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Technical & Practice



Rooftop construction

How Eric Parry Architects built a spa on the roof of London's Four Seasons Hotel. By *Felix Mara*. Photography by *Edmund Sumner*

Eric Parry Architects' spa for London's Mandarin Oriental Hotel was so warmly received when it opened in 2000, that it might well have been tempting to roll out an identical design for a similar commission at the Park Lane Four Seasons Hotel. But this spa, which opened in March, is constructed on the roof of a 1970 luxury hotel. Part of a general overhaul by ReardonSmith Architects and interior designer Pierre-Yves Rochon, it presented an opportunity to take a

Key points

- Load transferred through existing fabric
- Lightweight composite floor and beams
- Carbon fibre reinforcement strengthens new openings
- Bespoke textiles by Eric Parry Architects

new approach and posed a different set of technical problems.

'That was a cave,' says Parry, referring to the basement spa at the Mandarin Oriental. Nevertheless, just as the design of the Mandarin spa was informed by Parry's 1998 student residences at Foundress Court for Pembroke College Cambridge, which explored themes of privacy and communal space, the Four Seasons spa builds on his work at the Mandarin. As luxury hotel facilities, both are distinct

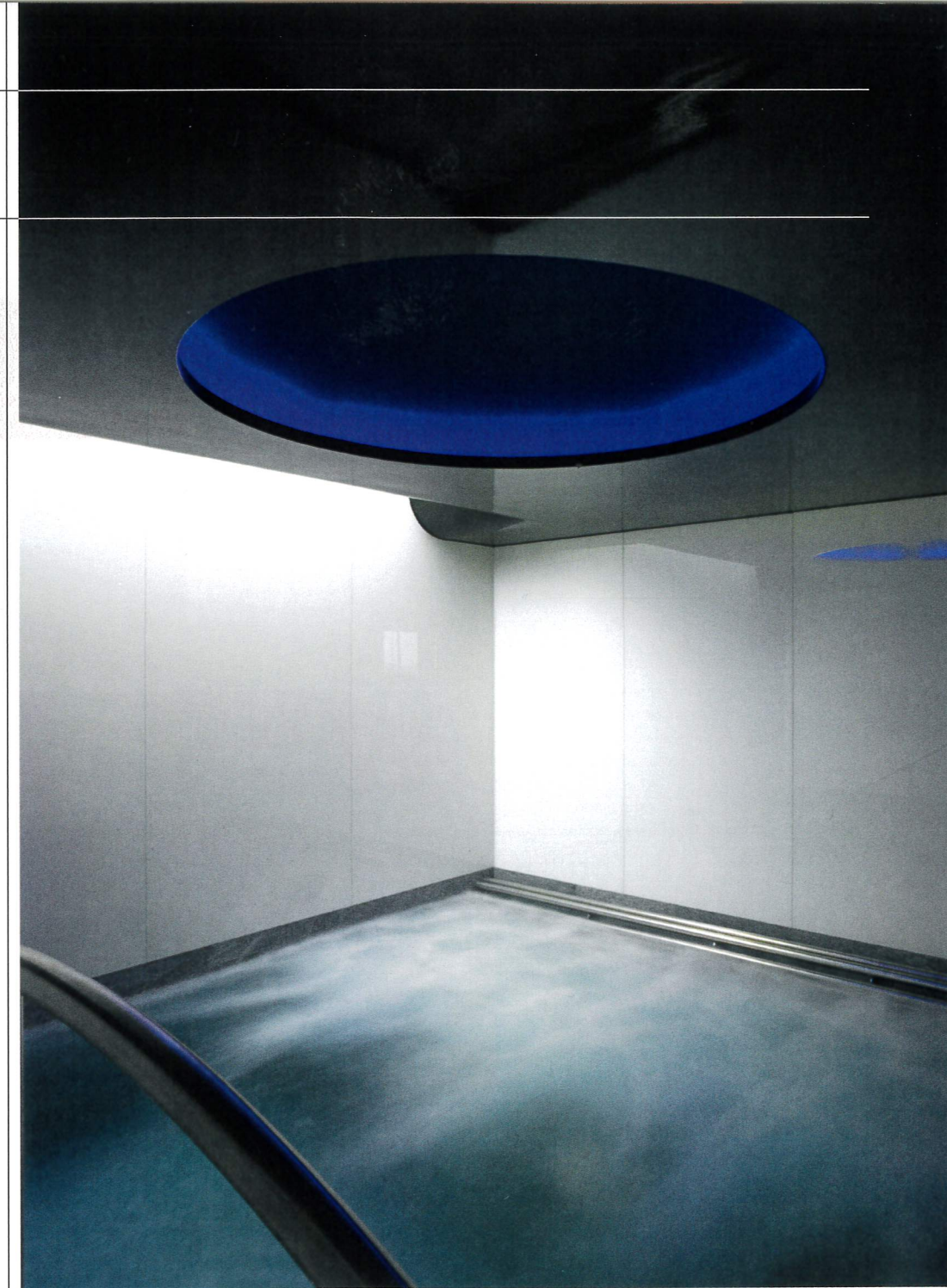
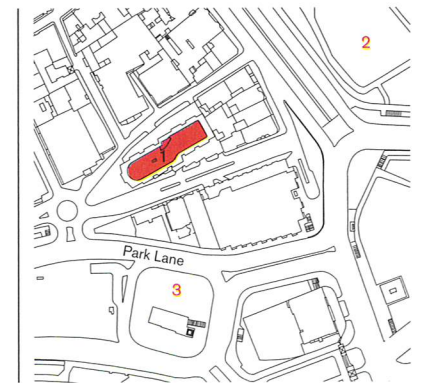
from the many other types of spa, and their purpose is to promote mental and physical well-being through a series of treatments and activities.

