

Design and Construction Standards

PUBLISHED BY APPA

Salary Trends: Facilities Professionals

The How, When, and Why of a Facility Condition Assessment

Essentials in Facilities Management

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30

ESSENTIALS IN FACILITIES MANAGEMENT

16 Design and Construction Standards in Higher Education

By Peter M. Slavin

In days past campus building standards emphasized only what was needed to learn (for the taxpayer's sake). Today's space standards, however —for both public and private—can be broad or exacting in their specifications and purposes.

22Five-Year Salary Trends for Facilities Professionals

By Ernest R. Hunter Sr., P.E., ACP, MOS (Master) This is the fifth annual article from the author, again using APPA's Facilities Performance Indicators (FPI) report to explore salary trends in educational facilities and determine their growth or decline in recent years.

30 Facility Condition Assessments - The How, When, and Why

By Glenda Mayo, Ph.D., CDT, LEED AP, and Pauline Karanja, M.S. The Facility Condition Assessment (FCA) is one metric often used by facilities professionals to get accurate data from which to make accurate decisions. Bridging the facility condition data into useful information that owners can use to make informed decisions, is key. Based on an APPA CFaR project.

columns

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Compiled by Gerry Van Treeck	

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Josh Logan and Nancy Hostetler are the 2018 Recipients of the Rex Dillow Award for Outstanding Article

Since 1987, APPA has

presented the annual Rex **Dillow for Outstanding** Article in Facilities Manager to the feature article deemed most relevant, readable, and valuable from the previous year's eligible articles. We are pleased to announce that the 2018 recipients of the Rex Dillow Award are Josh Logan and Nancy Hostetler for their article, "Exploring the Benefits of a Strong Internship Program," originally published in the November/ December 2017 issue.

APPA's Information and

Research Committee, led



Josh Logan



Nancy Hostetler

by Vice President Norm Young of the University of Hartford, made its selection from the eligible articles published in the six issues of *Facilities Manager* within the past year. The authors received their award during the Awards Reception at the APPA 2018 conference in Washington, D.C.

Josh Logan is an environmental studies graduate student working in the facilities management department at the University of Colorado Denver | Anschutz Medical Campus; he plans to graduate at the end of the year. Nancy Hostetler is the safety, regulatory, and training specialist at CU Anschutz.

Their article describes and details the extensive internship program offered by CU Anschutz's Facilities Management Department to address issues related to recruiting, training, and retaining their skilled personnel. One solution, per the authors: "By teaming up with local higher educational institutions, the department was able to tap into an immense pool of candidates from the area's finest trade schools, vocational schools, community colleges, and universities." To read the entire article, visit *https://www.appa.org/files/ FMArticles/(14-19)%20FM_ ND17_F1.pdf.* Congratulations to Josh and Nancy on receiving the 2018 Rex Dillow Award.

If you have an article, case study, or ideas to share with fellow APPA members and readers of *Facilities Manager*, please contact me directly at *steve@appa.org*. I welcome your contributions.

SPEAKING OF INTERNSHIPS...

A subcommittee led by Kristie Toohill (formerly Kowall) of Illinois State University has been working on developing and rolling out an APPA internship

program designed both to encourage more campus FM departments to offer internship programs and to encourage undergraduate and graduate students to consider working as an intern in a variety of facilities roles and projects.

Grand Valley State University and Illinois State University have interns in place and applying the beta process for further refinements. We are working on a website for both institutions and potential interns to connect with, and we will share more information via *Facilities Manager* and *Inside APPA*.

If you have any questions or wish to participate in the internship program, please contact Kristie at *klander@ilstu.edu*. (5)

COMING IN SEP/OCT 2018

Profile of President Don Guckert

Highlighting the Award for Excellence recipients

APPA 2018 Conference Highlights

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About APPA

APPA promotes leadership in educational facilities for professionals seeking to build their careers, transform their institutions, and elevate the value and recognition of facilities in education. Founded in 1914, APPA provides members the opportunity to explore trends, issues, and best practices in educational facilities through research, publications, professional development, and credentialing. Formerly the Association of Physical Plant Administrators, APPA is the association of choice for more than 13,000 educational facilities professionals at more than 1,500 learning institutions throughout the United States, Canada, and abroad. For more information, visit us at www.appa.org.

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digest

By Anita Dosik



2018 APPLICATIONS DUE NOVEMBER 30

Nominations and applications are now being taken for APPA's 2019 institutional and individual awards. Awards nominations submitted after November 30, 2018 will be held and considered in the 2020 award cycle. To find out details and particulars about each award, visit http://www.appa.org/membershipawards/index.cfm or contact Christina Hills at christina@appa.org.

industry news & events

APPA 2017 AWARD WINNERS

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2018 REX DILLOW AWARD FOR OUTSTANDING ARTICLE

• Josh Logan and Nancy Hostetler (RMA)

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Filled with countless contributions from APPA's training programs, publications, and research projects, APPA's Body of

Knowledge (BOK) is a powerful resource and reference tool. It is a searchable, digital compilation of resources that is updated on a regular basis, and addresses all the fundamentals of facilities management.

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BOK

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Visit the APPA Bookstore for your Copy of APPA's 2012-2017 Effective and Innovative Practices Award Winning Entries: With Updates

A compilation of all of the winners of APPA's annual Effective and Innovative Practices Award from 2012 to 2017. The 84-page PDF includes updates and the future outlook for the practices wherever possible, as we know that the continuing story of these best practices is of great interest and importance.



Educational institutions can undergo technological, budgetary, and procedural changes, and learning how the program or process has changed over time is of great significance. An institution may have dealt with modifications, improvements, or issues since its inception, and we sought to know it all — the good, the great, the bad, and the ugly.

PDF-A778. Price: Nonmember: \$30.00 (Member: \$24.00)

CALENDAR OF EVENTS

APPA Events

Aug 2, 2018 Senior Facilities Officer (SFO) Summit, Washington, DC

Aug 3-5, 2018

APPA 2018 Annual Meeting & Exposition Washington, DC

Aug 7-10, 2018

APPA's Supervisor's Toolkit Pocatello, ID

Sep 9-13, 2018 APPA U Washington, D.C.

Oct 15-18, 2018

APPA's Supervisor's Toolkit Richmond, VA

Oct 29-Nov 1, 2018

APPA/ACUHO-I Housing Facilities Conference Pittsburgh, PA

Regional Events

Sep 24-26, 2018 RMA 2018 Conference Aurora, CO

Sep 29-Oct 2, 2018 CAPPA 2018 Conference Spearfish, SD

Sep 29-Oct 3, 2018 PCAPPA 2018 Conference Spokane, WA

Sep 30-Oct 3, 2018 ERAPPA 2018 Conference Manchester, NH

Oct 6-9, 2018 SRAPPA 2018 Conference Greenville, SC

Oct 13-17, 2018

MAPPA 2018 Conference Cleveland, OH

For more information or to submit your organization's event, visit *www.appa.org/calendar.*

Risky Business: Risk Management for Higher Education Facilities

By E. Lander Medlin

his past February APPA completed its 13th annual Thought Leaders symposium, which focused on the topic "The Landscape, Framework, and Strategies for Managing and Mitigating Risk." We sought to:

- Learn more about enterprise risk management;
- Assess the risks confronting our institutions and the facilities industry;
- Identify strategies for mitigating threats and seizing opportunities.

Frankly, just the work "Risk" evokes thoughts of hazards, threats, and disasters—usually all negative. However, it's a forgotten truth . . . with risks come opportunities. You certainly don't want to be one of those news headlines, let alone deal with all the follow up, clean up, and potential public relations nightmares. It's easy to say "avoid risks," yet risk is defined as "any issue that impacts an organization's ability to meet its objectives." And, enterprise risk management (ERM) is defined as "a business process that takes a strategic, campus-wide approach to risk." What ERM further emphasizes is "optimizing" risks to achieve enterprise goals.

Nevertheless, it's almost mind-numbing and definitely mind-boggling as there are hundreds of risks we could identify. Unfortunately, that's what happens. We get so bogged down in making "lists of risks" that we don't or can't take real mitigation action. It's the 80/20 Rule in reverse, where we spend 80 percent of our time on list identification and 20 percent on implementation. The Thought Leaders monograph provides a number of approaches to creating these lists including using URMIA's (University Risk Management & Insurance Agency) Risk Register. Let others do the bulk of the work for you or your



institution so you can indeed focus on those risks that are High Probability/High Potential Impact. Use the "Heat Map" approach to categorize, rank, and prioritize your risks, which will in turn allow 80 percent of your attention focused on taking action.

THE GOAL: FLEXIBILITY AND ADAPTABILITY

The framework for effective risk management requires a proactive, institution-wide approach, and one that is integrated and strategic-not silos. Remember, not all risks are equal. We need a formalized assessment to determine priorities, processes, resources, execution, and metrics (measured and managed). Even without resources, we cannot afford to turn a blind-eye. The ultimate goal of ERM is to increase an institution's flexibility and adaptability. As Janice Abraham (CEO of United Educators and the renowned higher education risk guru) aptly stated, "Effective risk management includes the flexibility to respond to both negative and positive events and turn them to your institution's advantage." That's of critical importance in considering risks as potential opportunities.

In addition to the TLS participants' work, APPA queried SFOs about their institution's preparedness, effectiveness, roles, and accountability with respect to risk. Most said they have a solid foundation for institutional risk readiness. Yet, we must remain vigilant. We found that having plans for mitigating risk and understanding your institution's risk tolerance fall short if you don't know "who owns your institution's risks . . . meaning who is accountable?" Therefore, "If someone is not accountable for your institution's risk, then NO ONE is accountable for your institution's risk."

The monograph highlights facilities' role in managing risk as:

- Hands-On, In-Depth Knowledge
 - o Campus Buildings and Infrastructure
 - o Mitigation Actions
- A Large Responsive Staff
 - o Prepared for emergencies
- Eyes on the Ground
 - o Workforce engaged with operations
 - o Warnings of potential events

The perspective of facilities' roles and responsibilities are important. Yet, of equal importance are the perspectives of senior institutional officers from three stakeholder groups who identified what they



need from facilities:

- Security/Risk Managers
 - o Be the eyes and ears of the campus
 - Better cooperation and collaboration during planning, design & construction of buildings
- Academic Affairs/Student Affairs
 - o Be the content experts
 - Enhance understanding of risks, challenges, and strategies to maximize student health and safety and academic success
 - o Build stronger partnership
- CEOs (Presidents)/CFOs (Business Officers)
 - o Rely on facilities expertise
 - o Keep informed of needs and strategies
 - o Current on changing regulations
 - o Make the business case for facilities reinvestments

In comparing the two perspectives, the most notable gaps between facilities and senior institutional officers were:

 Include all stakeholders in decision-making with corresponding feedback loops

- Build a more response-oriented workforce that is adaptable and flexible
- A campus-inclusive culture NO silos

Janice Abraham was instrumental in guiding the TLS discussions and provided some best practices for managing risks and opportunities:

Start from the top

MEET YOUR INDUSTRY LEADER

- Understand specific roles
- Recognize differences between "business" and "education" industries
- Build on the work of others (experts, institutions, risk registers, etc.)
- Look at the total cost of risk
- Incorporate at the highest levels (Boards, etc.)
- Question "sacred cows" (they exist at every institution)

STRATEGIES FOR RESPONSE IN TODAY'S WORLD

Throughout the monograph we have identified major categories of risk, strategies for response, and key questions for discussion in and across your institution for managing and mitigating risks.

