### Products in Practice
Jan/Feb 2018

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It was one step...

...forward, two steps back for the construction industry in January. With pressure to alleviate the housing crisis, the polarising Grenfell Tower tragedy and housebuilder Persimmon’s board’s recent £800m pay out to itself, Theresa May’s decision to bolster Sajid Javid’s role with a new housing minister at the renamed Ministry of Housing, Communities & Local Government could help get our house in order, so to speak.

Dominic Raab seems switched on; formerly under secretary of state and minister for human rights, he has extensive experience with Middle East politics. That might be more about ‘homeland’ than ‘homes’ but you’d hope the tenacity required in negotiating such complex issues might make him more deaf to the claims of land-banking house builders that the housing crisis is the product of a stymied planning system and not their own understandable desire to limit market supply and keep house prices high.

But it’s unlikely that he’ll stretch to the idea that state funded housing might be the solution. A step back however is Carillion’s collapse, though the full implications, as PIP went to press, were yet to manifest. But 450 government contracts – from HS2 and Network Rail to NHS and education PFI projects – 20,000-odd jobs and 30,000 firms in the supply chain hang in the balance. Perhaps the big lesson here is that construction contractors shouldn’t try to serve school dinners. As Alexander Payne’s film ‘Downsizing’, a 21st century take on the Lilliputian allegory, attests; if you’re overstretched in the real world, small can be beautiful. •

San-Carlos Kucharek, Editor

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More online...
Testbed is a design for an architectural landmark to passively warn our distant descendants against wandering into a decommissioned nuclear waste isolation site

Stephen Cousins looks into the future: ribaj.com/testbed

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Cover image: Enigma restaurant by RCR Arquitectes and Pau Llimona, photographed by Dámaso Pérez Ontiveros

ribaj.com

Products In Practice January/February 2018
American Pi

Even by the rarefied standards of the US Ivy league’s Harvard University, Richard Rogers’ gifted Grade II*-listed 1969 Wimbledon home for his parents is now a frat house with knobs on for students of its Graduate School of Design. 22 Parkside used a yellow-painted industrial portal frame and state of the art glazing technologies to produce a domestic home that helped define the gestating high tech style. Gumuchdjian Architects’ sensitive restoration of the iconic home to make it perform for the 21st century involved the refurb of its two wetrooms, fully clad in Hi-MACS surfaces, proving that cleanliness can be next to godliness.

Holy water

If you like your sanitaryware Trappist try Benedini Associati’s Memory bathroom range for Verona manufacturer Agape. Also available in chrome, PIP favours its brass taps’ burnished finish, which offer self-flagellatory luxury worthy of the Bishop of Bath & Wells circa 1400. It even has ‘characteristic cross-shaped handles’ for extra indulgences. Liquid Design in cathedral-free Northampton is one of the first in the UK to offer this to a secular world.

Glass act

Halifax’s recently restored 18th century Piece Hall and central courtyard are a marvel, while the adjacent Square Chapel Arts centre offers a more dramatic, angular experience. Evans Vettori designed the arrowhead roof form to connect its new theatre block with Square Chapel’s grade II* listed building. Aluprof supplied the full height MB-SR50N curtain walling system, whose south wall glass was etched by glassmaker Sarah Galloway; the abstracted branches design helping mitigate solar gain. This is Yorkshire remember: the system’s continuous thermal barrier ensured insulation levels met BREEAM standards.

Silver sliver

Vasco's ONI radiator won a silver medal for Best Heating Product at the House Beautiful Awards 2017. Perhaps the judges were impressed by its ingenuity, hiding a fine copper heating tube behind an ultra-thin aluminium front plate with hanging towel cut-outs. Small bore pipes also means it works well with low temperature systems. So while floating ethereally, it’s very efficient and energy saving, making this wallflower no shrinking violet.
Rake and ruin
Simpson and Brown’s new visitor centre for Rievaulx Abbey near York is characterised not just by a roof – so palpably missing from the Cistercian ruins beyond – but by the interesting twist of its glulam spruce structure as its cafeteria area reaches out to them. The timber piers gradually rake relative to one another in plan. The architect says it not only ‘reveals’ views of the abbey from the inside, but the timber columns reference the stone ones beyond. And perhaps referencing the abbey’s long gone lead roof, VMZinc was called in to provide this contemporary standing seam one, projecting out moodily from the trees.

Martian sunrise
Belgian designer Michaël Verheyden seems to have a bit of a thing about the mari canali of Mars, if his Lucid 300 table lamp is anything to go by. And he’s channelling it through Roman precedents too, forming the base out of an oxidised silvered brass and the shade of honed alabaster. Designed for CTO lighting and weighing in at a hefty 9kg, you might want to check that the table’s got the right reinforcements before you get this God of War to position itself at its head.

Slick brick
Maccreanor Lavington was supreme winner of the 2017 Brick Awards for its South Gardens scheme in London, having already picked up the title of Best Large Housing development. It’s good news for the Heygate Estate redevelopment, which too often suffers less complimentary press. The judges, headed up by Joe Morris of Duggan Morris Architects, were impressed by how the firm made each new block look distinct with ‘expressive detailing’, using UK-manufactured bricks from Ibstock, Michelmersh and Wienerberger. Maccreanor Lavington also scooped an award for its Dujardin Mews with Karakusevic Carson.

Empty vessels making the most noise
There was an air of the King’s New Clothes about our editorial meeting with the Blindspace bods. ‘We’re selling empty space,’ they told us, and they really are. The firm has picked up on the fact that buyers just might not know what blind they want when they buy a place so it’s created a one-size-fits-all box recessed into the ceiling that allows you to leisurely ponder whether to go for blackout, muslin – or indeed both – at some hypothetical point in the future. The secret’s in the pop-off hinging section that lets you both install and then hide the gubbins; patented obviously, in a way a fitted blind will never be.
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Autodesk keeps on rolling

These are interesting times to be in the business of rendering software. Unfortunately, that’s not because great new strides are being made, new horizons discovered etc. Rather, it’s the ‘what can we do to avoid being crushed by the Autodesk juggernaut?’ kind of interesting.

But let’s back up a bit. For starters, not everyone reading this will know exactly what rendering software even is, so here’s a super-quick primer: My company is in the architectural visualisation business, so when a client comes to us to create imagery or animations of its building, we need software to help us do it. There are three main stages, modelling, rendering and post-production. You probably already know all about stage 1, it starts with your CAD drawings and ends with 3D geometry. Stage 3 is already under the sole ownership of Adobe Inc’s ubiquitous Photoshop software. But that’s ok, as it’s cheap and brilliant.

What happens between the two is where it gets complicated. Software is needed to turn 3D geometry into an image, to paint the pixels. There are numerous packages available, but they pretty much all have the same thing in common, they use variations of a technology called Ray Tracing. In days of old (‘90s, ‘00s) the output quality of different renderers was highly variable, but these days the vast majority are excellent. Something else they all have in common is that they devour resources, no amount of RAM or number of CPU cores will keep a renderer happy. The happiness of our render farm is almost the direct inverse of the happiness of our company accountant.

So, what’s changed? After years of taking a stand-off approach to rendering, Autodesk, the eighth-largest software company in the world and giant of all things in the building industry, has decided to get involved. Early last year it went shopping and came back with Arnold, a renderer previously little-known outside the Hollywood special effects industry. It now includes it free with its 3ds Max and Maya modelling software. Well, free with caveats. It won’t cost a penny to render on your own PC, but to send it to a render farm (how most archvis companies work) will cost you about the same as a licence of V-Ray, the current most-used archvis rendering software. It’s also brilliant quality, fairly straightforward to use and lightning fast.

Back to those in the business of rendering software, what do you do? There’s about an 80% chance your customer in architectural visualisation already uses 3ds Max, which now comes with one of your biggest rivals pre-installed as standard for no extra cost. You need to add value to your product, and fast.

First to react has been V-Ray maker Chaos Group, which has merged with Render Legion, creator of key competitor Corona Renderer. This has caused much consternation among users, particularly on the Corona side, but really, what else could either company do? Although it hasn’t yet happened, buy one, get both is a pretty good value proposition, nothing else makes a lot of sense. Like I said, interesting times.

