

# The Luk Hoi Tong Co., Limited

**Office:**

Proposed Office  
Redevelopment of 31 Queen's Road Central

**Location:**

Central, Hong Kong

**Type:**

Commercial

**Scheduled Time of Completion:**

2011

## A Design Dress Rehearsal Before Building



The exquisite exterior of the new building created in BIM.

Located in a highly visible and centrally located spot in Hong Kong, the LHT project team wished to create a more iconic building by remodelling the older office building. As a property developer, LHT has a strong interest in how BIM can improve and speed up the development process. BIM represents a revolutionary new way of working in the building industry that has the potential to improve the design and construction processes very significantly. To be able to use BIM effectively on the 31 Queen's Road Central project signifies the company is a participant in the forefront of this innovative process.

## The Combination of the Ancient and the Advanced

Inspiration for the new building design is drawn from the site and its unique cinematic history and physical characteristics. Situated at a prominent corner next to the pedestrian Theatre Lane, the sculptural form of the building façade is derived from the metaphor of a theatre curtain opening to reveal the office and retail programs within. The openness and transparency of the building façade frames a new dynamic and engaging street environment for Theatre Lane. Main concerns included the complexity of the exterior curtain wall and complex roof system and the numerous site constraints imposed on their construction process in the constantly busy part of Central. To achieve this complex design, BIM technology comes in handy.

The team favoured Autodesk's software versatility and compatibility with different software platforms, in that most consultants that they worked with are familiar with the software. The design team from Rocco Design Architects Limited successfully executed the challenging design with the aid of BIM as a powerful visualization and design tool.

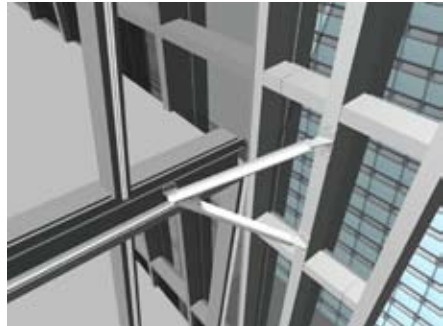
## Visualization at an Early Stage

The project team was able to meet their very challenging timeline with the aid of AutoCAD, Autodesk Revit, Autodesk Navisworks. Because they were able to model and then visualize design proposals in a very realistic way quickly, the team in turn was able to modify and confirm their design decisions in a very fast manner. BIM allowed them to visualize, the design very realistically at an early stage so that they were able to evaluate and resolve problems and make design revisions early on.

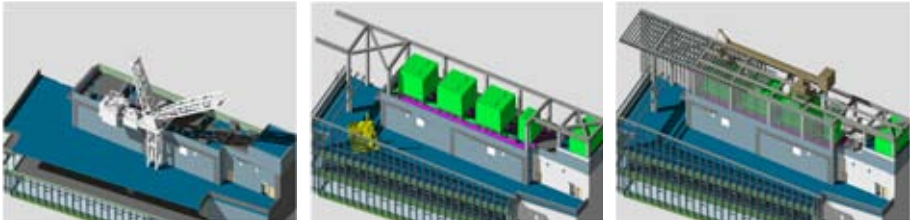
Throughout the design and construction process, the team had used BIM as an intense in-depth visualization tool. The key to its effectiveness was that it allowed them evaluate and analyze their product from multiple perspectives. They traditionally use a third person perspective to analyze building systems and details, but BIM also allowed them to easily use a first person perspective to



The curtain wall views from the inside.



Bracing details of the new building.



**The construction sequence of the roof feature.**

evaluate the experiential qualitative aspects of the building spaces. Overall BIM was able to improve and enhance their building design in the following areas:

### **i. Exterior Design of the Building**

The team was able to visualize the exterior design in a very realistic surrounding context from multiple perspectives, allowing them to fine tune the aesthetics of the design based on their clear understanding of how the design would look and feel from different vantage points. The LHT team used BIM to study the sculptural nature of their curtain wall facing Theatre Lane and how it impacts the street environment. This is very different from the 3D images in the old days where they are just mere representations of the artists. With BIM, the project team recognized the images generated were accurate representation of the design and the same set of information is going to be used in the construction.

### **ii. Curtain Wall**

The team created virtual mockups of the architectural details of their complex curtain wall design, which observed from the vantage point of both inside and outside the building, allowed them to analyze and refine the details' aesthetics and structural capacities. Ultimately, they made revisions to create more elegant and more structurally efficient curtain wall details. An example is a bracing

detail supporting a cantilevered portion of the curtain wall.

### **iii. Roof Design**

BIM helped the team coordinated and combined the mechanical area of the design and construction sequencing of their complex roof design feature which is important to the aesthetics of the building, but at the same time had to incorporate the building's mechanical and building maintenance unit equipments. This was a very challenging task as they had many functional requirements that must be incorporated within various structural, spatial, and constructability limitations. BIM allowed their contractors to successfully coordinate the construction sequence of these structural and mechanical elements.

### **Resolving Design Conflict**

Virtual overlay of their building's structural and M&E systems allowed them to detect conflicts and clashes at an early stage, so that the team was able to resolve these problems without delay, while as part of the same analytical process they were able to improve the overall mechanical layouts at each floor. As well, necessary adjustments were made early to avoid construction errors.

