



Faster, better design process with BIM

Project: Chhatrapati Shivaji International Airport Air Traffic Control Tower & Technical Block

Location: Mumbai, India

Type: Aviation

Scheduled for completion: 2012



"An unusual design calls for an unusual work flow, and REVIT is our software of choice."

Mr. Dickson Mak,
Associate / Design Architect, HOK

When HOK won the tender for designing the Chhatrapati Shivaji International Airport Air Traffic Control Tower & Technical Block – for the new airport in Mumbai, India – they did so with a design that was more sculptural than the competition. Featuring a curvy organic stalk, the tower was designed to fit within the site’s landscape plan.

For all the design’s artsy appearance, the tower would have to be built to strict parameters, including a height limit, a specified area for the top floor, and a wide cone of view across the airport. From day one, says Mr. Owen Cockle, an associate with HOK, the design team knew they would use Autodesk Revit BIM software: “Without Autodesk Revit, we may have thought twice about changing the design, which would have been much more labour intensive.”

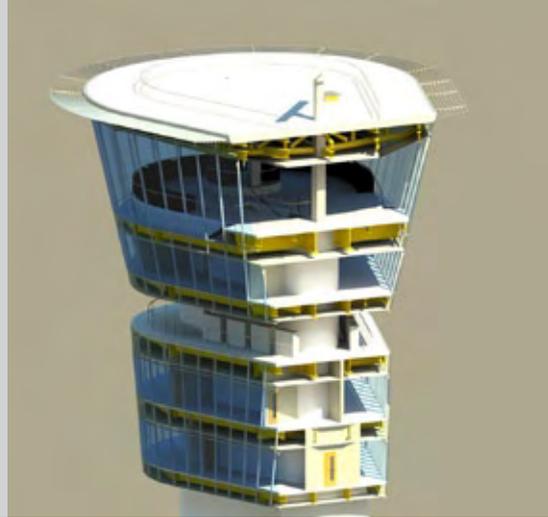
A strong working relationship

HOK is among the largest international architecture firms to have fully embraced BIM. Mr. Dickson Mak, HOK associate/design architect, recalls the firm’s early experiences with BIM, when he worked in the Los Angeles and San Francisco offices around five years ago. “I did some fairly simple pilot projects, and BIM was making quite a lot of noise – it was covered in a lot of seminars, and publications,” he says. HOK looked at



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available software, and in 2005 the board of directors decided to adopt Autodesk Revit.

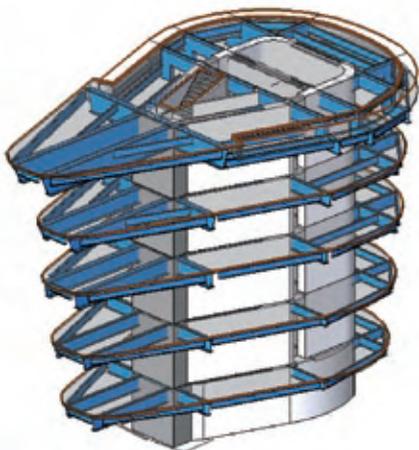
HOK and Autodesk have since forged a strong working relationship. HOK provided significant feedback to Autodesk on how to improve Autodesk Revit products, and is now close to using Autodesk Revit for all new projects worldwide. Two Autodesk customer success engineers have spent a week with HOK’s Hong Kong team, to help make them more productive with using Autodesk Revit.

Finding the best design options

For HOK, says Mak, Autodesk Revit is especially a tool that enables architects to visualise their designs. With it, they can quickly make detailed design changes, and there are particular advantages in detailed design stages, such as when an architect might change a building’s floor height – compared to traditional methods, Autodesk Revit makes it easy to see how such changes impact designs.

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Even people who aren’t architects or engineers can be impressed by BIM models. Using the models, it’s possible



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to show a building interior, and to then step back to show exterior views, spinning around the building. Clients can be excited seeing a virtual building this way. “It is an intelligent model - a real building,” says Mr. Cockle. “It’s meaningful.”