Bill Nuttall is technical director at London visualisation firm Glass Canvas

Books
Buy at ribabookshops.com

China’s Urban Revolution: Understanding Chinese Eco-Cities
Austin Williams. Bloomsbury 220P PB
With his background as an honorary research fellow at a Chinese University, the author is well-placed, having lived and worked in the country for years, to put forward a cultural reading of China’s progress, or not, in the field of sustainable urban design. And given Williams’ past stint as a journalist at the AJ, he does it in his characteristic informative and highly jaunty way. In it, for instance, you’ll find out about the nuanced Chinese understanding of the notion of copying as a respectful practice that honours the mastery of the original, and read of Ai Wei Wei’s 2005 ‘Ordes 100’ proposal to lure Western architects over with a design brief so absurd it could only be an art project. They came; and it was. Don’t let the lack of images put you off, this looks like an informed and prescient read.

Sustainable Stormwater Management
Thomas Liptan. Timber Press 280p HB
Liptan had a previous life in the sustainable stormwater division of the City of Portland’s Bureau of Environmental Services, so there’s a good body of experience behind his landscape driven approach to managing surface runoff. And the selling point for this book is that he stays exactly where he is, offering a highly observed account of how his home city manages the matter. The first section of the book covers general principles of stormwater design, but it’s the larger second section where global examples are counterpointed by the author traversing Portland to photograph constructed installations – critically, both successful and failed ones. Choosing not to stray too far from the city he knows and worked in, it’s the highly observational and specific nature of the study that seems to mark it out from most books on the subject.

Re-making Cities: An Introduction to Urban Metrofitting
Tony Fry. Bloomsbury 265p PB
For those who were worried that the 1972 Club of Rome ‘Limits to World Growth’ study concluded 2010 would be the tipping point into global catastrophe, you can rest easy. The University of Tasmania’s Tony Fry thinks it’ll actually be around 2030. And while I won’t disavow the catastrophic thrust of his argument (and he does form a particularly bleak view of the near future) I’m not sure whether this book is a victim of the message being lost in the medium. Fry states that his book is not a ‘how to book of answers’; and, with complex language, he delivers on that promise. This is a highly informed and academic analysis of the problems facing humanity; with his coinage of urban ‘metrofitting’ an evocative word that we should all rally behind to save the future. But Fry seems a John the Baptist figure in need of a Jesus.
Surface Design Show

With the January sales spending yet to appear on the credit card bill, now might be an opportune time to discuss retail design and the factors that drive us to get our wallets out despite a Christmas overspend. Luckily for me, changing room downlights isn’t one of them, accentuating as they do, my seasonal spread gloriously in sharp, narrow-beamed light. I can put the savings at three figures – good for me but not for the likes of Reiss and Cos, whose stores I left empty-handed with nothing more than a greater sense of wishing to tighten my belt. Such lighting faux pas and how to avoid them is the subject of lighting designer 18 Degrees’ Christopher Knowles’ seminar at Surface Design Show’s ‘Light Talks’. His ‘30 minute guide to creating beautifully lit spaces’ addresses the obvious clangers, to give architects some rules of thumb when considering lighting.

‘Downlighters are a scourge,’ he tells me. ‘And its amazing how much they are specified as a default option.’ Knowles is amazed how often designers spend good money on the internal specification, only to spend even more lighting the floor, leaving the eye level and wall surfaces lost in semi-darkness. ‘It’s as if people don’t have the vocabulary to express where the problem lies,’ he believes. But he feels change is coming with build to rent developers, keen to develop their own niche in a competitive market, looking at more imaginative ways of lighting space.

‘So how does he advise architects?’ ‘Get a lighting designer in’, obviously, his key message but he offers some interesting guidance. Stop considering spaces purely in plan, think how you would light the space if it had no ceiling.

‘Forty years of lighting experience between us and we still couldn’t work it out’

Try lighting as integral to the cabinetry or joinery. Such considerations encourage a holistic approach to space lighting design. And don’t overcomplicate things; the gamut of room lighting choices available to hotel guests often causes more confusion than pleasure. Knowles recalls a recent business trip with a work colleague where neither could fathom the complexity of the hotel rooms’ lighting design. ‘Forty years of lighting experience between us and we still couldn’t work it out,’ he recalls. ‘These things should be easy and intuitive. Room and mood lighting tend to be separate and that’s wrong; one bedside switch should turn it all off.’

And on the subject of mood he offers some generational advice. ‘Older people need much more light to accomplish the same tasks as younger people. What young ‘uns see as moody and atmospheric, old folks find just plain horrible.’

The Surface Design Show runs at the Business Design centre from the 6–8 February 2018. surfacedesignshow.com

PIP takes a look at a selection of products exhibiting at this year’s show

**Colourgrain**  
SIMON DAVEY  
When not building furniture, Herefordshire based joiner and master craftsman Simon Davey has been experimenting with timber as a surface cladding treatment, and he obviously believes in it so much that he made a business out of it. ColourGrain takes FSC-sourced timber planks and submits them to up to 10 different processes, including sandblasting and lacquering, to create a highly textured and distinctive surface for internal and external walls, and floors. Durable and available in 50 paint shades, Davey thinks it’s the lick.  
Stand 334

**Gama Duo decors**  
Finsa  
The Spanish timber products manufacturer has extended its range of decorative melamines in its new Gama Duo range for 2018. With the materials place on the back of chipboard or melamine, it provides affordable ways to generate strong effects with limited outlay. The Gama Duo range mixes colours and textures, both natural and artificial, allowing for easy combinations.  
Stand 210

**Concrete-look wall and floor panels**  
Concrete  
If you’re balking the possible mess from the installation of a poured concrete floor, you might want to look to Concrete to alleviate your worst fears. Produced from natural minerals and textiles, the firm has created decorative, engineered wall and floor panels that look and feel like poured polished concrete. With two new colours being launched this year, Titanium Black and metal Grey, it’ll allow your inner brutalist to flourish without being lumbered with the mucky process of constructing any formwork.  
Stand 200

**Kreda porcelain tiles**  
Grestec  
In another skeuomorphic twist, Grestec’s new brick Kreda range allows you to do away with cleaning up rough brick walls in order to paint them again. Available as a 200mm by 200mm tile module, the tiles tessellate together to create the standard 300mm x 75mm brick bond effect, complete with all its chalky nuances. Available in four concrete shades; white, silver, grey and dark as well as colours like dusty pink and sage green, you’d need to be a few bricks short of a hod not to realise the creative potential of combining them.  
Stand 596
Researchers in Switzerland have developed a lightweight flexible formwork which they claim could make complex curving geometric forms much cheaper and faster to build.

A team from Zürich’s university for science and technology (ETH Zürich) worked with industry partners to construct an ultra-thin, self-supporting, double-curved concrete roof inspired by the thin shell structures made famous by Spanish architect Félix Candela.

The 160m², 7.5m high structure was a 1 to 1 prototype (now dismantled) for a new rooftop apartment to be built in Dübendorf next year. It comprised an inner concrete layer, covered by heating and cooling coils and insulation, and a top layer of concrete covered by thin-film photovoltaics.

The inner layer of the shell was formed by spray-applying concrete to a stretched cable net with an underlying a polymer textile layer.

Researchers claim the construction technique can cut the cost of formwork, including the non-reusable custom-fabricated timber or milled foam normally associated with constructing complex curved geometric structures. Just 800kg of material, including a 500kg cable net and 300kg of textile, was required to support the 20 tonnes of wet concrete.

Professor Philippe Block from the Institute of Technology in Architecture at ETH Zürich told RIBAJ: ‘Positively or negatively double-curved geometries are normally prohibitively expensive to make and are therefore only used for projects with big budgets. Most of the cost is associated with building formwork and support scaffolding and the associated labour. We wanted to prove it was possible to realise these efficient forms, and create something as thin or thinner than what Candela did in Mexico, using an efficient and cost-effective lightweight forming system.’

The cable net was designed to take on the desired shape under the weight of the wet concrete, based on algorithms developed in collaboration with the Swiss National Centre of Competence (NCCR) in digital fabrication.

An initial algorithm worked out the non-uniform pre-stresses that had to be applied to the net to cause it to settle in a specific way. A second set of ‘automated optimisation algorithms’ calculated the additional stresses required on different cables to adapt the net to real-world conditions involving inaccurate construction tolerances or movement in timber edge beams to which the cables were fixed.

‘The second set of algorithms sorted through about 90 trillion options to tell us precisely how to correct the net by tightening or loosening the turnbuckles on the edges to redirect the cables to hit the correct geometry and ensure we don’t overstress members,’ said Block.

The technique can be applied to any pre-stressed structure that involves structural dependencies between various links, he added, including hanging forms, cable stayed bridges etc. ‘A known challenge on large scale civil engineering projects, such as cable-stayed bridges or large cable roofs on football stadiums, occurs when the geometry does not match the design simulation,’ he explained. ‘There are so many cables, it is difficult to know which to pull on to effectively get you to the geometry you need without overstressing other elements.’