Interestingly enough, it wasn't until the 1980s that we/institutions started thinking systematically about managing threats to the organization. Yet in today's world, facilities professionals, senior leaders, and the lay public are so much more aware of risk. This makes it even more challenging and requires solid identification, planning, implementation, and execution to prepare and protect our institutions.

Ultimately, the more you know, the more overwhelming, even daunting, the task of managing risk can feel! So now, how would you rank your "institution's" risk readiness? Most importantly, what can YOU do about it? We would suggest a great deal! It takes leadership by each and every one of us to:

- recognize risks,
- confront risks,
- own risks,
- be accountable for change,
- see opportunities, and
- seize opportunities.

It's your choice! 🕥

Lander Medlin is APPA's executive vice president and can be reached at *lander@appa.org*.

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APPA and COAA Launch a Collaborative Partnership

By Don Guckert

PPA and COAA (Construction Owners Association of America) have launched a collaborative partnership centered on the professional development of their members. Aligned with APPA President Chris Kopach's theme of "Harnessing and Transferring Knowledge," Dan Bollman, associate vice president for strategic infrastructure planning and facilities at Michigan State University (MSU) and APPA's Vice President for Professional Affairs, along with Jack Mumma, construction contract administrator at MSU and COAA past president, were instrumental in bringing the two associations together last fall to discuss opportunities for collaboration.

A significant number of institutions belong to both organizations, including current APPA and COAA board members from Carnegie Mellon University; Emory University; Penn State University; the University of Florida; the University of Maryland Baltimore County; MSU; and the University of Iowa. As stated by Gwen Glattes, project controls manager for Penn Medicine's Pavilion Project and COAA's current president, "The higher education sector represents over half of our construction owner members, and so partnering with APPA is a natural alliance for our association." Further, the second largest segment for COAA is healthcare, another crossover area for many APPA members.

COAA extended an invitation to me to deliver the general session welcome remarks for COAA's spring conference in Pittsburgh, Pennsylvania, in early May. My presentation, "What Happens After the Ribbon Cutting? Why Early and Continuous Operations and Management Staff Engagement Matters" (*https://www.coaa.org/Conference/SESSIONS/Session-18A/*



The-PDC-and-O-M-Relationship), covered topics related to the challenges and opportunities related to developing effective collaborations among those responsible for the creation and delivery of new facilities and those charged with the long-term operation and stewardship of those physical assets. I also discussed how organizational structures and staffing levels could have positive and negative influences on collaboration. Then I presented a sampling of best practices; this list included:

- Giving operations and maintenance an influential seat at the table;
- Aligning decisions to total cost of ownership;
- Closing the gap on divergent goals and expectations between the respective teams;
- Defining the project team's value proposition;
- Overcoming the obstacles that inhibit effective collaborations;
- Contributions that operations staff can provide for more successful project outcomes; and
- Ways that operations staff can inform the design decision-making process in order to pursue effective long-term stewardship of the facility.

The overarching theme of my presentation was that "We Provide this Place" to support the missions of our institutions and companies. Providing a truly successful and productive environment requires that we combine our services to work effectively together. Following the general session, Dan Bollman and I facilitated a breakout session with COAA's members to discuss ways to partner for more effective project results. Dan and I were impressed with the thoughtful discussion that ensued and the commitment of COAA members, and their associate members (design professionals and construction contractors), to pursue effective, productive collaborations. Many great ideas and practices were captured by COAA session facilitator Howie Ferguson, assistant director and senior project manager for the University of Florida's Division of Planning Design and Construction, to be shared with COAA's general membership.

FROM BIM TO OPERATIONS

BIM (building information modeling) has been a long-standing topic of COAA's preconference workshops at their spring and fall conferences. This year's spring conference featured a three-hour preconference workshop on how owners are using BIM platforms to capture and hand off relevant building, systems, and equipment data, with a focus on improving the transition from construction to operations. Because of our emerging partnership, COAA requested that APPA send two representatives to this workshop to share with COAA members how we are operationalizing the information created in BIM from the design and construction teams.

Brett Garrett, technical services director for facilities operations and development at Ohio State University, and Craig Dubler, facilities asset manager for Penn State's physical plant, shared their early adopter successes and lessons learned when they populated their work control systems with BIM information. COAA attendees appreciated learning about the postconstruction current and potential operational benefits gained by the information in their design and construction BIM models.

COMING SOON TO APPA U

APPA recognizes the importance of continuous learning for our members. Although we have a number of solid and successful offerings in our professional development portfolio, including the Institute for Facilities Management, the Leadership Academy, the Supervisor's Toolkit, the Senior Facilities Officer Summit, and our international, regional, and state chapter education conferences, we see an increasing demand to expand APPA's portfolio of training content and opportunities.

COAA has developed successful and popular training courses related to the delivery of design and construction projects by owners. Its courses are attractive complements to the coursework found at APPA's Institute for Facilities Management. These courses are a deeper dive into the technical aspects that are more broadly covered in the Institute's Planning, Design, and Construction track. Beginning with the January 2019 APPA U in Fort Worth, Texas, COAA will be offering a few of its Owner Training Institute courses alongside our Institute and Academy programs. This program will be led by COAA board member Terry Cook, senior AVP of administrative services for the University of Maryland Baltimore County.

With valued partners like COAA, APPA is accelerating its efforts to "harness and transfer" the knowledge among and within our respective associations to create a sum that is greater than its parts. (

Don Guckert will become APPA's President at the August 3-5 annual conference, He serves as assistant vice president, facilities management, at the University of lowa. He can be reached at *don-guckert@uiowa.edu*.



A Community College Perspective

By Mike Posey

aving been an active member of APPA for over 17 years, I am often asked about APPA by educational administrators and our staff, who want to know why our institution is so heavily involved in this professional group.

AN INTRODUCTION TO APPA

Like many of my contemporaries, I came to work in higher education from another industry. In my case it was from electronic manufacturing, and I had never heard of APPA. Several months after I started my employment at Pima Community College (PCC) in Tucson, Arizona, my supervisor asked me if I would like to go to the upcoming APPA training in



Fort Worth, Texas. The class started the next week, and one of my coworkers could not attend due to medical reasons. I immediately said yes, and was off to the Lone Star State.

My week-long training was some of the best professional training I have ever received. I found it particularly encouraging that the training staff was composed almost entirely of other facilities management professionals from other APPA member schools who were top-notch in their business. Not only was the training superb, but there were also opportunities to interact with other facilities leaders and managers representing a wide gamut of higher educational institutions from across the United States, Canada, and Mexico.

I also found it interesting to learn from my contemporaries that we at PCC were not alone with difficulties relating to operating large higher educational systems and providing superior facilities for our students, staff, and the public. I was astounded to discover that some of the most prestigious colleges and universities were also experiencing the same problems, such as aging infrastructure, deferred maintenance backlogs, decreased funding from state governments and other sources, decreased student enrollment, higher costs to provide personnel with competitive salaries and benefits, and changing student perceptions of the value of higher education.

USING APPA TO SUPPLEMENT RESOURCES

At PCC we try to use our APPA membership as an asset to supplement our resources. If you need managerial training for your staff, especially for upand-coming managers, then you should know that APPA is the international leader in this area. Virtually all of our managers and leaders at mid-level and above have attended APPA training, and they also participate in the Rocky Mountain Association (RMA) regional APPA organization. APPA also provides assistance to institutions to help them do their work more effectively and intelligently. If you need to post a question about an operational subject, you can post it with APPA and receive advice and feedback from peer institutions who have experience in the area you need help with. At PCC we are currently conducting an in-house review of our staff levels for all of our dispersed campuses. APPA has been an invaluable go-to resource in this effort and has given us the proper guidance and contacts to help us expedite it.

APPA is also great at recognizing the accomplishments of its member schools. PCC was ______ privileged to be a recipient of the presti-

gious APPA Award for Excellence in 2012. This singular award was warmly received by our staff and the leadership of the college. The staff were especially proud to be recognized for their hard work throughout the years, as they contributed so much to the growth of PCC. It should also be mentioned that APPA publishes Facilities Manager, a professional bimonthly journal, which I have found to be of tremendous value to myself and my staff. Many of the articles are contributions from our members and reflect the latest trends and best practices for those in the facilities industry. APPA also holds an annual conference that gives members the opportunity to participate in various forums and trainings by peers who make presentations on a wide variety of relevant subjects.

APPA-A TRULY PROFESSIONAL ORGANIZATION

In conclusion, I believe that most people in the educational facilities management field consider themselves professionals. Of course, many people use the term "professional" when discussing their work. One definition of a profession is "a vocation founded upon specialized educational training, the purpose of which is to supply disinterested, objective counsel and service to others." Among many hallmarks of a true profession are that it becomes a full-time occupation, that a training school is established, and that a national or international association is set up for members of the profession. In terms of an international association, I think you will agree that APPA sets the standard for us to follow. I firmly believe that membership

in APPA is essential to the promotion of facilities management as a profession. I wholeheartedly recommend that you join APPA as soon as possible to reap the benefits of membership. (§)

Mike Posey is director of facilities operations and construction at Pima Community College in Tucson, AZ. He can be reached at *mposey@pima.edu*.





By Peter M. Slavin

hances are, your college, university, or school campus did not develop without direction and planning. Most large universities and many smaller schools, public and private, are governed by a set of design and construction standards for many kinds of campus structures as well as the spaces and infrastructure between them. Covering labs and residence halls, water and sewer lines, phones, sidewalks, outside lighting, and landscaping, among other things, these standards number in the hundreds. They also prescribe the school's review and approval process for standards.

William A. Daigneau, APPA Fellow and member emeritus, and now a consultant based in Colorado Springs, Colorado, says that space standards for buildings came into use because "presidents and trustees wanted to build these monuments, and kids were just looking for a place to sit and

learn. As a result, many states put in building efficiency standards that tried to control overdesign and other concerns."

cation

The aim was to build only what was needed at state colleges and universities for the taxpayer's sake, Daigneau explains. Space standards accomplished that, while building efficiency standards limited construction costs. Then, the standards caught on at private institutions as a way to hold down construction costs and so led them to build more facilities, he adds.

Today, some standards are broad, while others are exacting in their precision, down to specifying the locks and hinges to be used. A number of state universities go further and rely largely on highly prescriptive specifications.

Large schools tend to collect their standards (sometimes called guidelines) online in comprehensive "design manuals," and give them to the architects, engineers, and designers they work with. The latter are obligated to follow them. "It's their 'Bible' that they hand to us," says architect **Robert E. Nalls**. Often the guidelines are written into contracts.

