

building

FANTASTIC PLASTIC

Herzog & de Meuron build a rainbow in Deptford

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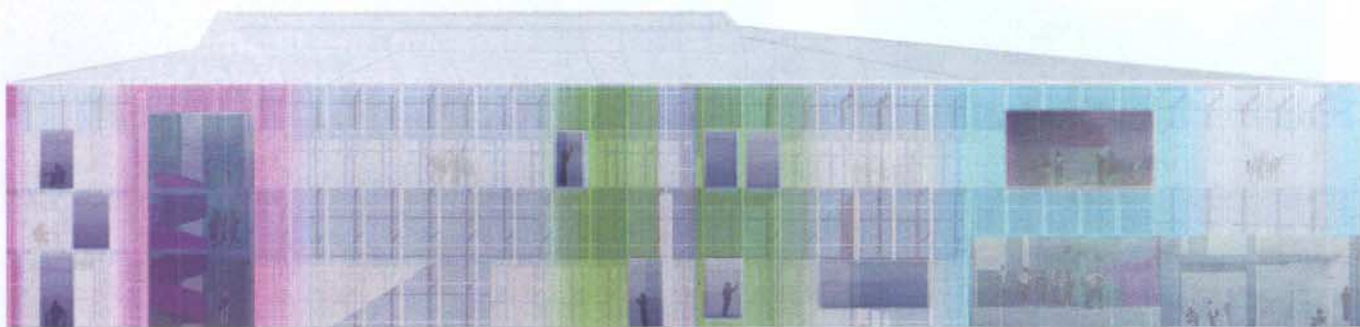
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Colour me beautiful

Sexy and tough, polycarbonate has a great future and Tate Modern architect Herzog & de Meuron has just covered the Laban Centre in south-east London in it. **Thomas Lane** meets the new kid on the cladding block



The centre is the first building in the UK to be clad entirely in polycarbonate, punctuated by glass windows. The mixture of blue, green, purple and clear polycarbonate will be like "pools of water on coloured fabric".



An early model of the Laban Centre in Deptford: The idea to use polycarbonate in wide bands on the facade was dropped in favour of the arrangement shown below left.

EVERYONE GASPED WHEN THEY SAW THE plastic-clad domes of the Eden Centre for the first time. Called ETFE, that plastic was lighter and stronger than glass and enabled the creation of a structure that became imprinted on the nation's consciousness. Well, move over ETFE, a new material has just arrived – and it's trendier and much more glamorous.

This new kid on the block is polycarbonate, and technological advances have enabled it to rise through the ranks from its humble beginnings cladding cheap greenhouses to superstar status. Tate Modern architect Herzog & de Meuron is so in love with this material that it is using the plastic to clad the facade of a modern dance centre in south-east London. The vibrant blues, greens and purples of the translucent cladding are to be illuminated from behind so the building will glow like a beacon amid the derelict factories and the garbage-clogged creek of Deptford. And in the daytime, coloured light will bring life to the stark concrete interior.

The £23m Laban Centre is designed to kick-start

the regeneration of this part of Deptford. Funded by the Arts Council, the building will house a dance school, theatre, cafe and community facilities. Harry Guggler, partner in Herzog & de Meuron, explains: "Colour is a very important issue. We wanted to enrich ordinary materials through colour and light. In the daytime, the colour recedes into the daylight. At night, the interior lights up through the panels as if colour is bleeding out of the building." In fact, the colour scheme was so integral to the design that the architects worked with artist Michael Craig-Martin to select the three colours for the facade, and work out how they would be combined.

At night, the silhouettes of dancers practising in the building will be cast against the coloured walls, in stark contrast to its grim surroundings. In the daytime, coloured light will flood into the building, giving each space its own identity so users can navigate by colour.