Scientists worked with cement producer Holcim Schweiz to determine the correct concrete mix, which had to be fluid enough to be sprayed and vibrated, yet viscous enough to adhere to the fabric shuttering without slippage.

Construction of the prototype took around six months, but refinements to the process should mean the actual apartment roof will be completed in just eight to 10 weeks.

Stephen Cousins
Glazing that makes a splash

Fineline reprised a successful partnership with architect Marshall and Kendon at the glass-walled Reading Spa refurbishment project.
Having worked with architect Marshall and Kendon on the Clifton Lido, Fineline was asked to help with the development and design of the glazing to be installed on a listed spa building in Reading. Following the transfer of the building and land from local authority to private ownership, the project has taken over three years to complete. The complex containing a new health spa, swimming pool and restaurant was opened in 2017 after extensive renovation and alterations that included design changes.

The architect had selected Fineline System 22 – the original choice for the Clifton Lido. The principal requirement was for two storey glass doors of 2.6m each, spanning 40m, which would tie back to the steel beamed infrastructure that separated the sliding and fixed panels from the listed building.

In the main area of the restaurant, café and swimming pool the designed glazing panels were to surround three sides of the pool. Two opening corner details at the health spa and café/bar allowed easy access to the pool and walkways. The double height glass panels were staggered alongside the pool and bar area, allowing the system to run on two tracks. While ground floor panels incorporated fixed and sliding doors along the poolside, the first floor glazing was fixed; the design mimicking the staggered ground floor panels.

Installation created many challenges. Access to the central area was limited due to the pool’s central location, drainage, overhanging roofs and only 1200mm of space between the front of the glass panels and the pool edge. As the limited access meant made it impossible to use a mobile lifting crane, Fineline’s own crawler crane was employed to move the glazed panels. To locate the frames at each level a special bracket was designed that would bolt to the I beam above. This, combined with the lifting hoist process, allowed the glazing to be moved along all joints in the steelwork and put into position. These brackets have been left in place to assist any need for repair or adjustment at a later date.

During construction, the nylon packers used for the base of the sliding doors started to expand by over 10mm due to direct sun exposure. This was overcome by the project manager, Tony Gilliam, engineering a solution on site. The design included first floor sliding windows for the principal entrance area, office and conference rooms, standard sliding panels in the corporate area and double two way pivot doors for the principal entrance lobby and ground floor offices.

Architect Sam Kendon, who had worked with Fineline on the Clifton Lido, required specially designed drainage details for the poolside. This worked extremely well, resulting in minimal issues on site. Reuniting the teams, including the same contractors, helped ensure the conclusion of a successful project.

Fineline always strives to supply the best advice on design and installation and continues to increase its expanding portfolio of projects in the commercial sector.
Kapelleveld elderly care and housing, Ternat, Belgium

DVVT imagined the lives of patients and residents for Kapelleveld care home, which is designed to stimulate occupants to help make them stronger.

Above The south elevation of the complex where the dementia care facility, left, faces out to the one-bedroom sheltered housing. Bold green window awnings make way for large sheltered balconies. Left Emergency escapes at the end of every wing allow staircases to generate new formal moves at the terminations.
In 2008 artist partnership Arakawa and Madelin Gins’ Reversible Destiny Foundation set up a test case art/architecture project in East Hampton, New York, that proffered an alternative response to the accepted thinking that architecture should necessarily consider and take account of increasing infirmity. Quite the opposite in fact. The Bioscleave House, with its perverse sloped living room floors with vertical grab poles, sunken kitchen and bizarre-shaped dining area actively forced its elderly residents to negotiate the territory of the home, offering them no quarter or concession. This, they argued, helped its occupants to remain what they termed ‘tentative;’ forcing body and senses to adapt and strengthen over time, stimulated by the effect of their ‘Life Extending Villa.’

To a less polarised degree, that’s what’s going on at the semi-rural suburb of Ternat on the outskirts of Brussels, where Flemish architect De Vylder Vinck Taillieu’s (DVVT) 8,300m² Kapelleveld home for 60 dementia care patients and 40 independent elderly residents challenges as much as it accommodates them. It might be working in the contemporary idiom but the firm has proved itself maestro of baroque perspectival plays and smoke and mirrors games, as evidenced by its Linkeroever social housing (PIP Nov/Dec 2013) and Vos House (PIP Jan/Feb 2015), both in Antwerp. In the grand spatial moves and finer detailing here, the firm has consolidated this approach. Highly considered yet playful, everything in this project merits a closer look; something belied perhaps by the deceptively prosaic nature of Filip Dujardin’s photography of the yet-to-be occupied facility.
Put the strangeness of Kapelleveel’s plan aside for a moment. DVVT partner Jo Taillieu emphasises that the building’s final form was never the primary concern; everything, he says, was driven by ‘sense of the people occupying it; the scale of a table or bed’. For instance, it was the desire to imagine what it might be like to spend increasingly protracted times supine, combined with the observations in the seminal 1977 text ‘A Pattern Language’, that led to the introduction of the bed-level dual aspect windows of the dementia care rooms, allowing each one a wider field of view. Of course, enjoyment of the view could only be possible if rooms staggered relative to each other; and this they did, resulting in the four Catherine wheel spikes in plan that obliquely fire out from the central fulcrum of their communal living/dining spaces.

And with no reason to be different, each room is therefore the same size. Its square bathroom space demarcated in white ceramic tiles one quarter the size of the green ones in the bedrooms, the floor module might have changed but the same games are being played. The dual aspect windows here become double butted mirrors that wrap around the sink vanity area and wall; revealed when timber sliding doors are opened. Large ceramic ball pendants in bedrooms translate to smaller wall mounted ones in bathrooms; each emergency pull cord a plumb line terminated with a complementary, grabbable red snooker ball.

The windows that frame views to the semi-rural landscape are a story in themselves. Taillieu talks of the conditions that precipitated the bespoke modification of a standard aluminium section to better meet the users’ needs. With all windows facing east/west the glass required shading but horizontal blinds was eschewed to retain the openness of the glazing to the view. Instead, rebated into the outer frame and attached to a mechanical elbow, a simple green fabric blind unfurls to shield the worst of the sun. Formally sharp against the cream brick facade, the blinds reference the solid hoods on John Hejduk’s 1984 IBA housing tower in Kreuzberg, Berlin. But against this almost primitivist statement, there’s built-in sophistication; the side light has an actuator that draws down a mosquito screen, allowing windows to vent, bug free. That way, says Taillieu, modified standard sections kept costs down and glazing
is only ever obscured out of necessity.

And so from the detail, the whole. It’s the collective saw-like forms of the windows that generate the final plan, dementia care bedrooms and spaces forming an ‘X’ over the building’s central spine, the one bed retirement apartments the longer ‘S’. This relative shift is important internally too. While dementia patients have a short walk towards a big window and small seating area at the end of each arm, the stagger makes a semi-private space at the threshold to each room where patients can stand and receive guests without being fully in the corridor proper. On plan it might look inconsequential but in reality it’s a palpably defensible space.

Legibility is also considered here. Black skirtings merge into black door reveals, helping the partially sighted navigate corridors. Black door handles contrast with white laminated doors. Even the principles of camouflage have been employed. White handles on white doors for staff are effectively invisible for those who shouldn’t be trying them.

Retirement apartments too benefit from the stagger; though here it’s externally. From outside their ‘L’ shaped living and bedroom glazed walls, balconies are shielded from each other, making incidental visual connection between adjacent flats possible but not prescribed; giving
elderly residents control over their level of privacy or engagement. Both details, Taillieu argues, respect individuals’ dignity.

But perhaps it’s the view from the windows that provides the ultimate proof of the ways that architects might stimulate even the most sedentary of bodies and minds, most created by the resolution of the geometries they acquired for the building. The strange scale illusion that occurs, the result of the 0.5m drop across the site from north to south, makes the view north look like a baroque perspectival trick; so too the bizarre overhang of the roof, supported by bright red painted timber struts whose spacings were engineered to change according to the loads imposed on them. Note too the mirrored stainless steel fascia plates where they attach back to the concrete structure. These complement those above the glazed doors of the elderly apartments, both creating an illusory, ‘non-being’ quality to the building that defies interrogation.

