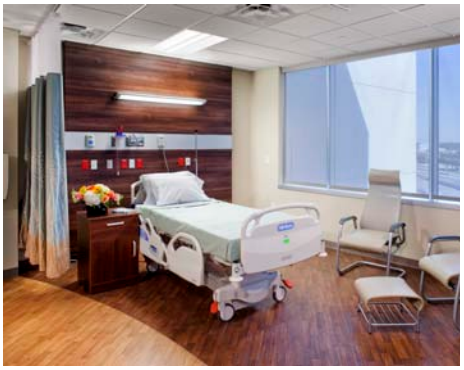
Methodist Hospital for Surgery
Addison, Texas



Team First:

A Case Study Discussing the Benefits of **Team Collaboration** and **Building Information Modeling** on the Design and Construction of a Physician-Owned Surgery Hospital Impacted by **Federal Health Care Reform**

CLIENTS
Methodist Health System
Private Physician Consortium
SRP Medical
Medica Development

PROJECT SIZE
108,500 SF
7 Operating Rooms
32 Patient Beds (including 4 ICU)
Diagnostic Imaging Suite

Rogers-O'Brien Construction

BOKA Powell

A prevailing sentiment is present today that Building Information Modeling (BIM) automatically ensures successful project outcomes. Lost in the discussion is the notion that the success of a project is inseparably tied to a cohesive collaborative spirit among team members.

Add to the debate the unique challenges health care projects present to general contractors and the design team, as well as unforeseen federal regulatory actions that affect the viability of the business model of the client, and a perfect storm scenario emerges.

Rogers-O'Brien Construction, based in Dallas, Texas, has long embraced a philosophy that partnering with the design team affords the opportunity to explore a variety of project delivery methods while optimizing team performance. Key to the partnering process is a belief that team members will commit 100 percent of their resources to the success of the project.

Early Commitment to BIM Documentation

When Rogers-O'Brien Construction and BOKA Powell architects were awarded the Methodist Hospital for Surgery project, located in Addison, Texas, the team agreed from the outset that the project needed to be drawn in BIM.

According to John Carver, senior vice president of Rogers-O'Brien, "Increasingly, hospital owners recognize that as complex as a hospital is, it requires a higher level of sophistication and coordination than other types of construction. The investment of human resources and capital for BIM are required to allow decisions to be made more quickly, and right the first time." The ability to share BIM data with all team members makes it inherently collaborative.

"Clients rely upon architects to provide the latest in technology. BIM requires more of the architect's up front time and effort, but pays back during the construction administration phase by reducing the time associated with shop drawing reviews and fewer RFIs," said Tom Dwyer, principal in charge of BOKA Powell's healthcare practice.

Twenty percent of traditional, non-institutional building construction is spent on MEP, but in healthcare projects, roughly 40 percent of the total project cost is attributed to MEP systems. After four months, a significant roadblock emerged when it was discovered that Revit software limitations left the MEP engineer at less than 60 percent document completion. Uncertainty about the MEP construction costs triggered Rogers-O'Brien to hire Brandt Engineering, a subcontractor, to complete the MEP drawings using their proprietary fabrication software. Under that methodology, the MEP construction documents progressed rapidly toward completion, and were inserted into the final construction documents.

Carson Coleman, project manager for Rogers-O'Brien, said it became clear that Revit was not vital for detailed MEP coordination, except to avoid structural conflicts. "The subs have to redraw everything for fabrication and automation. Duct work, roof drain piping and critical overhead items need to be coordinated to ensure that the plenum is sufficiently sized," Coleman said.

Early on, ownership asked that the project be completed as quickly as possible due to uncertainty about a prohibition on physician-owned hospitals in proposed federal health care reform.

"The prospect of [health care reform] legislation had been out in the health care world for a few years," said Scott Wilson with SRP Medical, the project financier. "The concept of physician ownership going away wasn't new. But while we were securing project financing, it was very questionable as to what was going to happen on that front."

Cognizant of the stakes, the team devised a fast-track construction schedule to control costs and meet the requested schedule.

Early in construction, the BIM model made site utility work particularly smooth, according to Rogers-O'Brien Construction Superintendent Donnie Tidwell. "We were able to save 25 to 30 days on underground work thanks to the subcontractors' off-site prefabrication of pipe and fittings and use of GPS technology to locate MEP slab penetrations into partitions," Tidwell said.

Health Care Reform Triggers Acceleration

Four months into a 14-month construction schedule, the physician ownership prohibition became reality. Immediately, the ownership group and Rogers-O'Brien brought the team together to discuss the feasibility of accelerating the schedule to complete 10 months of remaining work in six months. If the facility were not certified by the Centers for Medicare and Medicaid Services (CMS) by Dec 31, 2010, physician ownership would not have been possible and the project would have been in financial jeopardy.

"Failure was not an option," said Michael Schaefer, CFO of Methodist Health System.

Faced with acceleration, anxieties ran high, said Pamela Stoyanoff, COO of Methodist Health System.

"And that's when you know if your partners are good or bad partners," Stoyanoff said. "We had to sit down with Rogers-O'Brien, BOKA Powell and our other constituents and say, 'you've really got to move quickly.' It put a large onus on Rogers-O'Brien more so than BOKA Powell because BOKA Powell had done a lot of their work already. By that point, Rogers-O'Brien was having to build the hospital, and they were going to have to move at lightning speed."

