham, Manchester and, in Liverpool, the Cancer Trust by BDP. Lakesmere group is also investigating market potential beyond Europe – so who knows where McMullen heads next.

Since PIP was last here the factory processes have become ever more refined and efficient. The former competitors McMullen spoke of two years have officially been left behind. It has smashed through other barriers, including the 40-storey project mark, and is the only UK contractor capable of handling such tall buildings. Having attained those heights, it is now targeting complexity – leading the way by developing unique 'plug and play' details for integrating services and trades with unitised facades that architects will look forward to. It is also broadening the range of materials that can be incorporated into its solutions to include stone and terracotta. And its design assist service is there to provide solutions for any design ambitions. ●

**This editorial is supported by McMullen Facades Ltd, www.mcmullenfacades.com**



### 1. DESIGN AND TESTING

The McMullen process begins with a design assist service, ideally six to nine months before a project goes to planning. The firm works with the architect to meet the design and aesthetic requirements. As part of design finalisation, McMullen creates prototypes of the facade panels and has them tested by an independent laboratory. At this stage two full-time trainers are working with the manufacturing team ahead of a project starting, building in flexibility, skills and early knowledge of future projects.

### 2.MATERIALS AND INSPECTION

Once the design is finalised, products for the job are ordered and stored at the new factory, which has 20,000ft² of internal storage on site as well as a 100,000ft² outdoor yard. McMullen's main suppliers of aluminium profiles are Germany companies Hueck and Schueco. A week before production starts, components are retrieved from the store, tape is removed and each bar is inspected. Those with faults are quarantined. Profiles that pass are wrapped in a new tape to protect them during manufacture.

### 3. MACHINE SHOP

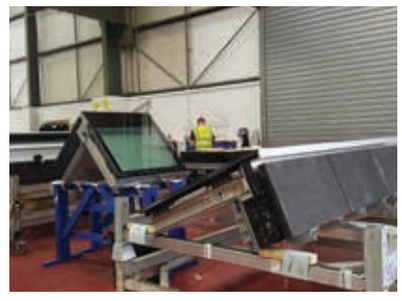
The machine shop runs seven days a week, four of which are 24 hour days. After wrapping, each profile is allocated to one of four saw and milling machines. Design information is programmed into the machines to handle the pieces in the most efficient way, taking about 1 minute per cut. The Doosan machine deals with heavier small pieces, including brackets. At the same time, each item is given a specific code based on the project and position. McMullen has implemented a barcoding system to make the process even more efficient. Items are then stored ready for use.

### 4. PRE-ASSEMBLY

Many complex parts of the design are pre-assembled on separate workbenches in order to feed the assembly line in a continuous process. These parts are slotted into the main frame later on in the production line process and can include anything from ventilation panels to balconies. While many items are project specific, workers can take items common to all projects, such as nuts and bolts, during pre-assembly and assembly from the kanban area at the head of the production lines. Quality checking takes place at each stage of production.

### 5. ASSEMBLY

The panel frame is assembled first. As the panel progresses along the production line it is fitted with more parts, becoming increasingly complicated. In the new factory McMullen has implemented a system of placing prototype panel sections by the assembly line to help workers see what to do. Moving through the factory at the moment are the King's Cross, Southbank and Elephant & Castle projects. As a job progresses, the building of panels speeds up, with the team becoming more efficient and increasing speed by sometimes 20 hours per panel.



### 6. QUALITY CONTROL AND TRANSPORTATION

Once each panel is complete, it is checked for quality for a final time, wrapped in film and packed into the steel transportation stillages. As the panels are all bespoke to the project, McMullen often has to order customised stillages to transport them to site. The company has more than 1,000 stillages on the go at once, moving back and forth from collection to delivery. These are then loaded onto trucks which leave the factory throughout the day. With overnight shipping from Belfast, trucks can arrive on site in London for 7am the following day.

**Left** $CO_2$ levels are increased in specific areas of the wood.

**Below** The steel gantries have no concrete foundations or guy ropes and were installed by helicopter.

# Woodland $CO_2$ testing station

**What:** Birmingham Institute of Forest Research
**Where:** Norbury, Staffordshire

Most people now accept that climate change is real and increasing levels of carbon dioxide ($CO_2$) in our atmosphere will have an adverse effect on our planet, but the exact impact is unknown. An experiment is under way in Staffordshire to try to quantify its effects.

The Free-Air Carbon Dioxide Enrichment (FACE) experiment is being run by the Birmingham Institute of Forest Research (BiFoR), which was set up by the University of Birmingham.

Its aim is to investigate how the world's forests will respond to future increases in $CO_2$ by recreating these conditions in three areas of a 160-year-old woodland.

The £10.4m facility that will artificially raise the levels of $CO_2$ has been built by West Midlands-based contractor Shaylor Group at Mill Haft Wood in Norbury. It consists of six cylindrical, 30m diameter metal ring structures that resemble gasholders.

Each structure encircles a segment of woodland and supports the pipework needed to deliver the gas.

The system has been designed so that while the trees inside the ring can be immersed in higher levels of $CO_2$, the rest of the forest should remain largely unaffected.

On average a total of 15 tonnes of $CO_2$ a day (over a month this equates to one return transatlantic flight) will be used to maintain the artificially high levels within three of the structures, while the other three will act as controls.

The 10-year project will allow scientists to test the resilience of a mature forest to the concentrations of atmospheric carbon expected by 2050.

They will be able to take measurements from deep within the soil and from above the tree canopy from sensors supported on the ring structures.

The project is being run by Professor Michael Tausz, who believes the research will produce concrete evidence about the ability of temperate woodland to mitigate future climate change.

'This is an unparalleled opportunity to really gain an insight into the reality of climate and environment change in this state of the art facility,' he says.

'BIFoR FACE is a technological marvel. Built into existing woodland without the use of concrete foundations or guy ropes, the facility gently delivers its enriched-$CO_2$ atmosphere to 30m patches of 160-year-old oaks.

'The impact of changing $CO_2$ should show up in the leaf chemistry of exposed trees within days, and in the soil within weeks,' Tausz predicts.

'Within three years, stem growth, canopy structure, and a host of other structural forest elements should be different in the patches exposed to elevated $CO_2$.'

The Staffordshire project is the second of these experimental facilities to be built – a sister forest FACE was set up by the University of Western Sydney in 2012.

Tom Ravenscroft

### LIGHT FOOTPRINT

Birmingham University wanted to ensure that the established woodland was not damaged in any way by the experiment, and returned to its original state after the experiment concluded. This meant the facility had to be built in a non-traditional way.

The 102 prefabricated, 25m high latticework masts were installed by helicopter so as not to disturb the site.

Each pylon was lowered onto steel grillages to avoid dropping deep piles into the ground. This will allow them to be easily removed when the experiment comes to an end.

The 1,000m of pipework that runs through the forest to distribute the $CO_2$ to the network of masts has also been constructed without drilling deep piles.

*The data refers to Bioguard Acoustic. The information is given for guidance only. Photos : Thinkstock - aressy.com - 05/16 - 10166

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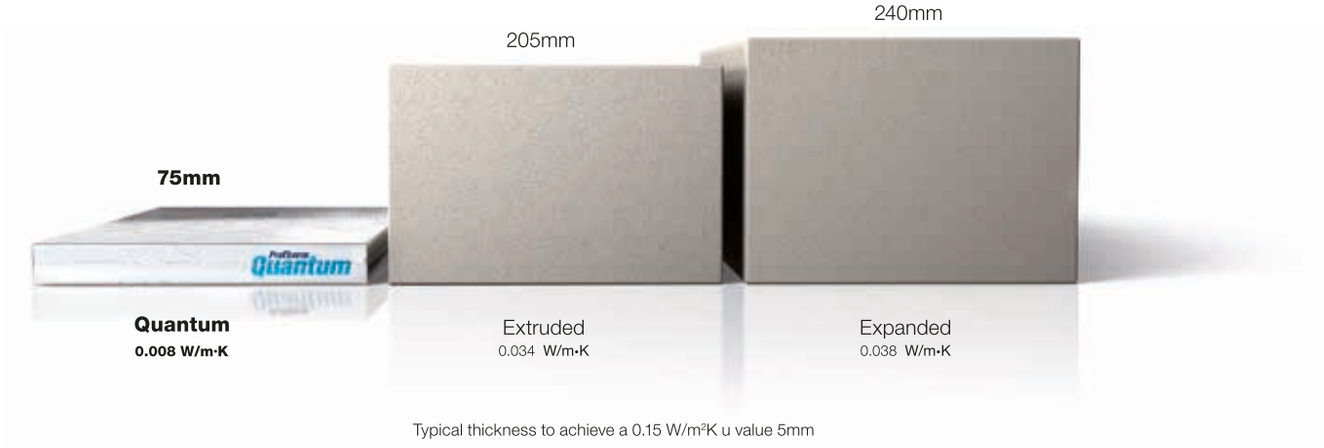


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# Centro Botín, Santander

## Renzo Piano's £80m new arts centre in Santander may be divided in two, but it is intended to bridge the gap between its citizens and its art and reconnect the city with its harbour

Words: Jan-Carlos Kucharek Photographs: Enrico Cano

Standing high above Santander on the Mirador Río de la Pila, looking down towards the centre and the bay beyond, it's easy to understand why Renzo Piano decided to cleave his new arts centre in two. Seen from the hills that jam the city into a long, narrow south-facing strip along the port's harbour wall until it gives way to sandy beaches to the east, his principle that residents should have unrestricted access to the view beyond the Centro Botín is clearly honoured. Even from here the building's conscious physical split does not belie its purpose.

