

COMPANY

Pinnacle Infotech

LOCATION

Mumbai, India

SOFTWARE

Autodesk® Navisworks®**Autodesk® Building Design Suite**

Autodesk Building Suite helps Pinnacle Infotech for BIM of Iconic Msheireb Downtown

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—**Avijit Pramanik**
Deputy Manager
Pinnacle Infotech

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—**Biswaroop Todi**
Vice President
Pinnacle Infotech

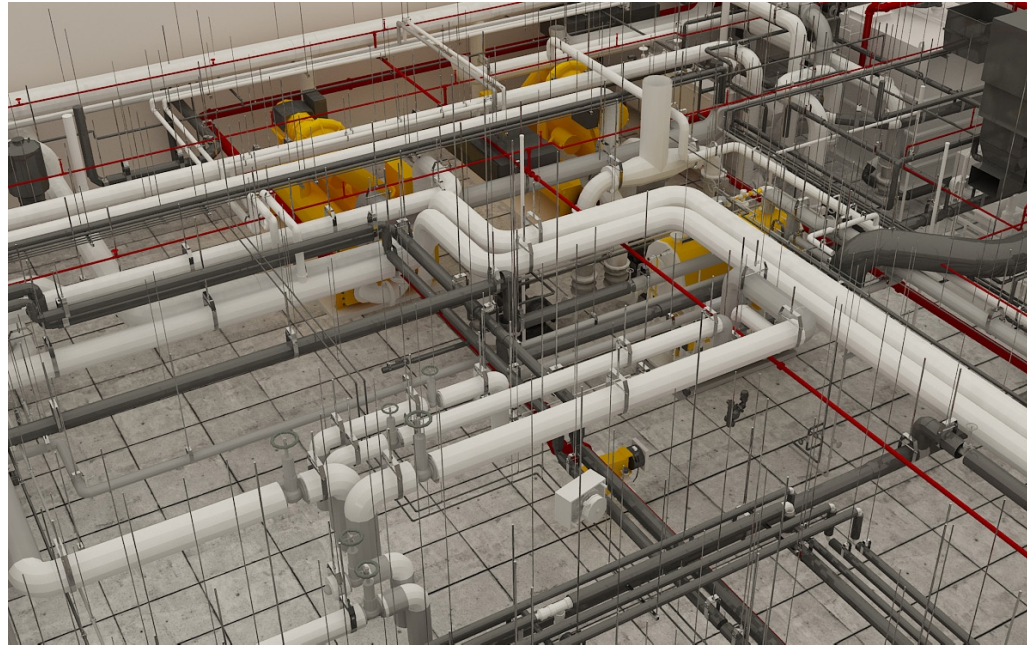


Image courtesy of Pinnacle Infotech

Headquartered in Durgapur, India, Pinnacle Infotech is a global leader in Building Information Modeling (BIM) engineering services. It caters to clients in more than 30 countries across time zones with global network of delivery center in India, USA, UAE and Italy.

Founded in 1998, the company is one of the most sought after name in the Architectural, Engineering and Construction industry. Its innovative BIM solution enables seamless collaboration among architects, engineers, contractors and sub-contractors and facilitates quick decision making, accurate construction documentation and improved construction and facility management.

Pinnacle Infotech is proud of its experienced team of more than 800 engineers and architects providing value engineering solutions to more than 950 esteemed global clients in construction industry. Pinnacle has won accolades in the form of numerous awards from the government and industry which includes excellence awards, innovation awards, top exporter and highest job creator awards.

The company works closely with clients and

has developed ISO 9001 certified work process to enable seamless working. Having adopted BIM for more than a decade, Pinnacle Infotech has successfully completed more than 4000 landmark projects like Dubai International Airport, Muscat Airport, Delhi International airport T3, pharmaceutical plants, Dubai Mall, Msheireb Downtown, Doha, VA Hospitals, medical centers, high rise towers, university campuses, industrial plants, dams, bridges etc. Currently Pinnacle is providing BIM and Engineering services to the upcoming tallest building in the World – Kingdom Tower at Jeddah.

Project Summary - Msheireb Downtown

One of the most promising projects undertaken by Pinnacle Infotech, Msheireb Downtown Phase III – an innovative Hub is situated in downtown Doha, State of Qatar. This mixed-use township spread approximately on 390,000 sq. m comprises of 14 buildings, which includes a 22-storey hotel building, four basement levels offering parking space to 2,200 vehicles, office, retail spaces, upscale apartments, townhouses, mosques, hotels, cultural and entertainment center among others.