Like the Mandarin spa, the facility at the Four Seasons comprises a linear sequence of spaces, from the reception to various types of treatment rooms to relaxation areas. This involves the central process of retreating from the outside world and what Parry calls 'an intense interiority'. Whereas the setting for the Mandarin spa (which >>

Site plan

1. Four Seasons Hotel Park Lane
2. Green Park
3. Hyde Park

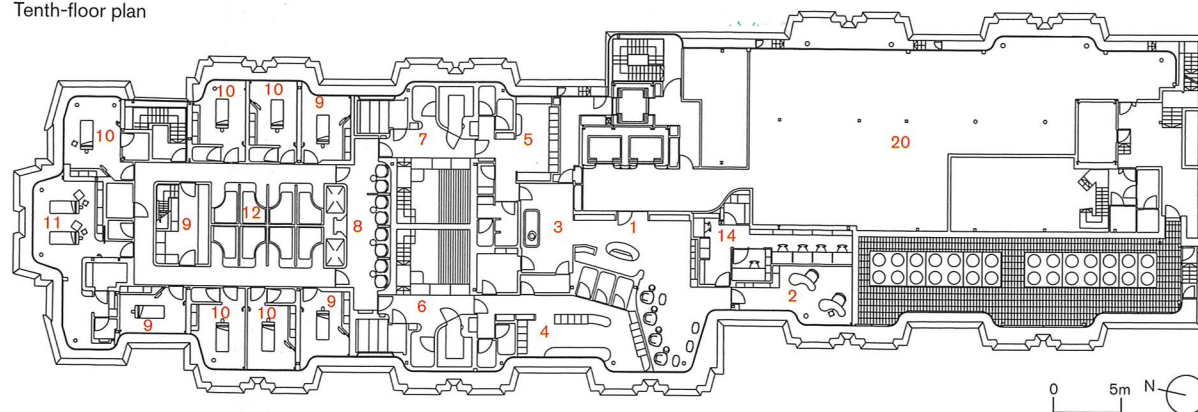
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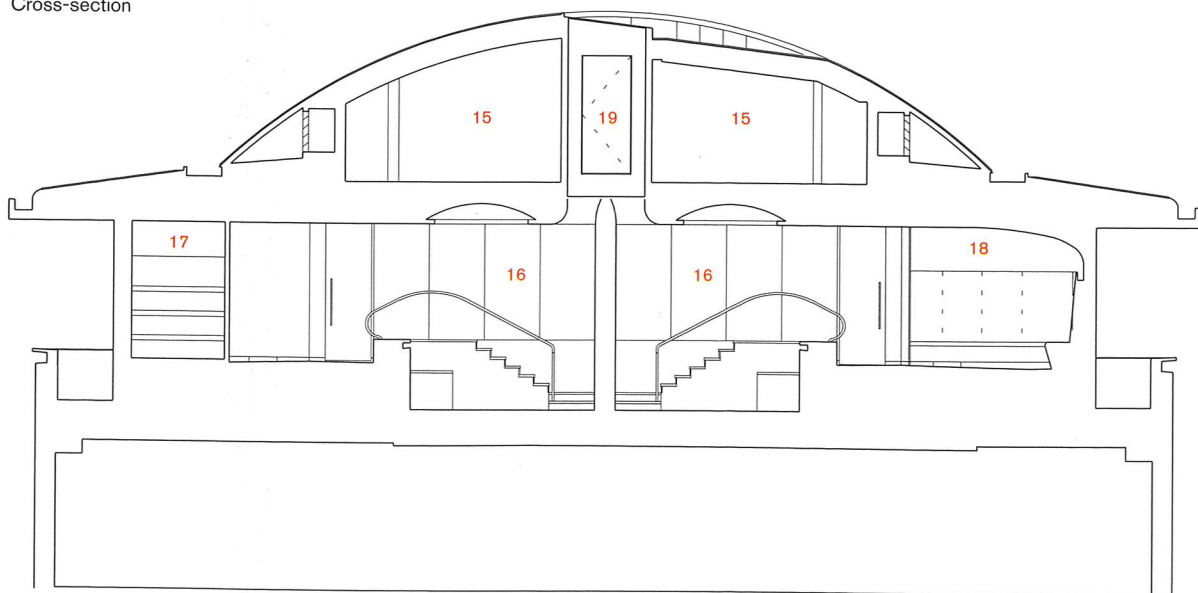