Now by conventional thinking, those camouflaged handles, mirrored plates, the alignment of lighting at odds to the staggered internal corridors, strange perspectival views; all would sit at odds with the notion of accounting for increasing dementia, but that is not how DVVT saw it. Taillieu says it was about the maintenance of a minimum standard of independence for residents; to create spaces that obviously considered their needs but then offered layers of sensory experience that only registered through occupation and long term exposure. It took as a starting point a life that might be spent more observing in stillness but it chooses to challenge that act of observing. And so at Kapelleveld the firm provides details that resonate throughout the building, to accentuate its perspectives with trompe l’oeil views from windows and to confound expectation with illusory uses of reflection. Both Arakawa and Madelin Gins might have submitted to their destinies but were they still ‘tentative’; one imagines they would be happily so here.

Architect
De Vylder Vinck Taillieu

Client
Teck & Partners

Construction consultant and health and safety co-ordinator
Bureau Bouwtechniek

Contractor
Jan de Nul Group

Structural engineering
Pascal de Munck

Technical engineering
Studiebureel Boucherie & Maes

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Specified

1 Rooflight, Sunsquare

Charged with creating a carbon neutral home which could be heated with only eight lightbulbs, the risk of overheating was great. Don’t anyone dare set flame to those tea lights! Perhaps this concern accounts for the lack of warm - or any - colours whatsoever in the design scheme. You can bet that rug on the sofa is Arctic fox. Why, even the cacti are shivering! The Sunsquare rooflight is presumably open to let out the visual tundra. The East London property featured on Grand Designs. sunsquare.co.uk

2 Door entry systems Urmet

Just as well the electronic door entry system got installed at the 2012 Olympics village, because now it’s been rebranded as N08, the ‘East Village’, Katya, the petit but surprisingly well-built gymnast, has been banging out numbers to her old room. And I mean banging. Luckily, Urmet’s IPervoice flush button entry system panels are made of vandal-resistant Elekta steel. So, it’s happily dealing with the pummelling techniques taught to her by Jerzei, her shotput throwing boyfriend. So entry will be about as likely as a Russian bobsleigheir in Pyeongchang... urmet.co.uk

3 Stained glass windows myglassroom

If it was good enough for William of Malmesbury, it should be good enough for us. But fashion’s fickle, and though it featured for hundreds of years in every window in Christendom, it was modernism that finally sealed the fate of stained glass. I mean, who needs colour, in a secular world far more into Newtonian white light? Yeah, the 20th century had its rebels – Bruno Taut held out against the tide – but here we all are, lit in unforgivingly sharp relief. Though those seeking colour in their cheeks could visit Surinder and Rowland Warboys, stained glass artists working in Eye, Suffolk. myglassroom.com

4 Riser doors Aspex

Like Captain von Trapp’s kids in the Sound of Music before that meddling nun put her ear in, children should be seen and not heard. The same could be said for riser doors too; except, drawing attention to those nasty services, they shouldn’t be seen either. But they must perform, as indeed the von Trapp family singers did at the Salzburg music festival before legging it from the Gestapo. But how do Aspex’s Novista Riser steel doorsets perform? The proof’s in its doorset based musical belters: ‘My Favourite Hinges’, ‘I am 16dB rated, going on 17...’ and who can forget the classic ‘Door, Re, Mi...?’ aspex-uk.co.uk
It's very important to make sure you can get the windows through the window, isn't it? I mean those delivery windows that close increasingly quickly and ever tighter. Window-maker Origin claims to be able to give you your windows during your precise windows with its ‘your lead time, not ours (YLTNO) promise,’ under which you can specify the fenestration’s required delivery date at the point of ordering. It is set up using ‘Dr Goldratt’s Theory of Constraints’, no less. Panes with less pain, then.

origin-global.com

Mistaken for a sundial, the ancient joystick of Wallah Dune House must surely number among one of the more extraordinary discoveries of recent times. With the early granite games console now lost, the controller was evidently used by Stone Age peoples in this part of Cornwall to play Pong and Breakout – before of course being superseded by the iron mouse. Perhaps in anticipation of the archaeological tourist trade, the owners have specified a new range of Anderson windows from Black Millwork.

blackmillwork.co.uk

In Skybar, agent 007 is racing against the clock to find a partially completed suburban conservatory. His opponent cracked, evil Herr Professor Design unt Bild has potted up a Peruvian fern with the potential to devastate humanity. Along the way, he is taken in by a duplicitous planning inspector who is quite rightly aware that James Bond can no longer get away with the kind of stuff he used to – but is she working for the enemy? And will Bond be able to parachute through the Jack Aluminium TRL90 flat rooflight and save the world?

jackaluminium.co.uk

Nowadays, you can only really call your home a home if it has a panic room; that cozy hidey-hole to thwart external threats. Thankfully, Assa Abloy has picked up on the zeitgeist with new high security doorsets for upmarket residential developments. Boasting its ‘highly sought after Pickersgill-Kaye multi-point locking system’ it offers peace of mind for when oil runs out, capitalism founders and everyone goes a bit feral. It’s so confident of its product it’s even provided low level door pulls for the orks to rattle when the earth’s crust yawns open and the evil hordes of Mordor are unleashed.

assaabloy.co.uk
Priorities and funding collide after Grenfell

Squeezed budgets are torn between demand for better fire safety measures and improving energy efficiency in tower blocks. But that needn’t be the case

Words: Josephine Smit

In the aftermath of the Grenfell Tower fire, Hammersmith & Fulham Council announced a £20 million fire safety programme for its high rise homes, which included installing sprinklers in blocks of six storeys and more. The council is just one of many tower block owners to react swiftly to the tragic events. While providing an immediate response and reassurance for tower block residents, bigger questions about the causes and consequences of the fire have yet to be addressed by the Grenfell Tower Inquiry, chaired by Sir Martin Moore-Bick.

The industry is also looking to Dame Judith Hackitt’s review of building regulations and fire safety to provide guidance on the way ahead.

It is PIR insulation that has come under the most intense scrutiny. ‘Post Grenfell, there was a huge amount of hurt and confusion, and it is still a difficult time for residents. But the industry is settling down to a more considered approach. PIR should still be the first choice in a lot of applications,’ says Simon Storer, chief executive of the Insulation Manufacturers Association (IMA).

Data moved on

In its submission to the Hackitt review, the RIBA is calling for the external walls of buildings of more than 18m high to be constructed of non-combustible materials. This view, shared by others in the industry, is being challenged by Kingspan Insulation. ‘That’s one solution, but in most facades it would be impossible to do in its entirety,’ says John Garbutt, the company’s marketing director. ‘You might be able to do it with insulation and cladding, but you could struggle with other components, like sealants. Also, large-scale system testing has indicated that their performance with some insulation materials deemed “combustible” can be very similar to ones containing those deemed “non-combustible”, so that approach could reduce design options for architects.’

The company is also campaigning for reform of the desktop study process, which demonstrates whether a cladding design complies with building regulations to take on board data from small/intermediate whole system testing. Alongside government-initiated large scale cladding tests, carried out by BRE, it commissioned fire laboratory Efectis to carry out intermediate scale system testing at Ulster University. ‘We wanted to assess the value of smaller scale testing,’ explains Garbutt. Its nine tests returned very similar results to the government’s large scale tests, indicating, he adds, that smaller/intermediate scale testing could be effective in the desktop study process.

Kingspan’s test regime raises questions about many aspects of regulation, says Garbutt, illustrating why system testing is needed. As a result, it is putting its case to the market in roadshows. ‘We want to get our test data out to local authorities,’ says Garbutt, ‘because if you take current government advice at face value you could be taking down cladding systems that would pass the large scale fire test mandated by Approved Document B and replacing them with systems that could fail. It is important to tell people the test data has moved things on.’

All manufacturers are working to ensure that specifiers are as well informed as possible amid the confusion. Before the Grenfell fire, Recticel Insulation was upping its technical support for specifiers, both in the UK and globally. ‘We wanted to ensure the right information goes to each specific marketplace,’ says Kevin Bohea, the firm’s commercial director. The company does not target the high rise market, although it works on a white label basis with partners in a range of applications. Like many in the industry, Bohea believes there is a need for much greater scrutiny of delivery; ‘The key question is, how do we move forward to see how every part of the supply chain adheres to the specification and installation?’

Clear responsibility

To answer that, the industry may not have to look far. Lessons from overseas and the days when the clerk of works and architect had project oversight are being highlighted as it plots a course for best practice in high-rise refurbishment.

