FMJ | OFFICIAL MAGAZINE OF IFMA | MAY/JUNE 2022 | THE BUILDING PORTFOLIO

FMJ

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inside

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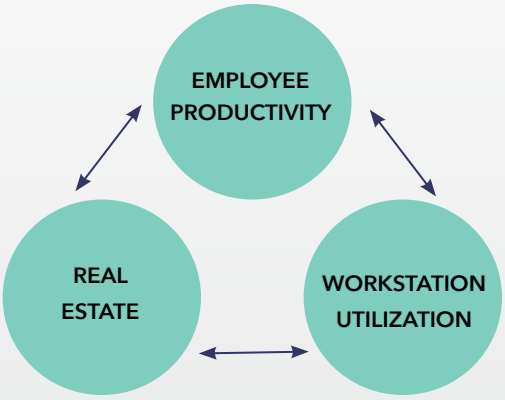

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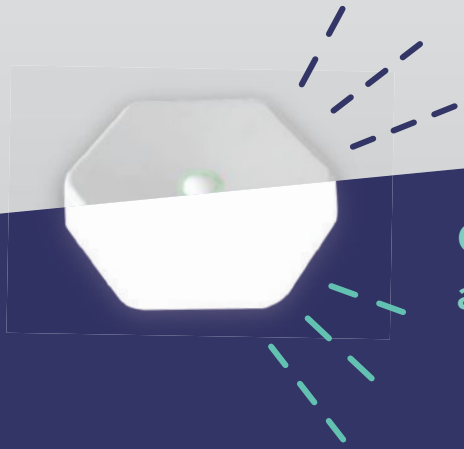

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Features

Sections

IFMA is the world's largest, most widely recognized association for facility management professionals, supporting more than 20,000 members in 135 countries. Founded in 1980, IFMA's vision is to lead the future of the built environment to make the world a better place. A key contributor to the development of international FM standards, IFMA provides career resources, continuing education and three industry-respected credentials; maintains the largest repository of FM-related content on the web; and hosts year-round global events. Among the values that guide us, we believe in the benefit of global diversity, inclusion and social equity; and we recognize that sustainability, resilience and responsible environmental stewardship are paramount. For more information, visit ifma.org.

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The online version of FMJ features extra resources like videos, podcasts, white papers and more to enhance your reading experience. Click on the FMJ Extra icons that appear in the digital magazine to link to additional sources of information to learn more about topics covered by articles in this issue.

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FMJ Extended

Check out the online issue of FMJ for a special section that follows the end of the print magazine and includes additional articles not available in the print edition. Read the extra articles listed below for contributions from councils and communities, and other supplementary content.

IFMA Chapters
Applying technology to convene, converse & manage change

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Editor's Note Bobby Vasquez

Turn on most any TV talent show and you will likely see a performer spinning multiple plates in the air. Audience members and judges ooh and aah as the performer frantically darts across the stage keeping plates rotating while giving new plates a twirl as "Sabre Dance" or "Flight of the Bumblebee" accompanies the spectacle.

In a few minutes, the act is over, the crowd applauds, the judges critique and the performer takes a bow.

Sound familiar?

Facility managers don't get the TV time, but their plates are most definitely spinning and always full — with the comfort and well-being of occupants, appeasing the C-Suite, ongoing maintenance issues, design projects, capital planning, data, metrics — and just like in the act, FM plates must be perfectly balanced, manipulated with skill to spin at an optimal speed, requiring the perfect touch to stay on top of their spindle. Instead of appreciative applause from the audience, response to an FM's performance is generally based on how well the whole show is going. If the air conditioning works, the water turns on and the workspace is sanitized, the FM might (figuratively) hear crickets. But one faulty light, unpleasant smell or dripping faucet and the audience clamors for another spinning plate to be added to the routine.

And if a plate drops? Suddenly FM is in the spotlight for all the wrong reasons. Health and security are compromised. Aesthetics and comfort are lessened. Projects are delayed and costs rise. The audience begins to lose faith in the act. And if too much attention is spent keeping a plate spinning or fixing a broken plate, another plate can fall.

This issue of IFMA's FMJ focuses on keeping all plates spinning across the building portfolio. Our FM authors discuss data-driven capital planning (Page 012), designing for productivity (Page 028), FM's role in decommissioning a building at the end of its life (Page 066) and much more.

It is a new era of FM. No longer backstage, FM is the headliner, showcasing its importance from the ground floor to the C-Suite. Keeping those plates spinning is no easy task, especially with heightened emphasis on safety, indoor air and environmental quality, sanitation and the use of space. And with increasing awareness that FMs are not just supporting spaces for people to work, but are helping to create engaging, sustainable spaces where people choose to be, the ooh's and aah's will emerge.

It's okay to take a bow.

Cheers!

Interested in writing for FMJ?
Email **bobby.vasquez@ifma.org** article ideas to be considered for future issues of FMJ.

From the **Chair**

PETER ANKERSTJERNE

MBA, COP, IFMA FELLOW

Chair, Board of Directors

This is my last column as IFMA Global Board Chair. I will hand the reins to First Vice Chair Laurie Gilmer on July 1. It has been my honor and privilege to serve our 22,000 members during what has probably been the most unsettling and challenging time in IFMA history.

Serving as the IFMA Global Chair for a two-year period has been somewhat unusual as the normal term is one year. But then again, there has been nothing normal about the last couple of years, working in the shadow of a global pandemic and now a devastating war in Ukraine. However, IFMA will endure, as it always has. Sure, we were influenced by COVID-19, as anyone else; but our dedicated staff, board members and our many volunteers rose to the challenge, pivoted and steered the association safely through the crisis. In addition, we received remarkable support from our many partners and sponsors who stood by us during this demanding time.

IFMA has never been in better shape than it is now. A strong management team led by President and CEO Don Gilpin, a highly competent, diverse and international board, and a solid foundation based on our triple C (Chapters, Councils and Communities) leadership teams have made IFMA resilient and adaptive to change. This has allowed us to deliver notable financial results, which have provided for a healthy balance sheet, removed all of our debt and even allowed us to write off all the debt to the IFMA Foundation during the same period. This, in turn, has enabled the Foundation to grow and attract new endowments, grants and sponsors.

IFMA's vision and strategy have proven to be right, in a world where the FM industry has dramatically changed and the crisis forced organizations to rethink their purpose and their facilities to accommodate a new work, workforce and workplace reality. An unexpected outcome of the global pandemic, but a welcome opportunity for facility and workplace managers worldwide to step up and redefine their role in the organization — as we now have the seat at the table.

IFMA continues to raise the bar globally and set the standards in training and professional development. This was recently evidenced by the partnership with JLL, in which IFMA will provide FMP® training to more than 1,200 on-site facility managers in North America over the next few years. Such partnerships provide tremendous value for IFMA but also to JLL as their staff achieve an internationally recognized credential valued by clients and partners across the world.

