



Detail of Kew Treetop Walkway  
Digital Project's 3D model.

Trifurcated pylon  
developed using  
Digital Project.

Architects Marks Barfield use Gehry Technologies' Digital Project to design and deliver some of the world's leading visitor attractions on time, on budget and with sustainability at heart.

## WHEEL OF FORTUNE

With 209 million passengers the London Eye, designed and recently sold by Marks Barfield, is located on the bank of The River Thames as it flows through the Worlds Leading Tourist City; it is the world's most visited tourist structure.

Marks Barfield's most recently completed project is the Treetop Walkway at Kew Botanical Gardens. Their next will see a 170 metre vertical pier erected on the Seafront at Brighton, on the South coast of England, where the popular and historic West Pier was previously located. A circular chamber will raise 170 people at a time to thrill at the spectacular views that 360 offers.

The company combines design creativity and engineering in ways that attract millions of visitors using Gehry Technologies Digital Project (DP).

1/30 interior of podola.



technology, supplied by UK VAR, Desktop Engineering. Chris Smiles, Associate at Marks Barfield, explained how this methodology is deployed. "Our practice develops unique propositions that combine multiple and interconnected functions of design, engineering, commercial and structural considerations including ground engineering, aerodynamics and deflection along with support analysis and complex mechanisms. We have been using Digital Project for 2 years and found that its parametric functionality allow us to rationalise designs taking all of these considerations into account. This is crucial because our designs have a primary reliance on mechanical and structural analysis and because of this, a great number of changes inevitably occur before a final solution is achieved."

## GROUP TICKET

Marks Barfield has 7 people trained to use DP and has benefited from support in this and other routes to best practice from Desktop Engineering (DTE) which, with its multi-industry customer base is able to deliver the most appropriate methods from aerospace and automotive engineering to the AEC sector. DTE Managing Director Geoff Haines commented, "DP was developed from Dassault Systèmes CATIA technology by Gehry Technologies to deliver advanced design-to-manufacture technology to architects and structural engineers.

It is enjoying considerable success among leading practices including Arup, Zaha Hadid, SOM, Allies and Morrison where parametric 3D based model technology secures a better outcome from better designs."

Having produced a finished design DP is used to communicate to fabricators, contractors and detailers using formats best suited to their work practices. Designer, Yan Gao spoke about this aspect of the process. "The ability to communicate to our supply chain is crucial to ensure that our design intentions are realised in the final structure and that inputs from consultants are efficiently rationalised and communicated in the design."

Chris Smiles added, "Accurate and timely communication of design iterations and their impact on the final form allows us to make better decisions which are based on more complete and precise information. This provides more design options and greater flexibility; DP effectively keeps you in the picture."

## BRANCH AND ROOT REVEAL

One example of the efficient use of DP is found in the development of the Kew Gardens Treetop Walkway where the use of inverse kinematics enabled the optimum location of pylons and the chain of bridge sections that link them together into a 200 metre tree top tour.



Treetop walkway at Kew gardens London.



Reduced BOM and use of repeated parts made possible with DP.

Looking up to the Treetop walkway.

# Up-Up and Away

By Nick Lerner

## Gehry Technologies Digital Project delivers advanced design-to-manufacture technology.

There were many constraints in the project not least being the requirement to avoid damaging the roots of nearby trees – these had been previously mapped using radar. The parametric capabilities of DP bore fruit in this aspect of the project by allowing the design elements to act in a parent child relationship. This allowed the designers to move one element and have others react to the change logically and within the design constraints that the overall scheme demanded.

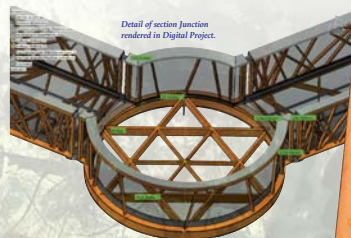
DP methodology also allowed the walkway's bill of materials to be reduced through standardisation of components and this in turn reduced project completion time to just 9 months. Yan Gao commented, "Our experience of DP is that it increases design productivity by 30 to 40% allowing us to meet tight deadlines and bring in contractors much earlier than would otherwise be possible. This enables concurrent working practice by allowing contractors to start their work sooner. This brought particular dividends in the design and fabrication of the complex tri-

furcated pylon design which could not have been easily resolved using traditional methods since it required input from several parties and resulted in many design iterations. Without DP this would have demanded a much greater resource and dramatically increased the total project cost."

Another example of the benefits that have been derived from this technology is found in the Rhizotron – a subterranean space that allows visitors to see tree roots. Its inclined concrete surfaces could not be communicated using traditional techniques. With DP and its 3D imagery the building's fluid lines could be understood and built without compromising the design.

Marks Barfield is making full use of DP to design and build more attractions on a grand scale; 360 being next. As a practice that has strongly focused on sustainable design DP helps by enabling a better use of resources with less waste, facilitating designs that reflect and communicate this vision.

For more information:  
[www.marksbarfield.co.uk](http://www.marksbarfield.co.uk)  
[www.DTE.co.uk](http://www.DTE.co.uk)



Detail of section junction  
rendered in Digital Project.

In practice



dte  
DESIGN TO MANUFACTURE