The division is even more palpable from the Mercado de L'Este, a market directly aligned with the arts centre, which is raised on steel columns to preserver shoppers' view of the sea. It was perhaps a political decision not to site it further to the west where it would have aligned with the Arco del Banco Santander, whose neoclassical grandeur was the first home of what is now Santander, one of the biggest banks in Europe; one that has made its founders, the Botín family, among the richest in Spain.

The Centro Botín is the first physical manifestation of the eponymous foundation, set up in 1964 by the late Emilio Botín, whose endowment is funded by a share of the bank's dividends. It aims, through working with hundreds of schools, to develop Spain's cultural and social agenda, as well as funding high level innovations in digital and biotechnology. In its work with new and established local and international artists, it aims to bring the best of European art to the region of Cantabria – and showcase them all in Renzo Piano Building Workshop's £80m waterside arts centre, kicking off with Carsten Höller's first solo show in Spain.

A quarter of the budget, £20m, was committed to a transformative piece of infrastructure that would connect the city with the arts in a more than an ideological sense. Previously, Santander had been separated from its waterfront by a four-lane highway feeding the port to the west. Sinking this into a new tunnel not only allowed the 10,000m$^2$ Centro Botín to be built on the site of a former ferry car park but meant the city could extend out into the enlarged Pereda Gardens and beyond to the steps of the centre itself.

Residents now have easy access to 2,500m$^2$ of gallery space, a 300-seat auditorium, classrooms, work spaces, a lower level restaurant, a shop and, most symbolically perhaps, a 200m$^2$ steel and glass raised public space that overlooks and partially cantilevers over the bay itself.

The building is perhaps best defined by the negative space that nestles snugly between

**Left** The Centro Botín, looking south east to the harbour. The gallery and public space is the Pereda Gardens and marks the start of the Paseo eastwards to Santander's sandy beaches.

**Left** Looking south from the Pachinko, all the circulation is externally expressed. The raised public space with its glass floor cantilevers out into the bay.
**Below right** The sinking of the four-lane highway into a tunnel lets the building connect naturally back to the city.
**Below left** The Centro Botín has been designed to deal with its maritime location.

the two hull-like sections formed of steel ribs connected to steel beams sitting on the columns and clad in 270,000 iridescent ceramic discs that pick up notes from the northern Iberian peninsula's ever-changing skies. It is not for nothing that this space rapidly earned itself the moniker of the 'Pachinko', the popular Japanese gambling phenomenon that involves firing hundreds of stainless steel ball bearings at speed around a vertical pinboard.

Renzo Piano says the name originates from the fact that he has made this raised glass and steel plaza the circulatory centre of the building; the visitors are the little balls running up and down its dual facades. But a Pachinko game is as much about the pins as it is the balls. And the pins here are the staircases, glazed canopy structure, lifts and routeways that populate and enliven these external facades. Piano says this is deliberate, adding that he hates internal stairs and lifts as they 'take away valuable space'. That may be true, but in this exposed maritime context, it had implications for the specification of the glazing and architectural metalwork.

### Pompidou revisited

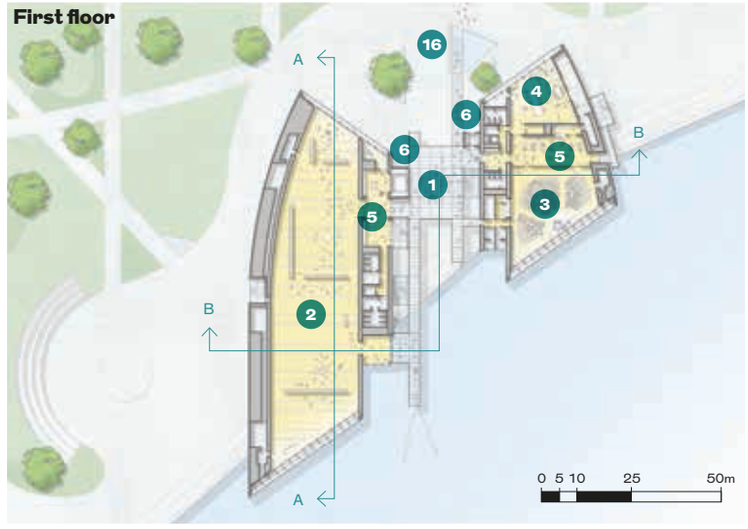
Echoes of the Pompidou Centre abound here, not least in the gerberettes that project from the roof beams on either side of the raised piazza to support the deck itself and the cantilevering walkways that push out vertiginously into the harbour. Sitting up on its concrete stilts, the whole structure is braced by the painted steel beams that run between the two side walls separating gallery from auditorium and admin blocks, filled in with frosted structural glass, but it is left to the gerberettes to do the job of supporting the walkways, which are far more 'live' in their nature – with a distinct bounce at their extremities. The steel louvre cladding of the walls is painted too, to avoid corrosion from the saline air.

Elsewhere, for the stairs and balustrades, RPBW and associate architect Luis Vidal Architects decided to push the boat out and go for marine grade steel. On balustrades this is manifested as uprights of dual solid steel flats topped with handrails of rolled hollow sections; a solidity delicately counterpointed by an interstitial mesh of stainless steel wire, akin to a fisherman's net – perhaps no coincidence given that

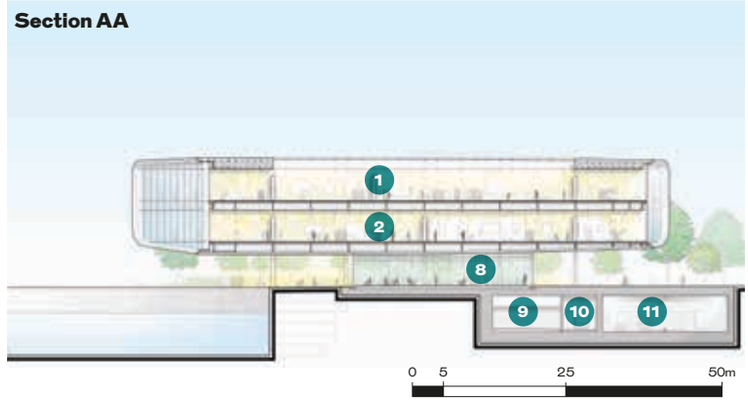
**1** Pachinka (upper square)
**2** Gallery 1
**3** Auditorium
**4** Offices
**5** Lobby space
**6** Lift access
**7** Gallery 2
**8** Restaurant
**9** Art storage
**10** Access road to Centro Botín
**11** Road tunnel
**12** Pereda Gardens
**13** Mercado de l'Este
**14** Santander Bank Arch
**15** The Paseo
**16** Stairs up to Pachinko

**Site plan**

**First floor**




**Section AA**




**Section BB**

Piano knew Emilio Botín was a keen angler.

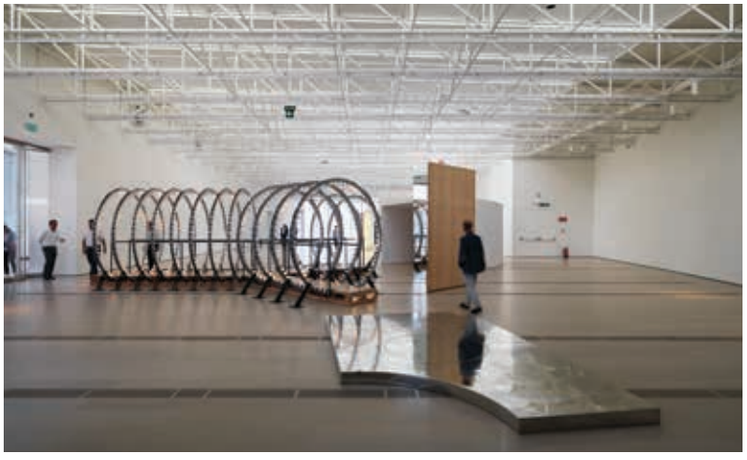
The marine grade steel is carried through onto the extensively glazed north and south elevations. Here, 5-6m tall panels of high performance solar control double glazing are held in place with steel mullion sections running the full length of the space. On the south facade this is augmented with a second, outer skin of glass and a ventilated cavity to mitigate heat gain to the main gallery spaces. While the expanses of glass offer visitors a stunning view of both harbour and city, some might find it strange to have an art gallery so flooded with direct sunlight, especially given Piano's past, highly engineered control of its ingress in previous buildings, such as the ferro-cement leaves of the 1987 Menil Collection and the 2013 extension to the Kimbell art museum, both in Texas (PIP Jan/Feb 2014).

**Lighting in a grey city**

There is a nod to such technical solutions in the thin, elegant, bidirectional frame structure of the upper gallery ceiling, but perhaps less of the ingenuity, topped as it is with simple skylights, fritted glass diffusers and an internal layer of adjustable horizontal blinds. Piano attributes this low-tech approach to the duller (and wetter) climate of the northern Spanish coast. It's a view echoed on the facade in his choice of the mother of pearl finish for the ceramic discs on the building's facade as a 'way to make the facade interact with grey light – and this is quite a grey city.' It also justifies the secondary purpose of the raised building as a huge shelter for the Pereda Gardens during one of Santander's frequent squalls.

The enormous glass and steel lift structures that pop up on both sides of the Pachinko act like snorkels, suggesting things going on beneath the surface. It's not just visitors who are served with their generous height – they're the only means of moving large artworks up from the basement level storage areas. The basement itself forms a subterranean connection between the two sides of the building and links to the access road that merges into the highway tunnel.

The apparently splendid isolation of the Centro Botín is, in fact, a conceit; it's part of the wider strategy of a gallery linking art back to the city and, by extension, out into the harbour itself. ●



**Above** The south glazed wall, with its stainless steel cladding, gives wonderful views out. Light ingress is controlled with solar glass and retractable blinds.
**Left** Carsten Höllers' inaugural show, set beneath Renzo Piano's delicate but low-tech rooflit ceiling.