Previous spread, left Aerial view from the north
Previous spread, right Top-lit pool
Far left Textile design sketch
Left Sky suite treatment room with views through fritted glass to Hyde Park
Right Reception area. The geometry and materials of new black aluminium copings are repeated in reflective soffits

Tenth-floor plan

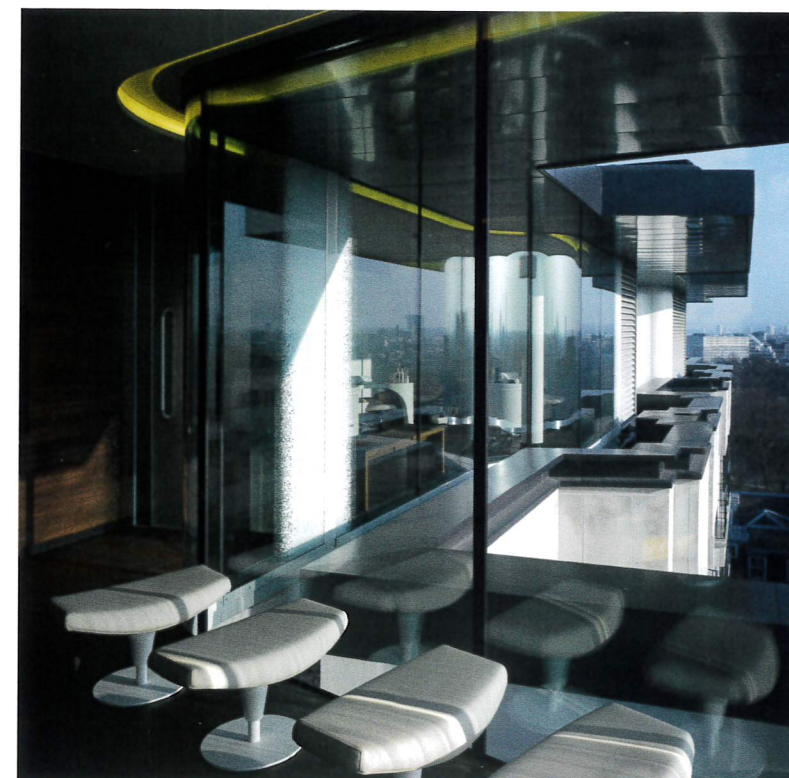


Cross-section



1. Reception
2. Manicure room
3. Lobby for changing rooms
4. Female changing room
5. Male changing room
6. Female heat experience
7. Male heat experience
8. Pre-treatment relaxation area
9. Dry treatment room
10. Wet treatment room
11. VIP treatment room
12. Post-treatment relaxation area
13. Back of house
14. Back of house - telephonist
15. Plant room
16. Pool
17. Sauna
18. Steam room
19. Rooftop
20. Gym (not part of spa)

0 1m



has no daylight) was ideally suited to this process of withdrawal, at the Four Seasons Parry had to devise ways of concealing distracting views from the tenth-floor facility. But he also took the opportunity to establish a dialogue with the outside world, with a graded sequence of increasingly cocooned spaces and a return sequence with a progressively transparent external envelope and panoramic views across Hyde Park, Green Park, Knightsbridge, Mayfair and Buckingham Palace.

In order to create what he calls a 'celestial world' and regulate light and views, Parry has applied a graded ceramic frit to the low-iron external glazing. Behind this he has draped bespoke semi-transparent curtains, designed by Eric Parry Architects associate Merit Claussen, who is a textile designer as well as an architect. These were created to be diaphanous, crinkly, pleasant to handle, lightweight, colour-fast, non-combustible, flame-retardant and to retain their shape

and colour after regular washing. Manufactured in Switzerland, they are double-woven, with a nylon warp and a dyed enamelled copper weft. Along with the spa's horsehair wall panels, they also provide acoustic softening to counteract sound-reflective finishes such as granite flooring and wall surfaces with over 20 coats of lacquer. The spa's rich materials are variously chosen to regulate moods and light levels, deal with wet and humid conditions, and resist wear and tear during its 18-hour shifts.

With high-density cladding materials, vitality pools, underfloor heating and heavy services, mainly accommodated in a 1.1-metre deep plenum below the spa, its structural design was particularly challenging. Structural engineer Adams Kara Taylor has resourcefully worked within the constraints of the existing building, while remaining wholly sympathetic to Parry's design intent. ■