Energy consultant Peter Rickaby says there are already working examples, such as Ireland’s requirement for two building professionals to sign off a project, which has brought clear responsibility to a poorly controlled system. Rickaby is co-author of a forthcoming report for non-profit group the Energy and Climate Intelligence Unit, which is looking at global regulation and practice to inform Sir Martin Moore-Bick’s review. That research has identified a spectrum of regulatory approaches, ranging from Germany’s extremely prescriptive route to Sweden’s performance based thinking, which relies on fire safety engineering. But the
a lot of the mould and condensation issues have gone.

Residents did not have to use heating last winter and is already showing positive results, says Pratley.

80% reduction in energy bills expected. Monitoring quality required to achieve Passivhaus standard.'

very high standard of design performance and build of the homes is being undertaken by Southampton

Gardner Stewart Architects associate John Pratley.

Keegans has had its clerk of works on site during designer for the contractor team. Project manager

the client, with Gardner Stewart Architects as lead architect had towers will go to sprinklers before overcladding,' says Mark Elton, director of Cowan Eco Design. ‘Although now is the time to be talking about concurrent works.’

Starved of political will, energy efficiency dropped down the agenda long before Grenfell. The cost of retrofitting high rise made it the Cinderella of refurbishment – although that makes it all the more important, argues John Pratley, associate of Gardner Stewart Architects, which is working on the EnerPHit Passivhaus retrofit of Wilmcote House in Portsmouth. ‘Passivhaus certification [here] will improve 107 homes and living conditions for 400 residents, so you can see how standards could be pushed up and the impact and reach increased,’ he says.

There are signs of a government rethink in the form of its Clean Growth Strategy, which looks to upgrade fuel-poor housing to Energy Performance Certificate level C by 2030. But that will have little impact on higher rise homes, says Elton. ‘It’s not hard to get to a C with these blocks, because they’ve only one or two external surfaces. But that’s not dealing with the building. Tower blocks of the 1960s and 70s are often quite airtight, but poorly insulated. You find very cold surfaces, internal moisture, poor ventilation and mould growth. Some have internal risers for services or waste that have been messed with over the years, with the risk that fire compartmentation is breached.’

Overcladding is the answer to these issues – and those presented by blocks’ ageing concrete structures, he says. ‘We need a national investment programme that sees overcladding as an investment in terms of fire and energy.’ But in an economic climate where tower block owners appear unable to secure government help to install sprinklers, that may be too big an ask. 

Lessons from overseas and the days when the clerk of works and architect had project oversight are being highlighted

approach to certification and inspection is more consistent, says Rickaby: ‘Very few countries allow self-certification, and a lot say they have independent inspection.’

He sees lessons from global good practice in low carbon refurbishment, such as the EnerPHit approach which requires design oversight in projects to deliver the Passivhaus standard, but caveats: ‘It would be hard to replicate that at volume through the UK industry, but it could provide a model.’

Grenfell also puts the spotlight on Each Home Counts, a report published last year. Led by BRE group chief executive Peter Bonfield, the independent review looked at consumer advice, protection, standards and enforcement for home energy efficiency and renewable energy, largely in the light of the failure of the government’s Green Deal. Now an implementation board is working on follow-on measures. ‘There are direct parallels between the processes and organisations we’re trying to design and deploy and what’s applicable in the post-Grenfell world,’ says Peter Capehorn, deputy chief executive and policy director of the Construction Products Association, who is leading on the building fabric and technology workstream for the Each Home Counts implementation board.

For example, one workstream is developing a framework of standards, including a new Publicly Accessible Specification 2035. ‘This will be the overarching standard in the framework for domestic retrofit,’ adds Rickaby, who co-leads the Each Home Counts standards workstream. Compliance with PAS 2035 is expected to be key to a quality mark, and it’s all due to be in place by autumn 2018.

A question of fire and energy

But while scrutiny following Grenfell may improve fire safety best practice in high rise homes, it may not help the drive to make them warmer and healthier to live in. ‘Any money councils have to invest in towers will go to sprinklers before overcladding,’ says Mark Elton, director of Cowan Eco Design. ‘Although now is the time to be talking about concurrent works.’

THE ENERPHIT WAY

Retrofit of Portsmouth City Council’s Wilmcote House is nearing completion after a lengthy process that has seen work carried out with some 400 residents in situ. The scheme involves three 11-storey Bison Reema precast concrete blocks connected by open walkways. Homes suffered numerous problems, including cold, mould, high heating and maintenance costs, and security issues arising from open decks.

They were earmarked for a major heating system replacement, but the comprehensive EnerPHit retrofit means only a minor heating upgrade is needed. ‘The council was fairly technically minded, so it was not a hard sell,’ says Mark Elton, who worked on the early design at ECD Architects and SBD.

EnerPHit’s Passivhaus approach has seen blocks overclad and balconies and walkways enclosed. Because it was not possible to increase loading on the blocks, the superinsulated exterior is effectively supported on a steel exoskeleton. Triple glazed windows and doors, and mechanical ventilation with heat recovery, have also been installed.

The original designer, ECD, has been retained by the client, with Gardner Stewart Architects as lead designer for the contractor team. Project manager Keegans has had its clerk of works on site during construction. ‘We have had a very good dialogue with them and the original design team throughout,’ says Gardner Stewart Architects associate John Pratley.

‘This is very important when retrofitting an existing building of this size and complexity, and because of the very high standard of design performance and build quality required to achieve Passivhaus standard.’

The retrofit has extended the life of the social housing and improved living conditions, with an 80% reduction in energy bills expected. Monitoring of the homes is being undertaken by Southampton University and although this is in its early stages, is already showing positive results, says Pratley.

‘Residents did not have to use heating last winter and a lot of the mould and condensation issues have gone.’
Proof that quality will out in housing design

Space, community and material finishes are all part of creating good housing. Happily there is still scope to offer quality homes

Words: Ruth Slavid

The government talks a lot about the need for more housing – a need that cannot be denied. But there is a fear that in the talk about numbers we may be focusing on quantity rather than quality. It was therefore encouraging that delegates at the PIP seminar on housing at the end of last year heard from three architects who have managed both to design and deliver quality, thanks to enlightened clients and sheer determination. One managed this even in the teeth of the contractor going bust.

Equally inspiring was the approach from manufacturers, showing how to ensure that buildings worked by looking at everything from the psychology of heating controls to a belt and braces approach to basement design and the minutiae of ensuring that full-fill insulation performs correctly.

Richard Crossley, technical director of Newton Waterproofing Systems, explained that with basement design one should always expect a high water table. If it is not naturally high, there is always, for example, the risk of a burst water main. He outlined the three main types of basement waterproofing. Type A involves “tanking” with a waterproof finish. Type B involves creating the tank with monolithic concrete. And Type C is an internally drained system that will gather and discharge any water that gets through.

The important thing is that none of these systems, however good the components, is going to be perfect because there will always be errors in workmanship. And without perfection there will be leaks. In an area such as a plant room or car park this may be acceptable, but in most cases it will not.

Newton has worked with an insurer to provide a protected basement guarantee, where, crucially, problems with workmanship are also covered as long as a properly accredited contractor is used. It involves combining methods A, B and C. While this may sound like belt, braces and a special overcoat for good measure, it is certainly worth it for anybody who is really keen to keep the water out.

At Vaudeville Court, near the Emirates Stadium in north London, it was not the water that had to be kept out but football fans. Levitt Bernstein designed a small but carefully considered set of new homes, funded directly and unusually by Islington council. It fought for good materials and maximised usable space by minimising circulation. But most radically, it created an enclosed communal garden that could be used not only by the occupants of the new

Above Vaudeville Court, north London, by Levitt Bernstein.
The architects on all three of these projects paid close attention to the choice of materials and to detailing.
One of the best things about going up The Shard is watching the seemingly tiny trains below snake to and from London Bridge station. This view has got even better recently as construction of the new Grimshaw-designed station has gathered steam, revealing the sinuous form of the roof, which reads not as one structure but rather as nine interconnected tapering ribbons, their metallic surfaces gleaming in the sun.

This fifth elevation was of particular interest to the planners, says Grimshaw associate principal Stuart Grahn, and central to achieving the key goal of uniting the two previously disparate elements – terminus and through station, which together form one of the UK’s biggest stations. The 31,000m² roof is now complete along with most of the station works and the project is due to be officially completed in spring. It has been a long haul – construction of the platform structures started in 2013 – with the added extreme logistical difficulties of keeping the station open throughout, a situation akin to carrying out open-heart surgery, says the practice. The result was a complex nine-phase construction, with platforms rebuilt two at a time.