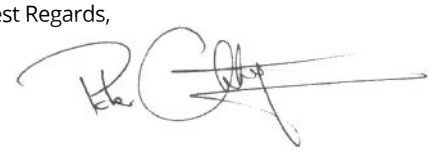
I also want to acknowledge IFMA's endless commitment in providing the best membership experiences and world-class events. For sure, IFMA's World Workplace Conference and Expo in Nashville will be a sought-after event and is already receiving a lot of buzz on social media. But before we meet in Music City, I personally cannot wait to attend the in-person World Workplace Europe conference in Amsterdam, which will once again be the go-to FM event in the region.

This edition of FMJ focuses on the building portfolio, a subject that is being evaluated by many real estate and facility professionals at the moment. With the adaptation of new hybrid working models, the big question remains: Is our current building portfolio right-sized and fit for purpose and could our organization benefit from adopting new, flexible workplace models such as satellite offices, coworking or flex office to keep costs low and keep flexibility as well as employee engagement high? In addition, we need to look at our portfolio through the lens of technology, employee experience, health/well-being and sustainability as these are increasingly influencing the way we design and operate our buildings.

In closing, I would like to thank my six colleagues on the IFMA Global Board who are stepping down at the end of June: Jos Duschamps, MSc. Eng; Hari Hedge; Luis Morejon; Lori Rowlandson; Colette Temmink, CFM, FRICS, CPM, CRE, MCR, SLCR; and Mindy Williams. Your support and contribution have been outstanding, and the profession is in a better place because of your involvement and commitment to the field.

Thank you for an amazing two years, and I wish you all a great World FM Day on May 11!

Best Regards,



From the **President**

DON GILPIN

President & CEO
IFMA

I have the privilege of working with some amazing volunteer leaders — professional women and men who lead their own organizations and teams, yet devote measureless time, attention and enterprise to IFMA's stability and growth. Every volunteer working on IFMA's behalf is a valuable part of our past, present and future; but each year's global board of directors' chair contributes strategy and vision essential to our progress.

Since I joined IFMA in 2018, we have been enriched by strong leaders, each with unique perspectives on how to improve the association, always ensuring our continued path forward. Over my professional career working with incoming board chairs, I typically ask what they want their leadership "theme" to be during their term. I want to know what success will look like for them — what fingerprints they expect to leave on the organization.

As current Chair Peter Ankerstjerne completes his term at the end of June and we look forward to welcoming new Chair Laurie Gilmer, I would like to share the fingerprints — the indelible marks that have made a lasting difference to our organization — that four of our past board leaders have left on IFMA, reestablishing our association as a respected, thriving and indispensable asset to our members' career development.

When 2017-18 Chair William (Bill) O'Neill asked for my unvarnished assessment of IFMA's state of affairs at the time, I gave it to him straight: we had problems. Bill and I spent countless hours via cell phone to envision a new, positive chapter for IFMA. He directed his expertise toward transforming and fortifying our association, reintroducing a culture of integrity, transparency and teamwork. Revitalization was in sight; somebody just needed to push the reset button. Bill's fingerprint is on that button.

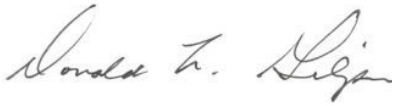
I then worked with 2018-19 Chair Graham Tier, IFMA Fellow. In order to right the ship financially, Graham and I pushed for new revenue streams, cutting unnecessary expenses and maximizing the IFMA brand globally. Graham gifted IFMA with the FM Training Framework that he created at the Hong Kong Jockey Club, which has evolved to offer IFMA members curated education from eight built environment associations. At the end of Graham's term, we reported that IFMA was in the black for the first time in five years, including a record level profit from World Workplace. Graham's fingerprint is our return to financial responsibility.

In 2019, IFMA Fellow John Carrillo took the helm as chair, bringing a more sophisticated approach to our strategic planning. Instead of changing direction with each new year (and each new chair), John initiated a strategic planning process with the help of a strategy consultant, fellow board members and staff, restructuring association decision making to support an overarching goal for the future. We unveiled our strategy last April. As an organization, we know exactly where we are heading. John's fingerprint is the return of decision making that supports IFMA's long-term strategy.

2020-22 Chair and IFMA Fellow Peter Ankerstjerne faced one of the most challenging periods in our history — guiding and sustaining the organization through the COVID-19 pandemic. Peter's responsive and creative leadership helped IFMA quickly pivot to a virtual business model. We continued to support our members with timely content on how to safely manage facilities and people. To maintain stability and continuity, Peter was asked to stay on another year as chair. Consequently, IFMA was able to springboard out of the pandemic and take advantage of growth opportunities other organizations were not as fortunate to achieve.

IFMA is experiencing membership growth again, and the organization is debt free for the first time in many years. With pluck, humor and presence of mind, Peter's fingerprint will always be remembered as the steady hand that guided our ship through unknown waters, increasing our reach across industries and continents, inspiring innovation and returning the association to a trajectory of growth.

We are once again in good hands with incoming Chair Laurie Gilmer. I am excited to see what new doors she will open for IFMA, building on the accomplishments of her predecessors and imbuing IFMA with her own perspectives and passions. What will be Laurie's fingerprint? I'll let you know next year!



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IFMA INTRODUCES DISCOVERY MEMBERSHIP

In March, IFMA launched a new limited membership for those interested in facility management or who do not primarily work in FM. Open to new members, Discovery Membership is a way to discover FM and access resources to better understand, grow and excel in the field.

Geared toward helping new members learn the language of FM and advance professionally, Discovery Membership offers limited benefits for only US$49/year. If a Discovery Member decides to upgrade to full membership during the 12-month term, the US$49 fee will be applied to the next 12 months.

BENEFITS INCLUDE:

- **Free Intro to FM Essentials course**
- **IFMA e-newsletters**
- **Research webinars**
- **IFMA's FMJ online**
- **Free quarterly members-only benefit**

Learn more at bit.ly/FMJ5Disc.

IFMA to upskill Americas-based JLL FM professionals

JLL recently engaged IFMA to provide training to more than 1,200 Americas-based Work Dynamics facility management professionals, marking the largest training initiative in IFMA's history. In its first year, the multiyear agreement will allow the company's FM employees to pursue IFMA's Facility Management Professional™ (FMP®) credential. Following the Americas implementation, the FMP program will be offered to JLL's FM professionals in other regions.

IFMA's FMP program builds relevant core competencies and skills that FM professionals need to develop their workplaces. The program upskills participants in the critical areas of operations and management, project management, finance and business, and leadership and strategy.

"Providing world-class training is a critical aspect of creating new career paths for valuable talent, and this new collaboration creates ample opportunities for personal development and career growth, which are essential tools for recruitment of top facilities talent," said Cheryl Carron, global head of facilities management and experience for JLL Work Dynamics and a member of IFMA's Global Board of Directors.

Global execs believe emerging tech will increase workforce

According to a recent report, "Executive Outlook on the Future of Work, 2030 and Beyond," global business leaders expect digital and emerging technologies to lead to more jobs over the next decade.

The University of Oxford and consulting firm Protiviti partnered to conduct the survey of 250 business executives about the future of work. While 74 percent of respondents believe that digital and emerging technologies will increase the size of the workforce in 10 years' time — with artificial intelligence (AI) ranked highest among leaders for driving radical transformation and growth — 86 percent agree the types of jobs employees will perform in the future will be different from today.

