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# Facility Maintenance Decisions™

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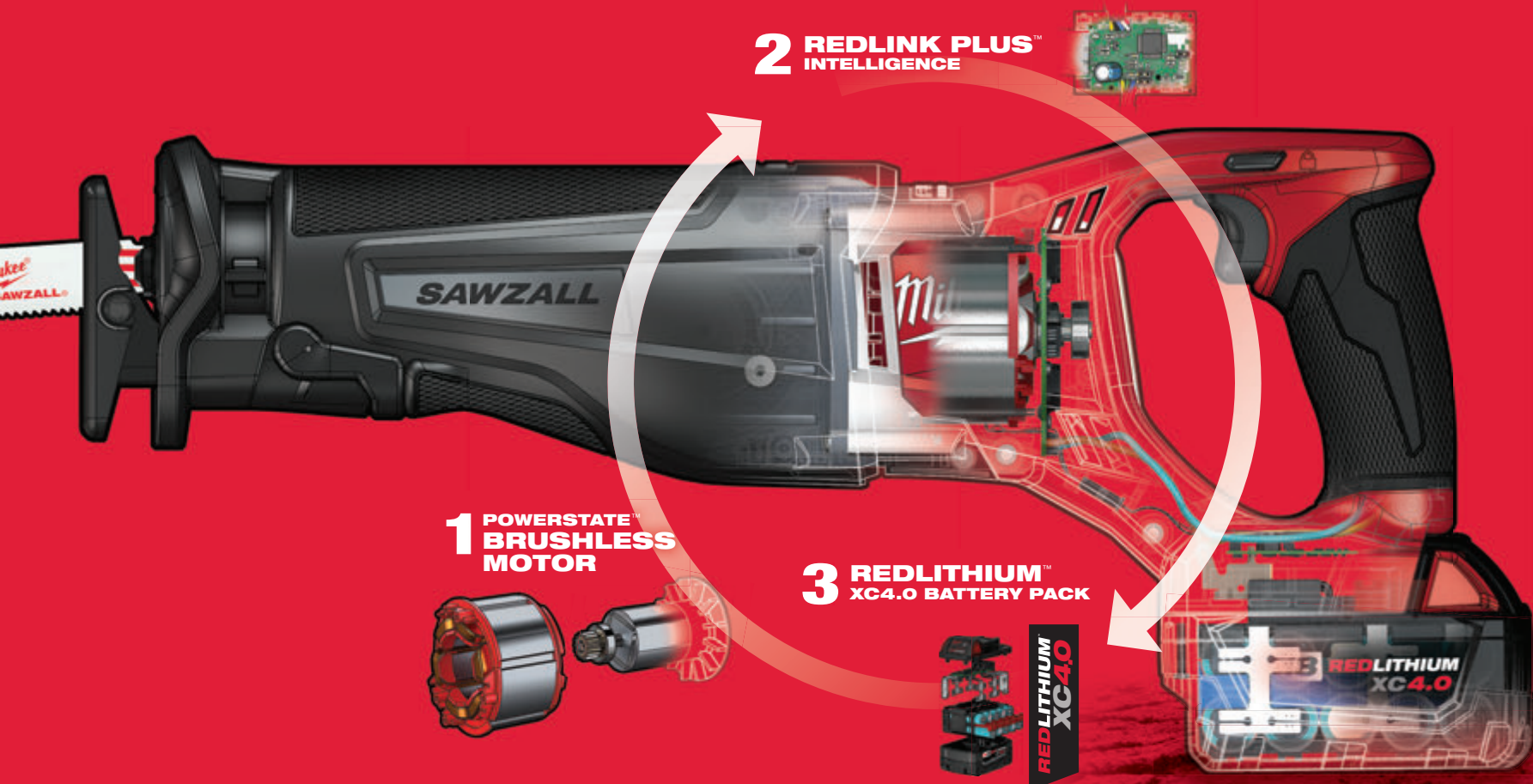


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# Ask the Drain Brains – Water Jets vs. Cable Machines. What’s the difference?

By Marty Silverman – General Pipe Cleaners

**Q:** We use cable drain cleaners at our facility. But my young guys keep telling me I should switch to high pressure Water Jets to do the same job. Are they right?

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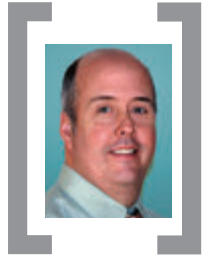
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## Bridging the Image Gap On Maintenance

Dan Hounsell, Editor

If anyone needs a clear example of the disconnect between the public and the challenges facing maintenance and engineering managers in institutional and commercial facilities,

an exchange between a television reporter and a maintenance supervisor provides it.

In a video that went viral in July, the reporter tells viewers that Grand Rapids (Mich.) Public Schools still uses a 30-year-old Commodore computer to control its schools' HVAC systems, even though voters had approved millions of dollars in bond money in 2011 to repair and upgrade schools.

"Why weren't those funds used to replace this?" the reporter asks, in a tone that suggested skepticism at the department's priorities. The response from Tim Hopkins, the district's maintenance supervisor, couldn't have been more direct or revealing.

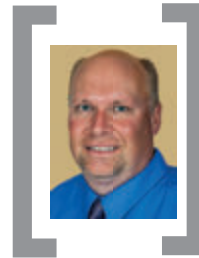
"There are a lot of needs in the district, so there are other priorities that we have to put in place ahead of this," Hopkins says. "And this system is still running."

Most managers in facilities nationwide that rely on public funds understand Hopkins' situation. Sure, it would be nice to upgrade everything in facilities, but that's not realistic. Taxpayers and school boards rarely approve a manager's capital and operating budget requests. More often, they cut maintenance budgets.

So while it would be nice to upgrade an HVAC control system that still runs, managers know that any dollars they receive instead must go toward leaking roofs, inefficient boilers, and faulty plumbing. The ongoing challenge for managers is to dispel the misconceptions that get in the way of progress on maintenance by communicating with whoever will listen about the true state of facilities and their departments' priorities and achievements.

To view the video, go to <http://ow.ly/Qbyid>.

Dan Hounsell offers observations about trends in maintenance and engineering management and the evolving role of managers in facilities. **Agree? Disagree? Have something to say? We want to hear from you.** Visit [myfacilitiesnet.com/danhounsell](http://myfacilitiesnet.com/danhounsell), and start a conversation.



## Are You a Champion Of Change?

Dave Lubach, Associate Editor

More than 500 maintenance and engineering managers responded to our recent survey on deferred maintenance and gave

us their views. We also received almost that many reasons why institutional and commercial facilities are in rough shape.

Not surprisingly, managers said leaking roofs and faulty HVAC equipment were the leading reasons facilities face repair backlogs of millions — and in some cases, billions — of dollars.

While such problems are understandable, the fact that they have persisted for so long is troubling. How can organizations continue to neglect such vital areas of buildings for decades, in some cases? One manager's comment on the situation no doubt is shared by many managers in similar situations.

"Everyone is concentrated on other things until there is a problem, and then it becomes an emergency," he says. While "everyone" might seem to take that approach to the proper maintenance of facilities, maintenance and engineering managers don't have that luxury.

Our survey also revealed that deferred maintenance priorities vary by facility. Perhaps that indicates organizations need someone to take charge of the situation and put their facilities on the road to recovery.

Managers have an opportunity — and probably even a duty — to assume that role. Ensuring the effective maintenance of buildings remains their top responsibility, and nobody knows facilities better than they do. By strategically planning projects to address deferred maintenance and communicating effectively with the C-suite on the need for proper funding for the projects, managers can become the champions of change that many organizations so desperately need.

Visit [www.facilitiesnet.com/16054ms](http://www.facilitiesnet.com/16054ms) to see survey results and offer your comments.

Dave Lubach offers insights gleaned from conversations with managers who make key maintenance and engineering decisions in commercial and institutional facilities. **Agree? Disagree? Have something to say? We want to hear from you.** Visit [myfacilitiesnet.com/davelubach](http://myfacilitiesnet.com/davelubach), and start a conversation.

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### minutes with...

**Kathie Shafer**  
Vice President for Operations, Messiah College, Mechanicsburg, Pa.

Shafer discusses strategies on how to avoid deferred maintenance issues

Listen to the podcast at:  
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**Laurie Gilmer** is vice president of facility services at Facility Engineering Associates. She leads the firm's facility asset management, building energy management, and sustainability services.

