

## **Hand in Hand - with Contractors** **by David Kozlowski**

### **Maintenance Involvement during design and construction can prevent costly problems later**

Problems with capital projects during construction and after completion are widespread. It doesn't matter whether the project is new construction or major renovation. Several things - very likely, many things - get screwed up.

The examples cited by maintenance and engineering managers seem to defy common sense: Inaccessible valves, unwired controls, programmed software that bears no resemblance to the way a building actually operates and a circuit breaker box in the ceiling.

If an architect, engineer or contractor had talked with a maintenance or engineering manager during the design or construction phase, it is likely such things would not happen. The problem is that few architects, consulting engineers or contractors are as familiar with how a building operates as a building's maintenance and engineering staff.

The result is not only design and construction gaffes but also higher costs in change orders, post-sign-off maintenance changes, and operational inefficiencies. Solving these problems takes a well-coordinated and committed effort in the design and construction process. Far too often, maintenance is an untapped resource of knowledge when it comes to capital projects.

### **Breaking with tradition**

**Maintenance involvement in design and construction is not cutting-edge stuff. In fact, it is done very informally in many cases.**

Daniel Kelley is HVAC superintendent at the University of Houston, a small university that is renovating a building one floor at a time, and, for the most part, the same contractors work on each project, Kelly says.

"We work side by side with them on a daily basis," he says. "They have questions, and we have questions. At the end of each day, we walk through the project, and if we want something changed, we bring it up the next day.

Usually, it's not a problem."

On smaller projects, such interaction is possible. But on larger projects, chance meetings between contractors and maintenance staff are much less likely.

Rick Montague, maintenance engineering supervisor for Samaritan Medical Center in Watertown, N.Y., relates a more traditional scenario. The campus is a mixture of buildings dating back to 1950, and large capital projects are contracted out. Architects, general contractors and engineers meet to design the project and make sure it runs on schedule and on budget.

Each contractor works on a little piece of the overall blueprint. The problem is that contractors don't all work together, and the results are sometimes difficult to maintain.

Montague has seen his share of projects and problems during and after construction. Ductwork sometimes runs underneath a valve, making access for maintenance difficult. Unshielded conduit and junction boxes run through spaces sensitive to magnetic fields. But he is careful not to place all the blame elsewhere.

"We've run our own pipes now and then that complicate things because they weren't documented," he says. "We sure see enough problems, and it shouldn't be, but it always is."

### **Tapping experience**

**Maintenance needs to be an active participant in any project's development, from beginning to end. More often, maintenance staffs are getting involved, and architects, engineers and contractors welcome it. After all, everyone is on a schedule and a budget, and the quicker and better something is done, the more everyone benefits.**

Rod Leland, director of facility services at Federal Way School District in Washington, has re-engineered his district's capital program by integrating his maintenance team into the design and construction processes. The team's involvement now is more than a meeting or two and a walk-through before the punch-list tour, he says.

The maintenance staff is involved in specification decisions and sits in on design meetings and regular construction meetings. Members of Leland's staff even do their own internal reviews of the plans.

"I don't sign off until my staff is satisfied with the project," he says.

As a result of the change, the district saves more money on capital projects. Even though the more integrated process costs more, Leland says the benefits include reduced change orders, reduced post-construction redesign, and increased building operating efficiency.

"Systems that we know are reliable are put into the project, and systems that aren't, aren't," Leland says.

To accomplish this, it takes tapping the experience of the staff, he says.

"Working as team is an old concept, but this is really a new application because we try to get different teams working together," he says. "It all boils down to communication."

### **Making it work**

**For Jack Burgess, building services manager for Reedley College in Reedley, Calif, communication begins when he shows his earnestness for taking control of a project. Burgess requires weekly, onsite meetings with the general contractor, architect, engineers and subcontractors, so design and construction teams know right up front that his department going to be involved.**

Burgess is selective about who is involved for time and budget reasons, but he is not shy about calling in his staff's experience.

"If you have resident experts - a boiler person for instance - bring them in at appropriate times," Burgess says.

Good communication also means building a good rapport with the contractor based on mutual respect, says Vince Lukasik, chief engineer for Shriners Hospital in Chicago. If that rapport exists, a manager can get changes made just by asking the contractor to do it, Lukasik says. Otherwise, making changes becomes a long, drawn-out process - so long that sometimes it is not worth making the changes, he says.

"I worked at another hospital where there wasn't good communication," Lukasik says. "Things were done one way, and that was it. We often had to make changes afterward or have the contractor redo it. That was expensive."

Perhaps the most important contribution maintenance can make is to catch changes early. Achieving this, however, means having productive meetings. Every person at the table must come prepared.

"You have to get the staff involved in areal way," Leland says. "You have asked the people who do the work for their advice, and they have to feel comfortable giving it, and giving directly to the contractors, engineers or architects There is no other way."

### **More than talk**

**A maintenance department's traditional role in the design and construction process is in participating in a punch-list walk-through. While this is still an important function, by the time a punch-list is collected, many problems already have been covered up, problems that can come back to haunt managers later.**

To remedy this situation during construction, some managers perform continuous walk-through inspections, which can be as formal as needed. Lukasik's staff holds daily meetings with contractors, he says, but regular walkthroughs often are more important.

"They'll do their walk-throughs, we'll do our own, and then we'll walk the project together," Lukasik says. "You can catch a lot of the problems when they're on paper, but there's nothing like seeing the real thing."

A more formal approach is to assign or hire someone specifically to keep an eye on a project. Burgess hires an inspector of record who continually inspects a project.

"If the contractor says he has this and this done at 40 percent, we make sure he has done what he says is done, and our inspector of record will verify it," he says.

Leland hires a commissioning agent who, instead of performing a formal final commissioning, performs commissioning continually throughout the life of a project. As a result, many mistakes are caught before the cost to fix them has a chance to grow.

The traditional facility design and construction process is handcuffed by its linear nature. For years, designers have handed off drawings to engineers, who hand them off to general contractors, who hand off them to subcontractors. And between the various hand-offs, there usually are meaningful but limited conversations. Finally, the keys to a building are handed off to the maintenance and engineering staff.

The problem of limited oversight during design and construction too often leads to larger problems down the road.

"Most of the design and construction team members really understand this," Burgess says. "It is just that they're not typically exposed to anyone trying to change the process. Sometimes, it takes a little educating."

Breaking through these protected shells and bringing everyone, including maintenance and engineering, to the table to work out problems sooner rather than later generally results in a building that is more efficient and cost-effective to operate and maintain. This updated process takes a little more effort on the front end and can cost more, but those who use it say its benefits far outweigh its costs.

For Burgess, it comes down to a simple metaphor:

"The right hand has got to know what the left hand is doing at all times."

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