As the Great Resignation continues to impact organizations, retention and turnover remain a top concern among the majority of surveyed executives. With 86 percent expressing concern about a potential shortage of qualified workers arising within the next decade, 85 percent expect AI-based training to improve employees' skills in the future.

Key findings and an interview with Oxford professor David Howard are available at bit.ly/3v6FkL9.

Have relevant FM industry news to share?

Submit your news to be considered for inclusion in the Industry News section of the next issue of FMJ. Send us an email at **communications@ifma.org**

Green Future Index 2022

The Green Future Index 2022 is the second annual comparative ranking of 76 countries and territories on the progress and commitment they are making toward a green future by reducing carbon emissions, developing clean energy and innovating in green sectors, as well as the degree to which governments are implementing effective climate policies.

Based on research conducted between October 2021 and January 2022, the interactive index shows which countries are progressing fastest in efforts to decarbonize. Key findings of this year's report:

- Sixteen Green Leaders are from Europe. Iceland and Denmark hold the number one and two spots, respectively; third and fourth places are held by the Netherlands and the U.K. Ranked 17th last year, the U.K. has become particularly aggressive in directing investment toward its clean energy transition: nearly 36 percent of the country's power came from clean sources toward the end of 2021.
- New top-ranked entrants include South Korea, Japan and the U.S. — all three have seen significant rises in their innovation scores thanks to their world-leading green intellectual property contributions and notable increases in pivoting infrastructure spending toward clean and green projects.
- The Greening Middle includes several European countries that have made significant policy and energy infrastructure investment gains. It also includes China, which continues to make gains in green society transitions, including purchasing more than half of the world's electric vehicles in 2021.
- Several previous Green Leaders appear to have lost momentum, including Singapore, New Zealand and Costa Rica; and India's green efforts are being overshadowed by an ongoing pandemic recovery plan that continues to favor traditional industries.

To view the research findings, visit the interactive page at bit.ly/3JoQuAi or go to bit.ly/3jBkcYt to view the report.

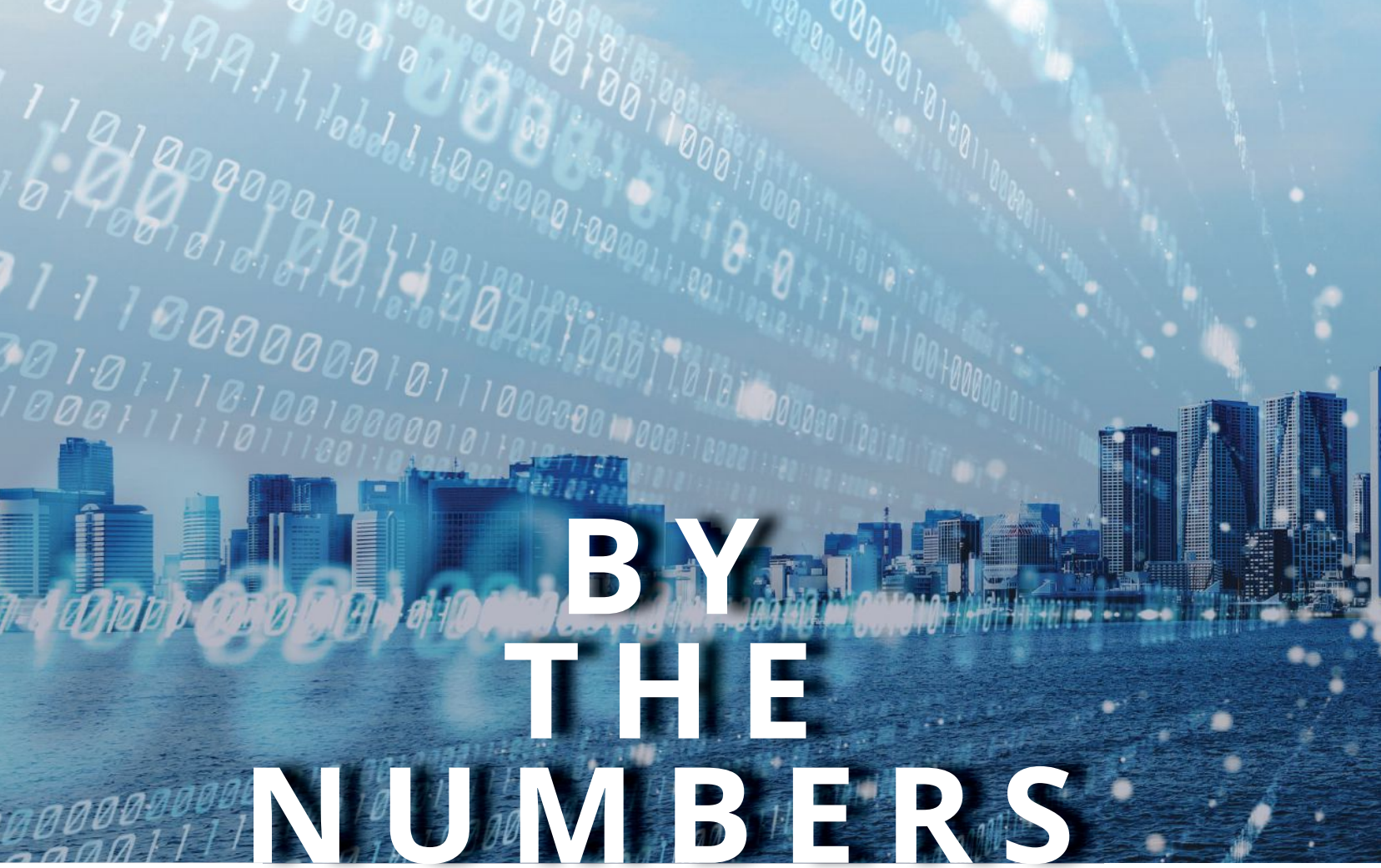
Potential of certifications to support pathways to employment, expand talent pool

A new series of reports co-published by Workcred (an affiliate of ANSI), Corporation for a Skilled Workforce, and the George Washington Institute of Public Policy serves as a resource to help policymakers, practitioners and employers better understand the characteristics of certifications and their potential as tools to help people enter the labor market, obtain a career goal or reskill for a new career. The five-part series (bit.ly/3O0tdbd) is the culmination of a research study that focused on how certifications serve as part of lifelong pathways for advancement.

The first publication, "Understanding Certifications," highlights how individuals who earn certifications/licenses fare better in the labor market at a time when enormous economic shifts predating and accelerated by the COVID-19 pandemic created a challenging job market. It also examines how some certifications can offer short-term pathways to employment — a valuable option for working adults and low-income populations. The final publication, "Certifications: The Ideal, Reality and Potential," recommends that governments and employers should encourage wider reliance on certifications in hiring.

In 2020, the ANSI National Accreditation Board granted accreditation for IFMA's Certified Facility Manager® (CFM®) credential under the ISO/IEC 17024:2012 standard. Maintaining this accreditation provides assurance that the IFMA Certification Commission operates according to internationally accepted criteria and best practice for personnel certification programs — an important distinction that sets those who earn the CFM apart in the global workforce.