The two-storey concrete-framed building is like a squeezed rectangle in plan. The two straight,

short sides incline gently inwards with a concave entrance facade forming a sweeping curve. The rear of the building bows out slightly. Vertical strips of coloured polycarbonate are used to create the subtle lighting effects. The 40 mm thick "boards" are hollow with two inner skins for structural integrity and will rise to the full height of the building. The external skin is colourless and the inner skin is coloured; some boards will be strongly coloured, others a paler tone, and there will be some uncoloured sections. An 800 mm gap separates the polycarbonate from an inner layer of white diffuse laminated double glazing that will soften the light coming into the building. More light will come in through the building's flush-fitting windows.

Kristen Whittle, the project architect, explains the attractions of polycarbonate: "It has a very watery effect. The fact it goes from clear to coloured really excited us." Herzog & de Meuron has gone to great lengths to create a seamless facade, which Whittle says is "like a ►

► homogeneous skin". The polycarbonate is softly reflective while the glass provides sharper reflections. Whittle describes the effect as like "pools of water on coloured fabric".

The cladding system has had to be devised and tested from scratch. The first step in the development process was to establish how practical polycarbonate is as a building material. It has been used to clad industrial sheds in Europe, and Herzog & de Meuron used it to clad the Ricola sweet factory in France, but coloured polycarbonate has never been used with an inner skin. New technical developments mean that it is more durable, and no longer turns yellow or goes opaque after a few years. A special polishing compound will be used periodically on the Laban Centre to remove any graffiti or scratches.

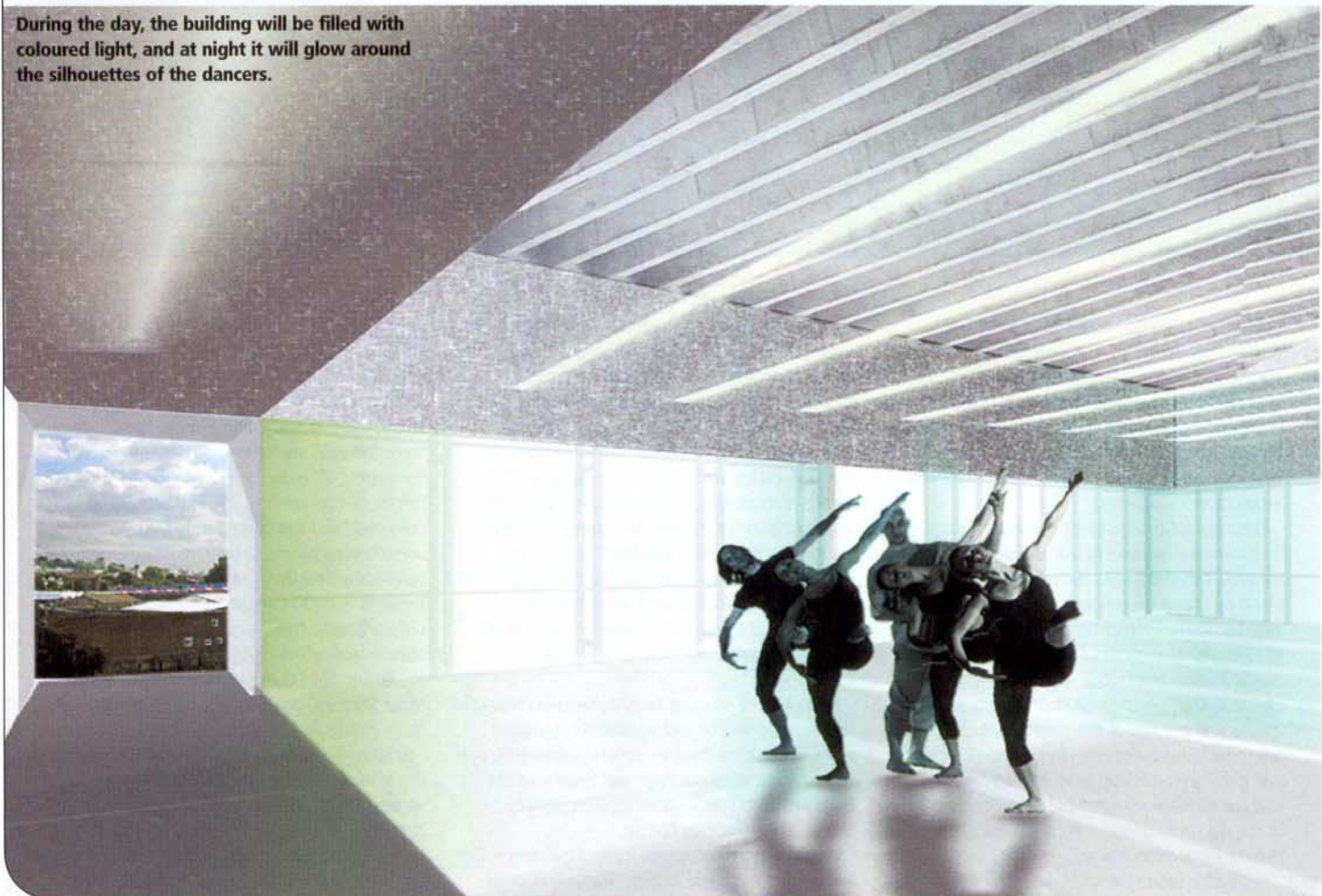
Working out the colour intensities and correct levels of light for the dance studios took a year. Arup Lighting wrestled with computer models of the colour intensities and worked out the effect each colour type would have on overall levels of illumination in the studios. But as

