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Making the Move to BIM:

How BIM Consultants Can Help You Win More Work, Increase Profits, and Minimize Risk

Just about every MEP contractor knows what Building Information Modeling is. Many of the larger, savvier contractors are highly engaged with BIM, but many smaller mechanical contractors may only have a fuzzy notion of what BIM is all about. According to a survey by a major technology consulting firm, a substantial minority of mechanical contractors will not bid on work that requires BIM. Companies should consider becoming BIM-enabled to procure more work, increase profits, minimize risk, and to ensure survival in the rapid technological modernization of the construction industry.

"The whole process seemed very daunting and we didn't understand what BIM truly was," said Brandon Willard, emerging technologies director for Skyline Electric, West Valley City, Utah. "We thought it was a software program and we were doing well in our niche markets, so it was one of those 'if it's not broke, don't fix it' mentalities."

Skyline Electric eventually realized that avoiding BIM was potentially costing it business.

"We really didn't know what we didn't know at the time," Willard recalled, "but in hindsight there were projects being developed that we were not invited to bid because we didn't have experience with BIM."

The firm performed its first BIM project in 2016.

That's doesn't mean that MEP contractors have to make the investment in people, hardware and software to create a full-blown virtual design and construction department. There's a much easier way for mechanical

companies to explore BIM; by using the services of a BIM consultant and modeler.

Skyline Electric added both people and technology because that was part of the firm's plan to eventually bring BIM capability in-house. Otherwise, Willard noted, a contractor doesn't have to spend much of anything if it engages with a BIM consultant.

"This is a huge benefit if you want to get started with BIM but aren't wanting to throw a large investment at it up front," Willard explained. "You get to see the benefit of the BIM process and then decide from there if it is worth the investment."

Using a BIM consultant and modeler will help MEP contractors service a growing market. BIM owes much of its growth to general contractors and construction managers who discovered that the process — and BIM is a process as much as a design tool — saved them time and money. The real impetus lately, however, is coming from building owners and developers who have learned that BIM helps deliver projects on-time and on-budget, or better.

BIM has also been adopted by governments for public construction. The United Kingdom has reportedly saved 15-20 percent on public construction projects between 2009 and 2015. Additionally, 68% of construction projects in the United States are government related. Though there is no current BIM mandate at the national level, recent projects at the local level have demonstrated BIM's benefits. In July 2009, the Wisconsin Division of State Facilities began requiring BIM on state

projects valued at more than $5 million. Following closely in August 2009, the Texas Facilities Division adopted BIM for state construction projects. The Los Angeles Community College District requires BIM on any sustainable building project that's funded through a voter-approved bond. Other countries that require BIM on public works include Denmark, Finland, Norway, Sweden and Singapore.

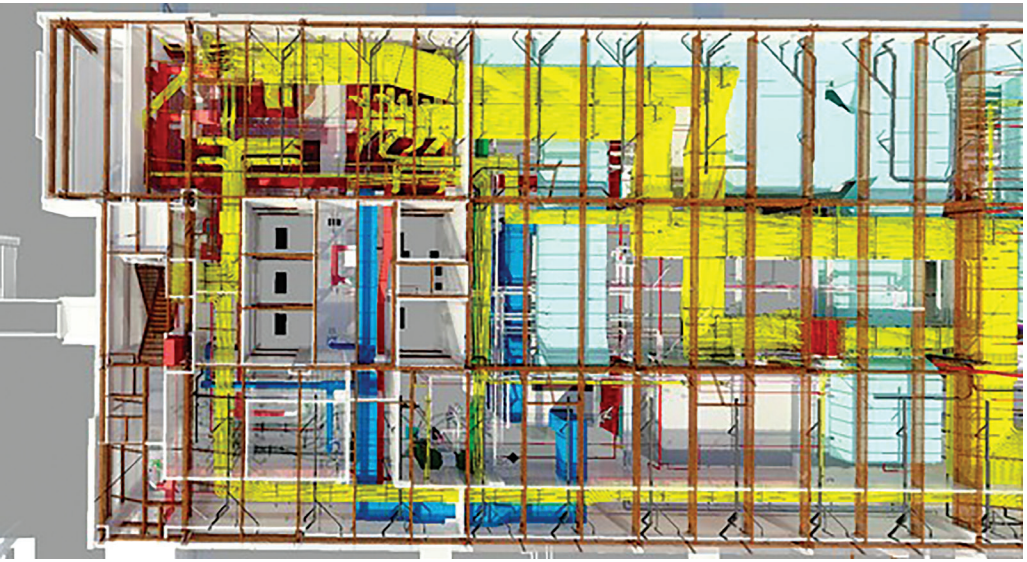
Why should MEP contractors explore using a BIM consultant to perform work on jobs that require BIM? Easy. Follow the money. BIM offers multiple direct and indirect ways for mechanical contractors to earn more revenue and profits.

