also checked in often with team members, sometimes as a group and sometimes one on one, to ensure they shared the vision. When I saw warning signs—low team energy, lack of engagement and frustration—that the vision had been lost, I brought the vision back to the forefront.

2. Build trust

A good project manager plays a major role in developing a highly functional project team. Trust is essential to that process. To build trust, you must develop a relationship with every team member and genuinely care about each person. With my project team, I strove to be an active listener, trying to hear what others were saying rather than what I wanted to hear. I managed my own emotions and exercised patience. All of these things led to a team that trusted me.

3. Look for the win-win

Standardizing processes required negotiating a new way of doing business. Focusing the team on the outcome to be achieved instead of the steps to get there was the key to finding win-win solutions. When conflict arose on my team, I shifted the focus to the issue and away from the personalities. I encouraged team members to fully articulate their positions, both the pros and cons. I fostered a safe environment in which team members could safely debate the merits of each position without fear of personal attack.

As a team, we were able to successfully standardize the business processes and implement the COTS grant and loan application system with minimal customization. My organization is now reaping the benefits it sought: efficient and automated processing of a huge portfolio of grants and loans. **PM**

Bernadette Williams, PMP, works in the IT services office of the project management and planning department at the Washington Department of Ecology, Olympia, Washington, USA.

Bottom-Up Risk Management

To optimize risk reduction, empower all contractors to flag problems as soon as they're discovered.

By Perry Daneshgari and Heather Moore

When our organization recently undertook a data center construction project, we kept one principle at the center of our efforts: The customer is the final recipient of the project. Because construction workers see the product before delivery to the customer, we realized we had an opportunity to anticipate what the customer was going to experience. By not just hiring but partnering with workers to execute the project, we were able to learn about problems in real time and reduce risks for the customer. This approach has been practiced successfully in other industries, including manufacturing, textile and automotive, and is the underlying philosophy of the Toyota Production System. We had been using it in construction for some time, but this was the first time we'd used it on such a large project.

And this project featured plenty of risk. Plans for the US$1.2 billion data center included a US$120 million electrical design and build component. No single electrical contractor could have carried out this phase alone, so we assembled a team comprising six contractors. Adding to the risks, each contractor had different accounting and project tracking systems, and the team included 370 electricians on the job site.

Having worked with many construction trade

> **Most projects carry the highest risk in the area of integration—bringing together all the required components necessary to produce the final product or service in a timely, cost-effective manner and with expected quality.**

By working extremely closely with construction teams, project managers have the opportunity to understand the project's risks and get valuable information that can help optimize quality, cost, time and safety.

contractors, we knew how valuable technicians' experience and training can be for reducing risks. In projectized environments, the work breakdown structure (WBS) can help take advantage of their expertise. But, what we learned from previous experiments and applications in other industries, is that the project's fundamental WBS had to be created and owned by the technical leader of the project's work—in this case, the foremen from each of the six electrical contractors. That's because no building is ultimately constructed the way it was designed. By letting foremen control the build-process WBS, we were able to clearly separate the sequence of work and its required resources, then plug them into the timing and space provided by the general contractor.

Most projects carry the highest risk in the area of integration—bringing together all the required components necessary to produce the final product or service in a timely, cost-effective manner and with expected quality. Here again, we involved the contractors. During the construction phase, we had all the field leads and supervisors report their

daily obstacles encountered. The obstacles were then codified and prioritized. Because of regular reporting and reviewing of the issues encountered, the project's number of repairs and errors were more than 35 percent lower than a similar project managed without this methodology.

Largely thanks to this risk identification and reduction process, the project finished 60 days ahead of schedule. But that's not all: It also saw a 13 percent increase in productivity from original estimated hours required to finish this project and a more than 20 percent improvement on initial estimated and expected gross margin for the participating contractors.

By working extremely closely with construction teams, project managers have the opportunity to understand the project's risks and get valuable information that can help optimize quality, cost, time and safety. **PM**

Perry Daneshgari, PhD, is the president and CEO of MCA Inc., in Grand Blanc, Michigan, USA. Heather Moore, PhD, is MCA Inc.'s vice president of operations.