Smaller schools tend to have limited standards. Others have nothing in writing and simply tell designers what they want, says Nalls, president of Nalls Architecture, Inc., Ardmore, Pennsylvania, and past chair of the Society for College and University Planning. Many schools have a building committee on the board of trustees or regents that reviews all designs, he explains.



William A. Daigneau



Robert E. Nalls

Most big schools routinely republish or upgrade their standards (or a portion of them) every few years. Princeton published its 12th edition in April. By contrast, Nalls has found that over time, smaller schools rely on the corporate memory of staff about how they do things.

Deviations from standards manuals are possible if justified with good reason, and they are frequently approved. Architects and engineers will push back when a standard is not appropriate to a project for technical or aesthetic reasons, says Nalls. Such exceptions are readily granted "if you can show why it's a more efficient design or whatever," remarks Daigneau,



Erik Backus

who long managed operations and facilities at the University of Texas MD Anderson Cancer Center.

Some might wonder why such care isn't taken with everything on campuses, such as how buildings are maintained year after year. There are a multitude of reasons why standards are so highly valued.

"Absent any set of standards, your campus starts to look like an eclectic statuary museum. You don't have any definition of what your architecture is supposed to look like," says **Erik Backus**, who directs the construction engineering management program at Clarkson University in New York.

Backus, who's also a civil engineering professor, says until recently at Clarkson an architect "would design a building that would look good on its own and would really attract donors . . . but wouldn't fit otherwise within the campus.

"That's an institutional image issue, and that's what sells your students," he adds. "They're making a decision within the first moments of being on campus, and a big part of that is 'what does it look like?' And if it doesn't look attractive...." A set of standards "reinforces the brand," says Daigneau. He points to the University of Rochester, where he formerly directed university facilities. Rochester takes pride in its quadrangle—red brick, limestone finishes, columns, exterior lighting—and had applied architectural and other standards throughout the campus to cement that image, he says.

Standards also establish the characteristic look of a university by determining building sizes and spatial relationships and materials, says Nalls—for example, when they mandate that buildings should be brick with white trim.

That produces a consistent

look across campus. Stan-

dards are vital because

"you're dealing with a

changing cast of charac-

ters on every project," he

adds. Standards also lead

to consistency in main-

tenance work. You don't

systems, he says.

want four different locking

In addition, standards

also lower operating costs

through standardization. Mechanics at Southwest

Airlines only have to learn

to maintain a single type



John Gibbemeyer

of aircraft, and campus design standards have the same effect, notes Daigneau. "You can train your mechanics, for example, on one type of building control system, how to maintain it across the entire complex, building after building," he explains. The

> standards allow stocking of standard parts from elevators to carpeting and buying in bulk. Office furniture and signage can also be standardized.

Backus adds that through standards, operating expenses also can also be reduced by improving the long-term performance, energy performance, and life of buildings. In addition, money can be saved on design fees because a set of clear standards gives design firms a head start.

Standards also permit schools to set building maintenance costs upfront, says Backus. For example, a mandate to use terrazzo flooring over ceramic in hallways means a particular custodial cost, length of service, performance, and noise level, he notes.

The cost of different standards has to be weighed in choosing them, says Backus. That should mean considering life-cycle costs of construction as well



as first costs, remarks **John Gibbemeyer**, a facilities manager at George Mason University (GMU) in Fairfax, Virginia. "There's a push to get people to think long term," he says.

There is a larger financial rationale for standards being an educational institution's fiduciary responsibility. Backus notes that both students and schools benefit when tuition and other costs are competitive. Affordability is vital in the present era of diminished state support of higher education and capped federal loans—big factors in the student debt crisis.

Median operating costs for university facilities at a four-year baccalaureate college run about \$2,500 a year per student, often higher at institutions with significant research, Backus says. If standards can help a college can lower that figure by a few hundred dollars, the savings for a student over four years can be appreciable, he adds.

Backus, who worked at George Mason before moving to Clarkson, observes that after GMU chose terrazzo as a standard, "Nobody was enforcing it." He emphasizes that "standards are only as good as how consistently you enforce them."

Things change, so standards have to be reviewed and updated every two or three years, notes Backus. Gibbemeyer thinks this should be done even more frequently.

The pace of technological changes seems to pose the greatest challenge to keeping standards current. "Technology is advancing so quickly, especially in the university where you have WiFi and Internet and AV (audiovisual) equipment . . . most institutions are not able to keep up," explains Gibbemeyer. He says of GMU's 2013 design manual, "We knew it was out of date when we published it."

Daigneau points to major changes in instructional labs—from physics to biomedicine—in the past decade. As for classrooms and lecture halls, he calls them "obsolete." How students learn has already changed so much, he says, that schools have overbuilt these facilities. New construction under current standards would simply add more idle lecture halls and classrooms.

Instruction and learning, he observes, has shifted from the lecture to work in small groups. The library, where students can meet to work on projects, has become the center of learning.

"Technology has made it possible to learn and teach in different ways," Daigneau explains. With so much material available online, it's no longer necessary for a professor to lecture and a student to sit in a lecture hall or classroom and take notes. Now a student in the classroom can ask questions based on what they have learned online, instead of simply listening to a professor hold forth.

Technological change in buildings, says Nalls, "gets out of date very quickly."

Gibbemeyer believes the pace of change means that "the manual should be updated once a year at a minimum." How many schools do this is not known.

But at least one school, Michigan State University (MSU), goes much further. MSU is updating standards continually.

MSU DESIGN STANDARDS CASE STUDY

Michigan State University has an unusual approach to formulating design and construction standards. Rather than a number of departments hashing them out around a table, 10 staff members from various building trades and other specialties call the shots in each of their fields.

Called "construction standard stewards," they are the go-to person when a change in their respective field—architecture, civil engineering, interior design, and so forth—is requested by another staff member. After a proposed change is examined by other staff in the field and works its way up to the steward, he or she decides whether to adopt the change. A steward can also change a standard on his or her own.

Is this decentralized decision making? "I would say it's *collaborative* decision making," remarks Leisa Williams-Swedberg, performance manager in MSU's Planning, Design, and Construction Department.

MSU may also have an unusual approach to deciding whether to allow deviations from standards. Deviations that may have a sizeable economic impact are determined by a project team. The team includes representatives of the university client, the Infrastructure Planning and Facilities division, and other MSU community members who may be affected by the deviation, such as the MSU police or Resource Center for Persons with Disabilities.

MSU is also ambitious about keeping track of technological change and changing standards/specs. (See main story.)

LEED standards are incorporated into MSU standards, and energy efficiency is emphasized, says Williams-Swedberg. In addition, recycling is very important on campus. Sorting is required to divert construction materials from the landfill, and recycling stations are located at every building. All this reflects students' desire for environmental stewardship by the university, she says.

MSU has been innovative in evaluating its efforts. In 2015, at the university's request, a Michigan architectural and construction firm conducted a peer review of MSU's standards and made recommendations. Then last year, all staff involved in the standards took part in a facilitated "Pause 'n Learn" session to critique their standards process. They removed some steps as a result.

At MSU, Williams-Swedberg says buildings have been designed to last 75 to 100 years, but she thinks that day is over. Things are changing too fast economically, technologically, and in terms of student needs. "I have a 19-year old son. I have no idea what his housing, technology, or preferences are going to be when he's 30," she says. "There are a lot more questions today than we had even 15 years ago about how we're constructing buildings on campus."

A SELECTION OF DESIGN STANDARDS

MSU staff have ongoing conversations with its craft trades employees, supervisors, university service providers/ partners (e.g., information technology (IT) services such as phone systems, data infrastructure, and IT equipment), and its classroom committee, states MSU's Performance Manager, Leisa Williams-Swedberg. "We are informed if different systems/materials should be considered, and[then] the process of vetting the suggestion begins, which will determine if the change will be accepted and incorporated."

Standards may be expected to serve an institution's needs, but they don't do so directly, comments Nalls. While schools rarely write their philosophy into their design and construction standards, it's not uncommon for a school to include its goals there, he says. "In that sense, standards can support [both] student and institutional needs. It's not uncommon for them to put their goals on sustainability into their standards—for example, all buildings shall be LEED

[Leadership in Energy and Environmental Design] Silver certified."

New standards can be controversial. They can pit the capital funds staff against operations and maintenance people, notes Nalls. Those writing the standards may be pitted against a faculty construction client who believes that those standards permit less space than they need, he says—and the classic fight is over the size of faculty offices.

Leisa Williams-Swedberg

When Backus led GMU's

standards revision in 2013, several

departments were at odds over who would lead the effort. There was also disagreement on other several matters: By issuing more ambitious standards, was the university assuming liability for what was normally the responsibility of outside architects and engineers? After hiring top-notch architects and engineers to tell the university what to do, why make them follow the manual? There was also general concern that the more demanding standards would boost construction bids. Gibbemeyer believes such political struggles are common on campuses.

Montana State University:	http://www.montana.edu/pdc/projects/2015/design- guidelines.html
National Institutes of Health:	https://www.orf.od.nih.gov/PoliciesAndGuidelines/ BiomedicalandAnimalResearchFacilitiesDesignPoliciesand- Guidelines/Pages/default.aspx
Princeton University:	https://facilities.princeton.edu/sites/facilities/files/DSM.pdf
Rutgers University:	https://pdd.rutgers.edu/university-design-standards
Southern Methodist University:	https://www.smu.edu/BusinessFinance/-/-/media/Site/ BusinessFinance/FacilitiesManagementSustainability/Design- Guidelines-and-Construction-Standards-Dec-2017.pdf
University of Iowa:	http://www.facilities.uiowa.edu/cds/
University of Kansas:	http://admin.ks.gov/offices/ofpm/dcc/bdcm/
University of Nevada Las Vegas:	https://www.unlv.edu/plancon/standards-contracts
University of Oregon:	https://cpfm.uoregon.edu/campus-design-standards
University of Pennsylvania:	https://www.facilities.upenn.edu/standards-policies/ standards/design-standards
University of Virginia:	https://oubo.virginia.edu/assets/documents/ FDG12thEd-201804.pdf

Whole Building Design Guide: http://www.wbdg.org/guides-specifications



Those involved in the discussions at GMU also had underlying views about the standards that conflicted, says Gibbemeyer. Facilities managers wanted to exclude certain products they'd had problems with, and those in planning and design favored manufacturers they had a relationship with and systems with lower costs. Project managers wanted to entirely disregard the standards manual.

"There was definitely disagreement on whether [the manual] should be published," says Gibbemeyer. He also recalls that "some contractors and engineers were told to ignore it and that it would not be enforced."

The manual was issued, but it was far from complete, says Gibbemeyer. GMU planned to form a committee to meet monthly to consider updates. However, Backus left for his position at Clarkson and had a series of short-term replacements. The manual has yet to be changed. (

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By Ernest R. Hunter Sr., P.E., ACP, MOS (Master)

his is the fifth annual article I have written for Facilities Manager exploring salary trends for educational facilities management (FM) jobs. The first article I wrote in this series was titled "Six-Year Salary Trends for Facilities Professionals" (Facilities Manager, July/August 2014). That article reported on salary trends for the period of FY 07-08 through FY 12-13.