The project is part of the world’s first sustainable regeneration of a downtown area in a modern

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city, combining traditional local building practices and design influences with the latest technologies in an energy efficient and environmental management. 150 Engineers, Architects and BIM professionals (130 In-house+20 Onsite Deputation) have worked on the project.

The Challenges

Modernization has led to a major boom in Qatar's construction industry, the projects are huge in terms of built-up area. Frequent alterations in design/ plans can lead to major errors in construction, while overshooting budgetary allocations and inordinate delays, resulting in work stoppages. Moreover, such projects require strong collaboration between the global team - the owner, developer, design architect, structural engineer, MEP engineer, general contractor, MEP contractor and design management consultants. It was a major challenge for Pinnacle Infotech to maintain the right balance.

BIM process identified several constructability and maintenance issues:

- Several instances of IFC plan not matching with the elevations, schedules and sections. Eg Mismatch between widths of the doors in the door schedules with the IFC plans.
- Incomplete information - Wall finishes and types, dimensions, material types, insulation for the vertical drainage pipes and condensate drain pipes and fittings, standard clearances etc. 6766 RFI's had to be raised to resolve these issues. Besides several workshops were conducted.
- Constructability issues - Several code related and constructability issues were raised through RFI's and the model and drawing were updated based on the responses.
- Maintenance issues - Accessibility for maintenance and operations issues were identified during the BIM process and RFI's were raised to resolve it.

Along with the above challenges there were some Architectural, Structural & MEP Risks like

- Timely Delivery of the file incorporating all the bulletin changes to stop delay in construction
- Preparing Coordinated Drawings within the allotted cost estimate of the project
- Maintaining the Quality of the created BIM Model for saving project cost
- 26 Change bulletins were issued during

the entire process but the construction schedule remain unchanged.

MEP Risks

- 900mm diameter ENVAC pipe introduced in the middle of the project and so coordination of services became a challenge
- 2 (Distinct) cooling pipes of 500 mm diameter introduced for service corridors in the middle of the project making coordination of services a challenge

26 Bulletin changes some of which were major changes, had to be incorporated without extension of time.

The Solution

The company implemented BIM process using Autodesk software to meet the demanding goals set for the construction of Msheireb Downtown. Project team chose to implement Autodesk building suite comprising of Autodesk® Revit® Architecture 2012, Autodesk® Revit® Structure 2012 as well as Autodesk® Revit® MEP 2012 for the design and documentation of Msheireb. Autodesk® Navisworks® Manage 2012 was used for coordination & collaboration and AutoCAD® 2014 for drawing creation. Navisworks® Manage, 3ds Max® Design and Revit® software for Virtual Simulation of the construction plan.

The company prepared a 4D Model to track the project time-scale. The 4D construction model helped the construction managers to track the project timeline and allocate resources control cost and rework. Besides, the task of laying the ceramic tiles with utmost precision for reducing the wastage was achieved by adopting LOD 400 BIM, which allowed segregated procurement of tiles as per level-wise requirement.

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said Biswaroop Todi , Vice President, Pinnacle Infotech.

Value Engineering done by Pinnacle for Architectural, Structural Trade & MEP Trades

- Detected Design and constructability issues.
- Facilitated Complete Coordination among all trades
- Saved rework and Material Cost
- Avoided work stoppage
- Provided Waste Management (ENVAC System)
- Facilitated Arrangement of Tiles
- Innovative Shop Drawings to support site construction crew.



Image courtesy of Pinnacle Infotech

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— **Bimal Patwari**
CEO
Pinnacle Infotech

BIM helped Pinnacle Infotech to plan using intelligent models and allowed its team to anticipate, plan and coordinate every aspect of the project design, detailing and construction.

MEP Trades

- Optimized Cable, cable tray sizes and routing to comply with codes and save costs and installation time.
- Modified Duct and Pipe Routing to reduce the cost of project & eliminate unnecessary fittings improving the system efficiency.
- Modified Vent Pipe design to suit site constructability
- Embedded services to speed up the site slab casting
- Coordinated MEP services with Existing structure and Interior Drawings.
- Optimized builder's work, slab and wall opening

Results:

Pinnacle Infotech benefitted in terms of accuracy, data integrity, revision management, quality of detailing and higher productivity. The company successfully generated coordinated Revit models and allowed all stake holders to check possible interferences among all building systems, leading to better project planning. This reduced construction delays, saving both time and money.