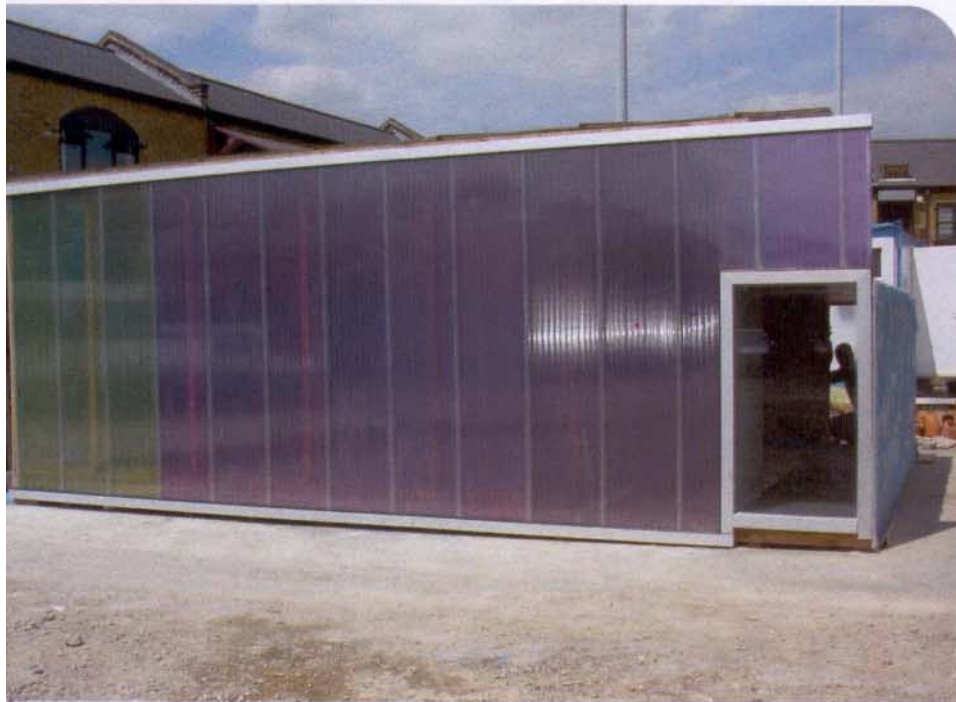
Rob Leslie-Carter, project manager for the scheme, says: "It's very difficult to put your faith in a series of figures that say there will be no glare in the studio. We were crossing our fingers hoping it would work."