**Above** The iridescent ceramic discs appear inside as the soffit to the shop/restaurant. Marine-grade steel cladding supports abound.

**Client** Fundación Botín
**Architect** RPBW / LVA Arquitectos
**Landscape architect** LVA Arquitectos
**Project management** Bovis Project Management
**Health and safety co-ordinator** Bovis Project Management
**Landscape consultant** Fernando Caruncho
**Tunnel infrastructure** Dýnamis
**Cost consultant** Gleeds
**Structural, lighting and fire engineering** Arup
**Environmental and urban planning consultancy** Prado y Somosierra
**Acoustic consultant** Müller-BBM
**Lighting consultant** artec3
**LEED consultant** Bovis Project Management
**Main contractor** UTE OHL/ASCAN
**Graphic designer** 2x4

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# Specified

**1**
**Door closers**
**Samuel Heath**

Colin, you know my door is always open to you – that's my open door policy. But I only expect employees to walk through that open door when I am in the room. Karen has told me that, when I am away, you have been entering nonetheless and taking the jumbo paper clips, which are even better than the coloured ones. As a result I have had no choice, Colin, but to make my open door policy a closed door policy, for which these sturdy Powermatic door closers will be just the ticket. It's Staples for you from now on, me lad. Now, hand over my multi-coloured Post-Its.
concealeddoorclosers.com

**2**
**Engineered timber windows**
**Black Millwork**

Aye aye Cap'n! Welcome aboard the Good Ship Homebuilding and Renovation Show, where you can peer through Black Millwork's porthole to gaze at its bounty of engineered timber windows and doors. Hoist the mainsail to examine the traditional timber tilt and turn box sash windows! Grab a bottle of grog and peruse the environmentally friendly material production! Find your way to the spot marked with the X to check out the Andersen window portfolio! And if you're forced to walk the plank, rest assured it's made from sustainable timber.
blackmillwork.co.uk

**3**
**Disappearing wall glazing**
**IQ Glass**

Wouldn't everyone like glass walls that disappear at the touch of a button, like these from IQ? Think you need the infinity pool as well, though. If it was my place, it would probably be invaded by the wood pigeons that the neighbour insists on feeding. And I'd have to put on a cardie and turn down my Best of the Electric Light Orchestra virtual Spotify album for fear of complaints. I think the best setting for IQ's indulgent disappearing wall glazing is overlooking an unpeopled and misty valley – preferably one you own.
iqglassuk.com

**4**
**Integrated attenuated trickle vents**
**Velfac**

Older readers may recall a time when London black cab drivers needed some persuasion to venture south of the river. Nowadays they're much keener, and not just because of Uber. Even Catford, once famous for its greyhound track, is becoming gentrified, these new flats being a case in point. There is still a slight issue with tracks though – the block sits between two railway lines, so Velfac supplied acoustically attenuated trickle vents as an integral part of its window systems for the 600-apartment block.
velfac.co.uk

**5**
**Window glazing**
**Maxlight**

The seventies. Avocado baths, flared corduroys, the stench of bad ideas gone worse and napalm in the morning, industrial action, rag rugs and A Clockwork Orange. But everyone seems to love that age, especially when it's all scrubbed up and placed against the kind of white and steely backgrounds that were never a feature of the original – that was all about yellow and sludge paisley wallpaper. Similarly, this mews house in south east London gets the best of both worlds with Maxlight's rooflights and doors, creating its very own Space Odyssey.
maxlight.co.uk

**6**
**Manual revolving doors**
**GEZE**

Knowledge might be power but in Glasgow it seems they can do perfectly well without it, thank you. The City of Glasgow College snubbed powered entrance doors for GEZE's TSA 325 NT manual revolving ones at its 2017 Stirling Prize nominated Riverside and City campuses. That's the famous local spirit for you; tough as the Gorbals, sweet as Susan Boyle, rich as a Tunnocks bar and with a punch like a pint of heavy. Or is that tough a as Tunnocks bar, rich as Susan Boyle, sweet as a pint of heavy and like a Gorbals punch? All those free and easy spins have left me rather dizzy...
www.geze.co.uk

**7**
**Steel windows, doors + partitions**
**Crittall**

Welcome to Whitby Hotel, Sir! I note you have a deckchair and knotted handkerchief among your luggage. I am sure you realise, Sir, that you are on the Upper East Side of Manhattan rather than a small seaside town on the coast of Yorkshire, Engerland? You thought the flight was rather long! Yes, well, easy mistake to make. On the plus side, we have some of the world's best nightlife, shopping and cityscapes - and Crittall ironmongery, here in the hotel. A stick of rock, you say? I will enquire with room service...
crittall-windows.co.uk

**8**
**Fixed and sliding doors**
**Fineline**

All that money on education, student flats etc, and what happens? They still can't afford to live away from mum and dad. Four of the hulking great brutes so we had to do something drastic – bought next door and joined the two at the rear with this rather nice glass extension. Fineline and the architect cleverly arranged it with sliding panels at each end and a fixed removable one in the middle. The minute we get shot of the kids, that's coming out, the partitions are going back in and one semi's for sale. That should fund quite a few cruises before we crack into their inheritance.
finelinealuminium.co.uk

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# Costed

## Aaron Wright, RICS head of infrastructure data, on trends in doors & windows

Since 2013 the market for windows and doors has seen steady growth. This can be attributed largely to an increase in construction activity in the commercial and residential sectors.

There has been a real trend towards fitting home exteriors with bespoke items such as aluminium bi-fold and composite doors. Clients and architects alike are looking to maximise indoor-outdoor living space, and this has fuelled demand for sliding glass walls and folding doors. These are also popular for home extensions.

Another driver of change is the younger generation's preference for contemporary architecture with simple clean designs, narrow profiles and large glass doors and windows. Although wood remains popular in the traditional and luxury market, it is largely in the shadow of composite materials in other markets. The sector has reacted quickly to this change in demand with new colours and composite materials.

Windows and doors in the commercial sector have witnessed good growth on the back of a recovery in office construction. Curtain walling takes the largest market share for this sector.

Changes to Part L of the building regulations are likely to increase demand for more energy efficient windows. Triple glazing is already standard in Scandinavia. With these solutions increasingly being offered and the UK becoming ever more environmentally conscious, doors and particularly windows with triple glazed, low-E glass featuring cavities filled with inert gases are expected to become the norm. ●

*These guide prices, as of 2Q17 for a UK mean location, are from the BCIS ORDB Schedule of Rates Service of the RICS. Based on a medium-sized residential project for products in the low to upper-middle specification range and exclude contractor's preliminaries, overheads and profit margin*

| Doors & windows | Range £/m² |
|---|---|
| **Timber internal doors inc ironmongery, lining, stops + architraves** | |
| Flush door painted, 35mm thick | £258 - £290 |
| Flush fire door FD30 painted, 45mm thick (see below for closer) | £285 - £320 |
| Flush fire door FD60 painted, 57mm thick (see below for closer) | £596 - £671 |
| Moulded door factory finished, 35mm thick | £216 - £243 |
| Moulded door FD30 factory finished, 45mm thick | £239 - £269 |
| Moulded door FD60 factory finished, 57mm thick | £575 - £647 |
| Panelled door hardwood veneered, 35mm thick | £241 - £271 |
| Panelled firedoor FD30 h/w veneered, 45mm thick | £289 - £326 |
| Panelled firedoor FD60 h/w veneered, 57mm thick | £553 - £622 |
| Purpose made softwood panelled door for painting, 35mm thick | £774 - £870 |
| Purpose made s/w panelled door for painting, 45mm thick | £881 - £991 |
| Purpose made s/w panelled door for painting, 57mm thick | £1,087 - £1,223 |
| Extra for intumescent kit to upgrade to FD30/60 | £111 - 124/£149 - £168 |
| Overhead/ electromagnetic door closers | £112 - £126/£350 - £394 |
| Powered door opener/closer | £1,120 - £1,260 |
| **External door and frame** | |
| S/W door, pattern 10, 45mm thick, doubleglazed, painted | £442 - £498 |
| S/W door, pattern KXT/SA, 45mm, d/g, painted | £444 - £500/£679 - £764 |
| Pair d/g s/w doors, pattern 2SA, 45mm thick, painted | £1,291 - £1,452 |
| Purpose made d/g single 44mm s/w door + frame, painted | £719 - £808 |
| Oak/h/w Alicante feature door, 45mm, varnished | £735 - £827/£745 - £838 |
| Steel doorset, six panel, factory finished | £2,195 - £2,470 |
| Fibreglass doorset, six panel, factory finished | £929 - £1045 |
| H/W folding doors, 1800 x 2100mm, 3 leaves, varnished, glazed | £2,043 - £2,299 |
| H/W folding doors, 3000 x 2100mm, 5 leaves, varnished, glazed | £2,775 - £3,122 |
| Aluminum sliding patio door 2400 x 2100mm, d/g | £2,387 - £2,685 |
| Aluminium folding door, 3000 x 2100mm, 5 leaves, d/g | £4,209 - £4,735 |
| Steel garage door, up and over, factory finished, 2134 x 2134mm | £612 - £688 |
| Insulated galvanised mild steel sectional door, man/chain op 3000 x 3000mm/4200 x 4000mm | £1,863 - £2,096/ £2,710 - £3,049 |
| Galv folding shutter door, top + bottom track, man op, one section, 3000 x 4000mm/6000 x 4000mm | £3,414 - £3,841/£6,020 - £6,773 |