The camera visualization technique in Revit also helped the company in providing a privacy element to each apartment in the building which could earlier be detected only through onsite inspection.

BIM helped Pinnacle Infotech to plan using intelligent models and allowed its team to anticipate, plan and coordinate every aspect of the project design, detailing and construction. It helped to identify the constructability issues before the construction, thus avoiding work stoppages, rework, wastage of time, material and manpower.

"Revit BIM software helped us progress through each phase of the project, starting from floor setup to structural and MEP clash detection," adds Sujit Majumder - Sr. Manager of Pinnacle.

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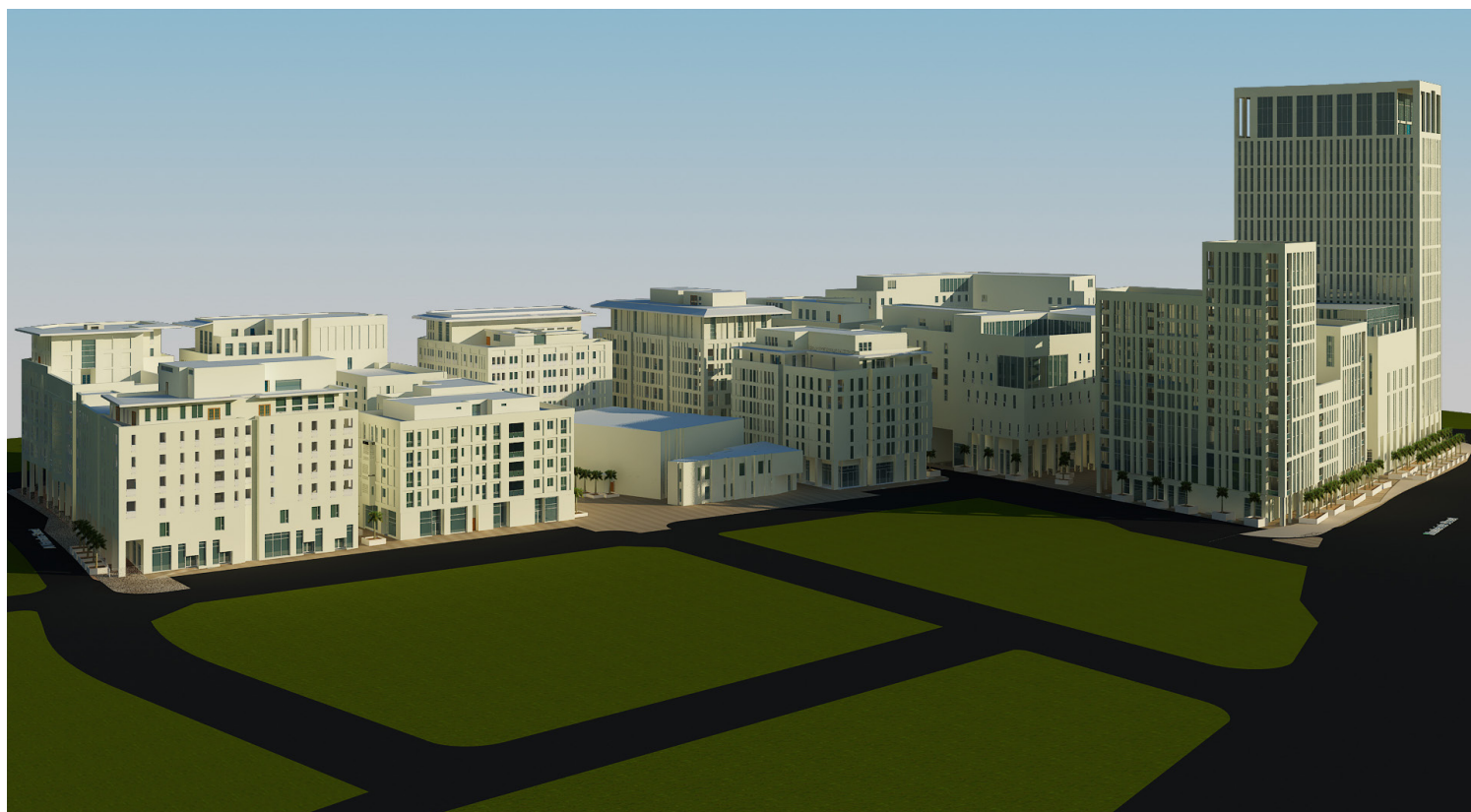


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