A half-scale mock-up was built to clarify these issues by physically modelling the light. "This was one of the best things that we have done on this job," says Leslie-Carter. Originally, solid colour was going to be used in bands across the facade. But within two days the team agreed that they would fade the strong colour out from the edges, leaving a colourless area in the middle. This is because the dancers could become distracted by having to visually adjust between different lighting conditions as each studio also features a window and artificial "white" light. The clear areas of polycarbonate mean white light will now predominate in the studios.

The mock-up also resolved the issue of which glass type diffused the light most effectively. White diffuse laminated glass was selected in preference to acid etched glass (which saved the

During the day, the building will be filled with coloured light, and at night it will glow around the silhouettes of the dancers.





A mock-up of the facade is used to test light/colour combinations. On the finished centre, two shades of each of three hues will be used to create gradations of coloured light.

client £150,000). The glass gently diffuses the coloured light into what Leslie-Carter describes as "a beautiful, ambient glow".

Despite these preparations, turning the concept into reality proved to be a nightmare. Initial tenders were wildly over budget, forcing the architect to make some large-scale design changes to ensure its stunning vision was realised. The perimeter of the building was reduced in height from 16 m to 12 m to reduce the amount of expensive facade needed. Deep concrete beams have also been used to reduce the floor-to-ceiling height of the internal light diffusing double glazing. Despite these measures the facade will still swallow 18% of the building cost.

But the architects have managed to turn what could have been compromise to their advantage. The building now features dramatic coffered ceilings where the roof slopes from the centre towards the lowered facade. The deep concrete upstand beams at the perimeter provide a handy surface to mount acoustic insulation and will also increase thermal mass, helping to regulate the temperature of the building. The internal glazing is still a generous 3 m high; if it had been much higher this would have increased problems of glare.

Cutting costs has not prevented the architect from carefully detailing the facade to maintain its flush appearance. It is topped by an anodised aluminium capping piece in the same colour and

plane as the roof, giving the impression that the it blends seamlessly into the facade. Special acrylic corner pieces have been made to avoid the use of metal that would break up the visual integrity of the cladding. Stepped double glazing has been used for the windows at ground level to extend the glass below the floor plate and the glass has been fritted to hide the concrete floor plate.

Building the facade should be relatively straightforward. The polycarbonate boards slot together vertically just like tongue-and-groove wall cladding and span the full height of the building, attached to a galvanised steel frame. Two shades of each of the three colours will provide the tonal variations.

The gap between the polycarbonate and the standard double glazing system will help cool the building in summer, and in winter the layer of air between the two skins will help insulate the building.

Work started on site in September last year. The insitu concrete frame is complete and cladding contractor Hirsch started work in August. The inner double glazing units are being installed and fitting the polycarbonate is about to begin. All the polycarbonate should be in place by the end of January 2002. This will have its protective film left on until the building is finished in August 2002 when it will be ripped off to lift the gloom of Deptford with a great splash of rejuvenating colour.

Polycarbonate: a star is born

Polycarbonate has many properties that make it ideal as a cladding material. It is transparent with very similar light transmittance properties as glass, but is also virtually unbreakable and non-flammable.

For cladding, polycarbonate is extruded into profiles with an inner and outer skin with connecting ribs for increased rigidity. Inner skins can be incorporated within the profile to increase its thermal properties. For example, the cladding on the Laban Centre has four layers with an impressive U-value of 1.45 W/m²°C. Polycarbonate can also reduce reliance on secondary solar control; the panels used at the Laban Centre feature dimpled inner skins that diffuse the light.

Concerns over the durability of polycarbonate have now been allayed thanks to new technology. Rodeca, the German maker that supplied the panels for the Laban Centre, guarantees that the polycarbonate will lose no more than 1% of its transparency over the first 10 years. The project architect, Kristen Whittle expects it to last for 30 to 40 years.

Polycarbonate can also be cheap and is quick and easy to erect. The panels feature a waterproof tongue-and-groove joint so it slots together on site. It can be used in lengths up to 16 m – the main limitation is the size of the delivery truck. Whittle believes polycarbonate offers so many advantages that it is unlikely to remain a neglected product for long. She expects to see a rash of buildings in which polycarbonate is the star.