Structural engineering



Like many hotels, there is a significant transfer structure between the cellular bedroom floors at upper levels and the larger reception and function spaces on lower levels. Additional load had to be minimised so that the impact on the existing transfer structures was reduced.

Having investigated the existing building to establish where it had surplus capacity, we lessened additional loading by using lightweight materials where possible without compromising the quality of Parry's design, and spread the new loads across points where the existing structure could bring them safely to the ground.

The new roof and floor are supported on a steel girder transfer grillage off the existing tenth floor. The new loads are sent directly down the concrete columns that were proven to have surplus capacity.

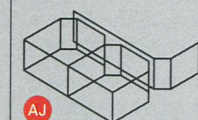
The new tenth floor was formed using lightweight composite flooring and composite beams in order to keep additional loads to a minimum. Many elements of the existing floor slabs had to be opened up to form new spaces. Carbon fibre reinforcement was used extensively to stiffen and strengthen new openings.

Stuart Sagar, associate, Adams Kara Taylor

Credits

Start on site
October 2008
Completion date
February 2011
Gross external area
1,893 m²
Form of contract JCT traditional contract
Total cost
Not supplied
Client Four Seasons Hotel
Lead architect
ReardonSmith Architects
Spa architect
Eric Parry Architects
Structural engineer
Adams Kara Taylor
Lighting DPA

M&E consultant Industrial Design Associates
Spa consultant ESPA International
Hospitality technology consultants
Spartan Communications
Quantity surveyor and project manager
Bruce Shaw Partnership
Facade engineer Arup Facade Engineering
Acoustic consultant Sandy Brown Associates
Main contractor and bespoke timber joinery
Beck Interiors



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Historic

Paying tribute to herculean feats of engineering in the past – plus the humble rope bridge

Eric Parry
Eric Parry Architects
Late French Gothic cathedrals

Walls of glass held miraculously in place by impossibly thin shafts of stone concluding in arborial stone vaults have, for me, endured above all other examples as the essence of engineering and iconography.