Skyline Electric was invited to bid on a couple of projects that required BIM, so the firm explored its options in Utah. Willard contacted U.S. CAD's Salt Lake City-based construction services director to see if the U.S. CAD team was a good fit for the Skyline Electric culture. Willard found U.S. CAD's ability to train contractors on the entire BIM process intriguing and the rest, as they say, is history.

Similarly, MTech Mechanical Inc., Westminster, Colorado, found that its workload required it to seek new partners, said Project Manager Jared

Quillen, LEED AP. The firm invited U.S. CAD to visit its facility and found that the two were a good fit.

Because BIM is a process, it gathers all construction data together in one place. That's why owners like it. It mandates coordination between all of the parties and helps avoid rework. Coordination, clash detection and sequencing among the various trades make the job go faster, smoother and avoids waste.



Mechanical contractors need to be aware that BIM changes the normal flow of the decision-making process as a project proceeds, noted Quillen.

"Many decisions are shifted from the experienced trade managers to less experienced drafters in terms of technical aspects of the work and coordination with other building systems and components," Quillen pointed out. "Once we are committed to the coordinated space in the model, fresh ideas from the trade's people become limited. It is so important to have the right minds behind the drafting and coordinating process."

Indirectly, the ability to work on BIM projects opens up more work for mechanical contractors. As more general contractors, owners and jurisdictions require the use of BIM, that will become a bigger issue. Being BIM "enabled" will also help contractors attract the millennial graduates from the top construction management schools. Tell a budding project engineer that you don't do BIM work and they may go to work for your competitors.

Many contractors are held back by emotional barriers and fears. Contractors may be thinking, "How can this software possibly sequence my work? I'm better at doing that than anyone, certainly better than a computer program."

Some may fear that their operating procedures will be disrupted and that trying to insert BIM into their business will be the proverbial square peg in a round hole.

Others may be worried about manpower. They have one detailer and they've been turning the engineer's design intent into 2D drawings since forever. You can't force them into BIM because they'd be starting from scratch and they don't have the time to begin with.

And some contractors may fear being embarrassed in a job meeting with the general contractor when they can't answer questions about coordination or expected performance.

Your personnel may fear that they will be replaced.

In the case of Skyline Electric, the field crews were waiting for that fancy computer stuff to flop so they could go back to doing what they had always done.

"They were afraid to trust the process because we are trained craftsmen and pride ourselves on being able to 'problem solve' in the field," Willard said. "It was scary to trust that the total station was indeed accurate on our layout and it felt as though the field was just waiting for something to go wrong so that they could blame this new process and get back to what they were comfortable with."

Such fears are normal, but they don't have to become a MEP contractor's reality. Hiring a BIM consultant and modeler will take care of all those issues. They are your advocate. You are not alone. Ninety percent of U.S. CAD's customers don't have a BIM department, but they have become very BIM savvy because of the training and assistance that a BIM consultant provides. A BIM consultant's role is to help the contractor and his staff

complete the project on time and on budget, as well as help facilitate change management.