Gilmer co-authored the International Facility Management Association's (IFMA) second manual in the Sustainability "How-To-Guide" Series, EPA's ENERGY STAR Portfolio Manager. She is a member of ASHRAE and IFMA, chairs IFMA's Sustainability Facility Credential scheme committee, and serves on the Northwest Energy Efficiency Council's Building Operator Certification Advisory Committee.



Laurie Gilmer, P.E.

## Finding the Elusive 'Easy' Button

Over the last several years, we have spent a lot of time talking about the plethora of information available to maintenance and engineering managers, as well as strategies to identify needed information, distill it down to the essentials, and package it in a form that facility executives can act upon to make good decisions. Positioning a team, a department, or an organization to make sound, data-driven decisions requires an intimate understanding of the way facilities serve and support the larger mission.

In an age where electronic devices are ubiquitous, information is plentiful, and devices are more integrated than ever, it seems managers have access to everything. Yet they still have trouble getting to the right information, not to mention dealing with expanding responsibilities, limited time, and leadership that is impatient for answers. If you have ever found yourself thinking, "If only I could push a button and get the answer ...," congratulations, you are not alone. We are all looking for the "easy" button.

The danger with this thinking is the tendency to believe that the ease with which we can conceive of a button solution is in direct proportion to our ability to develop that solution. But if experience has taught us anything, it is that the simplicity of a solution or tool is inversely proportional to the work it takes to develop it. In other words, the easy button is not so easy.

### User friendly vs. development friendly

The easy-button solution is simple for the user, but it takes significant time and resources to develop – determining inputs, variables, contingencies, and focused outputs to provide a simple user interface that is fast to decipher.

These solutions come in such forms as program dashboards and applications. The user interface is typically limited to key outputs, trends, and indicators and might not require or allow for much data manipulation.

On the other end of the spectrum are the tools that look more like databases and spreadsheets. They are relatively straightforward to develop and use commercial, off-the-shelf programs that most have ready access to. They are highly adaptable and customizable. They are also more transparent in terms of understanding the impact of data input and influencing factors on outputs. But they can be complex and require more manipulation by the user.

In developing any decision-making tool or program, begin with the end in mind. What question are you trying to answer? To get started, use this methodology:

- What decision are you trying to make? Budget allocation? Repair or replacement project planning?
- What information is required to make the decision? Facility use? Equipment service? Equipment reliability? System interactions?
- What variables affect your decision? Available funds? Capital projects already budgeted? Repairs and replacements technicians can perform concurrently?
- What output do you need?

### Concepts into practice

One of my favorite examples of this process came up recently with a facility management team that wanted to determine the best way to allocate its facilities budget. The concept was to develop a program that, with a click of a button, could tell them what to do. It was a great concept, but getting to a one-click solution that would give them the information they sought would have required a great deal of time and effort they just did not have.

**“It takes work to get to any solution, let alone the elegant, ‘easy’ button solution”**

Instead, they took a stepped approach similar to the one described above, and they developed their program first. In a fairly uncomplicated way using database information, they determined their budget needs. Their database provided them with a high degree of manipulation, allowing them to slice, dice, package, and re-package approaches until they had the approach that matched their needs. By putting the right priorities in place, the team was able to move forward, guided by business needs, to determine the best way to allocate their budget.

Another example highlights a different challenge. A facility management team

wanted to know the best, guaranteed way to reduce the cost of operations. They wanted “the answer.”

That was the first sign of trouble. With very little analysis, they found a few simple and obvious areas, and a more complex analysis highlighted additional operational improvements. The team was disappointed with the list of improvement ideas. It answered the question of the best ways to reduce the cost of operations, but the list only told them what they could do; it did not tell them what they should do. It gave them options, not answers.

Clearly, the team had to make decisions, but no one wanted to make the wrong decision. With more digging, though, the team found out it had quite a lot of performance data that could help them understand impacts and prioritize their decisions. They just were not using the data. It was a classic communication problem: Different departments managed different pieces of data, and no one was looking at the big picture.

Monitoring the impact of any change should have been simple, but they had not gone through the exercise of identifying the decision they were trying to make, the data available to them, and the way the story the data was telling them could inform their decision-making.

All managers have competing priorities that require them to balance high-performance-facility programs, financial limitations, and personnel constraints. They want simple solutions, and they want them fast.

But it takes work to get to any solution, let alone the elegant, “easy” button solution. Our job is not to look for the fast answer. It is to manage our resources well using the tools available to us. The “easy” button is not the solution. It is a tool. While that button might be tempting, it is our ability to grapple with the data and understand the influencing factors and impacts of our decisions that demonstrates our real value.

The easy button has a place, but managers must always apply it in the context of knowledgeable, data-driven decision-making. ■

**Agree? Disagree? Have something to say?** We want to hear from you. Visit [myfacilitiesnet.com/LaurieGilmer](http://myfacilitiesnet.com/LaurieGilmer), and start a conversation.



# CMMS and Materials Management: Partners in Efficiency

By focusing on key elements of materials management and maximizing the power of a CMMS, managers can control costs and improve efficiency

By Christopher R. Williamson, P.E.

**M**aterial and inventory costs can account for 25-40 percent of a maintenance and engineering manager's budget. While concentrating on other priorities such as preventive maintenance and urgent repairs, managers can easily lose track of the flow of tools, spare parts and equipment and their costs. Consider a facility with a \$1 million maintenance budget where 40 percent is spent on material. Reducing the material costs by 10 percent would result in a \$40,000 per year cost savings, or 4 percent of the annual budget.

Managers seeking greater control over and savings from their materials and inventory can implement several strategies to use materials more efficiently and effectively within their departments and facilities, and a computerized maintenance management system (CMMS) is an essential tool in achieving efficiency goals.

## Material costs and trends

The most important first step is to review the maintenance budget to determine the amount of money being spent on materials, including how much is spent weekly, monthly and annually. Managers also should know the percentage of the overall maintenance budget material costs represent. The key is to look for trends that might indicate seasonal or production changes. Heater elements, deicers, refrigerants and belts all relate to seasonal use. Minimizing these materials when they are out of season will avoid write-offs for expired shelf lives and hold down

carrying costs — the cost of tracking and storing the item, which can be up to 25-30 percent of its cost.

Next, managers need to tap into their departments' CMMS to perform a deep dive into the inventory items front-line technicians are checking out and procuring from the warehouse. The key report at this stage is an issued-inventory report or an inventory usage report. At a minimum, the report should include the item checked out, the technician who checked it out, the quantity issued, and the issue price.

When reviewing the report, managers should look for duplicate items the warehouse might be stocking at the request of different users. They also should look for items that are checked out excessively. Just by showing supervisors and technicians that managers are generating reports and reviewing data likely will generate savings because they workers realize their actions are under scrutiny.

While analyzing the report, managers can evaluate vendors by looking at similar items over multiple years to determine if a vendor has lost the competitive edge. To compare, consider asking in-house buyers to contact multiple vendors for the same item. Consistency and standardization are critical, but departments can procure many items through multiple vendors. Competition can reduce prices.

Finally, managers must ensure that purchase lead times are adequate, as ordering parts with next-day

delivery requirements drives up cost. The goal is to allow enough time for standard delivery times.

## Rebuilding the team

After getting a firm grip on the budget and inventory use, managers should reach out to several key members of the inventory management team to begin rebuilding the process.

First is the logistics or warehouse manager. If logistics is part of the maintenance organization, this will be easier, but if logistics services multiple departments, this will be more difficult.

If boundaries exist, managers can try to break them down by setting up regular communications meetings. Once a relationship develops, managers can take several important steps:

- Ask to tour the warehouse and storerooms to determine the amount of material being stored.
- Develop a list of any material that has been in the warehouse longer than three months.
- Follow up with supervisors and planners to determine the reason technicians have not used the material.
- Ask the logistics manager to send an updated list out monthly to planners.

To make things simpler, maintenance and engineering managers can ask the warehouse manager to label each piece of material to clearly identify the item, its date of receipt, and the person who ordered it. Having this information helps



the warehouse manager avoid having to look through boxes with dates over the last two weeks.

Managers also need to ensure that maintenance planners, schedulers and supervisors are coordinated in their efforts to streamline inventory management.