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for Facilities Professionals

Using FY 07-08 as the base year and techniques generally used by the U.S. Department of Labor, we set out to determine whether salaries for people working in primarily higher education FM jobs experienced salary growth or decline during the study period. Rather than repeat all the details of the methods, techniques, and concepts used in the 2014 analysis, I refer you to the original article which can be found on the APPA website at https://www.appa.org/files/FMArticles/44-53.pdf.

The purpose of this article is to revisit the 2014

analysis and take a five-year look at the period since then. We will be using the same methods, techniques, and concepts as we used in the 2014 article for the fiveyear period of FY 12-13 through FY 16-17. We will use FY 12-13 as our base year and determine whether there has been growth or decline in salaries during this fiveyear period. In other words, the ending year of the 2014 analysis will be the base year for this year's analysis.

The source of the educational salary information for this article is the APPA Facilities Performance Indicators Report (FPI). We will also make some comparisons between trends seen in this five-year period and the six-year period studied in the 2014 article. Additionally, as we have done in all four previous articles in this series, we will supplement the FPI data with information from the Department of Labor Bureau of Labor Statistics (BLS) National Compensation Survey,

Figure 1a	FY 1	2-13	FY 1	6-17	
Administration	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Chief Facilities Officer	149	\$135,316	127	\$148,437	1.10
Assoc/Assist Director	233	\$96,539	187	\$107,536	1.11
Bus/Budget Manager	175	\$65,222	147	\$68,028	1.04
Human Resources Manager	56	\$57,101	46	\$65,860	1.15
Training Officer	36	\$57,701	26	\$59,606	1.03
Telecom Specialist	6	\$50,321	9	\$56,420	1.12
Computer Programmer/Analyst	160	\$58,244	142	\$62,175	1.07
Other Administrative Managers	218	\$63,450	159	\$68,781	1.08
Secretary Clerical	662	\$36,249	454	\$39,675	1.09
Other Administration Positions	366	\$42,880	406	\$43,807	1.02
		с	omposite Avera	ge Salary Chg	1.08

Composite Average Salary Chg

the BLS *Consumer Price Index* (CPI), and the *Employment Cost Index* (ECI).

Those familiar with the APPA FPI survey know that it includes six modules representing the six FM core functions—Administration; Architecture and Engineering (A&E)/ Construction; Custodial; Energy/Utilities; Landscape/Grounds; and Maintenance. The survey collects salary data for 52 different jobs, grouped by the core function with which

they are associated. In the 2014 article we displayed the num-

ber of employees reported on in the APPA FPI survey and the

average salary for them for each FPI job for the base and ending

KEY

- FPI APPA's Facilities Performance Indicators
- BLS Bureau of Labor Statistics
- **CPI** Consumer Price Index
- ECI Employment Cost Index

year. In this article we have included the same figures with the same numbering scheme for the new base year and new ending year of our current study period. We have added the *Composite Average Salary Change* measurement for each FPI job group. Let's discuss the Administration group as a way of illustrating how to interpret the information.

As can be seen in Figure 1a (previous page), the FPI respondents reported on 149 Chief

Facilities Officer employees in FY 12-13, and on 127 in FY 16-17. The average salary in FY 12-13 was \$135,316, compared to \$148,437 for FY 16-17, resulting in a *Salary Change* of 1.10, or a

Figure 1b	FY 1	2-13	FY 16-17		
Maintenance Group 1	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Shop Supervisor/Foreman	745	\$58,973	636	\$63,672	1.08
Carpenter	504	\$44,643	461	\$47,663	1.07
Electrician	906	\$48,875	751	\$53,298	1.09
Locksmith	242	\$44,451	224	\$48,386	1.09
Machinist/Welder	87	\$49,255	61	\$52,855	1.07
AC/Refrigeration	909	\$48,713	716	\$52,177	1.07
Mason	71	\$43,633	42	\$50,707	1.16
Painter	394	\$42,779	332	\$45,969	1.07
Plumber/Pipefitter	665	\$48,367	576	\$52,536	1.09
Roofer	77	\$40,121	61	\$44,042	1.10
			Composite Av	erage Salary Chg	1.08

Figure 1c	FY 1	12-13 FY 16-17			
Maintenance Group 2	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Sheetmetal Worker	57	\$50,043	75	\$52,983	1.06
Other Trades Positions	514	\$43,328	456	\$48,893	1.13
Chief Superintendent Maintenance	186	\$75,583	162	\$83,346	1.10
General Zone Maintenance Worker	1,164	\$39,068	1,007	\$44,684	1.14
Elevator Mechanic	52	\$68,416	47	\$68,250	1.00
Vehicle/Equipment Mechanic	152	\$43,577	103	\$46,076	1.06
Storekeeper/Expediter	211	\$36,179	124	\$40,821	1.13
Labor/Trades Worker	357	\$38,123	270	\$41,324	1.08
Other Maintenance Positions	319	\$44,401	319	\$47,806	1.08
	all a second		Composite Av	erage Salary Chg	1.12

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Figure 1d	FY 1	FY 12-13 FY 16-17			
A&E/Construction	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Architect	146	\$83,657	108	\$89,551	1.07
Engineer	155	\$79,595	118	\$84,431	1.06
Facility Planner	109	\$68,414	83	\$76,504	1.12
Construction Manager	126	\$78,445	111	\$87,256	1.11
Estimator/Scheduler	51	\$56,338	33	\$54,973	0.98
Project Coordinator/Manager	375	\$63,574	421	\$70,082	1.10
Other Construction A&E Positions	396	\$47,800	401	\$58,305	1.22
			Composite Av	erage Salary Chg	1.10

Figure 1e	FY 1	12-13 FY 16-17			
Custodial	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Custodial Superintendent/Manager	159	\$64,994	163	\$72,542	1.12
Custodial Supervisor/Foreman	651	\$42,948	598	\$46,261	1.08
Custodial Crew/Team Leader	905	\$32,672	759	\$34,317	1.05
Custodian/Housekeeper	10,229	\$27,240	9,084	\$29,411	1.08
Other Custodial Positions	334	\$32,835	268	\$33,538	1.02
			Composite Av	erage Salary Chg	1.08

Figure 1f	FY 1	2-13	FY 16-17		
Landscape/Grounds	No of Employees	Avg Salary	No of Employees	Avg Salary	Salary Chg
Grounds Superintendent/Manager	105	\$66,228	106	\$72,350	1.09
Grounds Supervisor/Foreman	227	\$46,216	193	\$49,137	1.06
Grounds Crew/Team Leader	331	\$37,640	278	\$40,239	1.07
Groundskeeper	1,719	\$31,318	1,560	\$33,144	1.06
Other Grounds Positions	412	\$34,591	357	\$38,049	1.10
			Composite Ave	erage Salary Chg	1.07

10 percent average salary growth. Reviewing the remaining job titles in the Administration job group, you can see some level of salary growth for all jobs, ranging from 2 to 15 percent. The *Composite Average Salary Change* for the Administration job group for the five-year study period was 8 percent. In fact, all 52 jobs experienced modest growth in average salary except the Estimator/Scheduler and Elevator Mechanic job titles. The Estimator/Scheduler job title experienced a salary decline of 2 percent and the Elevator Mechanic job title remained unchanged.

While taking averages of averages is generally not a preferred statistical analysis technique, in this instance by doing so we can get a good perspective of how our current five-year study period compares with our 2014 six-year study period. Figure 1h is a summary of the average salary growth reflected by the APPA FPI survey for the 2014 study period and the current study period listed by job group. As you can see, there was an *Overall Average Change* of 4 percent growth for the 2014 six-year study period, compared to 9 percent growth for our current five-year study period.

In other words, the higher education FM workforce as reflected in the APPA FPI survey experienced a 4 percent pay raise during the 2014 six-year study period and a 9 percent pay raise during our current five-year study period. Stated another way, higher education FM workers' salaries grew more than twice as much during our current five-year study period than they did during the 2014 six-year study period—good news for our community!

It would be interesting to see how Figures 1a through 1h would look if developed for your FM workforce salaries for the same periods. As you review and interpret this information and

Figure 1g	FY 12	2-13	FY 1	6-17	
Energy/Utilities	No of Employes	Avg Salary	No of Employees	Avg Salary	Salary Chg
Director of Utilities	45	\$96,197	43	\$101,521	1.06
Utilities Supervisor/Manager	168	\$66,458	156	\$73,127	1.10
Energy Engineer/Manager	78	\$72,752	85	\$74,092	1.02
HVAC Controls Technician	205	\$52,612	243	\$56,773	1.08
Utilities Operator/Maint	919	\$49,857	848	\$53,722	1.08
Other Energy/Util Positions	158	\$48,074	199	\$52,811	1.10
			Composite Ave	erage Salary Chg	1.08

	11.11.11.1000001019449777749968-1945938877777				
Figure 1h	FY 12-13 Over FY 07-08	FY 12-13 Over FY 07-08			
	Average Change	Average Change			
Administration	1.05	1.08			
A&E Construction	1.04	1.10			
Custodial	1.05	1.08			
Landscape/Grounds	1.04	1.07			
Maintenance Group 1	1.02	1.08			
Maintenance Group 2	1.06	1.12			
Energy/Utilities	1.03	1.08			
Overall Average change	1.04	1.09			

construct similar analyses for your own workforce, keep in mind that the APPA FPI respondent population is not constant and changes from year to year. Some institutions participate every year, while other institutions participate less frequently. Additionally, participating institutions may or may not report salary information each time they participate. However, even with these facts in mind, this data is an excellent, reliable source for comparative analysis when attempting to make judgments about the health of your salary program compared to national trends.

From the above discussion, we can see how salaries for our two study periods compare based on FPI data. However, in most statistical analyses it is useful to have multiple data sources or reference points for making comparisons. At this point in our discussion it is helpful to repeat some of the details of the 2014 article for ease of reference. As we did in 2014, we now introduce the CPI and the ECI into our analysis. To make use of these two external national indicators, we created a data model connecting the files from the Bureau of Labor Statistics (BLS) database to five years of APPA salary data from FY 12-13 to FY 16-17. All values in both data sources were normalized to the base year of FY 12-13, so that appropriate trend comparisons could be made. To normalize the data, the value for each year is divided by the FY 12-13 value. This sets the FY 12-13 normalized value to one. The normalized value for the other years reflects how much that year's value increased or decreased over the base year of FY 12-13. You can apply the same normalizing method to your local data to see how your trend compares to the composite trend for each of the six FPI job categories.

Figure 2 shows the normalized trend lines for the composite salary growth for the six FPI job groups for our current five-year study period. The graph shows that all FPI job groups followed a similar trend, with salary averages increasing each year. So the next obvious question is, how does this compare with the rest of the national workforce?