A BIM consultant can handle conversations with and answer questions from the general contractor. A BIM consultant facilitates coordination and clash detection and they can have those tough conversations with other trades telling them that they need to change some aspect of their work.

The BIM consultant will produce coordination drawings, shop drawings and as-builts. The BIM consultant can either sit in on coordination meetings or drive those meetings. They can monitor site activity and make suggestions for optimizing project performance, whether it's an issue of scheduling, safety or execution.

Your BIM consultant can provide training for your hands-on folks, the project managers, superintendents and forepersons. The consultant can teach them how the model is turned into a tool that can be used by fabricators to create accurate assemblies (in some cases, down to fractions of an inch) and how that accuracy makes field installation smoother and faster. As a contractor progresses deeper into BIM work, they should look for some familiarity with BIM as part of their hiring decisions as they build their team.

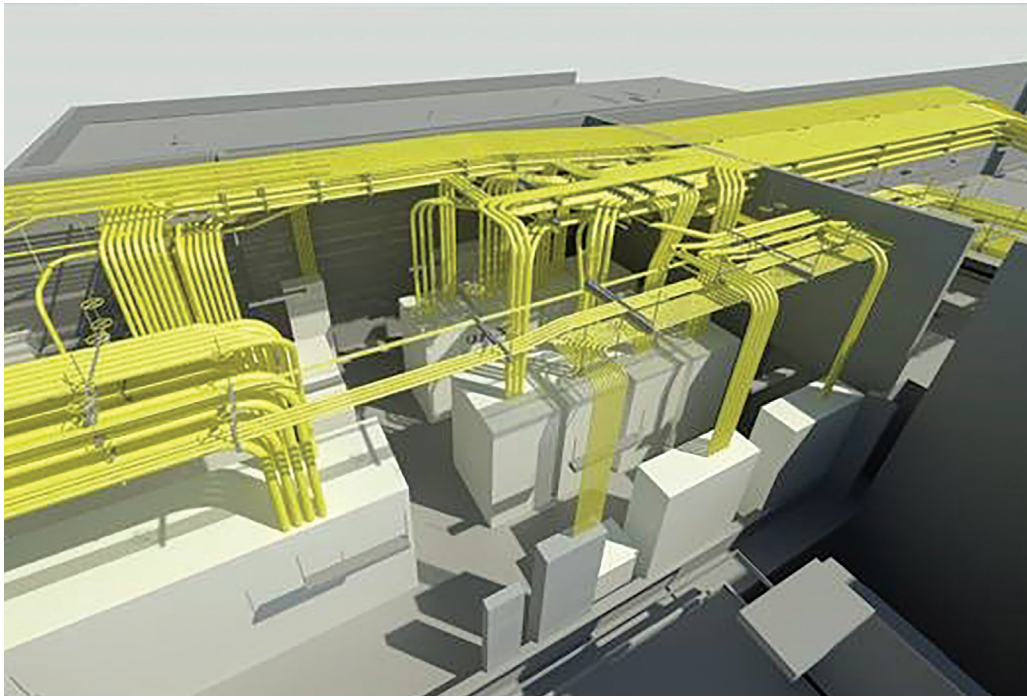
So, what do you need to know in order to work with a BIM consultant and how should you prepare?

You need to have clear expectations for your BIM consultant and communicate your standards and procedures so that the consultant knows how you work. The BIM consultant doesn't want the contractor to change the way they perform work. Workflows should be supported, not disrupted.

"U.S. CAD presented their team's value in a way that not only offloads the BIM effort." Quillen noted, "but maintains the importance of constructability and emphasized interaction with our managers to keep our means and methods in place."

Willard found that it forced the contractor to clarify its thinking and planning for a project. "We have definitely seen advantages because of the adoption of the BIM process," Willard said. "We are finding that it is a tool and not a solution to all construction problems. It has forced us to plan further ahead, which, in my mind, is a huge risk mitigation tool. Once we get through the coordination process, the projects definitely seem to run more smoothly than they would have otherwise."