IFMA's Senior Director, Professional Development Cathy Pavick noted that the growing role certifications will play in workforce development reenforces why earning a certification from an accredited organization is a critical step in one's career path. "IFMA credential holders can be confident that IFMA's certification meets the highest industry standards, and employers can trust that CFM credential holders' knowledge, skills and abilities have been evaluated through a valid and reliable assessment process," said Pavick.



BY THE NUMBERS

Data-driven capital planning

BY STU RICH

Facility management professionals know all the statistics. Humans are now primarily an indoor species, spending close to 90 percent of their lives inside buildings. Almost all the activities deemed productive happen indoors. It is no wonder the market has invested so heavily in buildings and infrastructure — maybe too heavily.

Globally, the value of buildings and infrastructure is more than all the stock and bond markets combined. As the global population rises and migration flows from rural to metropolitan areas, the planet is experiencing one of the largest building booms in urban areas ever known. This is creating a ballooning facilities footprint that continues to age inexorably. Case in point: the average age of a U.S. commercial building was 53 years at the end of 2021 — up from approximately 50 years in 2017.

The increasing age of the building stock is critical for several reasons, not the least of which is that it has proven that indoor environmental quality significantly impacts cognitive ability, or how one learns, thinks, reasons, remembers, solves problems, makes decisions and maintains attention. In their book "Healthy Buildings," Joseph Allen and John Macomber describe indoor air quality's substantial impact on cognitive function. Since much of human productivity is directly impacted by how well the brain is working, it makes sense that FM professionals should be focusing their attention on indoor environmental quality.

The increasing age of the building stock accompanied by insufficient renewal budgets also increases deferred maintenance backlogs. In conjunction with APPA (American Physical Plant Administrators), the Gordian State of Facilities in Higher Education report estimates that deferred maintenance backlogs now average US$106 per square foot in the sector, up 35 percent since 2007. While these trends and patterns have been clear to FM professionals for some time, it is often difficult to secure adequate funding for facilities renewal when inevitable budget trade-offs are made.

When the budget discussion involves replacing the HVAC system in the firehouse or purchasing new firefighting equipment, the HVAC investment often gets deferred. Likewise, when a university must

Managers are now looking for a path toward increased reliability and flexibility related to their facilities information systems.

either repair the roof on a facility or enhance the athletic center to drive ticket sales, the profit center often carries the day and the deferred maintenance backlog increases again.

FMs struggle to defend funding requests for various reasons. Among the more critical challenges are the:

- Lack of clear, consistent data about facilities' value and condition at the asset- or building-critical-system level.
- Absence of precise, data-driven analytics that describe the impacts of different funding scenarios.
- Reliance upon inadequate criticality rubrics to provide transparency and consistency to priority decisions related to capital funding.
- Inability to automate asset conditions and deferred maintenance from the organization's work management system to ensure budget forecasts are based on real-time data.

These underlying challenges have existed for some time, but the COVID-19 public health emergency has made this situation untenable. Today, executive teams expect FMs to quickly iterate on facilities planning scenarios and update forecasts for building capacity and operating costs. The global pandemic has forced FM professionals to rethink building capacity assumptions, reassess if office work must always be performed in the office, and reexamine how well-aligned a current facilities portfolio truly is to the needs of an organization.

On top of the underlying FM information systems challenges, this evolution has many facility managers feeling overwhelmed and unprepared. The initial gratification of suddenly finding themselves on the executive team's speed dial is replaced by a deep unease about their inability to provide data-driven analysis to justify their plans and funding requests.

Managers are now looking for a path toward increased reliability and flexibility related to their facilities information systems. Luckily, many successful FMs have already trodden this path, and they have described the following milestones and best practices for others to follow.

Start with a reliable inventory

One of the first things to remember is that overcoming any management challenge starts with a good inventory. FMs must have a clear understanding of available resources before planning their way forward.

As the variables of funding availability, schedule, asset condition and project costs change, it is crucial for professionals to quickly update forecasts and deliver updates in the same clear and concise formats.

In the case of FM, one of the best ways to establish an accurate inventory is through a facility condition assessment (FCA). A good FCA will include a moderately detailed accounting of all buildings and their primary systems. The more time an organization can spend on the FCA, the more detail they will get.

A baseline FCA should include all the core building elements that drive facilities renewal investments over the next five to 10 years. Many excellent engineering and consulting firms specialize in facility condition assessments. They have engineering expertise, experience in this work and the scale to deliver projects quickly.

Using industry-standard data structures is essential when collecting FCA data to ensure data consistency throughout a portfolio, over time and across vendors if using different partners for portions of your portfolio.

The de facto FCA classification system in North America is UniFormat, published by the Construction Specifications Institute (CSI) and the Construction Specifications Canada (CSC). At the same time, the U.K. standard is often Uniclass by the Construction Project Information Committee (CPIc) and NBS. These hierarchical data classification standards allow FM professionals to work with vendors to design a data collection project appropriate to the organization's needs, portfolio and budget.

Typical deliverables from an FCA include a detailed inventory and information regarding each asset's condition, remaining useful life and replacement value. A set of necessary repair or replacement activities for each asset to maintain its acceptable condition for the assessment forecast period is also standard. Finally, one might receive a capital investment plan describing annual funding required to address deferred maintenance over the term included in the plan. All this data may be delivered in various forms. The structure and format of that data will strongly influence how easy it is to import that data into one's existing analytical tools and computerized maintenance management system (CMMS).

Of course, an organization can collect their asset inventory and condition inspection information independently if they have qualified staff and resources. Most teams, however, choose an engineering firm partner to complete the FCA to gain access to their objective opinion, engineering credentials and staffing resources.

FOOD FOR THOUGHT:

Does your organization have a reliable inventory of your buildings and infrastructure? Is that data standardized in UniFormat? Are you able to use that data to keep your FCA up to date?

Implement a repeatable analysis process

Budget forecasting is an iterative process. To gain the trust of the executive team, FM analyses of funding requirements must be clear, concise and delivered in a format that is easy to understand. As the variables of funding availability, schedule, asset condition and project costs change, it is crucial for professionals to quickly update forecasts and deliver updates in the same clear and concise formats.

A set of Microsoft Excel templates can serve the overall analytical need for smaller organizations. Larger organizations with more sophisticated information technology teams might lean toward business analytics tools such as Microsoft Power BI, Tableau or ArcGIS Insights. These may be more appropriate solutions to a complex set of analytical requirements.

Ideally, an organization's asset and work management solution will have the tools FMs need to iterate complex budget forecasts quickly. Managers should confirm that their software's budget-forecasting tools provide all the capabilities the organization might need. This ensures budget forecasts are prepared with current data that leverages asset condition, performance curve information, work history and inspection details.

FOOD FOR THOUGHT:

What does your facility budget forecasting process look like today? Are the tools you're using helpful? Can you efficiently aggregate relevant data to drive objective budgeting decisions?

Create a comprehensive prioritization rubric

Capital investment decisions must consider factors beyond facility condition and deferred maintenance. All things being equal, in a budget-constrained environment, if there is the choice between remodeling the entrance to city hall or repairing the roof on the city salt shed, the constituent-facing building typically takes priority.