Turning our attention to Figure 3, and making use of the same method used by BLS, for each year we generated a composite trend line for the 52 FPI jobs; we will refer to that line as the *FPI All-Jobs Normalized Salary Trend*. This is done by computing the total salary amount reported for each job (average salary times the number of full-time equivalents (FTEs)), summing the results, and dividing by the number of FTEs reported in the FPI survey. By normalizing this composite trend data, we are now able to compare the result with the CPI, the ECI, and other normalized indicators. As shown in Figure 3, we now have normalized trend lines for three indicators that we can overlay over any of our own data to see how we compare.

A closer look at Figure 3 reveals that unlike the results for the 2014 six-year study period, the composite salary trend for our current five-year study period for all FPI jobs outpaced the CPI and ironically matched the ECI at the ending year. Since the CPI is a measure of how much we have to pay for goods (cost of living), the implication here is that the composite salary growth exceeded the growth in cost of living—another bit of good news for our community! And since the ECI is a measure of how much one FTE of labor costs employers throughout the nation, the implication here is that the APPA FPI participant community provided their FM employees raises compatible to the national average for other employers throughout the U.S.

It should be understood that Figures 2 and 3 are general comparisons made at the highest level against the composite data and therefore should not be used to draw firm conclusions.

However, they can be used as indicators of areas suggesting further "drill down" or additional analysis. Figure 4 overlays the three indicators over the graph from Figure 2 and drills down one level to the job-group level. This allows observations similar to the ones we made above—regarding the FPI All-Jobs trend to be made about each job group. Figure 4 shows that each FPI job group's composite salaries outpaced the CPI, and all except the Landscape/Grounds group outpaced or matched the EPI.

While the comparisons in Figure 4 are one level less general than those in Figure 3, further drill down is still needed to make firm judgments about individual job titles. There is not enough space in this article to drill down for each of the 52 FPI jobs. For the purpose of illustration, I refer you to Figure 5 of the 2014

article, which includes a discussion of drilling down to each individual job title.

This is where we ended our discussion on salary trends analysis in the 2014 article. However, with the space I have left, I would like to touch on the historical national unemployment rate as reflected in the BLS table, "Labor Force Statistics from the Current Population Survey." This measure profoundly impacts salary trends and the ability of higher education FM organizations to recruit qualified employees to fill vacant positions. As can be seen in Figure 5, the unemployment rate trend was dramatically different for the 2014 six-year study period versus the current study period. In 2007 the unemployment rate was 5 percent and growing. It peaked in 2009 at 9.3 percent, after which it started a downward

Figure 4: FPI Job Groups—Normalized Salary Trend

trend that has continued through April 2018.

During the 2014 study period, the unemployment rate never reached below 7.9 percent. Yet we started our current study period with an unemployment rate of 6.7 percent that steadily declined to 4.1 percent in 2017. The unemployment rate at the time of this writing was 3.9 percent. The good news is that our community salaries fared much better during our current study period than they did during our 2014 study period, partially because the unemployment rate was significantly better during our current study period. The challenging news is that higher education FM organizations will face stiffer competition for qualified employees to fill vacant positions as this positive employment trend continues.

SUMMARY

Let's summarize what was done in support of this article and

review what facilities professionals can do to understand and analyze their salary program trends. We used five years of salary data from the files we downloaded from the FPI report on the APPA website. We downloaded the ECI, CPI, occupational employment and wage data, and BLS unemployment rate data files from the BLS website. We built an Excel data model integrating the data from all sources.

Using the same methods used by BLS, we created composite normalized indicators to represent individual FPI job titles and FPI job groups. We normalized the data against the FY 12-13 base year for data compatibility and "apple-to-apple" comparisons. So, as noted in the 2014 article, FM professionals can apply this same methodology to the jobs in their organization to help make decisions regarding salary policies and practices. (**§**)

ENDNOTES

- 1. Department of Labor National Compensation Survey: *https://www.bls.gov/web/eci/echistrynaics.pdf*
- 2. Consumer Price Index (CPI): https://inflationdata.com/Inflation/ Consumer_Price_Index/HistoricalCPI.aspx?reloaded=true
- Employment Cost Index (ECI): https://www.bls.gov/web/eci/ echistrynaics.pdf
- 4. Labor Force Statistics from the Current Population Survey: *https://data. bls.gov/timeseries/LNS14000000*

Ernest Hunter is president and senior consultant/trainer for Hunter Consulting and Training, Austin, TX. He is also the developer of APPA's Operational Guidelines software tools: *CleanOpsStaff; GroundsOpsStaff;* and the just published *MainOpsStaff* programs, all available at *www.appa.org/bookstore*. He can be reached at *ernesthunter@gmail.com*.

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Facility Condition Assessments– The How, When, and Why

acility management relies on accurate data to make accurate decisions. One important aspect of accurate data is the condition and performance of assets obtained through the Facility Condition Assessment (FCA). Multiple metrics begin to bridge the facility condition data into useful information when owners begin to make informed decisions. One metric, the Facility Condition Index (FCI), has long been a guide post for facilities professionals. The basic calculation of the FCI is that *FCI = Deferred Maintenance (\$) divided by Current Replacement Value (\$)*. A 2004 APPA article, "The History of the Facility Condition Index," provides a great summary of the FCI metric and its inception.¹ Subsequent publications have reported different varieties of the FCA process and the metrics utilized, such as the FCI, but overall the FCA has stood steadfast in its purpose.

However, there remains a lack of standardization to the methods and metrics used for condition assessments. Researchers at the University of North Carolina at Charlotte wanted to understand more about the current state of the FCA process and established a Delphi panel of experts, formed with 13 participants who comprised four facilities management (FM) practitioners working for institutions of higher education (providing the owner perspective) and nine FM consultants. We wanted to know what the industry is currently reporting, why

FCI

Data Collection

Hierarchy

Purpose

SUBJECTIVITY

P

One of the greatest obstacles to the standardization of an efficient condition assessment process is the issue of subjectivity. Traditionally, a condition assessment for a building is performed through visual inspection by internal or external experts in specific building systems. While many asset management systems incorporate some measures to ensure uniformity, such as staff training, a third-party assessment, and the use of a numerically based rating system, the current condition assessment process is nevertheless highly subjective, and its accuracy is highly dependent on the experience and training of the field inspectors and assessors.

Often condition assessments are completed over long periods of time and by various entities. This can be problematic when attempting to compare reports. However, some veteran users of FCAs have developed consistent nomenclature and dependable internal metrics. Others agree that subjectivity can be overcome with the involvement of a third party or by the process being more regimented and data driven. There are of course some components in a condition assessment that are objective (e.g., facility size, location, and maintenance records).

BUILDING HIERARCHY

An FCA is performed primarily to facilitate the ranking of the components of all assets per the amount of repairs required. Although there are standards available for defining a building hierarchy during construction as developed by the Construction Specifications Institute (CSI), such as MasterFormat, UniFormat, and OmniClass, there is no specific recommended standard for FM. Even when the owner has selected a standard, the determination must be made as to how "deep" into a hierarchy the assets should be tracked (e.g., at the system level or component level?). Often the requests for proposals (RFPs) sent out by facility owners have different funding structures or may ask consultants to develop their own for the project. These funding structures and priorities drive the method and content of the FCA, and the lack of a standardized format may lead to the inability to compare results. So, although owners often mandate "a" structure, it may not follow a formalized or standardized structure.

As an essential step in an FCA, a building must be hierarchically decomposed into its main components, and OmniClass enables tracking at the component level. The hierarchy is intended to classify and cluster these components in different categories. When the panelists were asked which of the following formats for categorizing assets for assessments are used most often, the most prevalent in terms of agreement were Uniformat and then MasterFormat. One of the panelists made an accompanying comment that the classification standards available are limited in their effective granularity, which suggested the probable reason that OmniClass Table 23 is not as well-known and therefore not utilized. If owners utilize the same hierarchy to organize all owner information, this would ultimately save time when attempting to store information for future use. It is important to have the FCA process follow a usable hierarchy and categorization so that the information uploaded onto the owner's database is consistent with what the owner already uses internally.

REPORTING

What do owners require as part of their reported information from the FCA? The only disagreement here was whether a building summary is included in the FCA report, with 42 percent of the panelists indicating they do not include one, while 58 percent indicating they do. The other heading titles that the panelists agree should be included in the FCA are:

- General building information
- Detailed assessment summaries
- · Inspection team data
- Detailed assessment totals
- · Facility condition categorization descriptions
- Deficiency audit reporting
- · Photographs and drawings

The best format for the FCA reports was confirmed to be a database or Excel. There was agreement that FM has moved away from hardcopy binder formats. Utilizing electronic formats provides an optimal means for periodic real-time updating of data. Owner-driven reports depend on the audience receiving the information. For example, the VP or CFO would want a hardcopy binder or PDF report for quick reference, whereas FM professionals would need to store the data in a database for continued tracking and updating.

DATA MANAGEMENT AND STORAGE

There was disagreement on the storage and management of the data collected—for example, should reports be kept in Excel on someone's computer or entered into a shared database? Not all the panelists could agree that the data should be uploaded to a system capable of analyzing, tracking, reporting, and prioritizing data (in a computerized management system). This is counterintuitive to the orientation of a data-driven organization.

It is recognized that information remaining in static reports are snapshots in time as opposed to the integrated and dynamic use of data. This isn't a problem if we understand that FCAs then need to be "refreshed" regularly because the data is not actively managed. If continually managed, the "refresh" requirement would be unnecessary. The industry is currently working to ensure that a conduit exists to transition design and construction data into an owner's database, and this study raised the question of whether condition assessment data should be another type of information that can be employed for more than a single-use report.

TECHNOLOGY

Although slower than many other industries, the increased use of technologies is growing in FM. Not surprisingly, there was consensus on the use of iPads and handheld computers like tablets, laptops, and apps on phones for data collection. Unexpectedly, there was also consensus on the use of forms or paper-based systems (61.5 percent), with some panelists stating that these should be avoided, citing that they create inaccuracies in data transfer and add time and expense to an already costly process.

Technologies may also be utilized for diagnostics during the FCA process to determine the nature and extent of problems. There was no agreement regarding the use of infrared thermographs, handheld laser measurements, moisture analyzers, smart levels, and tape measures; but it is believed that many of these tools are used as one-offs and only when needed, so the panelists did not agree that they are used for every assessment.

The panelists were in consensus on the need to consult occupants. Occupants may provide insight to an ongoing problem that is not visually evident during an assessment. However, one of the panelists stated, "Even as the occupants are consulted, their perception of issues lacks building and system knowledge, and therefore the issue should be further researched."

TIME REQUIREMENTS FOR FCAS

For owners who are deciding whether to complete the FCA internally or to contract the service, the research inquired about the time requirement to complete an FCA. Although there was no established consensus, half of the panelists stated that for a building that had complex systems, such as laboratories with a complex MEP (mechanical/electrical/plumbing) system, two days were adequate.

When considering how often the FCA should be carried out, the survey results indicated that the highest-ranking period was five years, with 50 percent of the panelists indicating that a fiveyear cycle was the most feasible. This was followed closely by a three-year cycle as the second-most feasible option. "The best FCAs are done once, and then the data is managed in a life-cycle database," said one panelist. "As assets reach the end of their useful life, they are assessed individually, but the campus-wide FCA is only done once." The responses to this question may have varied due to the understanding that subsequent "updates" are the same as conducting a new condition assessment. Additionally, a panelist stated that FCAs should be conducted annually for all assets that are at or near the end of their useful life as determined by the life-cycle tracking system.