| Windows | Range £/m² |
|---|---|
| **S/W casements, energy rating C, ironmongery, d/g, painted, fitted** | |
| 483 x 1195mm, 625 x 1195mm | £345 - £389, £354 - £398 |
| 910 x 1195mm, 1195 x 1195mm | £572 - £643, £671 - £754 |
| 1337 x 1195mm, 2334 x 1195mm | £883 - £993, £959 - £1,079 |
| **S/W casements, e/r C, Georgian bars, ironmongery, d/g, painted, fitted** | |
| 625 x 1195mm/ 1195 x 1195mm | £459 - £516/ £788 - £886 |
| 1765 x 1345mm | £1,221 - £1,373 |
| **S/W mock sliding sash, e/r C, Georgian bars, spring balanced, ironmongery, d/g, painted, fitted** | |
| 910 x 1195mm, 1765 x 1195mm | £559 - £629, £960 - £1,080 |
| **S/W mock sliding sash, e/r C, side hung Georgian bar casement and vent windows, ironmongery, d/g, painted, fitted** | |
| 1195 x 1195mm, 2334 x 1195mm | £788 - £886, £1,681 - £1,891 |
| **Purpose made h/w windows, d/g, part L compliant, brass hinges, stays + fasteners, energy rating C** | |
| 900 x 900mm, 900 x 1200mm | £802 - £902, £895 - £1,006 |
| 1200 x 1200mm, 1800 x 1200mm | £995 - £1,119, £1,504 - £1,691 |
| **P/M h/w sliding sash, e/r C, spring balanced, ironmongery, d/g, painted, fitted** | |
| 825 x 1394mm, 1051 x 1394mm | £1,061 - £1,194, £1,167 - £1,313 |
| **P/M h/w sliding sash, e/r C, Georgian bars, spring balanced, ironmongery, d/g painted, fitted** | |
| 825 x 1394m, 1051 x 1394mm | £1,204 - £1,355, £1,304 - £1,467 |
| **White PVCu casement sashes, e/r C, reinforced sections, ironmongery, d/g,** | |
| 600 x 1200, 600 x 1200, with fanlight | £417 - £469, £423 - £475 |
| 1200 x 1200mm, one fixed, one opening light | £446 - £502 |
| 1770 x 1200mm, one fixed light, two opening lights | £653 - £735 |
| **Roof window, laminated, anodised aluminium facing, d/g, flashing units** | |
| 550 x 780mm, 550 x 980mm | £293 - £330, £309 - £348 |
| 780 x 980mm, 780 x 1400mm | £438 - £493, £1,095 - £1,232 |
| 1140 x 1180mm | £636 - £715 |

PHILIPPE VAN GELOOVEN

# 360° approach lights up The Circle

This dramatic, light-flooded HQ for a Belgian tech company fulfils the brief with extensive use of bespoke aluminium window and curtain walling systems from Reynaers

The architect's brief for the headquarters of Belgian technology giant Barco was to bring light into the heart of the circular building, as well as creating an open social space that links the interior to the exterior.

An impressive glass facade was designed by award-winning Jaspers-Eyers Architects to form a skin around the open plan central atrium space, which is illuminated with a full 360° of natural light.

The build utilises an innovative design concept with bespoke aluminium window and curtain walling systems from Reynaers.

In Barco One, also known as The Circle, transparency is a key theme. Positioned at the centre of the site with corridors linking it to other buildings on the campus, it is 75m in diameter and 25m high, with a spacious total floor area of 32,000m$^2$. In all, 7,900m$^2$ of glass and aluminium systems were installed across Barco One.

**Immersive experience**

Architects and specifiers can now take their own virtual tour through the project and experience its amazing architecture. For an optimal experience, Reynaers recommends watching the 360 video with a VR headset or using the Youtube app on tablets or mobile – bit.ly/R-Barco.

On the tour you'll see how the interior functions of the building correspond to its exterior, bringing the facade to life. Strong horizontals to the upper levels provide solar control for the interior, while a grand staircase in the atrium makes itself apparent on the exterior as a dynamically sloping line. Further emphasising exterior connections, a water feature flows from indoors to out, blending the building into the landscape.

Architect John Eyers explains that the circular form of Barco One contributes to its social function, as well as making it a centre point between other buildings on the campus in Kortrijk, Belgium.

'The unique rounded shapes and the internal connections ensure that employees bump into each other more often and create an active ambiance,' he says. 'The oval-shaped "meeting decks" stand out, appearing to float in space. Passerelles to the fixed core of the building balance the structure and ensure a constant level of activity.'

The facade was also designed to reflect Barco's brand and allow its technological innovations to be demonstrated. These include an entertainment room showcasing its beaming equipment, as well as a cinema for its audio tech.

Internal walls are finished with a taut, sleek appearance to become projection screens, immersing visitors in Barco's products.

**Left** A dynamically sloping line on the outside indicates the grand staircase within. The building features bespoke aluminium window and curtain walling systems from Reynaers.
**Above** Oval 'meeting decks' appear to float in space.

### Custom-made solution

Accounting for almost half the facade, a custom-made CW 50 reversed solution with slim profiles from Reynaers admits the maximum amount of daylight and adds complexity to the design. This means that the structural element of the wall is positioned outside the building, with only the narrow trim caps of the curtain wall itself visible from the interior.

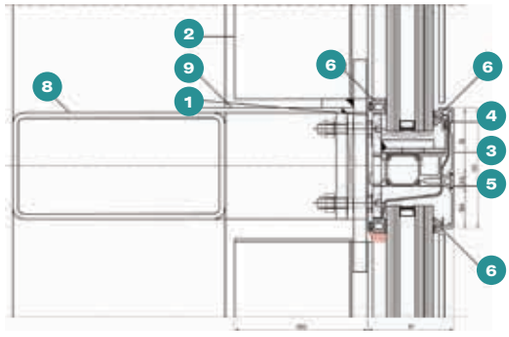
Rebecca Cope, marketing manager at Reynaers, says: 'The slender aluminium profile of our CW 50 curtain walling system improves transparency and outward sightlines to match the architect's design goals.

'The addition of a glass roof means that The Circle is filled with light, reducing shadows in the atrium. While an all-glass building makes energy-efficiency and temperature control a challenge, Reynaers' systems offer a thermally efficient standard.

'Innovative projects like these can be the most fulfilling, and this is a fantastic example of how we can produce bespoke solutions to make architects' creative ambitions a reality.'

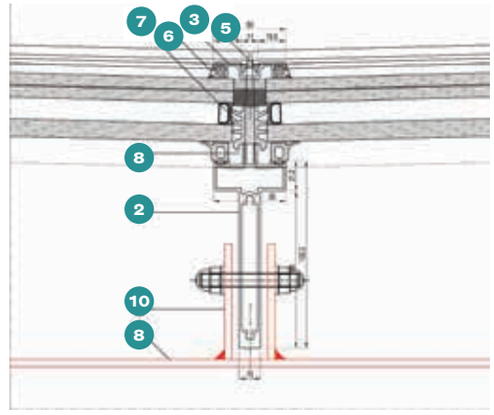
Architect: Jaspers-Eyers Architects
Location: Kortrijk, Belgium

### Crossed facade – vertical section A



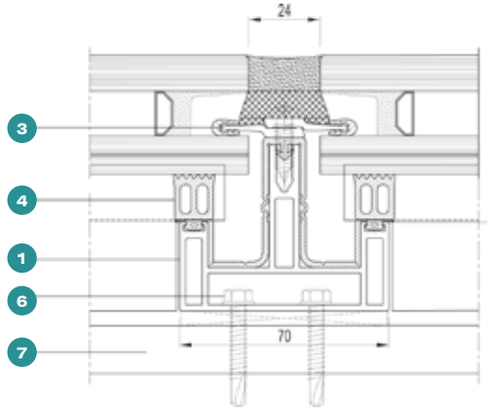

1 Horizontal frame profile (type CS 77)
2 Mullion (CW 50-SL)
3 Pressure plate
4 Continuous gasket
5 Cover gasket (screw fixing)

### Crossed facade – horizontal section B



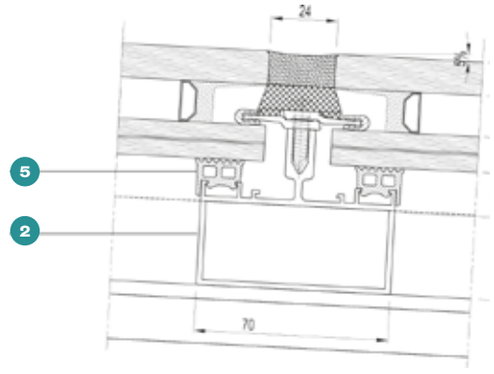

6 Glazing gaskets
7 Insulation gasket
8 Exterior steel structure
9 Local steel bracket (weight)
10 Local steel bracket (wind - glass stability)

### Roof - section C




1 Mullion
2 Transom
3 Clamping profiles
4 Inner glazing gasket – continuous
5 Inner glazing gasket
6 Fixings (in dry area)
7 Substructure

### Roof - section D

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# Community super-surgeries could save beleaguered NHS

## Integrating health and social services in a new sort of GP surgery could help answer the call for smarter ways of keeping the ageing population healthy

Words: Josephine Smit

In the not too distant future a visit to the GP could see us heading for a super-surgery in a local shopping centre. Follow-on assessments, procedures and treatments would be carried out in the same multi-service facility; we wouldn't need to go to a major hospital unless we have a serious accident or acute illness.

This ambition is intended to put the NHS on a sustainable footing by taking the pressure off overburdened hospitals and shifting more services to local integrated centres. These can offer a range of health and social care services, particularly for the ageing population. As health secretary Jeremy Hunt said two years ago: 'If we do not find better, smarter ways to help our growing elderly population remain healthy and independent, our hospitals will be overwhelmed.'