Organizations need to ensure that their capital investments reflect their strategic priorities. How do capital investments reflect organizational priorities related to responsible financial stewardship, energy conservation, social equity, affordable housing, racial equity, economic development or other strategic goals? What is the weight of each of these strategic goals compared to others? How do teams evaluate each proposed capital project using consistent criteria? Or share the evaluation process results with stakeholders openly and transparently?

A prioritization rubric can be instrumental when establishing a clear, consistent and defensible decision process. When creating this rubric, the evaluation criteria must be:

- Simple: Easy 1-to-10 ratings for impact against each priority.
- Clear: It should be easy to understand how requirements pertain to each project.
- Consistent: Criteria should apply to all proposed projects.

A prioritization process that is transparent, open and consistently applied goes a long way to building trust in the process and organizational buy-in to the end results of the process.

FOOD FOR THOUGHT:

How does your organization prioritize facility-related investments today? Do your decisions align with your strategic priorities? Are you able to clearly communicate those plans with stakeholders?

Complete the data cycle

Capital investment planning is another iterative process. With each cycle, underlying data must be refreshed. Repair and replacement work performed in the last cycle will change asset conditions, FCI values and deferred maintenance amounts. All the underlying assumptions of an FM's budget forecasts should use the best available current data.

An asset and work management system should be tied directly into an organization's budget forecasting tools to make this process seamless. In this way, as any facility's work is completed, the cost data, condition data, deferred maintenance values and other information that supports one's capital investment planning process is continuously updated as each work task is closed. When the data circle is unbroken the iterative capital investment planning process becomes less burdensome and more successful.

FOOD FOR THOUGHT:

Are your FCI values current? How do you maintain them? Do you trust them to support capital investment planning conversations?

Conclusions

The challenges facing FM teams grow more pressing each year due to various geopolitical factors. The COVID-19 pandemic has made these challenges more acute and forces strategic conversations about facilities at the executive level. This new focus on facilities presents enterprising FMs with new levels of influence in organizational strategy discussions.

To take the best advantage of this new window of opportunity, FMs must come to the executive table well prepared with solid data, systematic analysis, transparent processes and excellent information management tools. With proper preparation, FMs can significantly impact the stewardship of some of the world's most important investments: buildings and infrastructure. FMJ

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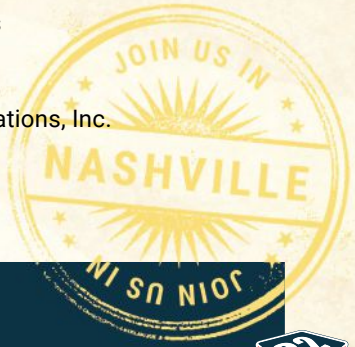

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FUTURE-PROOF FACILITIES

Optimizing Indoor Environments

BY JULIE WILDING

In the digital world, it is common practice to design and incorporate solutions that help prevent and overcome virus attacks. Software and tech companies regularly add new layers of security to combat ever-mutating computer viruses with every new generation of technological innovation. Watch group AV-TEST Institute suggests there are 450,000 new malicious programs (malware) that emerge every day in the digital world. By contrast, the scientific community estimates that there are 10 nonillion (10 to the 31st power) individual viruses on Earth. Could policymakers, planners and architects inspired by the digital world learn from cybersecurity to make the built environment more resistant to these real-world viral threats — including a virus like COVID-19?

This digitally inspired approach is the revised method that authors Naglaa A. Megahed and Ehab M. Ghoneim propose in their article "Antivirus-built Environment: Lessons Learned From COVID-19 Pandemic." Could indoor spaces be designed with transmission prevention in mind? Can architects, FMs and other built environment professionals plan and install an antivirus-built environment ready to help protect from the coronavirus or other pandemics?

Why the Built Environment Matters

The COVID-19 pandemic accelerated society's understanding of the link between healthy buildings and human well-being. The rapid spread of the virus caused many in the architectural community to reevaluate their life's work. Some architects and designers have seriously reconsidered the implications of designing for a world that will never be quite the same, especially when it comes to gathering in and using large public spaces, like airports, hotels, hospitals, gyms and offices.

Humans spend an average of 21.6 out of 24 hours a day – 90 percent of their lives – indoors. More than any other type of space, the indoor built environment is human beings' natural habitat. And how healthy is that natural habitat?

It has become apparent that the concentrations of some airborne pollutants are 2 to 5 times higher indoors than in outdoor concentrations. Any individual sitting in a typical home, office building or school can expect that 3 percent of the air they breathe in at any given time was just in the lungs of other room inhabitants. Every day, humans inhale one another's exhalations: the respiratory backwash whenever people take a breath in a shared space. When it comes to potable water, most people would agree that no person purposefully wants to be drinking backwash or otherwise contaminated water. Water standards ensuring cleanliness and drinkability have been around since the mid-1700s. What would happen if those same high standards were actively applied to the air humans breathe and the surfaces humans touch in the indoor environments where they spend most of their time?

Dr. Joseph Allen of the Healthy Buildings program at Harvard University's School of Public Health underscores why society needs to extend high standards of cleanliness to humans' natural habitat. He suggests that as conditions change, the tools and how they are used must also evolve. The benefits of investing in indoor environmental quality (IEQ) are clear. Researchers at the Lawrence Berkeley National Laboratory have estimated that the combined potential annual economic benefit of improved IEQ could be up to US$20 billion. Studies have found that enhanced ventilation can have measurable impacts on the performance of occupants in indoor environments. Research demonstrates that ventilation (bringing outdoor air indoors) has significant benefits for workers' health, comfort and productivity. One study showed that for each two-fold increase in ventilation rate, performance increased by 1.7 percent on average. Another study found that ventilation improvements alone can lead to a 3 percent productivity boost from improved health and a 1 percent payroll effect.

Numerous IEQ studies demonstrate that built environment quality has significant implications for organizations. The built environment matters because it directly impacts employee and building occupant performance and, by extension, organizations' bottom lines. Said another way, an investment in the built environment can yield significant returns.

Healthy Buildings Principles

Several principles have crystallized into the Healthy Buildings movement. Originating at the Harvard Chan School of Public Health, this movement summarizes its core tenets into nine foundational concepts:

- Lighting and views
- Ventilation
- Air quality
- Thermal health
- Moisture
- Dust and pests
- Safety and security
- Water quality
- Noise

In their book "Healthy Buildings: How Indoor Spaces Drive Performance and Productivity," Dr. Allen and co-author John D. Macomber summarize how these principles work in concert to improve humans' natural habitat, the built environment: "Research shows in an objective and reproducible way that our cognitive abilities, health, productivity and well-being are directly impacted by decisions in the engineering, operations and running of our buildings."

The Healthy Buildings movement points toward a significant shift in how we think about the future of the built environment. To address the nine foundational tenets of healthy buildings, future buildings will need to include smart solutions that integrate sensors and disinfection devices into

indoor spaces. This technological integration should also include continuous, autonomous solutions that address air quality and manage the risk of exposure to harmful microorganisms.