In some cases, contractors will need to clean up their standards and procedures, some of which may never have been written down before. It comes down to the expectations of the general contractor and the owner.



Every project has goals. A contractor must have procedures in place to perform to the standards required by the general contractor or the owner. If a contractor doesn't have this sorted out, the BIM consultant will help figure out what the goals should be, what the MEP contractor is supposed to deliver, and how the contractor is expected to perform. The BIM consultant will look for any missing pieces and try to fill in the gaps.

Having standards and procedures in place and being able to communicate them is mandatory. The BIM consultant will find it disconcerting if a contractor's team isn't really sure what BIM means; ask 10 people in the room and they give 10 different answers. That project will fail. BIM can be a bit nebulous inasmuch as it differs from project to project but everyone on the team has to agree with the mission. Standards, procedures, goals and deliverables must be clearly defined in as much detail as possible. The BIM consultant will help the MEP contractor do that.

Your BIM modeler will need to know your expectations for the BIM model that it is creating. That's based partly on what deliverables you need to fabricate assemblies in your shop and install them on the site; and what the owner's expectations are for the as-builts and final BIM document that will be delivered to him at the conclusion of the project.

What Level of Development do you need? The LOD Specification is a reference that allows everyone involved in a project know with a high degree of clarity what's contained in the BIM model. LOD is referred to by a three-digit number with LOD 100 being the most basic conceptual drawing

and LOD 500 being the most detailed. Different elements of a project can be rendered at different LOD. You usually don't need to see every screw in most cases but on some assemblies you do.

The modeler works with the MEP contractor to interpret the engineer's design and created a model that allows the contractor to fabricate

accurately. For example, the modeler will ask you about what brand of fittings or other components that you use to make sure the document reflects the way you build. The modeler will also revise the model as components are shifted around in coordination meetings.

The LOD should depend on how much detail you need to fabricate and build. If you're going to fabricate all of the HVAC, the ductwork should be LOD 400 so that your shop crew can assemble it accurately. If you're going to site-fit the sprinkler piping, it can be a less-precise LOD 300. For a general contractor to say that they want LOD 500 for all of the project is unrealistic and impractical, during the construction phase. LOD 500 aligns with the close-out or asset management phase of the job.

What should contractors communicate to the owner as they go through the process? Nothing but good news; give them progress updates. Some owners may want to see a clash report. Give them peace of mind by showing them just the major items, especially those that might require a change order. The owner doesn't need to see a list of 1,000 clashes. Show the owner the project trajectory and reinforce their confidence in you and the rest of the team by demonstrating that you're proactive and solving problems before they spend money on it.

"For the MEP trades, BIM is truly a way to deliver a better product safer, faster and more cost effectively," MTech Mechanical's Quillen said. "It can't be stressed enough that the other stakeholders in the BIM process need to understand that. It is not a 'coordination plan' and is very much the product we use to deliver projects. It is wrongly viewed as a pretty picture and 'checking a box' by many teams involved in the process."

BIM will change your contracting firm in advantageous ways. It forces better communications both inside your firm and with other trades on the job. It forces you to organize and systematize your policies and procedures so that they are repeatable and understood by everyone on your team. BIM forces everyone to be clear, whether that's cleaning up vague specs from the engineer or vague contract language. And BIM will help you win more jobs and make more money.

"I have found huge success in my life by finding someone who has achieved something that I would like to achieve and then shadowing them to get me through the learning curve as efficiently as possible," Willard said. "This is what U.S. CAD is doing for us currently as we are receiving training from them. There are way too many options out there and someone could spend a lot of time and money trying to figure out the best path up the BIM mountain, but U.S. CAD is showing us what I believe is the best route to the top and then we will modify what we have learned to make it our own."