FACILITY CONDITION INDEX

There was complete agreement that FCI provides a good overall indication of a structure's condition level. However, the complexity of the use and calculation of the FCI can be daunting. A panelist commented that the numerator selection is dependent on the client's mission and therefore differs from project to project. But if the point is to develop standards, then multiple formulas for multiple purposes should be developed. A substantial portion of the discussion regarding the FCI metric pertained to defining the terms, such as:

- Renewal cost is the current fiscal year renewal costs and not the aggregate total.
- Deferred maintenance denotes incomplete preventive maintenance (PM) and routine repairs.
- Deferred capital renewal denotes assets beyond their useful life that require replacement, renewal, or retrofit.

The most commonly accepted formula for FCI is: FCI = Deferred Maintenance (\$)/Current Replacement Value (\$) For the sake of developing standards, the numerator should meet the recently published APPA TCO 1000 Total Cost of Owership.² "The term 'Deferred Maintenance' is more appropriately termed 'Deferred Capital Renewal'. This term connotes a more accurate definition of what is needed and omits the inference to routine preventive maintenance and repairs that are not applicable to condition assessments," explained a panelist and TCO Committee member.

> FCI = <u>Deferred Capital Renewal (\$)</u> Aggregate Current Replacement Value (CRV) of all Managed Assets (\$)

The denominator was addressed in a separate question, and the panel came to a consensus regarding the formula: $CRV = gross \ square \ footage \ of \ the \ existing \ building \times \ estimated \ cost \ (per \ square \ foot) \ to \ design \ and \ build \ a \ new \ facility$

Although the panelists agreed on the use of the formula, the question of how the actual figures are derived, especially with regards to the estimated cost (per square foot) led to additional discussion. The panelists were asked about how their organization obtained their costs for use in the formula, and 25 percent stated that an internal estimator calculates CRV, but 62.5 percent stated that the cost-per-square-foot model is used. They also confirmed that "the CRV is taken from the aggregate value of the inventoried and managed assets. It is NOT the same value that the insurance would use for a total loss." Thus, while the results indicate that the formula may be standardized, the method of arriving at the figures to use in the formula differ.

It is agreed that the FCI is a static snapshot and is best used to track historical conditions or to justify immediate capital spending. A member of the panel commented that they feel as though the industry is moving past the FCI and toward more predictive approaches to managing deficiencies. This statement is evident in other APPA publications³ that discuss the use of hybrid methods in a formula combining the FCI with a Facility Renewal Index (FRI) for a total termed the "Facility Assessment Index" (FAI). There are numerous deviations, expansions, and adaptations of the metrics used in FM, whether they are used for commercial, educational, or public entity purposes. For example, a 2013 article discussed an extended concept of the FCI to address the needs of the National Park Service (NPS).⁴ An Asset Priority Index (API), which reported the "value" or contribution of each asset in the existing portfolio regarding the NPS's mission, was used in combination with critical systems identification.

SUMMARY

Overall, the panel members were in partial agreement that the metric should be used as a key performance indicator (KPI), likely because several indicated that the FCI has too much variance to be used as a true benchmark.

Standardizing FCAs is necessary for the broader and more effective use of managing facilities. The research confirmed that FCA information is used to make decisions. Thus there is a need for a consistent methodology supported by more detailed, assetoriented condition information. The FCI remains the overall desired metric to report the condition of facilities, as it provides a structure's condition level. However, owners should be purposeful about its use. A panelist summed up the researcher's thoughts in stating that "condition assessments drive the FCI, but there is so much more that can be done with the data to tell the real story." This research has initiated the discussion regarding industry improvements for condition assessments and additionally, the potential for the development of standards to assist in a broader use of the metrics.

In their ever-proactive approach, APPA has embarked on writing the implementation phase of the American National Standard entitled *APPA 1000 – Total Cost of Ownership for Facilities Asset Management*. This standard will incorporate key principles of total cost of ownership, one of which is FCAs. Stay tuned to see how APPA will continue to transform our industry to provide a standard that paves the way for the future of facilities management. (s)

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NFPA 3000 Standard: Addressing Active Shooter and Hostile Events

APPA Responds, Advances Improvements to NFPA Active Shooter Standard

By John Bernhards

new milestone standard now released by the National Fire Protection Association (NFPA) is likely to reset our thinking when it comes to active shooter and hostile intruder events, and facility readiness, on our educational campuses.

In April, the NFPA released a new standard entitled *NFPA 3000, Active Shooter/Hostile Event Response (ASHER) Program.* This standard was developed and published in just seven months, and was initiated by first responders in Orange County Florida, following the June 2016 Pulse Nightclub shooting in Orlando. NFPA quickly assembled a standards development committee of 46 subject matter experts, to include facility owners, academics, and emergency and law enforcement personnel. Also included were active shooter victims who engaged in the standard development dialogue and solutions-making process.

The momentum and drive to develop and release NFPA 3000 was further infused by the horrific massacre occurring October 1 at the Mandalay Bay Hotel in Las Vegas, resulting in 58 dead and over 500 wounded. A man armed with semi-automatic rifles fired from a 32nd-floor hotel window, raining gunfire on unsuspecting concert goers below. Four months later the standard was released for public review and comment, and following review and adoption of proposed public changes, the standard was finalized and published on April 11, 2018.

It is anticipated that NFPA 3000 will be readily adopted in many jurisdictions, as public pressure escalates on the issue of active shooters, and as communities seek answers. Now is the time for all educational facilities leaders to familiarize themselves with the NFPA 3000 standard, and to begin the conversation with state and local code officials on whether the standard will be adopted in their jurisdictions – and, if so, when. Dialogue is also needed across different institutional departments, most notably facilities, emergency planning, life safety, and campus law enforcement. The standard is available for viewing online and at no cost on the NFPA website at *www.nfpa.org.* APPA members attending the APPA 2018 Annual

Conference in Washington D.C. (August 3-5) can participate in an NFPA 3000 educational session where NFPA, together with APPA, will present and discuss the standard, and be available to answer questions.

IMPACTS TO EDUCATIONAL FACILITIES

The focus of NFPA 3000 is preparation for hostile events, coordination when events occur, and event recovery. There are numerous areas within NFPA 3000 that have an impact on educational facilities with regard to emergency planning, facility evacuation plans, preparation, and risk management. NFPA 3000 outlines requirements for a risk assessment of facilities that establishes which buildings and properties are at "high risk" for hostile events. The standard also identifies funding obligations and defines facilities readiness requirements.

APPA'S RESPONSE

APPA's Standards and Codes Council (ASCC) promptly responded to NFPA 3000's development. After careful review of the draft standard, APPA conducted an online town hall forum attended by more than 400 APPA members and stakeholders. NFPA's John Montes joined both myself and codes consultant Bill Koffel to summarize the standard's content and identify areas of impact to educational facilities.

The areas of greatest impact were found in Chapter Nine of the standard, entitled "Facility Preparedness." The standard identified the need for an annual exercise or drill at each facility. Town Hall Forum attendees raised concern over the overall effectiveness and necessity of an annual hostile event exercise for every building on a campus with multiple, contiguous build-

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ings. The requirement was viewed as overly redundant, costly, and a strain on campus personnel resources.

Campus law enforcement and life safety officials contacted by APPA also shared these same reservations and concerns. After receiving these responses, APPA crafted proposed changes to the draft standard through NFPA's public comment process. APPA's proposed changes included a recommendation that the number of required annual exercises be limited to no more than three per campus. This language would limit the required number

> of exercises but would not restrict a campus to conduct as many exercises as it felt necessary in preparing for such events. APPA also proposed that "table top exercises" be listed specifically as an exercise option in the final standard.

> The NFPA 3000 committee positively responded by removing the exercise requirement for every facility, and by adding language simply stating that "facilities with multiple buildings in a contiguous location shall annually exercise ASHER plans." To further complement this final language, the annex to the NFPA 3000 standard identifies "facilities with multiple buildings" to include schools and college campuses. In short, the new language in the final approved standard provides educational institutions with considerably more latitude. Additionally, the approved standard also clarifies the meaning of "exercise" and identifies seminars, workshops, and table tops as acceptable discussion-based "exercises," along with the more resource-demanding exercises (operational exercises) such as live building drills and full-scale exercises.

CONCLUSION

APPA ፝፞

NFPA 3000 requires facility owners and management to coordinate closely with life safety, emergency personnel, law enforcement, and first responders to ensure buildings and grounds have appropriate resources, emergency plans, and systems in place to prepare and respond to hostile events. The APPA Standards and Codes Council quickly engaged members to respond to NFPA 3000 – resulting in positive changes and making the standard more flexible and less costly to implement. (§)

John Bernhards serves as the associate vice president for APPA. He can be reached at *john@appa.org* and by telephone at 703-542-3848.

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Fundamentals of Measuring Maintenance Effectiveness

By Matt Adams

he basic returns of planned preventive maintenance have benefited from technology within the facilities management industry. Our peer leaders are proving the value of best practices associated with failure-based and run-timebased maintenance programs. The opportunity to reap the rewards of a robust maintenance program with less resources is more than appealing to our budget-constrained business. This opportunity further reinforces the need to document the return on investment for the resources we devote to these new, best-of-class maintenance approaches. The "numbers" have always been in our favor when communicated effectively. And now we have an even better story to tell, and more and more are telling it. It's always been a lean environment, but now more than ever, we can demonstrate what has been expected of us for many, many years: Do more with less.

SUPPORTING AND DOCUMENTING

Before we delve into financial returns, however, there is an important task to accomplish. Each institution should facilitate the discussion about supporting its educational mission and document and communicate the resulting goals. This discussion will revolve around the mechanical elements of our facilities. The basic template is the same for all service provided by our facility services operating units, and although the values or targets for many will be similar, it's important to communicate them to the greater campus stakeholders in order to promote a better understanding of the facilities department.

With respect to the mechanical aspects of our facilities, we should assemble a working group and agree upon those performance characteristics that we are going to leverage to support the educational mission. The "performance" of our mechanical systems refers to the ability of those systems to operate as designed in a manner that provides the maximum benefit for our campus stakeholders and customers. Each performance measurement should be selected, defined, and prioritized by the facilities management team. Some examples include:

Energy consumption. The energy consumption of various mechanical systems is predicted in optimal conditions by the original designer and equipment manufacturer. Each system and its associated subsystems can be monitored in a variety of ways, individually or in groups, to determine deviation from designed energy consumption. Effective maintenance will improve this performance measurement in a significant way.

System reliability. A variety of mechanical systems must perform reliably to support the institution's educational mission. Outages directly impact education and research in a variety of negative ways. The measurement of outages and the duration of each is a direct performance measurement impacting our ability to support the educational mission. Once again, effective maintenance will improve this system performance measurement.