The Role A UV-C Disinfection Ecosystem Can Play

Air quality and effective disinfection are critical components of healthy building practices, and UV-C disinfection can enable both. When combined with space utilization sensors, UV-C disinfection devices can facilitate continuously and autonomously disinfected indoor environments that create safer shared spaces. Dr. Edward A. Nardell, Professor of Global Health and Social Medicine at Harvard Medical School, said effective engineering controls can help make indoor environments truly safer. In his recent Time magazine article, Dr. Nardell encourages building managers and superintendents to consider better ventilation and add an extra protection layer through an upper-room germicidal UV (GUV) system. GUV fixtures have been around for decades and are proven to be safe tools for airborne infection control, although they are surprisingly underused. Their use dates to the 1930s, when researchers placed upper-room GUV fixtures in school classrooms to prevent the spread of measles. These fixtures were also used in U.S. health care settings before the discovery of antibiotics for tuberculosis and vaccines for measles, mumps and rubella. COVID-19 has prompted a resurgence of interest in upper-room UV systems and has also awakened an interest in an even newer, shorter wavelength called far UV. The effectiveness of UV-C to reduce airborne-mediated disease transmission is well established and is completely safe at wavelengths from 215 to 255 nm.

Far UV is the 222 nm spectrum of UV that is equally or more effective against airborne viruses but safe for occupied rooms because it cannot penetrate the outermost layers of skin and the liquid layer covering the surface of the eye. Far UV applications are particularly relevant for occupied spaces with high traffic and high turnover. Furthermore, far UV possesses demonstrable efficacy versus microorganisms. In one study of far UV's efficacy, researchers found that this form of UV light effectively inactivated aerosolized Staphylococcus aureus in a room-sized chamber. This study also showed that far UV had the potential to be effective against common airborne viruses, such as SARS-CoV-2. The authors recommended the UV wavelength as a solution for reducing airborne disease transmission.

Identifying and Managing Risk with Tech Enablement

With the reality of risk an ever-present factor in the built environment, risk mitigation through healthy buildings principles and UV-C disinfection are increasingly essential. In any given indoor environment, humans run the risk of microorganism exposure. "Approximately 60 percent of all human respiratory and gastrointestinal infections caused by viruses are acquired indoors," said Dr. Carolina Koutras, co-chair of the International Ultraviolet Association Technology and Research on Air and Surfaces Treatment Task Force. This alarming statistic underscores the importance of the indoor environment to human health, and conventional ventilation systems alone are not doing enough to create healthy buildings. The major advantage of continuous air disinfection systems such as upper-room UVGI and far UV is that they safely reduce the burden of viable microbes in real time, without the need to remove, treat and return clean air to the room.

The good news is technology enables better management of the risk inherent in indoor environments. One of the capabilities technology offers is risk modeling to inform better decision making for the built environment. FMs can evaluate the risk of existing airborne disease transmission in any given space. These models also allow for the quantification of various indoor air treatment options. These tools allow managers to test various mitigation options prior to costly and potentially disruptive changes.

The ongoing presence of many illness-causing microorganisms will necessitate permanent solutions in the built environment, particularly post-pandemic. With the help of healthy buildings principles and effective disinfection solutions like UV-C, building owners and occupants can mitigate the inherent risks of sharing spaces on an ongoing basis, both now and in the future. FMJ

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Finding answers in office metrics

BY LISA BARCLAY & JOHN C. WANG

Organizations are adopting a zero-waste-of-space policy. This is driven primarily by two factors. Firstly, in hybrid or flexible workplace models, employees are reevaluating the types of work and space they need to undertake in the office. Secondly, organizations are expecting a better ROI on their real estate.

Optimizing the workplace is a priority for many facility managers — balancing the needs of upper management to save costs, while simultaneously providing a more suitable workplace for employees to complete their work. This is truer now as an increasing number of organizations shift to new diverse workplace models. It presents a fantastic opportunity for FMs to rethink the kingdom over which they rule. However, the overarching objective of this optimization can quickly become a polarizing topic for FMs, particularly without solid data to back up the decision-making process.

It is certainly possible to make educated guesses, but as with any argument, hard facts win over gut feeling. In this case, data removes much of the guesswork for FMs, providing a reliable and objective source of information on which to base decision making. It is also indispensable proof to present before committing to actions when sharing plans with other stakeholders.

THE QUESTION IS:

Should data be employed to help right-size the organization's footprint, doing more with less and reducing costs,

OR

Should value be better extracted from existing spaces by diversifying and reappropriating them to better serve employees?

GETTING STARTED

Before any FM rolls up their sleeves to deal with data, there are several things they ought to heed:

Pure-software workplace systems

Pure software-based systems often promise a lot for little investment with no need to deploy hardware. While software-based systems are a critical component of room reservations and other space management activities, having a hardware component can provide added value in the form of real-time tracking of actual behavior.

Take, for example, a room booking system. An employee books a meeting room in a prime location: it is near all the commonly used amenities, has several ergonomic features and access to wired high-speed internet. What if the employee changes their mind about coming into the office that day and no longer needs the space, while also not bothering to cancel their reservation? Without something as simple as a meeting room panel for checking in to the space, there is no way of knowing that the booker has not shown up for their booking and will remain reserved within the software. On paper this looks good, space is being well utilized; however, there is prime desk space going unused for half the day.

The Right Hardware to Support FMs

This naturally leads to the topic of necessary hardware and sensors. Within any modern workplace, there is an ecosystem of hardware and other IoT (Internet of Things) devices communicating and working together to paint a digital picture of the workplace composed of data. Hardware such as room-booking panels or desk-booking devices help gather data regarding space utilization and occupancy.

Meanwhile, measuring any aspect of the physical world, sensors are meticulously tailored for a variety of application-specific functions. This can include functions such as detecting human presence or other data points such as current capacity, total footfall, environmental temperature, natural lighting and so on. Every piece of hardware or sensor is an invaluable data collection point, gathering vital data that by itself is not so meaningful, but when placed alongside other data can offer something vastly more significant and relevant.

Therefore, it is apt to think of there being both "good data" and "bad data." So, what is bad data? Simply put, data from a single source which is not combined with data from a separate independent source to identify trends and correlations. It gives an overview, but only at a shallow level, and does not give anything that can be acted upon.

Good data, on other hand, is that which is combined with a large amount of other varied data from different sources. For example, space reservation data, capacity, occupancy, temperature and lighting data can be compiled together to form an insightful and accurate overview of the workplace that is highly diverse and rich in information.

A SUCCESS STORY

IBM Global Real Estate (GRE) consistently uses data and insights to be an AI-driven real estate organization. Prior to the COVID-19 pandemic, it dramatically improved space and lease management and reduced costs using insights generated through IWMS. When the pandemic hit, they needed an even better understanding of real-time occupancy and utilization to understand how their spaces were being used.

They were able to provide real-time occupancy status overlaid with workspace data. The organization is enhancing the solution with IoT building sensors, Wi-Fi access points and heat-mapping technologies that can deliver critical information on space usage, including overcrowded areas.

As for the results, the GRE team reduced the time to complete space utilization analysis for a location by 99 percent, from 10 days to 10 minutes. In addition, with highly accurate space utilization data, GRE leaders can optimize usage and expenses across the global portfolio.