If planners are not in lock step with the scheduler and shop foreman, material can begin to stack up in the warehouse for a variety of reasons. Daily reactive work orders can prevent technicians from getting to routine repair work for which material was ordered. An unexpected illness or vacancy can reduce available hours.

All of these factors affect the amount of work crews can perform.

Next, managers need to educate front-line technicians on the impact of excess, leftover and demolished equipment. Use individual conversations and group meetings to educate craftsmen on the value of these materials. Materials that go unused become waste if they are thrown out. In some cases, technicians store these materials in shops or on trucks. But if planners do not know that material is available, they might continue to reorder the material.

Leftover materials also can create problems. Rubber components, includ-

ing O-rings, seals and couplings, can be exposed to excessive temperature and sunlight. When eventually used, they can fail prematurely or catastrophically, causing downtime for critical systems.

Managers can stress to technicians to return unused materials to the warehouse so they can be restocked or returned to vendors. If materials are not returned to the storeroom, they will end up in trucks or toolboxes, where they can not be accounted for.

By putting incentives in place for returning material to the warehouse — a gift certificate or a few hours vacation for

the craftsmen who returns the most material during a certain period — managers can encourage this behavior.

Finally, demolition also can yield reusable materials, including toilets, water fountains, disconnect switches, breakers, and air conditioning equipment. Reusing these materials can save dollars without jeopardizing reliability.

### Warranties worries

Managers seeking to gain control over inventory costs need to be sure that parts and equipment warranty information ends up in the CMMS and that warehouse managers track the information. While many construction projects come with a one-year warranty, many components and standard parts carry longer warranties.

For example, chiller compressors can come with five- or ten-year warranties. Standard parts warranties might not cover labor, and many times they must be at the discretion of the manufacturer. Departments can purchase extended warranties, but they can be complicated. For example, they can cover delayed start-up, whole unit parts, or just critical part warranties like compressor warranties.

The key is either to label the equipment indicating it is covered by warranty and include the warranty expiration date or to code it so when the CMMS generates a work order, it notifies the planner that the unit or part is covered by warranty. Otherwise, the planner will miss it and order replacement material.

Warranties also require proper installation, maintenance and operation. When developing job plans for the equipment, reliability engineers need to use the manufacturer's operations and maintenance manuals. By following the manufacturer's recommendations, technicians will not void warranties.

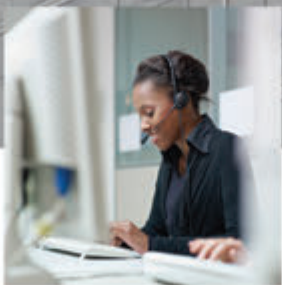
Training technicians and operators so they understand proper maintenance and operation is a best practice whether or not a warranty exists. Tampering with or trying to repair the equipment also might void the warranty. To avoid potential issues with warranties on high-value equipment, consider having the original equipment manufacturer perform maintenance during the warranty period.

By applying best practices for managing materials, my organization was able to save \$1.4 million annually with a \$3.5 million budget for materials and sustain it for four years. Any warehouse manager also will benefit from such practices because the warehouse will be more organized and less cluttered, and items will rotate more frequently. While results will vary, an organization can expect to save 10-50 percent on material annually by applying these same best practices. ■

*Christopher R. Williamson, P.E., CMRP, CEM, LEED AP — cwilliamsonpe@gmail.com — works for Jacobs Engineering as a maintenance director of a federal installation in Southeastern Virginia with more than 270 buildings.*



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# Striking a Balance on Facility Safety and Security

As access control technology advances, managers must coordinate it with traditional door hardware to protect occupants and operations

By Thomas Westerkamp

**D**espite the widespread use of electronic card access control systems, many institutional and commercial facilities still use traditional locks and keys. It is still less expensive to equip a door with a standard lock than with any type of electronic access control device. For these reasons, most facilities equip only a small percentage of their doors with electronic access devices and install traditional locks on the majority of their other doors.

So while the transition to electronic systems continues, many managers must find a balance between ensuring the performance of traditional door hardware components and incorporating emerging technology into their facilities. To achieve these goals, they must understand the essential considerations in key management, address related door hardware issues, including maintenance and specification, and develop guidelines for specifying electronic card access control systems when replacing traditional locks and keys.

## Effective key management

The two most essential considerations in key management are security and ease of ingress and egress. From these considerations flow all the best practices for key management. To achieve both goals, managers should adopt policies and standards for not only keys but for locks, closers, hinges, strikes, roses, kick plates, and all associated hardware.

Effective access control policies establish integrated goals, responsibilities, and overall requirements for the management of keys and associated components to protect facilities, equipment, information and processes. The policy also should cover the constraints governing the generation, distribution, accounting, storage, use, and disposal of obsolete keys and lock cylinders.

A core component of the policy is identifying organizational roles and responsibilities, including chain of command, the role of the key manager in providing central oversight, the role of infrastructure entities, including supervisors, users, and auditors. To provide constant surveillance

over the policies' implementation, policies should contain an audit function that managers can implement to verify the use of important practices. These practices include a statement of objectives — for example, to maintain optimum access control for comprehensive safety and security of occupants, buildings, equipment, and information.

They also should include the identity of the access control manager, as well as provisions for roles and responsibilities in essential areas.

## Policies into practice

The first principle of key management is, the fewer keys, the better. A key management board is an effective tool that provides excellent location control for shared keys. In this system, only one key or key set exists for each lock and lock set for important facility components.

These components include fleet vehicles, HVAC mechanical rooms, fire-control systems, transformer vaults, confidential records storage areas, electrical distribution control centers, remote and unattended storage areas, storage areas for critical and high-cost tools and equipment, roof access doors, material stores, and data centers. Even though several users might need access to these areas at different times, only one key needs to be available on the key management board.

The key board consists of a key identification number, a retention peg and a release peg for each controlled key or set of keys. Each user receives a colored, numbered release peg. The release peg color designates department, such as operations, maintenance, research, or administration. The identification number on the release peg identifies a specific individual.

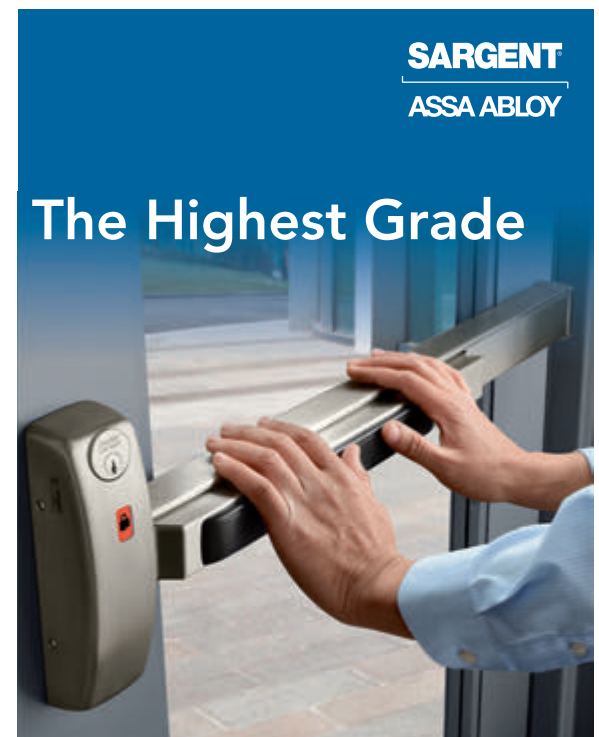
The user inserts their peg in the release slot, releasing the associated key or key set from the retention slot. This system provides a record and real-time display of all keys in the board, as well as all keys off the board, which has each key or key set and the lock with which it is associated. This system admirably meets the first principle of key management because it requires only one key to serve each lock. To release a key, an individual must insert and lock the release peg into the key board, so managers know which individual has each key that is removed from the board.

## Beyond specification

Maintenance and specification support each other. Managers who properly specify an access control system will find that maintenance time and costs decrease. A well-planned maintenance program also ensures that the specified system lives up to its ability to achieve optimum security and reliability at the lowest life-cycle cost.

Well-documented standards for cycle duty are also essential for maximizing the service lives of door hardware products. They ensure that the specified hardware is consistent with and of proper robustness and size for the facility's needs.

Managers also should ensure that selected lock vendors are appropriately licensed, bonded, and insured and can



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The initial cost of an electronic locking system is high, but the individual key replacement cost is lower because it is just the cost to delete the old card code and recode a new one. The lock remains the same.



