

GLASS PRO

Advances in glass processing have meant that glass has become a key architectural material.

Scott Sinden, managing director of **ESG**, looks at the possibilities that modern techniques have allowed.

In the built environment, the right construction materials are as important as design; whatever the architect can imagine, he must have the materials to transform a concept into a reality. Just a few years ago, predominantly glass structures were not possible; now they are a huge part of the urban landscape, and are establishing their role even in more rural areas, helping to bring the great outdoors inside. More than ever, originality in architecture relies on having the materials to successfully push boundaries.

DRAMATIC DEVELOPMENTS

Glass has long been essential in the design of prestigious buildings. Once the preserve of the church and the rich, intricate stained glass designs were embraced by a whole generation of inter-war architects and applied to family home windows and doors, as well as commercial buildings. Plain and mirrored glass were frequently used as media for advertising. In Victorian times, skylights, glass houses and conservatories became popular. In the 21st century, developments have been more dramatic.

Current processes have helped make glass one of the most versatile construction materials. The process of laminating toughened glass has allowed it to be used in structural applications previously thought impossible. These include stair treads, flooring, balustrades, balconies, roofs and atriums. A whole host of possibilities have been opened up by new processes, taking glass from a structural material to a major design element. Recent innovations in glass processing have added fade-proof, truer colour and visual elements, which can be deployed almost anywhere in the building.

In commercial premises, for instance, an organisation's identity and values can be conveyed in ways which could not have been achieved just two decades ago. Using colour and design to create new effects with glass has also made it a safer medium to use, simply because it now gets noticed.

A growing trend for architects is to use glass as a substrate, with a range of colour paints or lacquers applied to the inner surface, creating a high gloss colour effect. But modern techniques can allow more than colour to be added to the

Designs on the future of glass

design. In recent years, the innovative process of encapsulation has opened up more possibilities. By encapsulating a huge variety of materials such as films, graphics (full-colour printed manifestation), fabrics, some plastics, wood or even metal between the interlayers of the glass, designers and architects can introduce all kinds of design elements.

This process can also broaden the versatility of glass in structural applications. For example, the head of a bolt can be encapsulated between layers of glass, allowing a glass stair tread to appear as if it is suspended in mid-air. Bolts are supplied to the glass processor, who drills and inserts them through the lower layer, then sandwiches the bolt head in the interlayer, fusing a smooth, uninterrupted top layer of glass above the bolt head. The stair treads are then delivered to site with the bolt embedded, ready to be fitted to the supporting structure. The appearance of a floating, flawless tread is particularly pleasing, while the dirt-resistant surface of the glass ensures that it can be kept immaculately clean and as beautiful as when first installed.

Encapsulation is achieved in the laminating process, which can be done using annealed or toughened glass. The laminating process itself helps to ensure that the architect's design is long lasting. Toughened glass, normally five to seven times stronger than ordinary float glass, breaks, when damaged, into small harmless fragments. When laminated with a polyvinyl butyral (PVB) or EVA (ethylene and vinyl acetate copolymer) layer between the glass panels, the fragments are

held together. A panel in a vital safety area, such as a balcony, will therefore remain in place if damaged, maintaining a safe barrier.

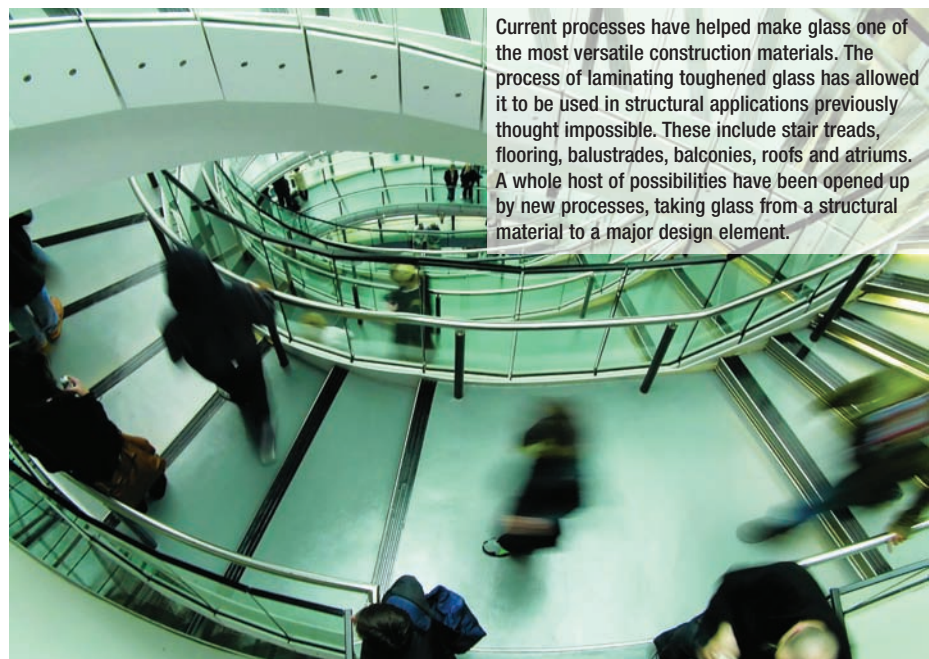
Colour and design can be also added by printing onto, or back painting, the inner surface of the glass layer itself; or a printed film can be inserted between the layers. The glass then protects the decorated surface – indeed the days of applying films to the outer surfaces of glass, where they can be scuffed and damaged, are over for the astute architect. The PVB interlayer also blocks 99% of UV rays, preserving the colour of anything sandwiched between the glass layers.

Etched glass has long been a popular tool for the architect, but requires the use of acid treatments. Today, a similar effect can be achieved through a newer sandblasting process, which allows designs to be reproduced more cost-effectively.

The use of safety materials, such as fire-resistant safety, toughened and laminated glass, can all be adopted with little compromise on design. For areas which require particularly high safety standards, such as balconies and stair wells, specialist glass such as toughened laminated glass can be used, either alone or together with the encapsulation effect.

The wise architect should now take a close look at modern glass processing techniques. Behind the scenes, much of the ability to create a modern stunning building relies almost as much on the glass processor's art as it does on the architect's imagination.

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