Total maintenance. Cost, not to be confused with total cost of ownership (TCO), is a subset referring to the annual maintenance cost of delivered services to the various mechanical systems. Typically this is tracked by the computerized maintenance management system (CMMS). The important consideration is the collection of maintenance information, as opposed to replacement. As better run-time and failure-based maintenance systems are engaged, costly, unplanned failures will gradually be replaced by highly efficient, planned maintenance activities. In turn, the cost of all maintenance activities will be reduced.

Life cycle. All mechanical systems have a designed and/or manufacturer-specified life or life cycle, which typically ranges from 5 to 50 years—but the performance of a system for the full duration of its life cycle is the goal. Any premature failure of a system that requires its replacement or overhaul is effectively lost capital or asset consumption. This measurement is sometimes collected in the facility condition assessment process. Capture of the measurements documenting the "lengthening" of our system life cycles is translatable to actual capital saved or preserved, and is a good story to tell.

Output per design specifications. The mechanical systems that directly influence the selected system performance measurements are assembled based both on maintenance planning considerations and on cost accounting. In other words, the one or more HVAC systems within a facility are tracked as an assembly of subsystems that are related by design, performance, and output. The value (cost) of maintenance resources delivered to these assembled

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systems is aggregated and tracked in support of the performance measurements. For example, a system group called HVAC 1A might refer to a complete system delivering defined outputs that are measurable in terms of our performance measures. This is largely an accounting and CMMS organization setup at the start of any program.

In addition, added to all other considerations is that of simplicity. Each facility may have many systems and subsystems, but a clever planner can assemble those systems and components into a group. This grouping aligns with maintenance efforts, designed outputs, and associated costs. Most importantly, this grouping allows for sensible measurement of performance metrics that support the educational mission.

GOING FURTHER AND DEMONSTRATING VALUE

A maintenance professional might be inclined to

introduce a great many more metrics beyond the basic system performance metrics that are prescribed here. This is totally acceptable, but it is likely to be preferable for internal facilities use only; the system performance metrics are selected precisely because they are easily correlated to the support of the educational mission by laypersons (everyone outside of the physical plant). In addition, when presented effectively, these metrics demonstrate the good use of resources by the facilities department in order to support campus stakeholders. The "moving of the dial" is even better when facilities professionals make judgments, adjustments, and maintenance planning changes that increase system performance in a measurable way.

By utilizing the new best practices of maintenance planning, the facilities department's demonstration of effectiveness is accelerated. Basic

> maintenance standards from APPA's Operational Guidelines and others should be met or surpassed using these new information-based, planned maintenance techniques.

In the past, many felt helpless to implement new planned maintenance practices amid the chaos of constant unplanned failures and constrained resources. However, these new practices allow for just that situation to be overcome. Better yet, if we organize and select performance measurements that are relevant to our stakeholders, facilities professionals can demonstrate significant value to the campus. (**§**)

Matt Adams is president of Adams FM², Atlanta, GA. He can be reached at *matt@adamsfm2. com.*

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Digitizing the Electrical Infrastructure

By Emanuel Kourounis

ime, cost, and productivity are top of mind for any leader who is looking to run an efficient business, and it is important to look at these through the perspective of a facilities manager. Facilities are running on aging electrical infrastructures that may result in delayed production due to equipment malfunction, or costly safety hazards. To keep their facilities up to date with the most current technologies, facilities managers may want to consider implementing data-based asset performance management systems (APMSs) to ensure that their systems are as safe, reliable, and efficient as possible. An APMS can help provide valuable insights to managers and help them make better business decisions. But before initiating it, managers should approach these changes with a

solid strategy in place that can be implemented over a period of time. If an APMS is part of your vision, then every modernization, replacement, or new project should be part of that long-term strategy.

PLANNING FOR INTEGRATION

There are many factors involved in developing a long-term strategy for a complex electrical distribution system. But if the goal is to be more proactive by leveraging digital technology, facilities managers should first consider implementing communications technology. Another consideration is data quality. Managers need to have a clear understanding of what type of data the assets can provide and how that data aligns with the system. With the understanding that all algorithms, thresholds, rules, and computations require a certain amount of data to deliver the desired outcome, the strategy must deliver the necessary data points to the system. Remember, the quality of the data will determine the level of predictability that a system can deliver. Developing a long-term, multiphase strategy to predict system reliability will help absorb the replacement cost and modernization over time and minimize the impact on the process.

Prior to finalizing the strategy, it is important to sit down with equipment vendors to discuss the most appropriate way to bring

their systems up to speed with current technologies. In addition, the facilities managers must ensure the technology they are planning to incorporate includes:

- Excellent network communication: The vendor and customer teams will need to ensure they are adding the most intelligent connection capabilities possible, and that they deliver high-quality, consistent communications across the whole system.
- Superior data quality: Facilities managers should ensure that the data being communicated throughout the system is accurate and in alignment with the APMS requirements.
- Leveraging existing systems: Most facilities have existing systems that are currently collecting data. To reduce implementation costs, consideration should be given to leverage existing systems and share the data between platforms.
- **Cybersecurity:** With a digital system, it goes without saying that security for sensitive information should always be paramount.
- Interpretation of the data: Have a clear understanding of the capabilities of the software system. How is the data being analyzed? Who will be interpreting the data and acting on it? What data is required to analyze the performance of the assets the facility wants to monitor?

PRIORITIZING YOUR STRATEGY

As you finalize the strategy, you need to prioritize your plan.

Foundation: Building the foundation is the most important step. Start by identifying your most critical assets. Trans-

formers and medium voltage (MV) circuit breakers should be at the top of your list. Facilities managers must also make certain that the new equipment will have the appropriate options to be in alignment with your APMS.

Networks: Ensure all substations that will be monitored have access to your network. Ethernet drops will be required at every substation.

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Edge Control: To minimize the connections to the cloud, edge control should be considered. Edge control could include platforms such as energy management systems, building automation systems, and supervisory control and data acquisition (SCADA) systems. These platforms will allow for data to be aggregated in one location and thus minimize

the number of connections to the cloud.

Apps and Analytics: The apps and analytics need to be able to evaluate data correctly and deliver actionable insights. The APMS should have the ability to receive data from the field and apply asset-specific algorithms, thresholds, rules, and computations to determine operating conditions.

Deliverables: As the workforce retires, facilities managers are challenged by scarce resources.

Most facilities do not have the resources to sit in front of a screen for a long time, and if they do, they often do not have the skillsets needed to interpret the data they are looking at. The APMS should deliver workable insights, such as documentation that includes the data itself, interpretations, actions to be taken, a timeline to accomplish those actions, and recommendations on maintenance cycles.

THE FUTURE OF ASSET PERFORMANCE MANAGEMENT

Incorporating an APMS will transform the way facilities managers and staff perform their work and will also improve their electrical system's performance and reliability. Managers will have a clear view of how systems are performing through continuous monitoring, and will be provided with the information they need to make better business decisions; thus they will be able to take a more proactive approach to maintaining their electrical distribution systems.

Additionally, these performance management systems will give facilities the resources they need to operate more effectively. Facilities have typically struggled with having adequate resources, whether it be the time necessary to perform tasks, or onsite staff who can interpret the data they have acquired. The APMS will feed back the information to an experienced professional who will be able to interpret it accurately and devise a plan to help onsite staff improve their system's functionality.

Facilities staff can also expect safer working conditions because they will have a more concrete idea of how their equipment is operating. Of particular concern is the fact that they are currently expected to monitor some electrical equipment while it is energized—but a performance management system with the appropriate sensors can mitigate risk by feeding back information without placing staff in potentially dangerous circumstances.

CONCLUSION

Both facilities managers and staff will notice increased operational efficiency, safer conditions, and lowered costs associated with system performance maintenance once they have integrated an APMS. And though this technology is still in its infancy, its potential to improve a facility's electrical infrastructure can help them take a decisive step into our digital world. (§)

Emanuel Kourounis is business development manager at Schneider Electric in Debary, FL. He can be reached at *manny.kourounis@schneider-electric.com*. This is his first article for *Facilities Manager*.

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FPI 2.0 and the Facilities Journey

By Theodore J. Weidner, Ph.D., P.E., CEFP, AIA

acilities officers are regularly asked to explain the interface between architecture, engineering, occupants, and costs. While many can speak to two or three of these fields, few are able to do so for all four. Rather than develop an expertise in all areas, facilities officers mostly utilize metrics (some called key performance indicators), combining data to create information—and ideally knowledge about such a large and complex operation. The APPA Facilities Performance Indicators (FPI) were devel-

oped to assist facility officers with those baseline metrics for campus facilities.

In addition to the FPI metrics, APPA has participated actively in the development of several standards that address facilities. The ISO 41000 series and APPA 1000 are two recent examples. ISO 41001, *Facilities Management* –

Management Systems – Requirements with Guidance for Use; ISO 41011, Facilities Management – Vocabulary (facilities management terms and definitions); ISO 41012, Facilities Management – Guidance on Strategic Sourcing and the Development of Agreements; ISO 41013, Facility Management – Scope, Key Concepts, and Benefits; and APPA 1000-1 – Total Cost of Ownership for Facilities Asset Management (TCO) – Part 1: Key Principles, are all tools that facilities officers can utilize to knowledgeably inform campus stakeholders about the effectiveness of facilities operations and development. While these standards do help facilities officers, they demand data to work effectively.

The FPI can be used to feed several of the tools associated with each of the above standards, making facilities data more important and valuable. It also means that the FPI needs to become an easier tool

Tracking Your Facilities Vital Signs

for facilities officers to use and to help them tell the story about their facilities. A team of dedicat-

ed people are working on that problem and creating what we are calling "FPI 2.0."

FPI 2.0: GATHERING DATA AND REPORTING METRICS

There are two fundamental steps that need to be taken to make FPI 2.0 a go-to tool for facilities officers. The first is to make data gathering easier. There are number of education data points requested by the FPI that are outside a facilities organization's normal sources, but which are reported to different governmental and nongovernmental organizations. One of the best practices for data gathering is to ensure the data is entered once by the person responsible for the data.

A frequent example in the FPI is the annual gross institutional expenditure—a big but important number that chief financial officers (CFOs) know, but not many facilities officers know. This and other significant data is intended to be pulled automatically for the FPI, so that it is accurate, consistent, and reliable. When the CFO sees the same number displayed in the FPI as reported by the institution, the FPI metrics become more meaningful.

The second step needed to get FPI 2.0 up to speed is to improve the reporting of metrics from the FPI. Since its development, the FPI has had a standard set of metrics that were determined to be the "best fit" of information for facilities officers' needs. However, every organization is unique, and a standard set of metrics tends to ignore the uniqueness of the organization and frustrates a facilities officer attempting to respond to that uniqueness.

