COMPANY
Buro Happold

LOCATION
Natal, Brazil

SOFTWARE
Autodesk® Revit® Structure
Autodesk® Robot™ Structural Analysis

A signature stadium

Buro Happold uses Autodesk® software to help bring FIFA World Cup™ 2014 to Natal, Brazil

Autodesk Revit Structure software helps us to be very fluid when we are exploring forms and working with the architects. There is a definite advantage in being able to cycle through design iterations and produce information that can be used very quickly by the rest of the team.

—**Cristobal Correa**
   Associate Principal
   Buro Happold

Natal Stadium image courtesy of Populous.

Project summary

In 2014, the FIFA World Cup™—soccer's world championship and the world's most widely viewed sporting event—will return to South America for the first time since 1978. Fittingly, the championship will be held in Brazil, the only country to have won the tournament five times. In preparation, 12 Brazilian cities will host matches in new and significantly renovated stadiums throughout the country.

One of those stadiums is the Arena das Dunas, located in the northeastern city of Natal and designed by architectural design firm Populous (formerly HOK Sport). Working closely with Populous is Buro Happold, a multidisciplinary design and engineering consultancy, whose New York–based team uses a combination of Autodesk® Revit® Structure and Autodesk® Robot™ Structural Analysis software to help create distinctive buildings such as the Natal stadium.

The challenge

"Being awarded the World Cup is a huge honor and a huge undertaking," says Cristobal Correa, associate principal at Buro Happold in New York. "Its team has won the tournament five times, but the country has not hosted the World Cup since 1950. When the world's eyes are on Brazil in 2014, they obviously want their buildings to look spectacular."

All 12 cities selected to host games will either upgrade their existing sports stadium or build a new one, each requiring a "signature" look that will distinguish it from the others. Fortunately, signature looks are what Populous and Buro Happold do best.

"Our buildings don't tend to be straightforward," says Correa. "We typically deal with architects who employ a lot of geometrical complexity to get distinctive looks. At the same time, however, we are committed to creating designs that also look buildable—designs that employ complex forms, but are actually a series of simple elements that can be attached together. Projects like the Natal stadium can really challenge the software."

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Buro Happold uses Autodesk software to help create distinctive buildings such as the Natal stadium.

Image courtesy of Buro Happold.

The Result

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In the case of Natal's proposed Arena das Dunas, one of the most distinctive features is its unusual roof. Using a combination of Autodesk Revit Structure and Autodesk Robot Structural Analysis software, the Buro Happold team has been able to take existing design models created in architectural modeling software and develop, analyze, and optimize the structural frame of the stadium.
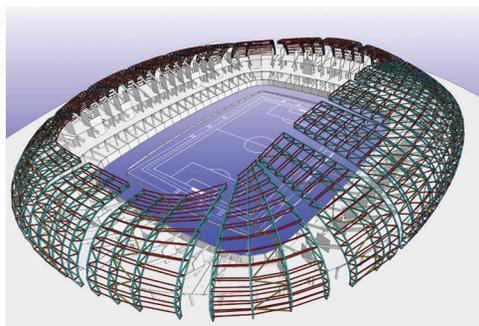

Image courtesy of Populous.

"We are very excited about the roof," says Erleen Hatfield, a partner at Buro Happold in New York. "Within Revit Structure, we can generate advanced geometry very, very quickly. We've been able to take advanced geometry from the architects and write our own customized scripts that define and generate that geometry. For the Natal roof, for instance, we were able to generate truss geometries through an application programming interface created by one of our engineers. We've experienced a 50 percent reduction in the time necessary to turn the design back around to the architect."

"The roof design is very cool and complex," Correa agrees. "Now that the project is being bid out to contractors, we can use the Autodesk software tools to analyze and come up with accurate steel weights, which are of particular interest to contractors when they are bidding. We have really worked hard to appropriately interface Revit Structure with our structural analysis software, and now we're looking at integrating that information into the fabrication models."

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>
> —**Erleen Hatfield**
> Partner
> Buro Happold

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