The roof concept was for typically 255m long canopies over each pair of platforms in ribbons that gradually rise to express the unified central public concourse located unusually on the floor below. The rise covers about 90m. As the roof ribbon lifts up, it admits light to the lower level through clerestory windows, with larger openings on the north side for indirect daylight. On the south side, the opening is smaller to reduce direct sun. This light is maximised by chamfering the bridge decks to the concourse.

The pre-set positions of the tracks and the 15 platforms give an irregularity to the plan, with a wider expanse used to navigate the transition between the higher through platforms and the terminus platforms. Here, two larger tapering ribbons step down to meet the lower level. From above, the different roof strands are clearly visible, breaking down its visual impact while...
The design is really trying to tie the two disparate parts together. It’s the first time it’s been unified and that’s what makes the project more exciting,’ says Grahn. ‘I hope it feels like there’s a continuity.’

Restricted track possessions and the resulting need for speedy construction that minimised works on site informed the prefabricated design of the roof canopies.

‘The programme was driven by rail possessions which gives a very compressed construction period. So we used prefabricated modular systems as much as we could. This meant we could bring large elements to site and install them overnight when we had access over the rails,’ explains Grahn.

The solution was the use of hundreds of prefabricated, 3m wide by 2.5m deep steel cassettes topped with Kalzip aluminium roofing, which the architect had used at Reading Station. This standard length is increased where the canopies widen out to meet each other over the tracks in the central part of the platforms.

‘It’s a good material for railway use. It’s robust with a naturally anodized finish. We wanted to avoid any kind of powder-coated surface that could scratch easily and get flakey. The metallic aesthetic helped sell the concept of a heavy base with the light roof element floating above,’ says Grahn.

Prototypes were erected off-site, one to demonstrate visual ambition and the other speed of erection, quality, and design and maintenance issues. Roof cassettes are mounted on a platform canopy formed by 3.8m high Y-shaped columns spaced at 15m centres and connected by spine beams. The columns incorporate rainwater pipes and electrical services, again to reduce clutter. With a de-cluttered platform a priority to give drivers and passengers clear sightlines, the cassettes incorporate a recessed linear trough for continuous, pre-wired services such as CCTV, lighting and the Customer Information System. This sits 1250mm away from the edge of the canopy to enable safe access for maintenance without the need for track possession. Service hatches in each cassette soffit at 3m centres allow maintenance access.

Trucked to site in loads of three, individual units were installed by tower crane, with each...
3m centres allow maintenance access. Trucked to site in loads of three, individual units were installed by tower crane, with each cassette plugged into the next and spliced with mechanically-fixed, aluminium flashing.

The concourse is created with the help of new steel bridge decks that support platforms and rail tracks. Above the concourse, the canopies are elevated and angled on the steel substructure rising up gradually to a high point of 9.5m. A trafficable gutter for maintenance is incorporated alongside the clerestory windows.

Particular attention was paid to the perimeter of the station roof along St Thomas and Tooley streets and its relationship there to the surrounding environment. The curving canopy is extended out to announce the entrances in the urban realm, with its arc visible from the nearby More London development. On St Thomas Street, care was taken with the interface of the new and listed arches, with the glazed upper structure expressed as a flowing lightweight element in contrast with the heavy Victorian structure.

At the terminus, canopies on the six terminating platforms are designed to sweep underneath the existing roof, which was constructed by Network Rail as part of the Shard interface works. This interface was designed so that the new canopies do not rely on making a structural connection to the terminus.

The extreme logistical difficulties had long delayed any attempt to embark on a much-needed redesign of this station, which dates back to 1836, and the transformation finally went ahead as part of the Thameslink expansion programme. Even before its final completion, it’s clear that the station has been transformed beyond recognition, not only for those looking down on it from on high but, rather more importantly, for its many thousands of users. Hopefully, with the end now in sight, regular London Bridge passengers will feel that the many years of construction-related pain was worth it for the considerable long-term gain. •
The world’s thinnest inverted roof insulation.

ProTherm Quantum®'s advanced Vacuum Insulation Panel system has been specifically developed for inverted roofs, balconies and terraces or wherever depth is critical to the overall construction. Quantum® can dramatically reduce the depth of a finished roof system, providing the solution to counter low upstands against the increasing thickness of traditional EPS & XPS products specified in order to meet more stringent thermal demands. It delivers an exceptional thermal performance with a 75mm threshold clearance and is the world's first inverted roof insulation to achieve BBA Certification.
Chelsea Creek, London SW6
To meet thermal requirements, ProTherm Quantum is installed above the PermaQuik together with a thermal sheet/water control layer in accordance with ETAG 031 requirements, enabling the achievement of U values up to and beyond 0.10 W/m²K.
Costed

David Holmes, associate at AECOM, provides an overview of roofing costs

Choosing the right type of roof is more difficult than most people think. Roofs serve more than the practical purpose of protecting the building contents and occupants from outside elements. They can help make it more energy efficient, bring in natural light and are important in defining the overall style of the property.

Gable roofs are some of the most popular types and are very easily recognised. They easily shed water and snow and can provide more attic space for storage or living, or be made into vaulted ceilings. Gable roof frames need to be constructed properly with adequate supports and can be covered with a variety of materials.

Flat roofs may appear to be totally flat, but in fact they have a slight pitch to allow for water run-off and drainage. Generally they are easier to construct than pitched roofs and require fewer materials. However, this initial low capital cost needs to be balanced with more expensive long term maintenance and repair costs.

Green roofs are aesthetically pleasing and are increasing in popularity. They are also energy efficient, thanks to all the vegetation which acts as an additional layer of insulation, and those cooling properties help combat the urban heat island effect. Layers are created using beneficial plant life, soil, drainage and waterproofing membrane. They do put a greater load on buildings than more traditional cold roofs (where the insulation is on the inside of the roof) or warm roofs (where the insulation is on top) so the designer needs to be aware of this.

The following rates are based on the UK average and represent typical prices at 2017 Q4. Please note that prices can vary significantly depending on the exact specification.

### Flat roof: Membrane and built-up systems

<table>
<thead>
<tr>
<th>Description</th>
<th>Range £/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single layer polymer roofing membrane; insulation</td>
<td>£84-100</td>
</tr>
<tr>
<td>Single layer polymer roofing membrane; tapered insulation</td>
<td>£150-180</td>
</tr>
<tr>
<td>Bitumen three-layer polymer modified bitumen system</td>
<td>£87-120</td>
</tr>
<tr>
<td>Bitumen two-layer modified bitumen system</td>
<td>£65-100</td>
</tr>
<tr>
<td>Bitumen felt roofing system, laid flat, with solar reflective paint finish</td>
<td>£110-150</td>
</tr>
<tr>
<td>Mastic asphalt; applied flat; to concrete substrate</td>
<td>£30-60</td>
</tr>
<tr>
<td>Single layer sheet roof; composite system; warm roof covering; vapour control layer; insulation and water proof membrane</td>
<td>£85-120</td>
</tr>
<tr>
<td>Polymeric waterproof membrane; 1.2mm thick fleece backed membrane; cold roof</td>
<td>£50-85</td>
</tr>
<tr>
<td>Roof walkways; 600mm x 600mm x 50mm precast concrete slabs on support system</td>
<td>£49-65</td>
</tr>
</tbody>
</table>

### Pitched roof: Tiles or slates

<table>
<thead>
<tr>
<th>Description</th>
<th>Range £/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Welsh slate tiles</td>
<td>£120-160</td>
</tr>
<tr>
<td>Natural Spanish slate tiles</td>
<td>£85-130</td>
</tr>
<tr>
<td>Synthetic slate tiles</td>
<td>£70-90</td>
</tr>
<tr>
<td>Reconstituted slate tiles; random slates</td>
<td>£88-90</td>
</tr>
<tr>
<td>Clay pantiles</td>
<td>£42-55</td>
</tr>
<tr>
<td>Clay tiles; handmade; sand-faced plain tiles</td>
<td>£86-130</td>
</tr>
<tr>
<td>Concrete tiles; interlocking; troughed / bold rolled</td>
<td>£35-65</td>
</tr>
<tr>
<td>Concrete tiles; plain</td>
<td>£34-53</td>
</tr>
<tr>
<td>Fibre cement slates</td>
<td>£42-58</td>
</tr>
<tr>
<td>Red Cedar sawn shingles; preservative treated; uniform length</td>
<td>£70-95</td>
</tr>
</tbody>
</table>