Our contractor used BIM as an analytical tool at the very beginning of the process to understand the design better, allowing

for more efficient construction sequencing, resulting in construction cost savings in time and materials. This helped to make sure the project can be completed on time according to the project schedule.

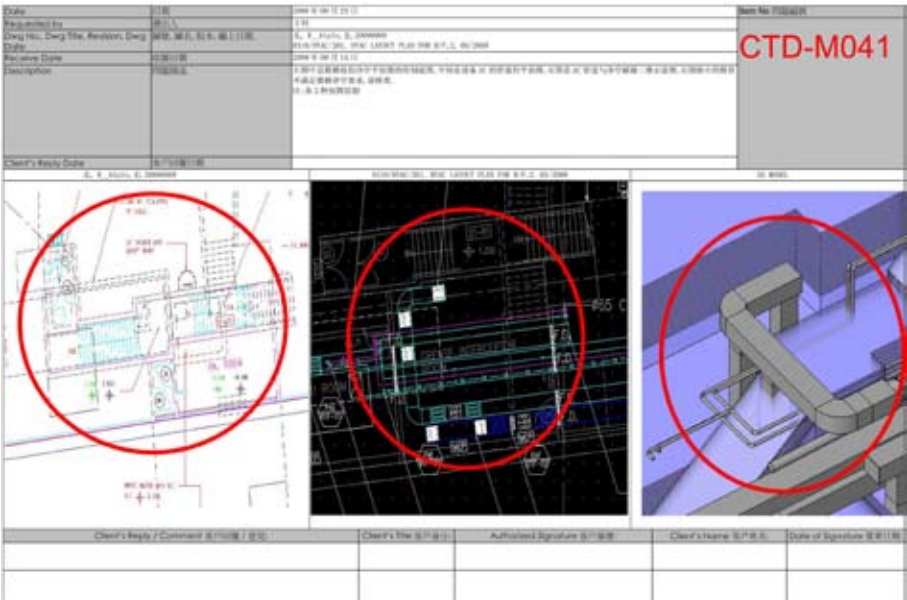
**Refining Construction Details**

This was the first time the LHT company has used BIM comprehensively. Our design teams have traditionally used AutoCAD for past projects. BIM software is a much more efficient and powerful design and documentation tool as compared to traditional 2D-based design and documentation tools such as AutoCAD. With BIM, the team can design, visualize, perform analyses, and generate documentation all in the same virtual environment. Conflict or clash detection can be performed quite automatically. Moreover, with its capability for accuracy and precision, BIM is a valuable design tool for the refinement of construction details.

By using BIM as an analytical tool, the team was able to study the architectural and M&E layouts of the building quite easily in 3D, allowing them to quickly evaluate and make design revisions that ultimately improved our building efficiency, thus yielding them higher building productivity. For example, one result was that they were able to improve the mechanical layout inside the ceiling spaces and generate higher headroom clearances for our building’s commercial lettable spaces.

**Creating a More Sustainable Building at a Lower Construction Cost**

BIM had helped the LHT contractors built in a more sustainable manner. They were able to estimate material quantities much more accurately. Thus, building materials could be saved. With better preparation for construction sequencing, contractors could plan to work more efficiently and save time, thus reducing the embodied energy associated





**M&E and structural systems analysis.**

with a typically longer construction timeline. This translates to savings in construction costs. Also, because the team could visualize the product at the early design stage, they could evaluate and make design changes early, to avoid costs involved with making design changes during or after construction.

In the future, LHT hopes that all parties can use BIM effectively. For example, for design consultants, the LHT thinks that it would be in the client's best interest if the design consultants can spend more time working on design issues and improving the quality of a design product rather than on dealing with documentation coordination, drawing management, and conflict detection. BIM takes care of all these things to allow the designers to focus on design. Cities like Hong Kong are perfect settings for the application of BIM, because of its density and limited space which creates a lot of complexity and restrictions for the development process. BIM is a comprehensive tool that can help developers and designers visualize and understand the nature of this complexity in a quick and clear manner. Darrell Chan, an Executive Director

of LHT further commented that, "Overall the design process was truly enhanced by our ability to experience numerous realistic virtual mockups. In this sense, much like a director of a theatrical production, the design team had the benefit of a true Design Dress Rehearsal for our project at Theatre Lane."



### **ABOUT THE LUK HOI TONG CO., LIMITED**

The Luk Hoi Tong Co., Ltd. (LHT) is a privately owned development company in Hong Kong founded in 1926. LHT has over the years developed various residential and commercial properties throughout the Hong Kong Region. The company currently holds a property portfolio that includes retail and commercial office properties such as the one being developed at 31 Queen's Road Central.

At 31 Queen's Road Central, the company had operated the historic Queen's Theatre for over 80 years prior to the site's redevelopment in 2008. The new development will be a premium mixed-use commercial building. LHT is strongly committed to high-quality sustainable development and the continual betterment of urban settings that surround its building projects.

In addition, the company also currently operates the Luk Kwok Hotel in Wanchai, the Nathan Hotel on Nathan Road in Kowloon, and the Dragon Inn Seafood Restaurant in the New Territories.