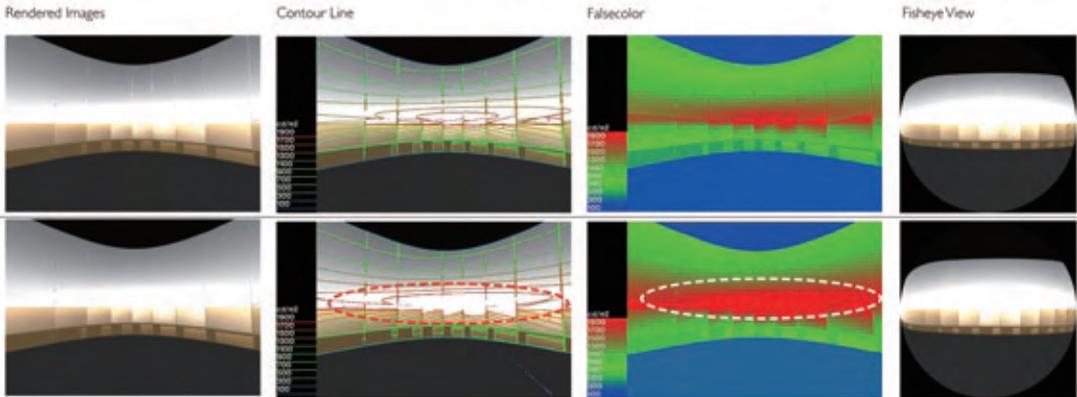
Collaborating to find clashes

BIM models can show far more in architecture, but more comprehensive models require collaboration with other teams who are involved in creating buildings. In the case of the airport tower, HOK worked closely with Arup, which was responsible for the structure.

“This worked fantastically,” says Mr. Cockle. “We worked on the skin and interior; they did the floors and columns. We gave Arup our model, they worked

on the structure, which we brought into our model.” By combining the information in one BIM model, the HOK and Arup teams were able to find and solve clashes involving architectural and structural elements of the tower – before construction even commenced.

The BIM model played a key role in helping show the client where suggested design options would work or not work in practice. An example arose early on – when the HOK team showed the planned generator would not fit in the large plant room intended for the bottom of the tower. The walls were sloping – as is typical for rooms throughout the tower – and the problem might have been hard to spot with 2D drawings, but was easily seen and demonstrated with the 3D model.



Quickly assessing design changes

Adding to pressure on the architects, the client often requested design changes – and typically wanted to know the next morning whether a change would work. Here, the BIM model proved crucial – allowing the HOK team to quickly verify whether changes would prove viable, including the ways the impacts ramified throughout the tower. “We had very specific standards for each room, and set the model to blink red if a required area became too low,” says Mr. Cockle.

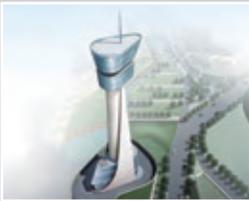
As changes were made to room types, the BIM model instantly revised the table of room areas throughout the tower. Even small changes could be tested in the BIM model – for instance, when the client suggested adding five washbasins to a ground floor toilet, the model showed there wasn’t room.

After assessing the results of changes, the HOK team used the BIM model to create images they could show the client during video conferences.

The team also used Autodesk Revit for generating 2D drawings – far more quickly than they could have done with traditional design methods. “What takes a day now would have taken five days before,” says Mr. Cockle.

Reflecting on the use of BIM, Mr. Cockle says, “Traditional ways of building design are very compartmentalised. With Autodesk Revit, the process is more holistic. I think BIM will change the industry.”





About HOK

HOK was founded in St. Louis by three principals – George Hellmuth, Gyo Obata and George Kassabaum in 1955. With the vision of being the world’s leader in innovation for the built environment, they have successfully made our expertise available across the globe in the last 50+ years. HOK is currently operating from 24 established office locations with more than 2,000 employees and their projects can be found in almost every continent in the world.

Their continuous success has been regularly acknowledged by industry watchers, their recent recognitions include:

- #1 Engineering News-Record “Top Green Design Firms”, June 2009
- #1 Engineering News-Record “Top Green Design Firms”, June 2008
- #1 Engineering News-Record “Top 500 Design Firms” (A/E Firms), April 2009
- #1 Building Design & Construction “Giants”, July 2009
- #2 Interior Design “Top 100 Giants”, January 2009
- #4 Architectural Firm, Building Design (UK), January 2009
- Urban Design Firm of the Year, AsiaCRE, April 2008

Their ability to collaborate across markets and disciplines in every part of the world allow us to see the “big picture” and, because they approach design from so many different perspectives, gives them an unparalleled ability to innovate.