Hunt has recognised that smarter ways include improving frontline facilities. In primary care, change has been supported by a £1 billion infrastructure fund which is dedicated to helping GP practices expand and integrate services and invest in digital innovation. But creating the bright new super-surgeries and integrated health centres of the future is not going to be easy when wholesale service transition is needed, public spending is squeezed and demand for services continues to rise.

More than 900 family doctors left the NHS last year according to NHS Digital, and 200 GP surgeries closed or merged. The figures reflect the pressures facing GPs, as well as the shift to larger, amalgamated facilities.

Shared Agenda is a national delivery agency that has grown out of Hull agency City Care, which was established 13 years ago to work on LIFT (local improvement finance trust) projects and now has a string of innovative community health schemes to its credit. Its 14th project, now under construction, shows what the future could be. Hull's Integrated Care Centre (ICC), which is being developed with NHS Hull Clinical Commissioning Group (CCG), is designed to treat elderly patients who have been referred by their GP as being at risk of hospital admission, and provides seven-day-a-week services geared to trying to prevent that happening. It has no beds or wards, but houses an assessment area, diagnostics suite, outpatients department and physical therapy area.

The ICC will also accommodate East Hull Fire and Rescue Service in premises on the periphery of the building, including a gym where fire personnel can both carry out their training and help provide rehabilitation therapies for elderly patients. This co-location of health and fire services follows a pilot initiative in Humberside, which has seen fire service staff attending incidents when elderly residents fall at home, and carrying out repairs to fall hazards such as loose stair carpet at the same time. The fire and rescue service can be natural partners for health buildings, says Jo Barnes, managing director of Shared Agenda: 'If people see fire personnel in a building they find it reassuring.'

In creating the ICC concept the development team had no other UK model to draw on. Hull could be promoting further innovation following a move by the council and the NHS to form a joint social care team. 'That'll start to drive more integrated uses,' says Barnes. 'Social care is desperately underfunded and in need of a rethink, and primary care is the best route.'

### The business of building

Delivering innovative schemes can be challenging, and the ICC has been five years in gestation. 'It has taken a long time because the commissioners had to work from scratch and make a business case that the project would produce

**Right** The Cripps Health Centre, by CPMG Architects for the University of Nottingham, will be the UK's largest GP surgery.

**Left** Waiting room at the Bloom in White City, by Penoyre & Prasad.

ROBERT GRESHOFF

savings,' says Barnes. 'Architects have got to be willing to accept risk, and to have a knowledge of how buildings work. We want buildings to be beautiful, but unless you sit down and work with the partners you're not going to get it quite right.'

The architect for the ICC, Medical Architecture, was chosen through a limited competition and appointed before the CCG had chosen a service user. 'In a lot of health projects you don't get a brief,' says Paul Yeomans, director of Medical Architecture. 'You have to work out what's important and what's not. We help to stack up the business case, and as architects we put up a certain element of challenge to the client, showing where space can be saved, for example.

'Every project has to be assessed in terms of what the revenue implications are of the building – that's not only the cost of the building over its life, but also the cost of running the services, including staff. There is a need to be sure that the revenue side stacks up and that a scheme will generate savings – as well as delivering excellence in care.'

On the ICC the practice took on risk in developing the project costs. 'To provide some comfort of cost certainty we had to provide a lot more information at RIBA Stage 3 than we would have normally planned,' says Yeomans. In other projects it has both invested equity and carried design risk. 'It comes down to the relationship with the client and how you are able to manage the risk in an easily quantifiable way.'

As health policy evolves and services integrate, that client relationship can also become complex. 'We've a multi-centred client – it could be a trust, a CCG or involve numerous stakeholders,' says Yeomans. 'Now CCGs are having a lot more say in how they want to procure their services. That has led to us getting more involved in dialogues with them, rather than the NHS trust.'

> 'I encounter countless financial experts in the NHS but there is a lack of creativity. We need architects to bring vision'

**Breaking the formula**

Those clients are key to the end result, and its impact on users and the broader neighbourhood. Projects like St Ann's Joint Service Centre in Nottingham demonstrate their power. The facility combines community and GP services with a library, youth and child outreach services, meeting rooms, offices and a pharmacy. It was developed as the first phase of the regeneration of the Robin Hood Chase area. 'It gave a lift to the area,' says Nick Gregory, director with CPMG Architects. 'Prior to its arrival the community's main focus had been ageing shopping precincts. The building shifted that focus, and since it was completed there have been further developments around it. It's all credit to the local authority and the NHS that they looked at the project in a broader sense.'

CPMG's latest community health project also has an enlightened client in the University of Nottingham. The Cripps Health Centre will be the UK's largest GP surgery, serving more than 40,000 patients, both students and local residents. The super-surgery will provide primary care and support for university research with 31 consultant rooms, a pharmacy and spaces for physiotherapy, procedures, mental health services, dental treatment and seminars.

But such projects are not the norm, says Mark Rowe, partner with Penoyre & Prasad. The practice has worked on a string of integrated health projects, such as The Bloom in London's White City, where primary healthcare and social services nestle among homes and shops. 'We're lucky in that people come to us when they want to break the formula,' he says. 'But we're not seeing as many of these projects as we did 10 years ago.'

It is currently working on the mixed use Peel Project, which is part of Brent council's broader South Kilburn regeneration. It includes a health centre which will sit alongside homes and shops, showing a discreet face to the street. The centre will have a cluster of consulting rooms around smaller, more intimate waiting areas, says Rowe. 'Quite a lot of what we've seen is about institutionalised medical interiors landing on the high street. The Peel GPs have been occupying a comfortable Victorian house, so we're trying to create a place where people will feel at ease. We took the GPs to Harley Street to show how items like furniture, carpets or desk lighting, can really help, but at the same time you can still have a hyper-medicalised environment with high tech equipment.'

It is not always easy to bring creativity to health projects. Rowe says, 'There's a tendency with the degree of technical guidance for everything to get hamstrung.' There is also a different mindset. Ecologic Chartered Architects director Sumita Singha sees the NHS close up, as a non-executive director of London's Moorfields Eye Hospital NHS Foundation Trust and working with the sustainable development unit at Public Health England. She recalls one discussion involving the latter: 'I was the only architect in the group and the talk was all about compliance. Lateral thinking and design didn't come into the conversation.

'I encounter countless financial experts in the NHS but there is a lack of creativity. It took the vision of Charles Jencks to come up with Maggie's Centres. That sort of thinking doesn't exist within the NHS.'

She sees potential for architects to help the transformation of the NHS. 'Because healthcare is fragmenting into communities there are more opportunities and relatively few practices in the UK working in the sector, compared with say, Germany or Belgium,' says Singha. 'We need architects to bring vision.' ●

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# Warner Stand, Lord's, London

This new stand had to respect Lord's particular sound imprint – and the sensibilities of its neighbours. Using PTFE and aerogel, Populous and Arup Acoustics set about delivering

Words: Eleanor Young Photographs: Morley von Sternberg

Thanks to Test Match Special the sound of cricket is available to hundreds of thousands of people every summer – the patient attentiveness as the bowler runs in, the thwack of willow on leather, the murmur of appreciation and smattering of applause as the ball reaches the boundary. Imagination fills in the whites against the bright green of the pitch and the clarifying sun.

At Lord's there's an extra special sound: the 'Lord's hum', the sound of gentle animation and contented conversation. For members of the Marylebone Cricket Club a test match is a chance to catch up with old friends. So when Populous moved from masterplanning Lord's to designing a new stand for members, it found a brief for a comfortable, 'pleasant' space. That applied to noise too, something consultant Andy Lambert of Arup Acoustics says is often underrated.

'The aural environment is subconsciously important in forming your overall impression of a building,' he says. The team also had to reduce noise breakout, work with the ground overall and ensure that audio systems were actually audible, while using an untested combination of roofing materials.

Sound can of course be contentious, especially if you live next door. To get planning in the first place the MCC wanted to address potential objections. Lambert identified what noise might spill out beyond the perimeter – plant, audio systems and crowd reaction ('Though we had limited ability to control that apart from having a poor England team,' he says). This helped drive the form and materials of the stand, which is cheek by jowl with its neighbours and is solidly designed in concrete to ensure that opportunities for noise breakout are minimised. Projecting glazed bays in the facade face Coronation Garden; to allow use on non-event days the sound levels had to be lower than those in the previous stand.

Lambert spent some time at Lord's during the design process measuring, listening and watching from different seats. He is very aware of the noise of spectators in each stand, the 'cheap seats' being noisier and the whole ground erupting when the Pakistan or India teams attract their own crowds. T20 cricket – the shorter evening game played in coloured kit – has yet another atmosphere, where the PAs pump out a far louder set of entertainment sounds, from cheerleaders to celebratory music. To avoid noise build-up under the concrete stand it has slatted timber undersides – which also helps the audibility of the sound systems.

Perhaps the greatest challenge was set by the architecture of Lord's and the Warner Stand itself. Unlike single sculptural venues such as Populous' London 2012 stadium, Lord's is a campus. It has the Stirling Prize winning Lord's Media Stand by Future Systems and the work of those giants of hi-tech, Grimshaw and

**Above** At the opening match the view into the Warner Stand from the pitch shows the simple continuity of what is apparently a single roof when seen from below.

**Right** The top tier in the Warner Stand sits under a thin stretched fabric skin.
**Bottom right** The concrete soffit of the lower tier of Lord's new Warner Stand is faced with strips of timber to avoid noise build up.

Hopkins Architects.

All come together with a far older grade II* listed club house and an arched brick wall that anchors Hopkins' Mound Stand in Lord's history. For the Warner Stand, in an unresolved corner of the ground, Populous designed a roof to draw together the pavilion end and embrace the ground with its outstretched, cantilevered glulam arms of super strong American white oak.