Pre-deployment Checklist

Here are some steps to prepare before rolling out IoT and adopting a data-driven approach to decision making in the workplace:

- **Map out goals and what insights the team wants to capture.** Make sure there is a clear understanding of business outcomes. This will help ensure the team has the right tools, can prioritize projects and focus on the needed data points.

- **Explain to employees in advance what the team is doing.** While intentions may be good, they can easily be misinterpreted. Employees may ask: "Are these devices being installed to spy on me every time I check in for a meeting room?" or "Why am I being tracked?" leaving a sense of uneasiness and distrust. It is important to explain why it benefits them and how it works (i.e., is data anonymized, who it is shared with, etc.)

- **Get IT involved.** Even the best laid plans can still fail without taking basic considerations, such as will it be possible to provide power to these IoT devices, and if so, what new infrastructure will be necessary to support all these devices that utilize Power over Ethernet (PoE). IT is the best bet for logistical problems. Ensure any new integrations will be successful and fit into the bigger strategic plan laid out by the organization in terms of their technology roadmap and needed support for rollouts.

- **Enterprise over consumer grade.** Enterprise-grade hardware should always be advocated for over consumer grade. It is simply better built for the task at hand and can offer lower total cost of ownership.

- **Avoid disparate systems.** Choose an IWMS (integrated workplace management system) that can reduce organizational siloes and capture all data in one integrated system. All this captured data needs somewhere to live so it can be analyzed and used to improve decision making. Having one system across the FM organization will save everyone time, effort and money.

- **Decide who is in charge.** Choosing a good leader to drive the project, as well as be held accountable for both successes and failures, is key to any initiative. They also need to believe in it and be willing to throw their full weight behind it.

TYPICAL KEY METRICS TO LOOK OUT FOR IN THE WORKPLACE

By far the simplest thing to measure is booking data. This data shows who, when and how often spaces are being booked by employees, as well as cancellations and no shows, and can be easily gathered through room booking displays.

Actual usage versus reservation data

A simple metric for evaluating how long people are using the space they booked against the time for which they reserved it. This can be achieved by comparing bookings against the actual time a meeting room was used before users checked out of the space.

Occupancy data versus location

This is the data that shows the actual time your workplace resources are being utilized. How long was the meeting in Room 203, how much time employees spend away from their desk during their booking, and so on.

Percentage usage of full capacity

How often and when facilities are at full capacity, if it all.

Utilization data of different space types

This simple metric clearly shows to which level spaces are being utilized, which is particularly useful when there are a variety of spaces, including meeting rooms, huddle rooms, conference rooms, silent booths and lounges, for example. This can be evaluated with room check-in data.

Historical versus current occupancy data

Essential for identifying trends over time, and how employees' habits are changing over time in response to actions by the FM or from external factors.

Meetings versus desk versus other types of spaces

When adjusting floorplans and increasing or reducing certain types of space, this metric can be referenced against other data such as over-utilization to evaluate efficacy.

YOU'VE GOT YOUR MULTIFACETED DATA, NOW WHAT?

The question now is what should be done with this fresh-from-the-oven data. What trends are being looked for? What needs improving about the workspace, and how can it be adjusted to meet the needs of employees? Where can costs be saved? Or, returning to face the dilemma of deciding between reducing the space the organization is renting, or maximizing the utilization of the space currently held, or a fine balance between the two.

Data itself is the raw ingredient. Now it is time to produce insights that can enable better decisions around spaces. FMs do not want to have to go to many disparate systems to get those insights. With an IWMS infused with data from a variety of sources and analyzed with the help of artificial intelligence (AI), FMs can bring together critical utilization and occupancy metrics into a modern dashboard to deliver easy-to-understand data visualization on space usage — all in one place. They can then use these insights to make decisions for lease renewals, determine if expansion or consolidation of space is needed, and provide the types of spaces occupants need when they need them.

Take, for example, the problem mentioned earlier of a hot desking system. Employees make reservations, then either do not show up or cancel it, blocking it from use by other employees. Upon checking live reservation data, it displays more than 90 percent of desk space is utilized; however, employees have complained in the past about being unable to make bookings, despite plenty of desks being unmanned. That is a problem. Upper management may also see a host of empty desks and incorrectly believe that there is too much space and begin to ask questions regarding the necessity for such vast office space. Issues can quickly become exacerbated.

This highlights how important it is to centralize and compare data from different sources — the booking system and occupancy sensor data — in a single platform to pinpoint the root cause of issues and to evaluate whether shrinking the organization's footprint, or making better use of the space, is the right decision in this situation.

CONCLUSION

Right-size facilities, maximize what one currently has or meet in the middle? There is no single answer for each individual organization. However, driven by the wealth of data and insights now under their belt, FMs can make the right decision. The data confirms what they knew from the start, or the outcome is a new revelation. Either way, it facilitates a new level of confidence in decision making, based on hard facts over gut feeling. FMJ

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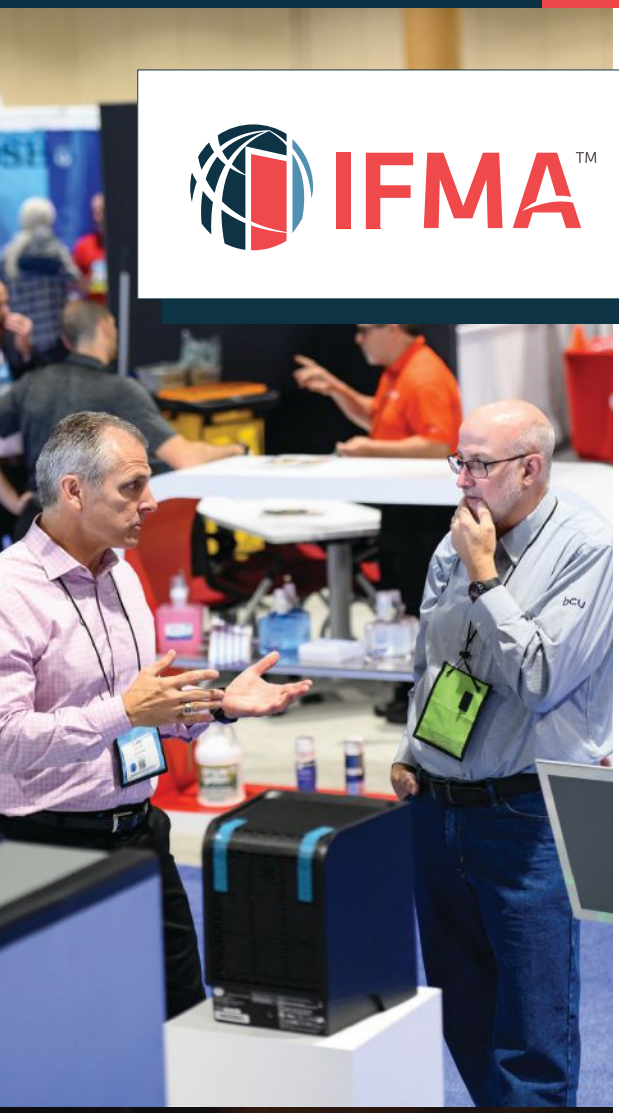

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Designing for PRODUCTIVITY in Multi-use Facilities

BY DELIA BURL

As the modern workplace changes and adapts to the needs of both employees and consumers, multi-use facilities must pivot to create spaces that foster productivity and experience, while also prioritizing efficiency across departments.

