enventure

Engineering Excellence.
Building Trust.

Modeling Efficiency into Hospital Construction and Facilities Management

Type of Project	Client Industry	Location	Project Duration	Tools Used
Hospital	**Turnkey provider**	**USA**	**3** months	Revit+Navis-works+Lumion

Project Profile	Team details
420,000 sqft	Ar. Architect: **10** Yrs | Architect: **8** Yrs | Sr. Electrical Engineer: **8** Yrs Electrical Engineer: **5** Yrs | Sr. PHE Engineer: **12** Yrs | PHE Engineer: **6** Yrs Sr. HVAC Engineer: **12** Yrs | HVAC Engineer: **6** Yrs

When it comes to large-scale projects like hospitals, there are a multitude of risks that need to be managed – from investors to sales and marketing teams, to legal and compliance teams, all trying to get from greenfield to go-live in the shortest time possible. For the engineering and construction teams, this means multiple stakeholders to be managed. This customer who was setting up a 350,000 square foot hospital was no different. Given the scale and complexity of the project, there were naturally a diverse set of stakeholders to be managed. Precision, timeliness, and consistency in quality were going to be crucial success factors.

The customer wanted a LOD350 building information model (BIM) that would help simplify construction, extraction of 2D construction documents and Bills of Quantities (BOQ) using Revit and NavisWorks). The BIM would also serve as the reference for facilities management and maintenance activities, after the hospital was opened.

Enventure quickly established a team, offshore to begin the project estimation in collaboration with the onshore project coordinators. After acquiring the building specifications, a stringent deadline, compliance requirements for US building codes, and a request to minimize requests for information and clarifications (RFIs and RFCs), the Enventure team set out to accomplish the task.

Enventure Approach

With the challenging goal of getting the entire hospital model completed in 2800 hours flat, Enventure realized that its capabilities for standardization, automation, and repeatability would be tested to the limits.

To facilitate repeatability, the team created approximately 600 families for the Mechanical, Electrical, Plumbing and Firefighting components of the model, derived from the vendor cut sheets. Parametrization of the repeatable components exponentially increased the efficiency of the engineers developing the models.

Project/Solution Overview

The tight schedule for delivery meant that the different engineering streams would have to be parallel processed to reduce production time. To facilitate this, Enventure relied on its step-delay approach where once a particular model component was designed, the engineers would move on to the next. The validation, and quality oversight processes would be performed on the completed model and any changes/modifications would be added to the work backlog, thus avoiding lags in production.

In addition, working 24x5 in three shifts allowed for a smooth and consistent production. The typical challenge of communication and collaboration was addressed with Enventure's project management methodology that prescribed a brief overlap between shifts, during which handover was performed. In addition, the third shift would be the point of contact with the customer and was also tasked with documenting and communication review feedback and change requests to the other teams.

The high stakes also meant that the customer wanted to be hands-on aware of the progress. Enventure's project management dashboard allowed the customer to be apprised real-time with the current status.

The modeling by itself was a challenge because of the different components involved. While for an organization with the experience of Enventure, even mentioning challenges of routing plumbing and

electrical lines alongside oxygen and other gas piping in hospitals would raise eyebrows, but during the design phase every project is challenging. The challenge is only further exacerbated by the diverse set of building codes for hospitals, and a short delivery timeframe.

Customer benefits

The customer was able to complete the project execution on-time and before the onset of winter. Some of the most crucial contributors to this were:

- The project was delivered in 2700 hours, allowing the customer 100 hours of lead time to the delivery of the project – a luxury in most cases
- Enventure's value engineering helped reduce construction costs by almost 25% by reducing unwarranted routing and efficiently eliminating conflicts between the Mechanical, Electrical, Plumbing, and Firefighting structures.
- Strict adherence to US building codes allowed for a one-step approval of the construction documents, saving time, labor costs, and most importantly, maintaining the customer's reputation as contractor that consistently delivers within-budget and ahead of schedule
- Requests for Information and Clarifications were a luxury in a project like this, and Enventure's project onboarding processes were emphasized as the contributor to success, given the low (six) RFIs raised for such a complex project.

Summary

Designing MEPF for hospitals is challenging even with 23 years of experience and reassuring the customer that their work is in good hands, is always difficult. One of the key takeaways for Enventure from this project was the fact that our decision to begin the approach to the project with parametrization planning was one of the key drivers of speed and efficiency. It also emphasized the importance of our mantra – R.E.F.R

- Responsive to customers and their preferences
- Efficient with the work that we do
- Fast in acquiring the project details and fast in turnaround
- Reliable in our ability to consistently hit the target – time after time

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