Architect Philip Johnson wanted a lightweight and transparent material for the roof. He chose polytetrafluoroethylene (PTFE) not only because he had used it before at Ascot but because it echoes the neighbouring Grand Stand.

Although there are in fact two roofs – one over the stand and one over the top floor restaurant – he wanted to use a roof material that would tie them together. To give the effect of a single roof canopy while providing an insulated interior, Populous specified Tensotherm, a 16mm sandwich of PTFE fibreglass membrane installed by Taiyo Europe. In between is a fleece impregnated with Lumira silica aerogel. It is translucent, with a visual transmission of 3%, so light still filters through to the restaurant which doubles as an event space on the 100 days throughout the year that planning allows additional events to be booked.

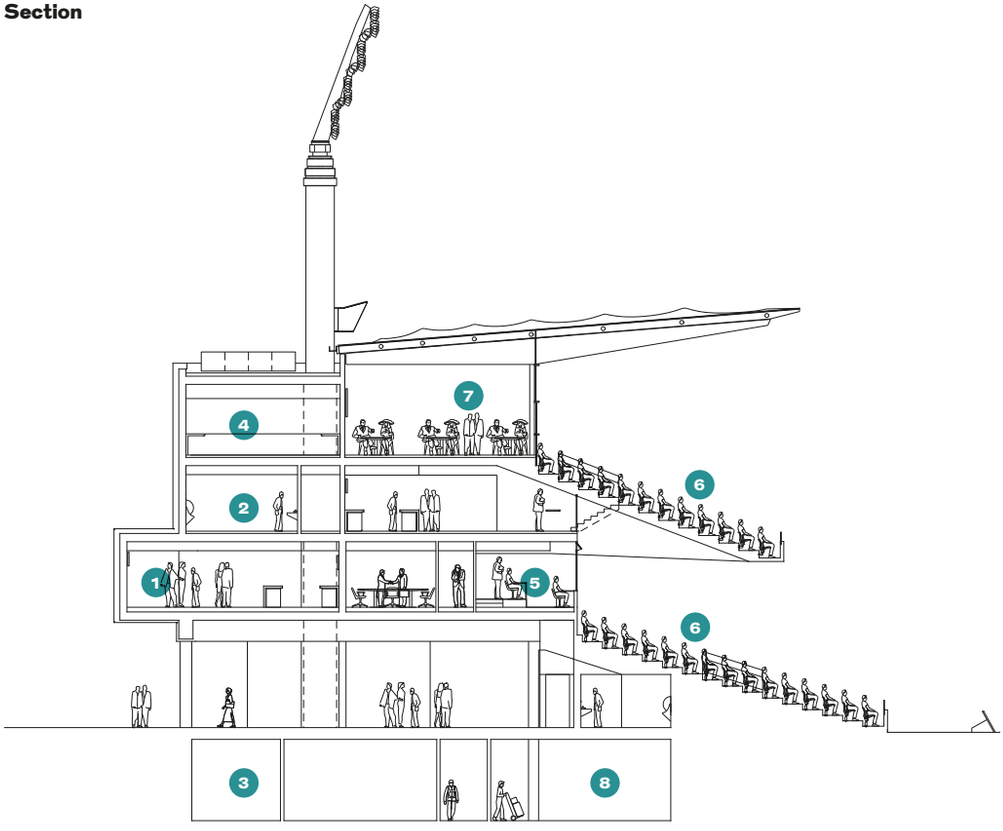
The stretched PTFE is pushed up by a steel armature from beam to beam, creating a modulation that gives interest and complexity. But stretched fabric acts likes a drum and rain impact noise is a well known problem with ETFE roofs. That might be all right for a cricket club restaurant – after all if rain stops play for any

It was important to preserve the 'Lord's hum', the sound of gentle animation and contented conversation as MCC members catch up with old friend at test matches

**Left** Inside the top floor restaurant at the Warner Stand. The acoustics had to work for pleasant member conversations on match days and throughout the year, come rain or shine, for event hire.

**Plan**

**Section**




length of time most people don't stick around to get wet in the open stands. But for an entertainment space it is critical to get it right. Cabot Corporation, which manufactures aerogel, describes it as having sound insulation properties (19Db sound transmission class). But would it need a rain suppression mesh to take the force out of the drops?

Arup SoundLab, normally reserved for concert hall projects, was used to create the sound in different rain conditions to help decide on mitigation measures. This is the first time acoustician Lambert has done an auralisation of a rain impact assessment and he describes it as 'extremely complicated'. There is no legislation in this area but there is a standardised test, ISO 140-18:2006 , which gives data on the overall noise level at different frequencies.

Tensotherm was being used for the first time in Europe so its supplier agreed to acoustic testing at BRE. Lambert's original plan was to take a microphone and record the lab sound but he decided there were more variables to be considered. Into the calculations pot went the test data, the roof area, room dimensions and reverberation and a Met Office report on different grades of rain in London (test information comes as moderate, intense, heavy and cloudburst). Lambert used the data for intense (15mm/hour) and heavy (40mm/hour) in his auralisation. When all was ready client and architect gathered at the SoundLab to listen to the rain. Happily the auralisation suggested that a rain suppressor was probably not needed – but the clips for retrofitting it went up just in case.

**1** Bar
**2** WC
**3** Plant/store
**4** Kitchen/catering
**5** Match control suite
**6** Terrace
**7** Restaurant
**8** Staff area

# Specified

**1**
**SonoPerfD acoustic metal tile**
**Armstrong**

'Oh, what a feeling, when you're dancing on the ceiling,' sang Lionel Ritchie, but what of the blood rushing to your head and your feet gradually going numb? Or your features being pulled curiously brow-wards? And being a cause for alarm for anyone entering the room, not to mention having one's dancing skills scrutinised? At least with Armstrong Ceiling Solutions' effective SonoPerfD, the beats won't be ricocheting off the dance surface because of the minute mesh and metal holes permeating the tiles. So, by all means give it a go – but for your own wellbeing, not all night long.
armstrongceilings.co.uk

**2**
**Acoustic plaster system**
**Armourcoat**

How do you turn down the volume on an otherwise echoic white box? This acoustic plaster system is wearing a secret mineral woolly jumper beneath its marble white surface. This means energy passes through the surface to reduce the auditory bounce-back, as tested by experts at the University of Southampton. Sadly for some, the solution doesn't come with a dose of Valerian, cosy slippers under the floorboards, comedy ear muffs or lamps wearing hidden nightcaps under their shades.
armourcoat.com

**3**
**Akutex HS surface**
**Ecophon**

If you think that grin will distract from the fact that your 'herb soup' is really only herbs and water with apple skin shavings, you're mistaken, chef. Rosemary, thyme and oregano might make for a tasty boeuf bourguignon but they don't constitute an entire meal. When you're next on dinner shift, chef, may I suggest you don't spend the night drinking Negronis with – and, I heard, off – the pastry chef? So, once you've nuked the souffles and wiped their exploded centres off Ecophon's hard-wearing, sound-absorbing, stain-protected ceiling, get out the steam cleaner and get jetting!
www.ecophon.com/uk/

**4**
**Hardrock Multi-Fix insulation**
**Rockwool**

You're huddled in a smoke-filled, tea-stained bunker with stressed-out colleagues as the cacophony of the marauding hordes outside penetrates the staffroom's flimsy defences. It gets louder and you exchange glances with the others. Only old Jonesy (maths) can retreat to a quieter world, by turning off his hearing aid – and besides, he suffered far worse in the war… Nothing like that these days of course, particularly not at Stopsley High School in Luton, where even the delightful sound of the school orchestra practising in the new music room are muted by Hardrock Multi-Fix insulation.
rockwool.co.uk

**5**
**Heradesign ceilings**
**Knauf AMF**

The Engine Shed is a name to send a thrill down a trainspotter's spine, but there's more chance of seeing a ghost train than a real one here. It was hush-hush when built as part of a military set-up in Stirling between 1896 and 1913. Now it's been refurbed as a conservation centre for traditional building skills and materials. Thanks to the Heradesign insulation materials on the ceilings it's still hush-hush though. Train buffs will have to make their own noises as they imagine an engine pulling up on the track that once lay beneath.
knaufamf.com

**6**
**Acoustic spray**
**Oscar Acoustics**

You wouldn't catch me on this mega-rink, the training area at the International Arena Wales, Cardiff. I'd be clinging to the side trying to stay upright, lest I lose my fingers to a million mobile scalpels. Even in the festive season, with Wham!'s Last Christmas playing on the speakers, I'd be on the side, praying friends and family weren't filleted by a hired skate. Even should a blade cleft them in twain, their cries would be quelled by Oscar Acoustics' spray, which cuts reverberation to allow careless whispers in even the largest halls.
oscar-acoustics.co.uk

**7**
**Ceiling panels**
**Troldtekt**

Minimalism, we love it, but spare a thought for the aurally challenged who find the bare wooden floor aesthetic, usually accompanied by equally hard bare walls, a distressing experience. One hears of a newcomer to the apartment lifestyle whose high-ceilinged living room bounced sound around so effectively he could only sit there wearing earplugs (how about some good old-fashioned carpet, you murmur?). Four islands of Troldtekt Plus acoustic panels did the trick – they can incorporate speakers or lighting, and even be printed with an artwork.
troldtekt.co.uk

**8**
**Acoustic panels**
**Soundtect**

This meeting room is clearly where employees come to gain their stripes. The big pharma company which we can't name is obviously into bold statements, done as part of a £1.8m refurbishment project and designed to combat dozing during conferences about placebo trials, regulations and test facility upgrades. There is nothing meek about this interior, the designer's choice for the Soundtect baffles is loud and proud. It's good to know that meeting attendees' voices will be well heard over the roar of the décor; it's like go faster stripes for big pharma.
www.soundtect.com