Nahim Iqbal
Ryder Architecture
The Colosseum

The Colosseum in Rome represents an era of vision. It was not engineered using software to deal with formulas, rules and regulations. Use of modern composite iron or steel was also absent. It was made by skilled stonemasons, using natural resources, offsite construction processes and standardised parts. Such methodologies are yet to be fully exploited within industry today. The essence of engineering is to deliver the unimaginable through visionary understanding of the techniques and processes which can create efficiency.

Craig Liddell
KLH UK
The rope bridge

The simple rope bridge has been used for centuries and has enabled the movement of man and livestock across what were previously deemed to be impossible or impassable routes – opening up possibilities for future opportunities. A humble but important feat of engineering.



Left top The vaulted ceiling at Sainte-Chapelle **Left bottom** The rope bridge at Carrick-a-Rede

Above top The Lovell Telescope at Jodrell Bank
Above bottom Vladimir Shukhov's Moscow tower
Right Electricity pylons

Stephen Melville
Ramboll
Vladimir Shukhov

The definition of engineering is to use physical laws and materials in a creative and innovative fashion. This is embodied in the work of one man. Vladimir Shukhov started a brilliant but sadly unappreciated career in 1877 which encompassed inventing the theory of double-curved forms, applying it to hyperboloid towers such as his Moscow tower of 1922. Shukhov led the way in collaboration; he worked with the Constructivist architects of the day and did equally great work in the field of industrial design. Cooling towers around the world are literally a concrete manifestation of his ideas.

Eddy Rhead
The Lovell Telescope

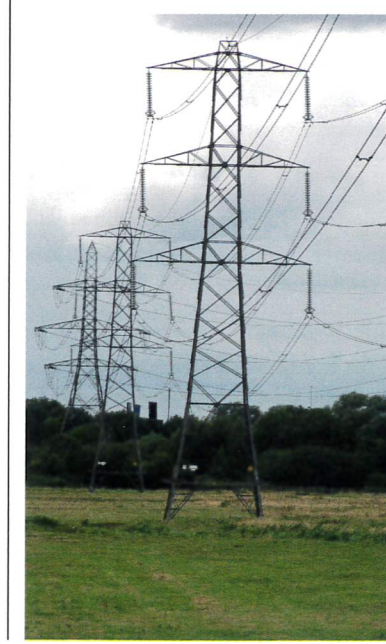
Typifying the Modernist credo that beauty comes when form follows function, the Lovell Telescope at Jodrell Bank is a startlingly beautiful structure that is simply doing its job. Designed by engineer Charles Husband for astronomer Bernard Lovell, the huge 76-metre diameter dish sits on a delicate lattice work of steel. Despite huge cost over runs and construction delays, the telescope sealed its place in history when it tracked the first satellite, Sputnik. To see the structure rising up from the Cheshire countryside is an awe-inspiring sight, and testament to the human race's endless quest to seek answers beyond our own planet.

Skeletal structures

An ubiquitous tower, a man who made towers and a huge telescope: three important skeletal structures

Christian Wren
Hilson Moran
The electricity pylon

Reginald Blomfield designed the UK's first pylon in 1927, and his tenaciously practical lattice tower has survived 80 years of technological evolution to remain almost unchanged from its original design. The sleek tapering steel structure channels 400,000 volts of electricity, typically rises to 50 metres in height, and is designed to withstand the extremes of British weather. To say that the pylon is to the electric era what the cross is to Christianity would not be profane. It is a symbol of human capability and taming of the landscape.