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provide a current insurance certificate. The selected vendor also should be able to recognize such problems as: sprung hinges; insecure hinges; sagging doors that are difficult to open, scrape or cause door jamb wear; and leaking closers or worn closer cylinders. These deficiencies can render a new lock ineffective due to misalignment.

Periodic re-keying and cylinder replacement are necessary for security reasons. In the case of re-keying, too many keys have been issued; unauthorized copies were made; keys were lost; key holders left the organization and took keys; or key holders gave keys to others, then left the organization and did not return the keys loaned.

Mechanical lock re-keying constitutes an expensive way to ensure security. For example, the cost to re-keying a facility's six entry doors was more than \$1,300. Because the process is so expensive, managers might resist doing it often, even though they know some keys are unaccounted for. Meanwhile, the facility is vulnerable to identity theft, unauthorized intrusion, theft, and vandalism. These are among the reasons managers consider replacing keyed locks with electronic locks on some applications.

## Eye on electronics

Electronic lock choices are expanding. Among the options are biometric locks, as well as key fob, smart-phone-activated, and even surveillance locks that take a picture and deliver a personalized greeting to each person who enters. The initial, one-time cost of electronic card keys is higher, but the individual key replacement cost is lower because it is just the cost to delete the old card code and recode a new one. The lock remains the same.

Wireless access control choices also have expanded greatly. For example, technicians can install one low-cost model into an exist-

ing mechanical cylindrical or mortise device by changing out only the cylinder in about 15 minutes. This cylinder replacement converts a mechanical lock into an electronic ANSI grade 1 with a mechanical override. The change requires no additional wiring or door preparation, and the battery reportedly lasts for 100,000 cycles.

The model is actuated by radio-frequency identification technology and can be unlocked by a key-fob-type transponder from up to 20 inches away. The door only opens when the handle is turned. When the handle is released, it relocks. It

## Replacing keyed locks with electronic locks can help reduce a facility's vulnerability to unauthorized intrusion, theft and vandalism

can also be fitted with a biometric reader that allows entry only after swiping a finger across the bar to identify and verify authorization for critical applications. System administrators can program the transponder with a laptop- or Blue-tooth-enabled hand held device, and they can program assignable rights to provide certain access times for vendors or maintenance staff.

Unlike mechanical lock cylinders, these keyless locks cannot be picked or tampered with by inserting materials in the key slot. The rolling encrypted code prevents code-breaking. The locks preserve aesthetics because they look just like the mechanical one, so the conversion can be done gradually throughout a facility.

In the final analysis, access control—whether mechanical or electronic—begins with key security. If a key is stolen or lost, given to others, or in some way leaves the possession of the assigned person and falls into the hands of an unauthorized user, a significant breach of security has occurred. At that point, the organization's security and access control policies and standards help determine the organization's course of action, and the strength and reliability of the installed door hardware components and access control system comes into play. ■

*Thomas A. Westerkamp is a maintenance and engineering management consultant and president of the work management division of Westerkamp Group LLC.*



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# Energy Upgrades

As energy costs rise and pressure mounts to maximize savings, managers discuss challenges, successes and roles in projects to improve energy efficiency



**Chris Walinski**,  
Building Operations Manager,  
Munich Reinsurance  
America, Princeton, N.J.



**Greg Harubin**, Director of  
Facilities Management,  
Day Kimball Healthcare,  
Putnam, Conn.



**Tom Lanzilotta**,  
Campus Energy Manager,  
Stony Brook (N.Y.) University

By Dan Hounsell, Editor

Between sustainability considerations and bottom-line pressures, maintenance and engineering managers are under the gun to improve the energy efficiency of key facility systems. But finding energy waste is just the first step. Planning, performing and ensuring the long-term performance of energy-efficiency upgrades all present tough challenges that managers must overcome.

## [Q] What steps does your organization take to identify energy-efficiency upgrades with the greatest potential?

**WALINSKI:** We invest in energy auditing, benchmarking and enhanced metering to ensure the company makes informed decisions and can validate results for its energy program. The audits and metering highlight areas that should be addressed, and the facilities team tries to use every available resource — attending trade shows and conferences, industry publications, continued education, reaching out to peers, and networking — to identify possible solutions.

**HARUBIN:** We rely on engineering data analysis. We look at simple payback primarily for our decision-making. We accept offers from energy-service companies for performance engineering surveys — anything we can get that gives us another look and more data. We also seek projects that potentially replace capital equipment that we already have issues with, and we look for projects that have greater potential for getting utility incentives.

**LANZILOTTA:** We use a collaborative approach to identify energy-efficiency upgrades, which involves obtaining input from technicians, building occupants and the university community.

We currently are in the midst of a university-wide energy audit, and from this audit an energy master plan will be developed. As the audit has progressed, we receive preliminary reports, and from these we bundle various projects looking for the quickest (return on investment). We then consider project complexities and duration and how they may impact building occupants.

## [Q] What is your role in that process?

**WALINSKI:** In my role as building operations manager, I am part of the team that brings new ideas to the table. I also oversee the process of the multiple ideas being concurrently reviewed and discussed. Finally, as the manager of the process, once the team decides what upgrades would have

**HARUBIN:** I guide the process and select the final measures to be packaged and presented for funding to the utilities or the grant entities. There's a portion of every project that must be paid by the hospital, so I present it to our board of directors.

## [Q] What is the role of your department in planning and performing energy upgrades?

**LANZILOTTA:** Our campus planning, design and construction, and facilities and services departments work together to determine the best equipment for the project, both functionally (and) aesthetically, and what is best for the environment. We also decide whether a project can be done with in-house staff and management or if the use of outside contractors would be more productive.

**HARUBIN:** We participate in that final design. We're basically driving the bus. We're integral in the final plans and scheduling. We also run the 24/7 operation, so we're integral in all the shutdowns and ultimately the final acceptance of the project.

**WALINSKI:** Maintenance and engineering make up the team that identifies and cultivates the potential upgrade ideas. Once approved, the team either institutes or manages the institution of the upgrades. One of the other important roles the team plays is in educating the campus employees to the changes occurring to promote the continued growth of the sustainability culture and reaching out

**“We participate in that final design.  
We’re basically driving the bus.  
We’re integral in the final plans  
and scheduling”**

the biggest impact or offer the best value, I present the findings to management to procure funding.

to and engaging with employees through focus groups and surveys to ensure the team is looking at potential upgrades in a comprehensive and holistic manner.

**[Q]** Please describe a recent upgrade that has been the most beneficial to the organization.

**LANZILOTTA:** We are at the tail end of completing a campus-wide energy reduction

project that involved retrofitting over 55,000 fixtures with long-life, energy-efficient lamps and ballasts, installing over 5,000 lighting controls, and adding variable-frequency drives to control the speed at which electric motors operate. This project helps contribute to Stony Brook's goal of reducing energy by 20 percent by 2020, improves lighting levels and building controls, reduces maintenance costs, and helps bridge the gap to new technology.

**HARUBIN:** The one that jumps off the page is a \$400,000 digital control upgrade that we

just completed. It was a big piece of the pie for us as far as obsolete controls. The thing that's interesting about it is that it only had a 7.24-year payback, so we bundled it with quicker-payback projects and got the whole bundle of projects into the three-year payback range. We qualified for a 50 percent incentive from our public utility.

**WALINSKI:** Because our projects have so many different combined benefits, it is difficult to choose the one most beneficial, but some of the most beneficial improvements included:

- a building automation upgrade because it had the added benefit of enhanced metering and reporting, which has been critical to the success of many of our subsequent projects
- any of the large-motor variable-frequency-drive projects
- the campus lighting upgrades because they improved the lighting's ergonomic benefits while reducing operating and maintenance costs, improved sustainability and efficiency, and offered excellent ROI.
- the upgrade of lighting controls by improving efficiency at every level — private rooms, public areas, and workstations. It had the added benefit of giving employees ample lighting when needed but (also reduced) energy use whenever those levels were not needed.