# 100% design, designjunction, London Design Fair

Now in its 15th year, the London Design Festival promotes the city as the design capital of the world. PIP takes a look at some of the products on show at the various locations from 16-24 September

**Construct 16 ceramics**
**Irina Razumovskaya**
Born in 1990 Leningrad, RCA post-graduate ceramic artist Irina Razumovskaya was influenced in her formative years by both the treasures on display the Hermitage Museum and decay, via the breakdown of the USSR, an event she was born into. Her pastel 'Construct 16' pieces, on display at the British Craft Pavilion, allude to a time when things seemed more black and white than they do today.
London Design Fair, Hall T3 Stand N12

**Cyclone F28 lamp**
**Bartek Mejor for Fabbian**
Polish designer Bartek Mejor gained his masters in ceramics and glass at the RCA and has since become one of the designers for the Italian lighting firm Fabbian. His cyclone lamp is inspired by the freezing of liquid clay spun within a vortex – a design modelled in 3D software but crafted by hand. The result is a beguiling whorl of digital meringue.
London Design Fair, Hall T1 Stand E27

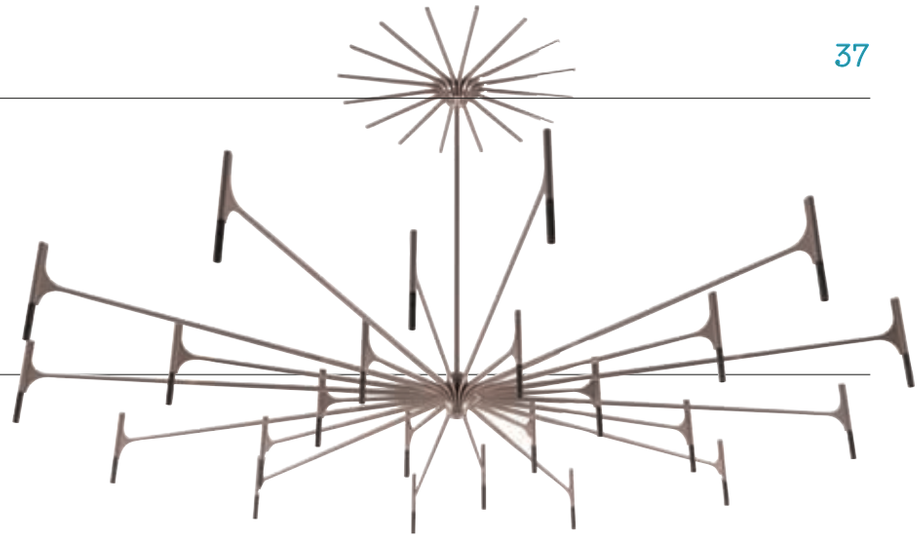
**Omstak chair, OMK 1965**
Founded by Rodney Kinsman, a key figure in the UK's high-tech design movement, OMK produced much of the furniture for Terence Conran's habitat stores in the 1960s and 70s. The brand has been reborn this year, re-releasing the old classics alongside new designs for both the retail and contract markets.
Designjunction, Cubitt House Stand B3

**Spanish chair**
**Fredericia**
Icons of Denmark will be showing off 100 years of craftsmanship at King's Cross, not least with designer Børge Mogensen, whose 1958 Spanish chair of solid oak and saddle leather even now still balances delectably on the cusp of tradition and modernity. They'll be keeping it fresh too with their new Acme and Verve chairs.
Designjunction, Cubitt House Stand A13

**Bespoke writing desk**
**Ian Parker Design**
Crafting bespoke furniture from his own workshop for nearly 20 years, craftsman Ian Parker will be showcasing his one-off pieces such as this crafted art deco inspired marquetry writing desk. There's a level of style and execution here that wouldn't put it out of place in Patrick Gwynne's James Bond-like lair, The Homewood, Surrey.
100% Design, Stand DL10

**Fazer Mirror**
**Studio Gud for &Ratio**
Portugal's Studio Gud seems to have sought inspiration for its Fazer mirror from design classic Achile Castiglioni's Arco lamp. Fazer, whose cut marble base props or counterbalances a 290mm or 400mm diameter, brass-framed mirror, offsets its simplicity with rich materials.
Designjunction, The Canopy Stand 2

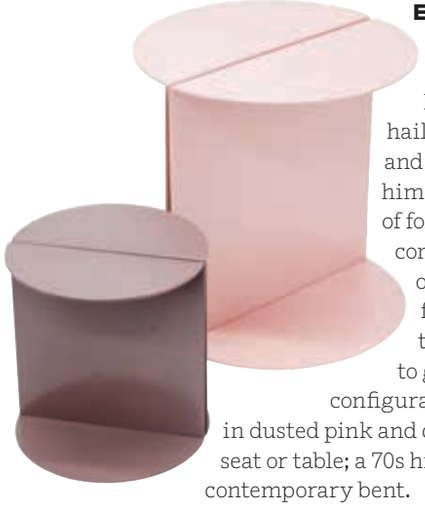
**Monument lamp**
**Louis Jobst**
Jobst trained as an architect with the likes of Carmody Groarke before moving into product design. That might explain his fascination with primal forms and materials, and the stated influences of Brancusi and Chillida. His Monument lamps, such as the 'Square', form a material triptych bringing together 90mm steel billet, Roman travertine and glass to produce a weighty, contemporary ode to the simple, monumental forms of the past.
London Design Fair, Hall T1 Stand F14



**Le Grand Chandelier, Stabörd**
Portuguese design house Stabörd will be showing off its new, bespoke suspension lamp, whose fine timber and metal tube structure, with a large number of different woods and metal finishes, is wildly configurable. And the materiality will speak loud – this baby runs to 4m across and 400mm deep, ensuring its delicate spider-like shadows will crawl their way across the walls of any room.
100% Design, Stand DL14

**Bicoca lamp**
**Marset**
Designer Christophe Mathieu has created a lightweight, portable, platonic, polycarbonate lamp with its distinctive tiltable shade to direct the light. As an added quirk, he's installed a magnet in the base so you can stick it to metal surfaces, defying gravity. There's also an accessory to attach it to a sofa or bed head to let the mini lamp max out your reading light levels.
Designjunction, Cubitt House Stand B11

**Escape furniture**
**Fernando Mastrangelo**
The USA designer uses hand-dyed sand and ground blue glass to create stratified furniture that looks like it has been born out of the earth or the oceans. Apart from sand and glass, he's experimented with cement, and even salt and coffee, to play on the permanent and the temporal to create pieces that are both 'rugged and refined'.
London Design Fair, USA Pavilion



**Egg series furniture**
**Martin Albarran**
Designer-maker Martin Albarran hails from Puerto Rico and has made a name for himself creating works of folded metal to create complex, geometrical, one-off furniture forms, or to tessellate together simple forms to generate more complex configurations. His egg series, in dusted pink and chocolate, can be either seat or table; a 70s hippy flexibility with a contemporary bent.
London Design Fair, Hall T1 Stand D18

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www.londondesignfair.co.uk

**Merge table, Lowry Design**
Cabinet maker Richard Lowry came from a family of boat builders, so working with wood has been second nature for him. The Merge table came from the observation of how a seat and a work surface could be integrated to form a single, bespoke piece of furniture. Cherry wood with walnut dowels, brown leather and a solid concrete surface are crafted together, bound with a monkey puzzle of a leg arrangement.
London Design Fair, Hall T1 Stand F10

# Specified

**1**
**Acrylic panels**
**Lustrolite**

Do people carry on with their nonsense even after you shoot them a glance of disdain? Are your adversaries flourishing beneath your withering looks? Do the evildoers merely romp more cavalierly when you attempt to convey they are malodorous to your nose? In short, are your glassy stares being misinterpreted? Practise a more intense look in the bathroom or kitchen with Lustrolite's new shower and kitchen splashbacks solutions which, although made of acrylic, are easily mistaken for glass and are the go-to example of glassiness in today's market.
lustrolite.co.uk

**2**
**Bespoke engineered panels,**
**Havwoods**

Conventional parquet can be so, well… passé so fortunately Havwood's Bespoke floors have a remedy for the usual laid floor-snore that will have you feeling as though you are living inside a beautifully wrought marquetry box. So, why not take the chance to explore your new life as a doodad inside just such an artful receptacle? Imagine the existential feeling of lonesomeness experienced by a single earring. Live the crippling uncertainty of a key to a long-forgotten lock. Rack your brains as you ponder the emptiness of life as a bolt without a nut.
havwoods.co.uk

**3**
**Wireless battery charging seat**
**Hi-Macs for ZENS**

Manufacturer Royal Ahrend and Dutch designer Basten Leijh are behind this furniture that unites comfort and state-of-the-art technology with Hi-Macs' robustness. Up to three people can sit around ZENS' recharge seat, take the weight of their feet and studiously ignore each other as they witlessly recharge and scroll through their social media apps. The red light given off by the charging station also acts as a beacon of respite and unrealised intimacy. Expect this brand new blend of relaxation and minimal human interaction at a lounge or waiting room near you, soon.
himacs.eu

**4**
**Polished concrete floors**
**Monodec**

The Monodec floor from Flowcrete gives credence to the suggestion that it might not be a case of diamonds hiding in the rough, but that the rough has been hiding the diamonds. A little diamond polishing of common or garden concrete brings out the grandeur of the included aggregates which are then stained and highlighted not only for your visual pleasure but as a delight underfoot. Its success has one asking where else might the rough be hiding? A graceful silhouette inside London's Walkie Talkie building? An amuse-bouche in a packet of Doritos? Opportunities in Brexit?
flowcrete.co.uk

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# The collaborators

PIP's regular section showcasing inspired partnerships between manufacturers and architects

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### Rockfon® Mono® Acoustic supplies smooth surfaces for high quality acoustics

Rockfon Mono Acoustic brings together beautiful, smooth, monolithic surfaces and outstanding acoustics. Suitable for both ceilings and walls in either newbuilds or renovations, three UK projects show how Rockfon Mono Acoustic is ideal for retail, restaurant and public spaces.