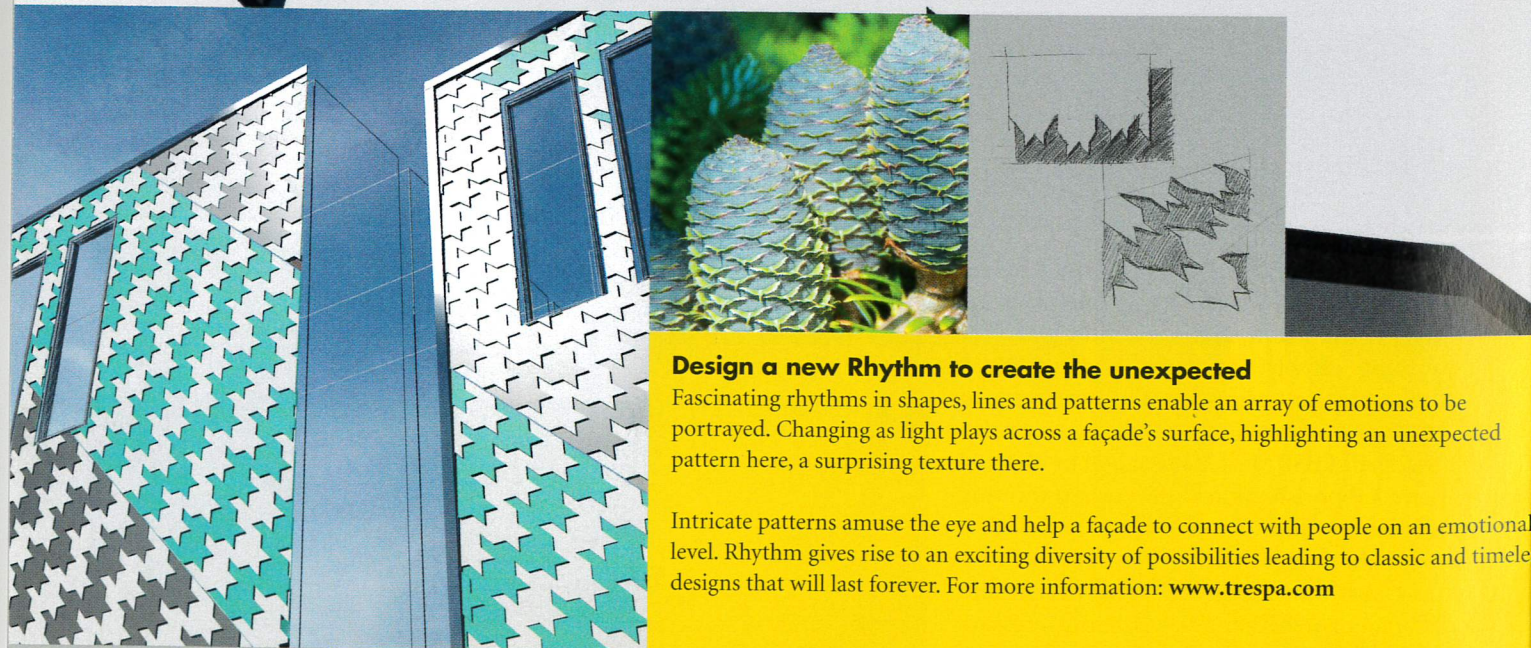




May 2011

Heron Tower and the health of the high-rise
Cutting edges: Eldridge Smerin in Epsom
Valerio Olgiati in Landquart • Dominic Cullinan in Calais
Jeremy Till on spatial agency – practice beyond building
Stephen Mullin on AStudio • Ashton Porter's workhome
Inventive envelopes: Eric Parry and Wilkinson Eyre

For personal patterns, think Trespa



Design a new Rhythm to create the unexpected

Fascinating rhythms in shapes, lines and patterns enable an array of emotions to be portrayed. Changing as light plays across a façade's surface, highlighting an unexpected pattern here, a surprising texture there.

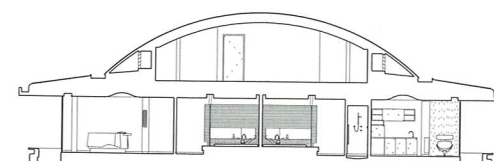
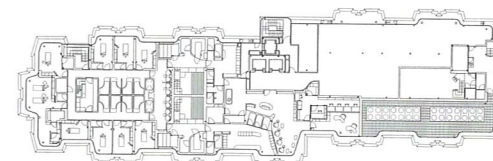
Intricate patterns amuse the eye and help a façade to connect with people on an emotional level. Rhythm gives rise to an exciting diversity of possibilities leading to classic and timeless designs that will last forever. For more information: www.trespa.com

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Top of the world
Eric Parry Architects'
rooftop spa at the
Four Seasons Hotel
London at Park Lane.