**[Q]** Did unexpected challenges arise during the project?

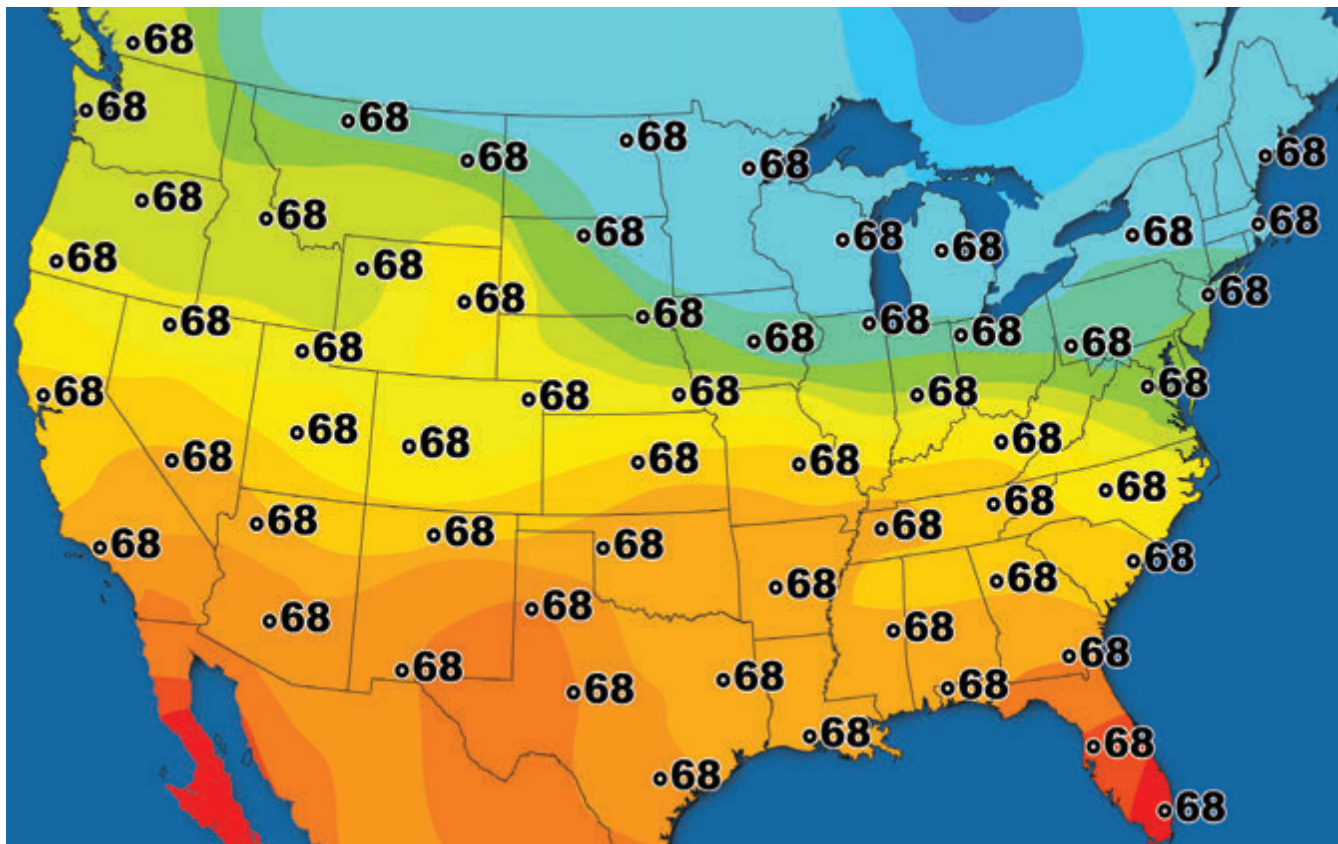
**WALINSKI:** The original biggest challenge was ensuring the team had enough qualified data to support its calculations. Since then, different projects have offered different challenges. Whether a project required more communication to or education of the campus employees, or more research and follow-through to find maximum rebates and ensure they were collected to improve ROI, many of the projects had nuances arise that required the team to shift priorities or schedules.

**LANZILOTTA:** Gaining access to spaces and acceptance of lighting sensors was probably the biggest challenge. To address access and acceptance, we had Q&A-type meetings with building managers as a group and introduced the contractor representatives for face-to-face interactions. We also periodically sent out project updates to the building managers and asked for their feedback.

**HARUBIN:** The challenge was the fine-tuning at the end of the job. We'd have two chillers running instead of one, and the controls engineer is scratching his head. (It's challenging) when you're integrating packages from older chillers with digital packages with newer controls and trying to get two different manufacturers' systems to work together.

**[Q]** What steps do you take to emphasize the importance of post-installation monitoring and maintenance during the planning process?

**HARUBIN:** Unlike some other maintenance departments that have another group in their organization that manages construction, we're pretty familiar with construction. We select the engineers and the architects, and we manage the construction process. We're the owner's representatives for all that stuff. We're at the hub. So we're pretty familiar with what we want as far as deliverables at the end of the job. We require that we get all the maintenance and inspection and testing, the



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**LANZILOTTA:** Post-installation measurement and verification are an important step to prove that the project was as efficient as proposed. We accomplished this by using our submetered energy baselines and compared them to consumption after the completion of the project. We also took individual readings of the energy consumed at the fixture before and after the retrofit. This macro/micro approach ensures that estimated savings are realized. To ensure savings are maintained going forward, all old lamps and ballasts were purged from stock (as well as from) hiding spots in closets and mechanical rooms. We would like to avoid old technology from being installed back in the fixture in the event of a failure.

**WALINSKI:** The company emphasizes metering at every stage of each project. It is how the team justifies the projects it proposes, how progress is tracked to ensure projects are trending to meet targets, and how upgrades are validated after completion. The campus already employs enhanced metering in every major mechanical and electrical system and additional metering is installed as part of upgrades when appropriate. The team relies so heavily on data collection that emphasis on its importance is not required amongst the team members. For post-installation monitoring and maintenance, part of the ROI for every project is the reduced future operational expenses. Upgrades are monitored and maintained to ensure continued optimal performance and expense control.

**[Q]** What lessons has the organization learned related to maintenance and engineering about upgrade planning and performance?

**WALINSKI:** Tracking and documenting lower operational costs for past projects is critical to earning funding for future projects. Savings associated with upgrades are tracked and referenced to show how perpetual and cumulative savings reduce the company's expenses and to validate the projects' originally proposed ROI and internal return on investment. Using proper measurement and verification and having data available from the continued tracking of performance and savings are critical elements to the team's ability to secure funding and prove value.

**HARUBIN:** My recommendation is to question the engineering, especially from people who benefit from the project going in. Do everything you can. Look at similar projects that were done. Does the project really return the savings that it shows on paper? What you'll find is that a utility will agree to something and they trust, to some degree, the engineering, but it won't come true in the field.

**[Q]** What is your organization's next planned energy-efficiency upgrade?

**HARUBIN:** I'm looking at another couple hundred thousand dollars for replacement of existing digital controls. That will get me a lot closer than I was a couple of years ago to where I need to be. But I have to bundle that one because those don't have paybacks under four years. So I'm bundling it with steam-valve

and trap replacements, which has a payback of four months. The savings is half a million dollars over 15 years. I was amazed by the loss from steam traps and valves.

**LANZILOTTA:** We are working on a project that will upgrade our exterior lighting to LED technology with an advanced wireless management system. The system will monitor fixture performance and operating conditions and execute commands based on inputs, such as schedules and daylight levels. In the event of a failure,

our maintenance department will be notified in real-time (as to) the pole number and location. The payback is longer than we'd like, but the reduced operational and maintenance costs in conjunction with safety enhancements make it a desirable project.

**WALINSKI:** The next major project being researched for the company is to potentially add natural gas pre-heats to improve the ability to maintain comfortable temperatures in winter, reduce operational expenses, and reduce indirect energy use. ■



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## Product Focus

Hard Decisions: Specifying  
Concrete-Repair Tools

A new generation of tools seeks to maximize worker safety, ergonomics and productivity

By Dave Lubach, Associate Editor

Concrete is one of the most durable construction materials used on interior and exterior surfaces in institutional and commercial facilities. But problems inevitably arise due to its improper installation, wear and tear from traffic, and exposure to the elements.

So workers can repair concrete problems effectively, maintenance and engineering managers need to provide

in-house technicians with the most appropriate power tools and equipment. Developments in new-generation tools aim to help workers deliver successful projects by controlling dust, reducing vibration, and taking advantage of the benefits of battery power.

## Concrete concerns

Concrete tools need to be durable enough so that technicians can repair

cracking, structural issues and surface problems. Each problem carries its own set of challenges.