The Word is the award-winning National Centre for the Written Word in South Shields. Inside, the circular facade is likened to the pages of a book inviting the reader in. Rockfon Mono Acoustic is installed around the perimeter of the galleries in the building's triple height atrium. The elegant seamless ceiling helps control sound and creates a continuous ribbon around the atria, enhancing the centre's contemporary design.

Dorney Lake, owned and managed by Eton College, is a world-class sporting and events venue with an Olympic heritage. Rockfon Mono Acoustic was used at its boathouse to create three long, linear rafts in the Lake View Room, with Mono Flecto edge panels producing the central wave effect, which echoes the movement of the water outside.

ACME Architects' multi-award winning Victoria Gate shopping centre in Leeds has over one million square feet of premium retail and leisure floor space. Rockfon Mono Acoustic was perfect for this challenge, which had to meet Class A acoustic performance. In addition, the Mono Flecto panel edge detail made an easier task of fitting the complex, detailed installation within the demanding time constraints.

**www.rockfon.co.uk**
**(0)208 222 7457**

ROCKWOOL Rockfon®

## Outdoor spaces usable all year

### BAL introduces a new range of external tiling solutions for balconies, terraces and roof terraces

ALEXANDRE ZVEIGER

With the surge in popularity of outdoor living, architects are increasingly being faced with the need to incorporate balconies, roof terraces and ground floor patios into designs in both commercial and domestic projects.

Making these areas available all year round requires coverings that are durable, hard-wearing and usable in all weathers, which means tiles are the perfect answer. When specified with the correct system assemblies, many types of tile installations are possible externally. This includes the use of finishes such as ceramics, porcelain, some natural stone and pavers.

However, without the correct systems, tiled areas can be susceptible to cracking, efflorescence, or staining – all derived from water damage or fluctuations in temperature.

If water penetrates the lower levels of an external assembly it can pose a serious risk to the structural integrity of any balcony, terrace or patio. If no provision is made for water to drain away efficiently, permeation of water through tile joints will eventually cause damage.

To address such problems BAL, in conjunction with sister company Gutjahr, has introduced a new range of External Tiling Solutions.

Simple to install and providing rapid, immediate and high volume drainage, the system ensures water is drained down through the screed and rapidly expelled from the assembly through drainage mats, grates and drip/drain edge profiles, meaning no water staining and no freeze/thaw threat or efflorescence.

**www.bal-adhesives.com**
**01782 591120**

YOU + BAL

# Windows give a better outlook

## West Leigh has a new generation of aesthetically pleasing and energy efficient steel windows

Ideal for new build and renovation projects, where energy efficiency and aesthetics are key, the new MTS50 steel window offers narrow sight lines and a U-value as low as 1.4 W/m$^2$K, depending on the glazing unit employed. The use of the system has been pioneered in the UK by West Leigh , working closely with Swiss designer and supplier Ottostumm. It is based on highly engineered, thermally broken steel sections designed to closely replicate the character of the traditional W20 steel window.

The design of the thermally broken profile means that MTS50 steel windows are manufactured differently from traditional solid, hot rolled steel section windows. With this in mind, West Leigh, which is a member of the Steel Window Association, developed new manufacturing techniques and appropriate paint applications. In the 12 months since launching the MTS50 profile, the company has successfully employed it to fulfill over £1 million-worth of supply and install orders.

West Leigh has introduced the MTS50 steel window to extend the range of solutions available to specifiers, especially in the new build sector where outstanding contemporary architecture is required. Offering all the benefits traditionally associated with steel windows, including slender profiles, large panes of glass, good light transmission and large opening windows, the MTS50 provides incredible versatility.

www.west-leigh.co.uk
020 7232 0030

WEST LEIGH

# Online specification for faultless tiling

## Saint-Gobain Weber's free WeberSpec tool and support CPD will keep you up to date and accurate

Saint-Gobain Weber manufactures a comprehensive range of high quality products for professional tile fixers and applicators and is recognised for its innovative, high performance technologies. These include Low Dust Technology™, the proven formulation that significantly reduces airborne dust created during pouring and mixing, and ECO SMART™ Cement Replacement Technology, demonstrating Weber's commitment to sustainability.

Now the firm has launched the free, easy-to-use WeberSpec online tool, which allows architects and specifiers to create up-to-date and technically accurate tiling specifications. The account is opened and accessed by email and password. A project brief is required with prompts to enter specific fields such as: the surface to be tiled; the substrate; type and area of tiling; finish and movement joints. It automatically generates a full M40 specification to NBS standards, including all necessary components and ancillaries. The specification, which is supported by British Standard BS 5385, is saved in the account and can be amended later if required.

'WeberSpec is easy to use, but when advice is required our technical team is on hand,' says head of marketing Tracey Dempster. 'To support it we have also launched a RIBA-Assessed CPD – Floor Tiling onto Calcium Sulphate Screeds.'

weberspec.co.uk
08703 330 070

WEBERSPEC

# Sign Up

**Lee Marsden,** project director at Coffey Architects, gives us three of his specification favourites

### HANDMADE BRICKS

Our RIBA Award winning house in Harpenden, Modern Detached, draws inspiration from the local arts & crafts vernacular. The use of crafted brickwork, vertically ribbed alongside charred timber, also brings a human scale to dramatic elevations. For the exterior we used a light grey brick from WH Collier, which has been making bricks at its Essex clay pit for over 150 years. The bricks are all hand thrown and we liked the natural creasing and textural variation in each one. We developed a brick fin detail to provide modulation and deep contrast of light and shadow to the facade.
whcollier.co.uk

### 3D PRINTING FOR COMPONENTS

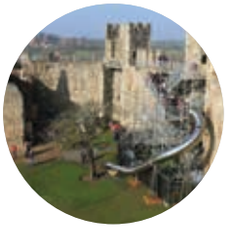
We have recently invested in 3D printing technology for rapid in-house prototyping of models and details. This incredible technology is affordable and still constantly improving. Imagine, just two years ago, when designing perforated screens for our Science Museum Library project, we worked out that to 3D print the components in our studio would take at least a year... now, our Projet resin printer is running constantly, modelling design options and construction details in no time at all. We can make five models of our resi tower in Southwark before lunch.
uk.3dsystems.com

### POLISHED CONCRETE

Architects have few opportunities to refine details with the same builder over several projects, but we have been able to do just that on several of our private residential schemes. We have been refining concrete flooring finishes with The Concrete Flooring Contractors for years. I appreciate the relationship we've developed, but I also really like the process of refining concrete because it is part technical, part alchemy! For our Hidden House in Clerkenwell the result is wonderful, a deep figuring you would expect of a marble floor. It is rather porous, so you have to be careful with the red wine...
theconcreteflooring.com

# ...Sign Off

**Jan-Carlos Kucharek** enjoys three of this issue's out-takes



### SHAPE OF TUBE...

Singer Ed Sheeran: despite his success and riches you can't help but love him. Maybe it's cos he bought a sports car he doesn't drive as 'I look like a tit in it' or built a pub in his garden or slept for six weeks on Hollywood actor Jamie Foxx's sofa or drunkenly thwacked Justin Bieber's face with a golf club on a Tokyo pub crawl. It turns out his home town of Framlingham in Suffolk loves him too. His ode to it, 'Castle on the Hill', has boosted visitors to the 12th century ruin, and the recent £1 million restoration now allows access to its ramparts which have been blinged up with a 6.5m helter skelter steel tube slide, adding some roll to all that rock.

### CRIM MINI

The road to hell really is paved with good inventions, as proved by the recent sale of a 1964 mini owned by former Conservative MP and transport minister Ernest Marples. He oversaw the building of Britain's motorways – while owning a road construction business and producing the Beeching report – which closed 4000 miles of rail network; so no conflict of interest there. He promoted growth of the UK's road network by buying his mini – the only hatchback ever built, so he could fit in his golf clubs and cases of fine wine. Quite how he squeezed in the prostitutes is another story, but that may have prompted his flight to playground Monaco to avoid tax evasion charges.

### FEW BRICKS SHORT OF A HETERODONTOSAURUS

Well, an Iguanodon, in fact. It seems the 3m high, 4.5 tonne herbivore that would have roamed in the Cretaceous period has hidden for 132 million years in what's now brick firm Wienerberger's quarry in Ewhurst, Surrey. Found in a boulder of compacted clay, palaeontologists transported it to March, Cambridgeshire, where it's being slowly extracted. One wonders what 'Indie', as she's known, would make of it; spending geological eternity with aspirations for an august home in Albertopolis, only to end up in a local museum called 'Fossils Galore'. Just as well she was too tightly encased in her clay grave to be able to turn in it.

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At Geberit, we appreciate that every detail matters, from the look to the logistics. From the sturdy resilience and innovative intelligence of Geberit Duofix frames to space-saving wall-hung toilets and effortlessly stylish flush plates, we can transform any project from inspirational start to outstanding finish. Enhancing one specification after another by bringing design freshness and functional ingenuity to any bathroom space.
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## DuraSquare. Striking. Precise. Rectangular.

The new bathroom series, DuraSquare, blends the precise edges of the rectangular outer form with soft, organically flowing inner contours. The washbasin made from DuraCeram® sits on top of a matching metal console, shown here in black matt. The glass shelf provides practical storage space. For more information, visit **www.duravit.co.uk** or **pro.duravit.co.uk**