In addition, graphics display techniques are generally not in a facilities officer's toolkit. Utilizing a widely available platform, Tableau, FPI 2.0 will provide the senior facilities officer with graphic tools to tell the story regardless of whether the issue is deferred capital renewal, custodial operating costs, or anything in between. The facilities officer will be able to leverage the strength of the FPI to track performance over time and show how institutional and organizational goals are being met through consistent and reliable measures. The FPI can still be used for low-level comparisons between "similar" institutions, but more complex analysis of disparate data will be possible too. The facilities officer will enter the world of big data and be able to make meaningful connections. These connections may make it possible to demonstrate organizational effectiveness, identify both achievable and stretch goals, and create additional opportunities to have a "seat at the table."

FPI 2.0 is not a destination—it is part of the facilities journey. Watch for it and take advantage of it. (\mathfrak{F})

Ted Weidner is an associate professor at Purdue University and consults on facilities management issues primarily for educational organizations. He can be reached at *tjweidne@purdue.edu*.

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Book Review Editor: Theodore J. Weidner, Ph.D., P.E., CEFP, AIA

This month we return to the issue of leadership. A wise and talented university administrator who teaches leadership told me that there are hundreds of books on the subject. This column has reviewed many, but not hundreds. It may not be possible to review all the leadership books published in a single year, but these seem worthy of recognition. Leadership is an important topic for facilities officers, because leadership can manifest itself at numerous levels of the organization, as you will discover below.

LEADERSHIP TRANSFORMED: HOW ORDINARY MANAGERS BECOME EXTRAORDINARY LEADERS

Peter Fuda, Amazon Publishing, 2016, 242 pp., hardcover, \$30; softcover, \$15; Kindle and Audible

As a consultant and researcher into leadership coaching and development, Peter Fuda has written a compelling book based on his experience and doctoral research into the elements of leadership and the development of great leaders in a wide variety of organizations. In *Leadership Transformed*, Fuda utilizes seven metaphors to describe behaviors or methods that result in a good leader.

The seven metaphors are Fire, Snowball, Master Chef, Coach, Mask, Movie, and Russian Dolls, and are used to describe how one leads and affects others within an organization. The metaphors are descriptive

and are supported by the explanation for each one, despite their somewhat corny names. Fuda includes individual case studies that he recounts from his consulting work, which demonstrate how such leadership traits make for a better organization. Through these case studies, he also demonstrates that two or more of these traits may be present (or need to be present) when leadership transformation occurs, depending on the person and institutional setting.

Where *Leadership Transformed* excels is to present executive leadership characteristics in familiar forms, in order to encourage readers that anyone can become a great leader. This is certainly a cheaper way to transform your leadership style than by hiring Fuda to coach you through such a metamorphosis. Making a self-directed transformation is facilitated by access to various tools on his website.

Leadership Transformed is an interesting and compelling book. It is not overly long; it makes use of modern technology through Fuda's website and can be an important tool for those facing leadership challenges.

GROWING WEEDERS INTO LEADERS: LEADERSHIP LESSONS FROM THE GROUND LEVEL

Jeff McManus, Morgan James Publishing, 2018, 166 pp., softcover, \$16.95

Leaders can arise from almost anywhere in an organization; it's just a matter of finding them and allowing them to grow. That's the message presented by Jeff McManus in *Growing Weeders into Leaders: Leadership Lessons from the Ground Level.* In this easy-to-read book, McManus provides several stories exemplifying different forms of leadership, and more importantly, the leadership development that he oversaw as director of grounds at the University of Mississippi ("Ole Miss").

Most APPA members are aware of the Carnegie Foundation study and subsequent Center for Facilities Research (CFaR) study that showed campus visitors develop an immediate and long-lasting perception of the campus within the first two minutes and may never attend an institution that doesn't make a good first impression. Campus grounds are the only thing visitors can see in that small amount of time, so good

leadership at the "ground level" is important for the entire institution, despite grounds being a small portion of the overall campus budget.

McManus uses dozens of vignettes to show how he was able to identify potential leaders within his organization either through inspiration, situations, or contributions. Some of those leaders are still at Ole Miss, which means the campus continues to benefit and prosper from their leadership. Others have moved on and are utilizing their leadership talents at other organizations. In both cases, the campus benefited from the leadership development that McManus provided, and which he now shares with us.

To repeat—there are hundreds of leadership books available in the marketplace. Some books are costly or require a huge time commitment to get to the point that McManus is able to make quickly in *Growing Weeders into Leaders*. If you have a limited budget and limited time, then I recommend this book, available from APPA at *www.appa.org/bookstore*, particularly for managers and leaders working in grounds or building maintenance. (s)

Ted Weidner is an associate professor at Purdue University and consults on facilities management issues primarily for educational organizations. If you would like to write a book review, please contact Ted directly. He can be reached at *tjweidne@purdue.edu.*

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Mobile Solutions are Essential for Emergency Preparedness

How Mobile Facilities Dashboards are Game-Changing for Facilities Teams

By Brian Bailard

ire, flood, gas leak or, God forbid, active shooter. Are you ready for it? Is your facilities team ready? The Parkland, Florida school shooting tragedy has brought emergency preparedness to the top of the priority list for nearly every facilities team. Senior executives nationwide want to know whether their teams are as prepared as possible for emergency situations that could be life-threatening or, at the very least, disruptive and expensive.

You might ask, 'will this even impact me?' The answer is a resounding 'Yes', and sooner than you want. Based on a survey of nearly 200 facilities directors conducted by AIIM and ARC in August, 2017, facilities teams on average face a catastrophic facilities event every two years at a cost of \$506,000, and 86% of teams report not being fully prepared for emergencies. In fact, some state legislatures are currently working on legislation to mandate emergency preparedness, at least for schools.

Addressing the Right Emergency Priorities

When an emergency hits, being prepared to take the right actions fast matters, including:

- Shut-Offs Can everyone on your team find them quickly?
- **Safety** Use evacuation maps to get people to safe refuge areas.
- First Responder Support Quickly send building plans to first responders.
- Emergency Plans Access and execute emergency plans.

Mobile Solutions Deliver Instant Access

Mobile solutions are transforming how facilities teams operate. Apps and dashboards provide immediate access to all key information from any mobile device within a couple of clicks. Documents can then be easily sent via text or email to anyone who requires the information to take action – like first responders or contractors performing emergency repairs.

Mobility equates to speed when responding to emergencies. This can mean savings that are upwards of thousands, even millions of dollars. When a water leak or fire is contained quickly, there is less damage which means lower repair costs and less down time.

It's time facilities teams re-evaluate their processes and workflows for how they can be more nimble and efficient, especially given the rise in emergencies and natural disasters during the past year. Incorporating the use of a mobile solution-the right mobile solution-is the key component.

Learn more about the research at: go.e-arc.com/ebook-APPA

See how Mobile Facilities Dashboards work at: go.e-arc.com/APPA1807

Brian Bailard is executive vice president of ARC Technology Solutions, a division of ARC Document Solutions. He has 20+ years of software industry experience, driving innovation in the SaaS space for companies such as HootSuite, MarketShare, Socialtext, and ThomsonReuters. e-arc.com

products

Compiled by Gerry Van Treeck

OASIS INTERNATIONAL'S Aquarius Counter Top is the point-of-use water cooler for the well-appointed office. It's engineered for people who appreciate the quality of fine refreshment—and who need to make a quick stop before getting back

to work and life. Aquarius Counter Top conveniently dispenses cold, hot, and room temperature water from a single dispense point and can be connected to a filtration system for ultimate refreshment. Get a drink, make a fast lunch, or fill a water bottle. Whatever the need, whatever

the temperature, Aquarius Counter Top gets it done—even faster with three preselect cup sizes or an any size dispense amount. The 11-in. dispense height is specifically made for on-the-go bottle refilling. For more information visit Oasis International at *www.oasiscoolers.com*.

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announces an array of Performance Series Multi-Format Hybrid Recorders and Performance Series Multi-Format HQA (high-quality analog) cameras. Through

an expansion of the current product line, these new multi-format products offer a flexible upgrade and expansion path for SMB (small and medium-sized business) video security installations, such as retail, restaurants, and commercial offices. These updates to the Performance Series portfolio can be used to help lower installation costs and provide customers with an opportunity to upgrade to a state-of-the-art system without having to redesign and install a completely new system. By using existing cables, cameras, and other hardware, installation time can be decreased as well, simultaneously providing a path for future upgrades and becoming a "go-to" solution for retrofits. For additional detailed information on Honeywell products visit *www.honeywellvideo.com*.

HEADS UP LOCK COMPANY has broken through another barrier for restroom users in medical facilities. They have designed an elegant, safe way to show if the restrooms in medical facilities are available from a distance. The new wall light is pleasing to the eye and is an attractive addition to all users in any facility. The pleasing LED light shines on the wall as an attractive alluvial fan. It consists of a smart deadbolt lock that electroni-

cally gives awareness to medical staff outside the restroom. If the light is red, the room is occupied. If the light is green, the room is available. It's that simple. This patented and affordable device is low maintenance and can be installed by any qualified handyman in all single-stall restrooms. Most medical care managers know that their patients' and guests' comfort is important. But their medical staff must know where their patients and guests are at all times. The Heads Up Lock gives the staff increased

awareness with just a quick glance. They won't have to wonder if the restroom is occupied—it will instantly remove all doubt. For more information on Heads Up Lock Company products visit *www.headsuplock.com*.

CAMBRIDGE ENGINEERING has launched a line of vertical and horizontal stands to accompany their heating and make-up air units. The Cam-

bridge S-Series is an HTHV (high temperature heating and ventilation) direct gas-fired space heater that is 40

to 70 percent more energy efficient than all other types of indirect and direct gas-fired systems used to heat large commercial and industrial buildings. The S-Series is easy to install and start up because it is compact, lightweight, prepiped, and prewired. It has been a popular choice due to its reliability and efficiency, as well as its ability to offer better comfort through destratification. It also provides indoor air quality by using 100 percent outside air instead of recirculating stale air. Cambridge HTHV technology exceeds the Department of Energy's 90 percent high-efficiency gas-fired technology standards. The M-Series is a make-up air system designed with reliability and

year-round energy savings in mind. M-Series heaters include patented Cambridge Low-Fire Start Technology, and proprietary stainless-steel burners provide ventilation and tempered makeup air for a wide variety of demanding commercial and industrial retrofit needs. For further information on Cambridge Engineering visit www.cambridge-eng.com.

ECO-PRODUCTS is launching a new line of compostable takeout containers that are unmistakably and undeniably natural. The bases of the new containers come in a natural bagasse color and are made from 100-percent-renewable sugarcane fiber. Named World-View Naturals, the new line is

strong, durable, and versatile. Guests can easily tell that these takeout containers are environmentally friendly. The new line consists of sugarcane bases with RPET (recycled polyethylene terephthalate) or Ingeo lids for maximum strength and optimum presentation. Eco-Products is introducing the new containers as interest in "zero waste" skyrockets among restaurants and caterers. The

public is increasingly seeking out environmentally friendly businesses committed to sustainability. For more information on Eco-Products visit *www.ecoproducts.com*. (5)

New Products listings are provided by the manufacturers and suppliers and selected by the editors for variety and innovation. For more information or to submit a New Products listing, email Gerry Van Treeck at *gvtgvt@ earthlink.net.*

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