“Cracking is probably going to be the most common problem, and a lot of times to prevent cracking crews will score concrete ahead of time to prevent that,” says Taylor Hoppe of Milwaukee Tool.

“But sometimes with poured floors like sidewalks, walkways or basements,



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The PS 1000-B provides images of objects concealed inside concrete. The X-Scan system can locate rebar, post-tension cable, metal and plastic conduits, glass-fiber cables, voids and wood. Immediate scan analysis is possible in a 2D or cross-sectional view, making it easier to find and mark reliable drilling locations. A rubber-coated housing protects the handheld unit, and it resists water and dust. **Free Info: Circle 151**



## DEWALT

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The SDS series includes four models, featuring the D25263K, a 1 1/8-inch unit that features three internal and external rubber seals that offer protection from debris. The tool weighs 6.8 pounds and features Shocks™ vibration control and a vibration-reducing side handle. The hammer features three operation modes: hammer drill, drill only, and chipping. Other SDS models include: the 1-inch D25262K; the 1-inch pistol grip D25133K; and the 7/8-inch D25260K. **Free Info: Circle 152**



## BOSCH TOOL CORP.

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The CSG15 5-inch tool features power up to 12.5 amperes and 9,300 rpm and includes a guard system for collecting dust. The wrap-around auxiliary handle offers users multiple grip positions. A four-stage sealing system integrated into the output shaft and double-seated ball bearings protect the gear housing from dust. A sealed switch extends performance life, and epoxy-coated field windings improve tool protection. **Free Info: Circle 153**



## MAKITA U.S.A.

## Concrete hammer

The 2-inch HR5212C joins the AVT® rotary lineup. The motor delivers 19 Joules of impact energy. The tool features the option of lock-on or trigger-activated in the chipping-only mode, with a push-button, start-and-stop control in front of the rear handle for more convenient operation. Additional features include soft starting for more control and greater accuracy and a torque-limiting clutch. **Free Info: Circle 154**





what they'll find is the concrete will shrink as it sets or dries, which causes it to crack.

"One of the common ways to help with that problem is to use a grinder with a diamond wheel. What they can do is run the wheel right through the crack, and it rounds out the bottom of that crack so it prevents the crack from going down through the concrete."

Structural problems that involve such building components as foundations are more complex and might require scanning equipment to uncover hidden problems as rusted rebar.

"Thermal (imagers), sonar — there are many different methods to try and figure that out," says Aaron Brading of Hilti Inc. "You can bring in a specialist or, if you think it's going to come up frequently, actually purchase the equipment, which is a significant investment for a one-time use."

Grinders can be especially effective when repairing concrete surfaces.

Concrete surface problems occur "when there's not enough air mixed in

that sells for \$3,000, they may not have the equipment available.

"That's a challenge. At what point do you do it in-house and bring in equipment as needed, or bring in a possible expert in the industry to help with some guidance on which bit to use and how much pressure to apply? Or, do I contract it out for a fixed cost per hole and get it done by a specialist?"

#### Clearing the air

Limiting workers' exposure to concrete dust generated by power tools has received more attention from the Occupational

Safety and Health Administration in recent years. As a result, manufacturers have redesigned their latest offerings to address the issue.

"Not only is it important to reduce the jobsite cleanup, but when you're working that close to the concrete and kicking up all that dust, you're always going to breathe in some of that silica dust," says Mitch Burdick of Bosch Tools. "Maybe (it's) not enough to reach harmful levels, but it is uncomfortable. It's beneficial for reducing unnecessary or time-consuming cleanup, but it's obviously helpful to the worker."

**'Being able to get rid of a cord is a safety dimension you don't need to worry about, especially if you're working up on a ladder or drilling a bunch of holes over your head'**

the concrete before they pour it," Hoppe says. "It causes the surface to chip away. If you've ever seen a poured floor that's not finished properly, you can see the aggregate in the concrete, and delamination can occur during the finishing process.

"To fix that, guys will use grinders and diamond wheels to grind that away. Once the surface has been broken up a little bit, they can re-pour that on top."

Managers specifying power tools for concrete maintenance need to give cost careful consideration. Depending on the scope of the project, managers might decide to rent a tool for a task instead of buying it.

"They may not own the tool that allows them to self-perform the work as they're used to," Brading says. "Typically, they're self-performing any miscellaneous application that comes up, but in some cases, if the tool required, for example, is a core rig



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To limit dust created by drilling holes and grinding concrete, manufacturers are focusing on upgrading dust-collection systems and collector guards to reduce the potential for dust inhalation.

"If you're doing in-house maintenance and you've got to do a quick hole with a rotary hammer, instead of having to come get the vacuum out and cleaning up this whole area that you're working on, you can use a lot of the dust-collection systems that we're seeing get more popular out there today," says Andrew Plowman of Milwaukee Tool.

When deciding whether to specify a dust-collection system and general cleanup vacuums, managers need to consider several differences.

"Dust-extraction vacs focus on better air-flow suction, have better or advanced cleaning systems and allow you a HEPA filter option," Burdick says.

In specifying tools for concrete repairs, managers also need to focus on flexibility and performance. As a result, many managers are moving away from a one-

concrete repairs. For one thing, using cordless tools can improve worker safety related to trips and falls.

"The trip hazard is a big piece of going to cordless for the owner and the convenience of the operator," Brading says. "If there is a cordless alternative available, it's hard to get an operator to go in another direction."

Another appeal of cordless tools is that they enable users to work and move without worrying about extension cords.

"When you have portability, you're getting rid of a cord, and in these operations where you're working at eye level or waist level, you're working all over the place," Plowman says. "Being able to get rid of a

cord is a safety dimension you don't need to worry about, especially if you're working up on a ladder or drilling a bunch of holes over your head.

"You see a lot of guys maneuvering a cord around in order to work up there. That cord can get kicked or grabbed. It's something in the back of their minds. To be able to alleviate that kind of awkward feeling makes you much more productive in addition to just being cordless." ■

## In specifying tools for concrete repairs, many managers are moving away from a one-size-fits-all mentality and opting to specify different tools to match specific tasks

size-fits-all mentality and opting to specify different tools to match specific tasks.

"There are little idiosyncrasies between the hammers," Plowman says. "It's not just get the biggest one and (hoping) that will do everything. The smaller hammer will drill a lot quicker for smaller applications, and it will also be about a third or a fourth of the weight."

Technicians want power tools that offer less vibration and are more comfortable to operate, but specifying low- or no-vibration tools can mean sacrificing some performance.

"You have to combine low-vibration tools with performance," Burdick says. "It's easy to take vibration out of a tool because you can just lower the performance, but the consideration is not just whether it's low vibration but what tool gets the job done the quickest with low vibration."

### Cutting the cords

Cordless, battery-powered tools also are becoming more popular options for



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## Project Management

Lighting the Way to  
Energy Savings

Ongoing lighting upgrades at the Mall of America deliver bottom-line benefits and refresh the retail giant's appeal

By Dave Lubach,  
Associate Editor

Charlie Brantl talks with many lighting manufacturers in his role at the Mall of America in Bloomington, Minn. Many of the discussions focus on products aimed at reducing energy use at the massive retail facility that contains 4.87 million square feet and attracts 42 million visitors annually.

While saving energy is a top priority for any mall — the Mall of America has reduced its use 16 percent since Brantl started at the facility 17 years ago — keeping customers coming back is higher on the mall's priority list than it is for most other

commercial and institutional facilities. To make sure the mall remains an economic powerhouse — it employs 11,000 people and generates \$2 billion in annual revenue — the facility undergoes constant renovations and expansions. These projects frequently target the mall's lighting systems.

The upgrades are part of a strategy that involves “just a constant updating of products so it doesn't become old to people, where nothing's new and it's all the same and they've seen it and they're done with it,” says Brantl, the mall's technical service manager for electrical and HVAC systems. “If it's not as good for the public and guests, it's not going to impress them.”

## Spotlight on upgrades

The mall completed one of its largest lighting projects in 2011, when LEDs replaced high-intensity discharge (HID) fixtures in two parking ramps that contain 12,000 parking spaces. Brantl specified LED products and swapped out 5,800 fixtures for the upgrade to produce \$720,000 in yearly energy savings and cut the ramps' energy use by two-thirds.

The LEDs' installation took one year, following four years of preparation that involved Brantl conducting research to find an appropriate mix of lighting products.