### Pitched roof: Sheet metal

<table>
<thead>
<tr>
<th>Description</th>
<th>Range £/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper sheet; mill finish; flat seam or wood rolled</td>
<td>£170-205</td>
</tr>
<tr>
<td>Copper standing seam roof; mill finish</td>
<td>£175-225</td>
</tr>
<tr>
<td>Extra for pre-patinated copper finish</td>
<td>£40-70</td>
</tr>
<tr>
<td>Aluminium sheet; mill finish; wood roll; insulation (U-value = 0.25W K)</td>
<td>£80-135</td>
</tr>
<tr>
<td>Aluminium sheet; standing seam; mill finish; insulation (U-value = 0.25W K)</td>
<td>£80-140</td>
</tr>
<tr>
<td>Extra for Pvb2 aluminium finish</td>
<td>£10-20</td>
</tr>
<tr>
<td>Stainless steel; terne coated sheet</td>
<td>£140-170</td>
</tr>
<tr>
<td>Lead roof covering; code 7; welded seam; milled lead; laid flat</td>
<td>£150-175</td>
</tr>
<tr>
<td>Lead roof covering; code 7; welded seam; milled lead, pitched roof</td>
<td>£150-195</td>
</tr>
<tr>
<td>Zinc; Natural Bright Rheinzink; pitched</td>
<td>£11-150</td>
</tr>
<tr>
<td>Extra for pre-weathered zinc</td>
<td>£20-30</td>
</tr>
</tbody>
</table>

### Pitched roof: Fibre-cement sheet

<table>
<thead>
<tr>
<th>Description</th>
<th>Range £/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile 6 fibre cement; single skin; natural grey finish</td>
<td>£28-40</td>
</tr>
<tr>
<td>Insulated system (U-value = 0.25W K); Profile 6 fibre cement external skin; metal lining panel internally</td>
<td>£55-70</td>
</tr>
<tr>
<td>Extra for coloured fibre cement</td>
<td>£1.75-2.25</td>
</tr>
<tr>
<td>Double skin GRP translucent sheeting</td>
<td>£60-73</td>
</tr>
<tr>
<td>Triple skin GRP translucent sheeting</td>
<td>£67-81</td>
</tr>
</tbody>
</table>

### Landscape roof

<table>
<thead>
<tr>
<th>Description</th>
<th>Range £/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive sedum type flat roof; growing medium; waterproof layer; separation layer; low maintenance</td>
<td>£220-280</td>
</tr>
<tr>
<td>Extensive rockery type green flat roof for planting with rockery type plants; growing medium; waterproof layer; separation layer; low maintenance</td>
<td>£210-300</td>
</tr>
</tbody>
</table>
The world’s thinnest inverted roof insulation.

ProTherm Quantum®’s advanced Vacuum Insulation Panel system has been specifically developed for inverted roofs, balconies and terraces or wherever depth is critical to the overall construction. Quantum® can dramatically reduce the depth of a finished roof system, providing the solution to counter low upstands against the increasing thickness of traditional EPS & XPS products specified in order to meet more stringent thermal demands. It delivers an exceptional thermal performance with a 75mm threshold clearance and is the world’s first inverted roof insulation to achieve BBA Certification.
Specified

1 Bus stop’s green roof
Bauder

An industrial-strength swing at the bus stop off those steel cantilevers? It’s a start. But there’s only so long you can swing without getting bored and if you are waiting for the D7 to Stratford as I frequently have to do you would definitely tire of being pendular. May I suggest a slide, roundabout, see-saw and perhaps even a trampoline? This Norfolk Association of Architects award-winning bus shelter for the University of East Anglia also has a Bauder green roof installed, so you can shape some sedum in the interim.

bauder.co.uk

2 Decra Noxite tiles
Icopal

You better work, roof! For centuries, you kicked back, simply content to insulate a property and curtail water ingress. Oh, sure, your thatch did provide a micro-habitat for birds and insects - but that wasn’t on purpose so it hardly counts. But nowadays, if you aren’t generating power or growing shrubs, we need to know why. Another option is scrubbing NOx and NO particles from the air, such as these go-getting tiles at Liscard Primary in the Wirral. Pull your NOx up, roof: simply keeping the rain out is no longer an option!

icopal.co.uk

3 Green roof substrate guide
Boughton

Landscaping industry supplier Boughton has released some info about which substrate to use for various ‘green roofs’ – everything from ‘extra-light’ mixes where weight is an issue through to ‘podium green’, where you are thinking about putting a hydrangea up top. And shown is the Georgia O’Keeffe Memorial Rock and Log Garden which can also presumably take ‘intensive’ substrate since there is a lorry-load of buffalo skulls and some aloe vera due for delivery Wednesday. Don’t forget your poncho.

boughtonlandscaping.com

4 Roofing refurb
Aggregate Industries

Who can solve the mystery of Ranksborough Hall, Rutland? Why do so many wheelie-bins assemble outside the property every Tuesday? [Bin day? – Ed] How did Aggregate Industries and Rutland Roofing complete the entire job fitting Bradstone Cotswold roofing tiles within a mere six months? How did they make it look like the slate tiles they took off? How did all the scaffolding get round the gables? Where is Rutland anyway? Why all the questions?

aggregate.com
Sign up to our intensive week-long immersive Northern Expressionist Self-Help Workshop in Cambridgeshire, where you can creatively explore post-millennial tension in the midst of pancake-flat farmland. Workshops include: Munch: The Primal Scream and Brexit-terror; Egon Schiele: weight gain in the face of modern existential nausea; All That Glisters: Klimt, the superficiality of selfies and overcoming Instagram addiction. Special curly bird deal on curved roof dwellings fitted with anthroposophical hand-cut slate tiles from Cupa Pizarras.

cupapizarras.com/uk

Saudi Arabia is perfectly stable! Sure, the UK might be keeping its self-defence forces in fine fettle and the odd multi-billion dollar asset may have gone missing but it’s business as usual. Still, if political tension does ever create problems getting to Mecca, the UK’s faithful may consider Fitzwilliam College, Cambridge, as a pop-up alternative destination. Denys Lasdun’s domed scallop detailing would surely make a great temporary substitute. And recent work by Cullinan Studio with Sarnafil on the roof means the college is ready to receive pilgrims.
gbr.sarnafil.sika.com

What makes a rooflight a roof? Or, to put it another way, what does it take for a lowly sky window to make it from our ‘Doors, windows and ironmongery’ section into the vaunted ‘Roofing’ arena? As you will see, dimensionality helps. This 12m by 6m Vision AGI for Heatherwick creation has a ‘gridshell’ and is billed as a ‘fully self-supporting roof’. That’s the structural rationale – the only question that remains is whether or not being shaped like an almond smooths the entry’s passage from one definition to the other.
visionagi.co.uk

How long are you going to be standing there with that thing in front of your face when you could be THROWING THE BALL FOR ME? You’ve been muttering and walking backwards and fiddling and walking backwards for about half an hour when there are BALLS TO BE THROWN! Look how disappointed and expectant I am. HOW CAN YOU TURN ME DOWN? Oh, lord, now you are bragging to your neighbour about these Brookhurst handmade clay roof tiles from Sahtas and your barn built in 1914 but WHEN ARE YOU GONNA THROW THE BALL?!
sahtas.co.uk
Enigma, Barcelona

RCR Arquitectes and Pau Llimona created a dream-like set for this extraordinary restaurant, all extrapolated from an initial watercolour

Words: Pamela Buxton  Photographs: Dámaso Pérez Ontiveros/Fototec

Guests arriving at Enigma, the Barcelona restaurant designed by 2017 Pritzker Prize-winning practice RCR Arquitectes and Pau Llimona, could be forgiven for being a little taken aback.

Enigma is the latest venture from Albert Adrià, first known for his work at his brother Ferran’s celebrated three Michelin-starred el-Bulli restaurant and who now leads the elBarri group of restaurants. The new restaurant is located on a noisy street corner in Ensanche, a not particularly fashionable part of the city. There is minimal signage. Rather than being greeted at the door, diners instead must wait until the time of their reservation and then tap in an entry code that they are given on booking to activate the door. Then, still without seeing any Enigma staff, they progress up a curving ramp away from the hustle of the city and into a quite extraordinary restaurant environment.

The overwhelming sense is of being beneath a strange billowing metal cloud, with walls and floor covered in abstract designs and furniture that looks at first as if it’s been shaped from ice. Almost everything is in shades of grey. It is all rather strange and quite unlike any conventional restaurant.

This, of course, is the point. Adrià was keen to explore different approaches to dining, not just in the food but the way it was experienced. Central to this was the design of the interior, realised in an intense collaboration with the design team over more than two years.