Conceived as a hat with an overhanging brim, Eric Parry Architects' rooftop spa at the Four Seasons Hotel London at Park Lane houses a sauna and vitality pool as well as steam, heat and treatment rooms.

Intended to control daylighting and views out, a seamless white glass ribbon wraps the entire tenth floor of the building with clear glass breaks, *writes Eric Parry Architects*. The glazing spans vertically between a bespoke top and bottom glazing channel to eliminate vertical supports. A frit pattern – generated by scripting varying sizes of dots using bespoke parametric computer modelling – provides a series of cloud-like vision slots. Scripting also allows the pattern to continue seamlessly around the radiused corners of the openings.



Providing a U-value of $1.8\text{Wm}^2\text{K}$, the flat, concave and convex double-glazed and thermally toughened units comprise a 2x8mm outer pane with a clear polyvinyl butyral interlayer, an argon filled 16mm cavity, and a 2x6mm inner pane, also with a clear PVB interlayer.

Concealed rainwater pipes are located between the glazing junctions with a polyester powder-coated cover plate finished flush with the glazing providing a seamless effect. A UniRail access system is used under the glazing line, which follows the curved profile.

A highly crafted roof was paramount given the prominent site location. The existing 1960s building had an extruded plan form which terminated abruptly at roof level. The spa extension presented the opportunity to provide a 'cap' on the roof, which would complete and add gravitas to the building. It was important that the extension read as a single volume and therefore a barrelled roof was introduced on top of the glass ribbon walls. This keeps the profile low, while at the same time providing all the necessary plant equipment for the newly refurbished hotel below.

Success depended on specifying a metal which could achieve a perfectly curved roof profile with a high degree of detailing, and without faceting. A zinc standing seam system was chosen for this reason.

The roof starts at the north with the dome. It then follows a kink in the existing hotel plan before terminating at the south with metal fins over the plant areas. The fins follow the same

spacing as the standing seams allowing the roof to be perceived as an unbroken surface.

The scheme resulted in two zinc specifications. VM Zinc Anthra-Zinc Plus – was used around the perimeter to add visual weight to the edge of the roof. The zinc was laid onto Foamglas insulation board over a plywood substrate in sheets measuring up to 15 metres long.

The underside coating on the zinc systems obviated the need for additional ventilation. This, combined with the use of cellular glass insulation, resulted in a 'compact roof' build-up. The absence of obtrusive ventilation details, combined with the decision to clamp the UniRail access system directly to the zinc upstand seams, eliminated the need for additional support. This also simplified the detailing process by avoiding unnecessary bulky penetrations through the roof.