Rogers-O'Brien worked with subcontractors to determine the probable cost to expedite the delivery of materials and completion by dual shifts, and then shared that information with the ownership group. With a green light, team members committed to meet the new deadline.

"Collectively, with our architectural partner BOKA Powell — along with Rogers-O'Brien subs — Methodist, Medica [the developer], SRP Medical [the financier] and physicians went to work. What impressed me most was that day the group got together to figure out how to make it work. Failure was not an option. Each team member was an advocate for our success, and we held each other accountable every day," Carver said.

The cohesiveness of the team was due in part to pre-existing working relationships among team members.

"We picked subs that we have worked with that are basically our partners," Coleman said. "We did not have to take the low bidder. So when we got into acceleration, these were all people we knew and every-

one played very fair."

With such high stakes, accuracy was key. The level of detail in the BIM models became a huge asset. "There was no time in the schedule for redos. Work had to be done right the first time," Coleman said.

An engineering surveyor used GPS technology to verify precast embed placement in the structural frame to 1/16 of an inch accuracy. Of more than 600 embeds, only two were misaligned, and human error was to blame. Fortunately, armed with an accurate embed survey, Gate Precast was able to reposition embeds in the affected panel prior to casting. "It was the smoothest precast job I've ever dealt with, even with unusually tight half-inch joints called for by the architect," said Tidwell.

"Had any of the panels had to be shipped back to Gate Precast, the schedule would not have been met," Carver said.

"Field collaboration rose to an unprecedented level and significantly contributed to achieving the project schedule," Dwyer said. Lead BIM architects and the project manager from BOKA Powell moved on site to respond to requests for information (RFIs) as quickly as possible.

"On site services turned the general contractor's RFIs into responses in minutes rather than days," said Michael Crowe, project manager for BOKA Powell. The speed of responding to RFIs and the closeness of project partners contributed to extraordinarily high confidence, Coleman said.

"We were able to double the crew because of how well we were coordinated. We weren't afraid to have two precast erection crews working two cranes in opposite directions around the building," Coleman said. "And everything worked. This is just not done. It was a tight little building."

Construction coordinators used the BIM model to check the accuracy of MEP installation to preempt mistakes, said Tidwell. "Many times, I walked the job with our MEP coordinator and his electronic tablet to investigate things that didn't look right," Tidwell said. "Things like [medical gas] valve locations were verified prior to covering up the studs and piping."

"Everything fit," said Jon Walls, MEP coordinator for Rogers-O'Brien. "It was amazing to see an offset installed before everything was installed around it. You're thinking, 'why did they do that?' And all of a sudden the pieces got filled in and you can see why they did it."

Utilizing the BIM model, space efficiency was improved by allowing for adjustments in sleeve locations, reducing column furring, said Coleman. "We adjusted the building to the mechanical system, rather than adjusting the mechanical system to the building," he said.

Another concession to the accelerated schedule was a series of changes in specified finishes and products from overseas. To ensure products could be delivered on time, the design team revised the interior selections and chose products of the same quality that could be obtained from domestic sources more quickly.

Accelerated Schedule Achieved

The certificate of occupancy was issued Sept. 30, 2010, four months ahead of the original scheduled completion. Staff occupied the building on October 11, 2010, and patients began arriving Nov. 1, 2010. By Nov. 3, 2010 the hospital had seen the required 15 inpatient and 5 outpatient cases to be eligible to be surveyed for Medicare/Medicaid provider certification. Methodist Hospital for Surgery received its provider number on Dec. 29, 2010. It was the last physician-owned hospital in Texas to receive CMS certification.

"With the right set of motivations or things at stake, you can accelerate a project considerably," said Schaefer. "But it takes a Herculean effort by everybody, and I would think that not every builder can do it. Rogers-O'Brien certainly demonstrated that they can do it."

Wilson said it took great faith in the team for Methodist and the physicians to move forward despite the risks.

"It's a great credit to Methodist and the physicians that they assessed the risk and they had confidence in the entire project team," Wilson said. "They had the confidence in Rogers-O'Brien to physically make all of the thousand moving pieces physically come together, BOKA Powell to make sure that on the fly drawings could be finalized or revised in time to get things done and to oversee that project."

Lessons Learned

Reflecting upon the finished facility, team members said there were many lessons learned.

"One of the most exciting things about that project was that there was never a weakness," said Wilson. "It was a real team effort. Everyone around the table did not only what they were contractually expected to do, but they did more in the spirit of cooperation."

The BIM process and collaboration were invaluable tools, said John Carver.

"BIM makes the general contractor's job easier, the project goes more smoothly and it can be completed more quickly with far fewer field issues," Carver said. "Concerns are addressed in the office ahead of time."

But, Carver said, "success depends on the team, more than technology." "BIM is a great tool, but the willingness to make it happen is far more important," Carver said.

In the end, Crowe of BOKA Powell said this was the best general contractor experience in his 30-year architectural career.

The project team's unwavering commitment to meeting the accelerated deadline was the ultimate saving grace that made the project a success for Methodist and the physician owners.