“At the time, LED just wasn't there yet,” Brantl says. “The cost of LEDs was so high. Finally, I just pulled the trigger 4½ years later when I got one company to give us the right price and right product.”

Another significant lighting upgrade involved the incorporation of daylight. In 2014, the mall removed high-wattage fixtures and installed 400 feet of skylights in one of its four main corridors. The skylights are part of the 1.2 miles of clear panels that now cover 70 percent of the facility — a stark contrast to the mall's darker days when it opened in 1992.

At that time, “they used to have pretty dark colors in the mall,” Brantl says. “Now they're going to a lot of white colors just to bring everything out. We've done a lot of renovations to brighten up the mall.”

The Mall of America's successful lighting upgrades involved effective planning, accounting for post-installation maintenance, minimizing daily disruptions and clear communication with all team members and affected parties.

The mall's other lighting upgrades have included replacing 500 50-watt (W) MR16 bulbs and recessed cans in a corridor with 5W LED MR16 halogen bulbs, a move that lowered energy use from 25,000 W to 2,500 W.

When Brantl started working at the mall, it was using incandescent PAR 38 fixtures. Eventually, he replaced them with lamps that reduced wattage per fixture from 150 to 39.

“With the renovations, they put a lot of ceramic metal halide lighting in, which is good lighting,” Brantl says. “The ceramic metal halide has a high color rendering index. But to show more true daylight colors, which they have on the west side, they put a skylight down the entire west side for daylight lighting.”

The mall also found energy savings by upgrading the lighting in mall directory signs, removing 400-500 W tubes that required replacement every year with 150 W lamps that last seven years.

While the many upgrades have been successful in helping the mall hold down lighting-related energy costs, Brantl is still cautious to research the potential benefits of any proposed upgrade.

“There's more that we can do, but it has to make sense,” Brantl says. “We have to have a three, max four, year return on investment on anything we do and then also make sure the product lasts that long.”

## Beyond products

Successful lighting upgrades involve much more than installing the most appropriate products. Effective planning also involves accounting for post-installation maintenance, minimizing facility disruptions, and communicating clearly with all team members and affected parties.

Brantl's staff is hands-on with the Mall of America's lighting systems once installation is complete.

“What I do with lighting systems is go through existing stuff and make my own suggestions about how we can have reduction of wattage with better lighting,” says Brantl, who tends to not be involved in the initial planning of projects.

To avoid interrupting the flow of traffic through the mall when performing system testing and maintenance by doing most of the work in common areas overnight, when the facility is closed to the public.

“We don't do our maintenance that would interfere with our tenants, but we get calls constantly” throughout the day, Brantl says. “We monitor all the



PHOTOS: MALL OF AMERICA





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temperature in the mall as far as cooling, and we also program a lot of different lighting for different events when they want lights on at a certain time.”

Brantl’s role in planning the upgrades requires regular communication with city officials regarding lighting codes. He works closely with Bloomington officials to ensure the proposed projects meet the city’s building codes for lighting.

“Most of the stuff the mall does, even in the ramp lighting, it’s not going to be an out-of-the-box fixture,” Brantl says. “It has to be a spec-made fixture. The best thing I

can do is work closely with the city and not slip something by them because then you have a trust factor. Once you have (clear communication), you get along real well.”

**Selling the savings**

The Mall of America’s ongoing lighting system upgrades and structural expansions keep the facility in a state of change, so communicating clearly with upper management is critical for Brantl.

“Budgeting is always a challenge because some of the stuff you budget for, you actually need to educate them on why you’re

budgeting for it,” Brantl says. As an example, Brantl helped top management understand his thinking behind a significant investment designed to help the mall avoid possible economic disaster.

Several years ago, he submitted a capital budget that included funds to buy additional backup transformers at \$250,000 apiece — a significant investment.

“They wanted to know why we needed two spares,” Brantl says. “I basically said, ‘The transformers are 20 years old, they are spec-made, and (it) can take up to six months to get one. If one goes down and

within six months another goes down of the same type, this mall is closed. How much is that going to cost per day?’

“My job was to show them what it would cost to do that before we get a new transformer. It would have been a ridiculous cost — millions of dollars, rather than just a quarter of a million dollars for two spares. In the end, they agreed I was right. We ended up getting it, but that was almost a two-year process. Budgeting is easy. Getting them to go with it is hard.”

Brantl says he understands the reason top executives would question such a request before approving funding.

“You have to sell it, but you also have to have facts that make sense,” he says. “I don’t blame them. If we’re going to spend this money, we want to make sure we’re spending it wisely.”

**A future of change**

Brantl and his staff will continue facing lighting challenges. He is now overseeing a \$325 million expansion on the Mall of America’s north side that includes a luxury hotel, a 10-story office tower, and about 60 new retailers.

The expansion includes lighting upgrades to the adjacent common area of the mall that blends the new area into the existing north corridor. When the expansion is complete, Brantl will take control of the office tower and the mall’s new common areas.

“All of the old HID lighting and any compact fluorescent lighting is going out, and new LED lighting is coming in” to the north corridor, he says. “So there’s another energy reduction for us as far as getting all the big cans out that are metal halide and ballasts. Right now, we’ve got two guys working on those fixtures, tearing them apart so that we can recycle them properly.” ■

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# Flexible Fleet: Diverse Challenges Call for Savvy Management

One community's array of terrains and landscapes underscores the need for effective and versatile management of grounds equipment

By Dave Lubach, Associate Editor

**P**elican Bay presents an array of challenges that would test the fleet of grounds, construction and transportation equipment in almost any institutional or commercial organization. The 2,200-acre community located on Florida's Gulf Coast near Naples includes streets, walkways and parks, as well as lakes, Gulf of Mexico beaches, and 500 acres of naturally protected land.

With a population of about 6,400, Pelican Bay is a separate community within the city of Naples and Collier County. The area is a mixed-use planned community development that includes residential, commercial, and public areas. The many different kinds of landscapes require that Pelican Bay deploy a fleet of vehicles capable of handling an array of tasks daily.

"It's rare that all of my vehicles are not being utilized," says Marion Bolick, Pelican Bay's operations manager, who oversees the fleet. "We don't have extra vehicles in our fleet, so when one goes down for repair or maintenance, that's one of our biggest challenges — getting crews deployed throughout the property in an efficient manner."

## Focus on the fleet

Bolick's fleet consists of 13 trucks, including pickup trucks, flatbed trucks, a dump truck and a bucket truck equipped with an aerial lift to reach hard-to-access areas such as light poles and trees. The fleet also includes six utility vehicles, six zero-turn mowers, a front-end loader, two boats, a chipper, and pull-behind blowers for street and sidewalk cleanup.

The community's operations staff includes 13 full-time employees, all of whom work for Collier County, Bolick says. Any temporary labor positions are under the Pelican Bay Division jurisdiction. Residents pay an assessment to receive an exclusive staff for public services.

The Pelican Bay staff maintains about 10 miles of streets and walkways, 36 acres of turf areas and 57 acres of landscape along roads and walkways and in two community parks.

Staff also handles the grounds for the commons, which is the headquarters for the homeowners association, and the community center, a multipurpose facility that hosts meetings and other public events.

Of the many challenges Bolick and his staff must contend with, dangerous weather presents significant concerns.

Pelican Bay sits in an area that sees frequent lightning strikes. As a result, one of the staff's regular tasks involves repairing streetlights and poles that have suffered lightning and storm damage.

"We utilize the bucket truck often for light repair," Bolick says.

"We have somewhere around 1,000 light poles to maintain, and with southwest Florida being the lightning capital of the U.S., we recently had lightning strike one of our poles that we had to replace.

"The pole didn't get knocked down, but it knocked the light off and damaged the concrete pole, so it will have to be replaced. It's the second or third time within a year



The 2,200-acre Pelican Bay community includes streets, walkways and parks, as well as lakes, Gulf of Mexico beaches, and 500 acres of naturally protected land. The fleet of vehicles crews use to maintain these areas includes mowers, utility vehicles, trucks, and boats.

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we've needed to replace a pole, so it's more common than I want it to be."

### Day-to-day duties

The fleet of equipment also must handle more routine maintenance and grounds duties. For example, the staff mows the community's turf areas weekly from March through November and every other week the rest of the year. The need for effective mowing is reflected in the department's equipment purchasing history, including the addition of three new mowers in the last three years to double the fleet.