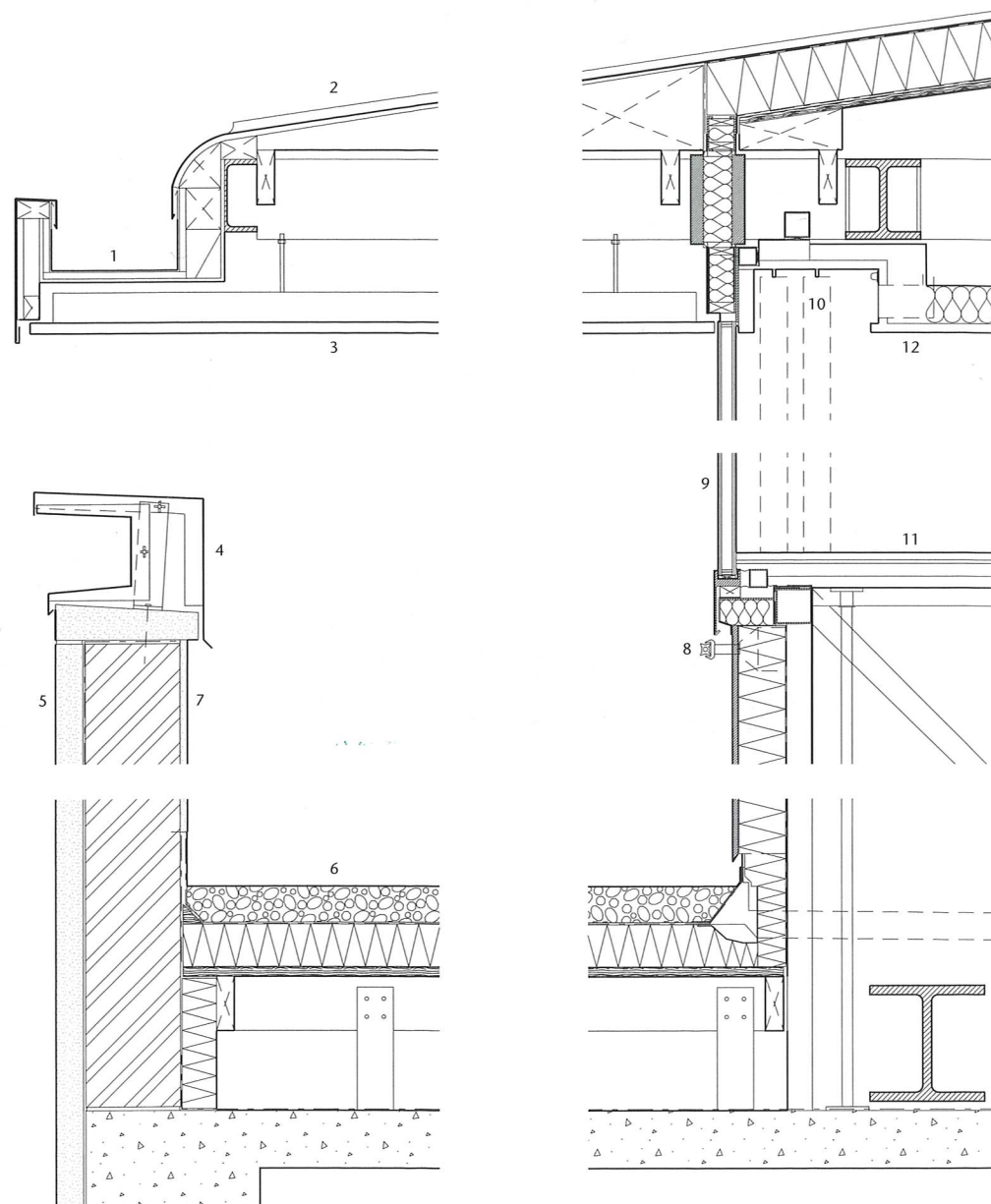
Section through spa facade and roof

1 Black zinc gutter on timber substrate, 2 upstand seam zinc roof on timber substrate, 3 black aluminium soffit, 4 black aluminium coping, 5 existing Portland stone ashlar panel, 6 grey cobble stones, 7 white-painted render below glazing, 8 fall-arrest system, 9 double-glazed unit, 10 lighting and curtain trough, 11 timber floor, 12 plasterboard ceiling.

Project team

Architect: Eric Parry Architects (spa), Reardon Smith Architects (hotel); structure: Adams Kara Taylor; m&e: Industrial Design Associates; project manager, CDM coordinator: Bruce Shaw Project Management; qs: Bruce Shaw Partnership; landscaping: Macgregor Smith; lighting: DPA; spa consultant: ESPA international; acoustics: Sandy Brown Associates; fire: Ramboll Safe; facade engineer: Arup Facade Engineering; artist: Stephen Cox; contractor: Beck Interiors; hotel operator: Four Seasons Hotel; photos: Edmund Sumner.

Selected suppliers and subcontractors
Quartz-Zinc Plus, Anthra-Zinc Plus standing seam roofing: VM Zinc; Foamglas insulation: Pittsburgh Corning; liquid applied waterproof roof coatings: Liquid Plastics; roof fall-arrest system: Uniline; glazing, external metal work: Lakesmere; glass, fritting: Eckelt Glas; glass curving: Sunglass.



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