

Natural selection

Roof windows are used in a diverse array of projects, none more so than an exhibit at London Zoo, where they help simulate Giant Galapagos Tortoises' natural habitat.

There can be no doubt that, when used in combinations, roof windows make a dramatic visual statement. The level of natural daylight they bring to a living or working area invariably makes them a focal point in their own right.

In commercial situations, roof windows have extended design scope for a vast array of roof types. They are now routinely used in imaginative ways for projects of considerable diversity. The new ZSL London 'Giants of the Galapagos' exhibit, featuring rare Galapagos Giant Tortoises, is a prime example of a stylish, practical yet somewhat unusual design for a particular need. Natural daylight was key to the creation of an environment reminiscent of the animals' natural habitat. The building reflects the geometry of the site with a mono-pitched, partly glazed roof, facing south for maximum sunlight. The visitors are offered good views of the outside enclosure as well as the internal areas, through a large faceted glazed wall. Architects Wharmby Kozdon used 18 Fakro FTP-V centre pivot roof windows in a series of combinations to occupy 40 per cent of the overall span.

The building has been designed as a low, well insulated structure with glass and green roof to minimise energy consumption for both heating and cooling, all within the limitations of a relatively low budget and a short construction programme. It makes use of natural lighting with 40 per cent of the building's roof area being glazed to provide the tortoises the required natural UV while inside the building. Walls are insulated to a very high specification and all windows have low E glass double glazing to help reduce heat loss. The low energy building forms part of a bigger scheme of 'Gigantic Reptiles' at London Zoo, sitting along side the recently built Komodo Dragon house and the 1900 Reptile House.

The roof windows are a critical component of the building. Architect Mike Kozdon explained, "We needed a roof which would provide relatively large areas of evenly distributed natural light. We therefore needed an affordable, high-performance roof window which could be used in combination where



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necessary. The short construction programme did not allow for extended lead-in periods for delivery normally associated with bespoke specialist products. The windows needed to be fully opening in hot weather and provide trickle ventilation during cold weather. They also had to be suitable for integration within a biodiverse green roof, the surface of which needed, ideally, to be flush with the outside face of the roof windows. The Fakro FTP-V windows provided the solution to these problems and satisfied all these requirements".

A U-value of 1.4W/m²K sets a high standard for the roof windows, but they offer additional benefits which are not entirely obvious at first glance. The sleek frames enable a larger glazing area to be provided without detriment to durability or stability, while topSafe® technology (unique to Fakro windows) provides the highest level of security currently available in a standard product (BS EN 13049 Class III). Even if inadvertently stepped on during routine maintenance of the green roof, they will withstand the weight.

Regent's Park has been a conservation area since 1969 and the zoo boasts a number of listed buildings. Consultations held with English Heritage led to natural materials such as green oak batten and board and reclaimed ekki hardwood posts being specified. Wharmby Kozdon had used a green roof for their earlier design of the zoo's Komodo Dragon house and had also designed its 'Web of Life' building. Their bold use of the 78 x 140 cm windows in the Galapagos Exhibit took roof design a stage further, and with the roof windows being from an FSC accredited source, sustainability and biodiversity requirements were met in every respect.

Eighteen roof windows in a relatively small span is unusual, but the principle of using them in combination is one that can be adapted to any loft conversion, and also green roofs.