"We're keeping the three older ones as backups, since mowing is one of the biggest parts of what we do," Bolick says. "It's a lot of ground (to mow), including the natural park settings, and along the roadways and sidewalks that we maintain."

The beaches along the Gulf of Mexico, the Natural Resources Protected Area of Clam Bay, and 45 bodies of water within Pelican Bay present a different set of challenges for the department.

"We have two restaurants on two different beaches, so there's material around each of them that we have to maintain,"

Bolick says. "Those areas with the mangrove trees (part of the protected area) and the boardwalks going out to the beaches, we maintain them."

Activities within the protected area require special permits for the staff to perform its regular maintenance duties, which typically require the use of the boats.

"We do water sampling, and with some channels from other bays, there are canoe trails that are pretty narrow, so we have to keep those clear," Bolick says. The staff uses boats to trim mangroves, dredge Clam Pass — a river-like body of water

adjacent to the beach — clear debris and fallen trees from canoe trails, remove exotic plants, and clear hand-dug channels for proper water distribution.

### Versatile vehicles

As the Pelican Bay fleet evolves to meet the varied needs of the community and its many elements, Bolick finds more ways to tap into the versatility of utility vehicles to meet those needs.

"We rely heavily on utility vehicles," he says. "We use the utility vehicles to spray lakes and for spraying turf and ornamentals. This year, we bought a pull-behind mower (an attachment for utility vehicles) to cut lake banks with because I wanted to keep the riding mowers off the banks."

The remoteness of some parts of the community play into the adaptability of utility vehicles.

"Not everything in Pelican Bay is accessible by truck," Bolick says. "Some places, we have to have utility vehicles. With some of the areas on the beach that we have to maintain, that's the only way we can access them."

Electricity-powered vehicles might soon become a part of Bolick's fleet as the department seeks to address sustainability. Bolick says he used electric vehicles during his last job as grounds manager with a South Carolina hospital. Using electric vehicles in a community setting presents challenges familiar to grounds managers who have considered purchasing the vehicles for other uses.

"The use of electric vehicles is limited, due to battery life, speed, and load and carrying capacities," he says. "On some of our utility vehicles, we carry 100-gallon sprayers, and electric power is not as efficient as using gas and diesel-powered utility vehicles. We are looking at purchasing electric utility vehicles to access lakes on the golf course because they are quiet and minimize noise."

### Smooth operations

When a vehicle in Bolick's fleet requires maintenance, the Collier County fleet management department provides inspection and repair services. Because crews use the machines frequently and often handle multiple tasks daily, open communication between the staffs is essential to ensure the machines return to action quickly.

"If it's something we know about that we can tell them ahead of time that we're going to need parts for, I tell them to let me know when the parts are in, and we'll bring it in ahead of time," Bolick says. "But if it's something in need of repair and we can't wait, we just have to hope they get it in as soon as possible."

As he continues to evaluate fleet needs, Bolick works closely with staff members to seek their input before making decisions about purchasing new equipment.

"I have two supervisors that I rely on quite a bit for their input, as well as different crew members," Bolick says. "My electrician, I certainly involve him on the vehicle he uses and ask what he needs. (Purchasing vehicles) depends on what the piece of equipment is, but with all the interested parties, I want to get their input on it." ■

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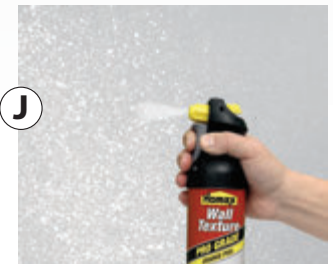
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**Current protector**

The CLIP®-LV joins an expanded line of protectors generically referred to as Is-Limiters. When an overcurrent condition occurs, the unit senses it and quickly opens the bus bar, transferring or commutating the current to a parallel, low-continuous rated current-limiting fuse that interrupts the fault. The protector is rated for continuous currents of 4,000 amperes. **Free Info: Circle 150**

**B** BOBCAT CO.  
**Utility vehicles**

The 3600 and 3650 hydrostatic-drive machines haul more materials than previous models and feature a 24-horsepower Kohler diesel engine. The hydrostatic drive offers increased comfort while executing repetitive back-and-forth movements such as hauling, mowing, sweeping, and snow removal. The vehicles can reach a maximum speed of 30 mph. Operators can choose suspension settings to match load requirements and achieve optimum comfort. **Free Info: Circle 152**

**C** KEE SAFETY INC.  
**Aerial work platform**

Easi-Dec provides workers with access to elevated heights and the roofline of single and two-story buildings. Two workers can assemble the system and lift into position from the ground floor in less than 10 minutes. The platform features a load rating of 750 pounds and measures 6½-feet long by 2½-feet deep with adjustable telescopic legs. **Free Info: Circle 155**

**D** NATIONAL SAFETY APPAREL  
**Face shield**

The ArcGuard® provides protection against arc flashes with features such as high-visible light transmission for increased visibility, an attached see-through chin cup for improved peripheral vision, and a lightweight design. The shield comes in both 12 calories and 8 calories options with adjustable settings that allow for locking in various positions. **Free Info: Circle 151**

**E** EXMARK MANUFACTURING  
**Stand-on mower**

The Vantage S-Series propane rider uses a Kohler electronic-fuel-injection engine that increases fuel economy. The 52-inch cutting deck features Flow Control baffles and a welded steel deck and includes 7-gauge spindle-mounting rings for improved durability. The blade spindle assembly features cast aluminum housings and maintenance-free bearings for maximum service life. **Free Info: Circle 153**

**F** LENNOX COMMERCIAL  
**Rooftop units**

The light commercial Raider® line includes a 6-ton unit available in gas and electric and electric and electric configurations and the 14 SEER units available in 3-5 tons. Available options include multi-stage air volume supply fans and a BACnet® building automation system as field- or factory-installed options. Units are available in 3-12.5 tons and include design features to match installation requirements. **Free Info: Circle 156**

**G** EYE LIGHTING  
**High-bay luminaire**

The 215-watt HBL LED replaces 400-watt metal halide lamps and features a rated life of 50,000 hours. The luminaire features a wide-beam reach and a corrugated color temperature rating of 4,000 degrees Kelvin, a color-rendering index of more than 80, and efficient operation in -30-50 degree Celsius temperatures. **Free Info: Circle 154**

**H** GENERAL PIPE CLEANERS  
**Drain cleaner**

Model 88™ clears 200-foot-long drain lines of tree roots and other stoppages. It features a ¾-horsepower motor, and a 3.5-to-1 ratio gear head increases the unit's power potential. The machine's longer steel frame protects the drive coupling, and a larger front wheel eases navigation concerns. The machine spins 8- to 10-foot quick-coupling cable sections in 3- to 10-inch lines. **Free Info: Circle 157**

**I** AMERICAN STANDARD BRANDS  
**Sensor faucets**

The Serin collection offers deck-mount and wall-mount models with the sensor hidden in the spout tip. Specifiers can choose a flow rate of 0.5 gallons per minute (gpm) with pressure-compensating multi-laminar spray or a 1.5 gpm flow rate with pressure-compensating laminar flow. The sensor recalibrates every two minutes to compensate for soap, water droplets and dirt. **Free Info: Circle 158**

**J** PPG ARCHITECTURAL COATINGS  
**Wall coating**

Homax® Pro Grade® reduces application time from two days using a hopper gun to two hours. The aerosol can include a pressure-adjustment toggle and pattern-control dial for precise spray control. The wall textures can match orange peel patterns in water-based or oil-based formulation and knockdown patterns in a water-based formulation. **Free Info: Circle 159**

**K** SMARTWARE GROUP INC.  
**CMMS**

Updates to Bigfoot CMMS Enterprise and Enterprise+ include the addition of six features, including CMMS configuration for job planning, purchasing, parts inventory, and reporting. The features are designed to complement the workflows, policies, and practices of users, enabling users to modify the CMMS to meet their most important needs. **Free Info: Circle 160**

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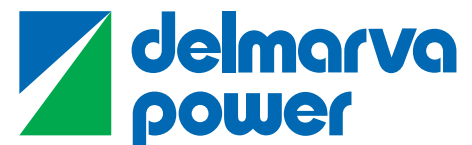


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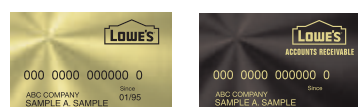
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