The site was difficult – noisy, dark and littered with columns. According to Rafael Aranda of RCR, the aim was to create an abstract yet serene interior landscape that, by being a total disconnect with the urban surroundings, encourages diners to leave the rest of the city behind. Having blanked that out, they can then concentrate on the cuisine and the company instead. The sense of experience is heightened by the promenade nature of the meal – diners move around various zones of the restaurant throughout their evening, passing along the side of the open kitchen. There are tantalizing glimpses through glass screens to different parts of the restaurant but the overall plan is rather labyrinthine and guests never see all their fellow diners at once.

The design concept started, as all RCR projects do, with a watercolour response to the brief. For Enigma, the architect came up with an abstract design with varied intensities of tone and pattern that served as the reference point for the project’s dream-like aesthetic. To give enveloping continuity throughout the interior, the design was translated in one material across
most of the surfaces from floor and wall panels to counters and joinery and kitchen hoods.

Imagining this on sheets of paper was one thing, but it was quite another to realise it in sufficient detail over hundreds of square metres of surface. This was delivered through a collaboration with TheSize, the Spanish manufacturer of Neolith sintered stone, which was game for the challenge of creating a customised design that could be used across the many different surfaces. The product had the right practical properties – it is resistant to high and low temperatures, is strong, impermeable, scratch resistant and hygienic, all especially important in the kitchen. And crucially, the manufacturing process could accommodate a bespoke design. The variegated floor, for example, was created with no repeats, and involved scanning the original watercolour followed by an intensive
process of digital manipulation to give the appropriate density of detail and image quality required for digitally printing on that scale.

On vertical Neolith surfaces such as kitchen hoods, counter sides and wall panels, the design of abstracted downward strokes seem suggestive of heavy rain beneath the cloud-like ceiling. In some areas, these are combined by moulded glass panels that appear like frozen flowing water. In other places these are opaque.

“We were very interested in exploring the material in different forms to get the most out of it,” says Aranda. The use of grey, he adds, gives more profound opportunities for tonal variation and to use this to define space.

Freestanding furniture was designed by RCR in translucent polyester resin. The entirety is intended as a visual dialogue between the different depths of spaces.

The cloud itself is created using steel net. By working this in an artisan way to create the ruched, billowing effect, the architect was able to give the humble industrial material ‘soul’, says Aranda, just as it had by creating bespoke patterns for the glass.

This is combined with 2500 LED lights, used in different colours to vary the effect from zone to zone. Columns are made a virtue through the use of cladding and their adaption to serve additional roles, for example, as glass storage.

A slightly disconcerting element comes at the end of the customer’s journey – a reinterpretation of a bar from one of Adrià’s previous ventures, 41º (not designed by the same architect).

Back in Enigma itself, the otherworldly design is certainly an essential ingredient of the restaurant’s recipe. Anywhere else, such a strong visual concept could overwhelm the culinary experience. But when the food’s as extraordinary as it is at Enigma, there can be no danger of that at all.

Above left The restaurant has a low-key street presence.
Above In the teppanyaki room, diners sit around the grill as the food is cooked.

Above Washroom, with Neolith used on the wall and floor.
Left Closing a fantastical journey, the bar, recreated from a previous Adrià project, strikes a disconcertingly different tone.
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kahrs.com

2 Washroom
Amwell

Welcome, ladies and gentlemen, and thanks for coming along to City Passporting Rights or Bust – the referendum quiz show where you get to take a claw hammer to 12% of UK tax take! In a minute, we will be welcoming everyone’s favourite suited and booted question-master, Duncan Bannatyne, and our four lucky contestants, but before then we would like to put in a quick word for our sponsor, Amwell, and its Sylan Glass range, which makes all this possible. Let’s hear your appreciation, ladies and gentlemen!
amwell-systems.com

3 Kitchen extractors
Falmec

The last time I saw this much moody drama in a kitchen was when Aunt Kath’s pressure cooker exploded while she was cooking her neck of lamb, coating the walls and sending the weight straight through the ceiling into the lodger’s laundry basket. Well! He only shot out of his room and came a cropper on the hall linoleum. Thank god this Falmec Circle Tech Murano glass extractor fan is, like Aunt Kath, as robust as it is glamorous, or we could be picking shards out of the fox terrier for a week.
falmec.co.uk

4 Waldkante wall panelling
Team 7

Let me stick it to you straight: you wood die for the new range of wall panelling from Team 7. Maybe you still haven’t twigged. There are three types available, untreated oak, alder or walnut. It’s a tree-t. So, don’t be a chip off the old block and or you might get lumbered with more smooth plasterboard to seal and paint. Join the splinter group and fit Waldkante (‘forest edge’) in your project. You will be glade you did.
alfa-massiv.com
Focus SB is a British company dedicated to manufacturing electrical wiring accessories of unparalleled quality for over 40 years. To ensure continuity of design and finish throughout your projects, we can manufacture matching plates for a number of popular product options. Please contact us for further details.
Friedrich Ludewig, director of architect ACME, gives us three of his specification favourites

**CLT**

We have used our office stair as a prototype to show that cross laminated timber can be used in more sculptural ways. Timber supplier Blumer Lehman cut 120 pieces of timber for us quickly and precisely, using a 5-axis CNC joinery machine directly from our parametric 3D model. Each piece can be unloaded and carried by one or two people. Pieces are interlocked by milled dowelling and adhered with an epoxy glue and long screws. Un-treated except for some oil, the timber is starting to show signs of wear after a year, but a little sandpaper and oil and it looks like new again.

molotrade.com

**METAL PIPES**

Bending metal pipes to precise curves is not a common problem, but something we have worked hard to solve it. For one scheme, Seele developed a machine that can bend 76mm steel pipes to any curvature, with incredible precision. The machine can also route holes and slot openings in pipes, to a predetermined 3D cutting schedule. We used 14km of stainless steel, for its resistance in a marine environment and to maximise the span support between pipes, reducing the overall amount of substructure, but we think we have only scratched the surface of possibilities.

bolon.com

**KETLEY ENGINEERING BRICKS**

It has taken us a while to find a brick that looks good and can deal with exposure on all surfaces. We know of several complex brick facades that had insurance claims and needed major work, as water ingress led to spalling and detachment. Ketley Bricks made a custom extrusion with high crushing strength and very low water absorption for frost resistance. The Engineering Brick range is strong enough to be used as a paver and can be varied in colour. Setting the bricks in 3D created interest and shadow, so the bricks’ colour and surface could be consistent, plain and smooth.

solusceramics.com

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

**WINDS OF CHANGE**

This shows how far we’ve come since we read Nick Clegg’s lips in 2010. Now higher education is just customer service provision; gone are the days when I spent my free time fishing the least dirty plate from the stacked student digs sink, worrying whether that last crit had earned me the boot. Now you can sue your university if you fail and someone else will do the dishes at Ernest Place, Durham’s luxury undergrad student housing, boasting chill-out zones, gym, sauna and cinema. As there’s always one drunken Charlie who’ll try to impress his flatmates by lighting his farts; luckily Kentec’s Taktis fire detection/alarm system will deal with any impromptu evacuation.

**FIVE GO TO THE WALL**

... before finding that Enid Blyton’s Kirrin Cottage in Dorset is the most wanted home in the UK, according to a survey of 2000 adults by window manufacturer Origin. Now, I don’t know what the Famous Five’s home looks like, having been traumatised early by reading Noddy; but to my shame, I do know the rest. Fern Cottage of grumpy Doc Martin in Port Isaac, Tom and Barbara’s DIY home in ‘The Good Life’, Christian Grey’s penthouse in 50 Shades of Grey and Mallorca’s Love Island Villa. With no Grand Designs House of the Year in the running, Kevin McCloud may be relieved his viewers haven’t entered second childhood, love furry slippers or have prurient tendencies.

**THE FUTURE OF FLIGHT**

I remember little of Naples Airport: an Italian on his mobile gesticulating wildly while a barman prepared the strongest Negroni I’d had in some time. It’s rather vague after that. So for those wishing to recall more than Sanssavoro Chapel’s Veiled Christ, pizza and washing lines from the city, local firm Architettura has redesigned Naples’ passenger areas with slick deconstructivist furniture in Hi-Macs, whose aerodynamic references and fluid forms would have had Futurist manifesto writer Filippo Marinetti writhing ecstatically in his wrecked Bugatti. Though unlike that car, the acrylic Solid Surface is, says the owner, amazingly resistant to fire, scratches and shock.
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