The steady increase of the hybrid workforce has made interdepartmental collaboration essential, and the reduction of space needed for in-office work provides an opportunity for efficient real estate use. Factoring in open-concept and collaborative workspaces, multi-use facilities can utilize tools such as building information modeling in construction and maintenance, maximize asset usage with innovative technology, and configure spaces that are not only highly functional but also promote sustainability for the workforce of the future.

Building Information Modeling Brings Thoughtful Design

Building information modeling (BIM) is changing the thought process and trajectory of building construction to one that focuses on sustainable infrastructure. BIM integrates the design, construction and internal maintenance of the facility through digital modeling, allowing FMs to determine the unique needs of each multi-use facility and adjust prior to construction and purchase of materials. For multi-use facilities, design for each portion of the facility may be unique, resulting in a distinct need for additional technology, such as BIM, to find the most sustainable format for optimizing construction conditions. One of the largest benefits of BIM is its ability to boost productivity among FM workers through the entire building life cycle. With the carefully constructed BIM process, there is a noticeable decrease in the need for project management, with the ability to identify issues proactively, reduce rework costs and foster communication within an internal team. BIM allows for greater visibility and maintenance predictability within facilities, a must-have for ensuring multi-use facilities remain as functional as possible for current and future generations.

Outside of sustainable infrastructure decisions, BIM provides the opportunity to adapt to the trends of the modern office, including the continuation of the hybrid workforce, to promote an innovative and collaborative environment for interdepartmental growth. According to the 2021 Gartner Inc. Digital Worker Experience Survey, nearly 80 percent of workers are using collaboration tools for work, an increase of 44 percent since the beginning of the pandemic. For multi-use facilities, this is especially important, seeing as the unique needs and requirements for each portion of the facility may overlap with one another. BIM and modern design foster this need, promoting both digital and in-person communication among FM workers and the communities involved.

With multi-use facilities, the need for an efficient and productive facility is vital. Individuals who are venturing into an office or multi-use facility space expect modern technology to be a key component, especially those entering the workforce.

Enter, the modern coworking space.

Designing for productivity in a coworking space requires detailed knowledge of the desires of the workforce, which today, include open-concept layouts with an emphasis on outdoor elements, and areas that connect lifestyle to the workplace, such as technologically advanced meeting rooms and food availability. While this may seem excessive, the benefits of coworking spaces have taken the world by storm. Remote teams, entrepreneurs and startups alike can network, collaborate and thrive, all on an individualized schedule. The result? A productive, communicative team that fosters communication and propels growth.

Modern Asset Management Promotes Office Productivity

When designing for productivity in multi-use facilities, especially those that cater to professional use over recreational, modern asset management is a must. According to Snapchat's 2021 study, Gen Z's Role in Shaping the Digital Economy, Gen-Z will become a dominant force in the workplace with the number in work across the six markets trebling to 87 million by 2030. Additionally, augmented reality (AR) in the workplace is expected to expand four-fold by 2023. For multi-use facilities, incorporating technological advancements such as AR and virtual reality (VR) for asset management promote productivity during the construction, maintenance and growth process of modern facilities.

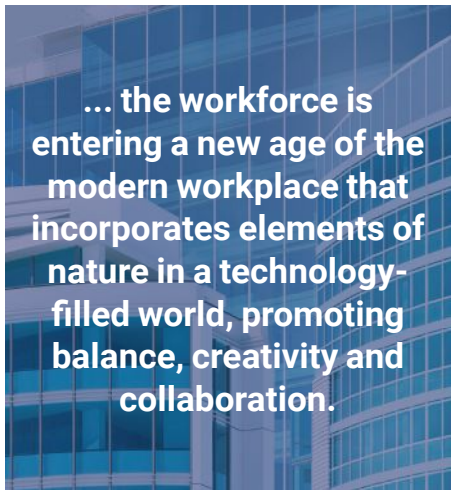
VR and AR have a large presence in the entertainment sector, but how do they connect to the field of facility and asset management? AR is used as an extension to a user's real-life experience, morphing the physical and digital world to create a new digital view. VR takes this to the next level by creating an entirely computer-generated simulation, allowing for a fully immersive experience using equipment

such as computers, sensors and headsets. In relation to FM, VR has made it possible to create 3D renderings of facilities, including internal equipment systems such as plumbing and electric. How does this impact multi-use facilities? By allowing FMs to gain significant insights into the internal health of each section of their facility, as well as schedule proactive maintenance for each area without having to disrupt the internal structure or halt current usage of the facility for repairs.

Those working in the FM sector are growing older, and as many near retirement age, there is a need to promote careers in the industry for Millennial and Gen-Z workers. However, outdated facilities and a lack of technology and collaboration within this sector may drive individuals away. Designing for productivity using modern technology and eye-catching design provides a visual representation of the importance of FM, driving younger generations to consider a career that utilizes myriad factors to promote safe and innovative facilities to the public.

The Adoption of Biophilic Design for Productivity & Sustainability

Biophilic design, especially since the inception of the COVID-19 pandemic, has become an integral part of design and construction for multi-use facilities. Biophilic design is the concept of increasing human connectivity within a building through space conditions, utilizing direct and indirect nature. With unique design characteristics being employed in facilities of all sizes, occupants of multi-use facilities have begun to reconnect with nature in a new way, not only recognizing their own desire to immerse themselves in a natural environment, but also finding that it fosters productivity and well-being. Design concepts for biophilic design can incorporate both direct and indirect sources of nature, including significant use of windows and greenery, open concept hybrid spaces, gardens, patios and visual additions such as a nature-focused color pattern or design elements within a facility.



There is a continued shift within the modern workforce of integrating career and lifestyle choices and finding a balance between the two. No longer are employees sacrificing their happiness and well-being for a salary; rather, they are viewing potential job prospects from a comprehensive lens, including lifestyle benefits such as office space, collaboration opportunities, benefits, company values and more. Using tools such as biophilic design in the inception of the facility design process can make a significant difference in the appeal and desirability of the space. In Human Space's study, The Global Impact of Biophilic Design in the Workplace, the findings showed that those working in spaces with natural features reported 15 percent higher levels of overall well-being and feelings of creativity, as well as a 6 percent increase in productivity.

Companies are adopting biophilic design concepts in the workplace, including major conglomerates such as Amazon. Incorporating a biophilic collaboration area in their Seattle headquarters required extensive collaboration to construct and has promoted productivity among workers who desire a change of scenery to spark creativity. After years of working from home, with many Gen-Z employees having only ever known remote work, the workforce is entering a new age of the modern workplace that incorporates elements of nature in a technology-filled world, promoting balance, creativity and collaboration.

Cultivate Areas for Movement Through Active Design

Just as mental health plays an integral role in promoting productivity within multi-use spaces, physical health should not be overlooked. According to Gallup's 2018 study, Employee Engagement on the Rise in the U.S., 70 percent of employers have adjusted their facility's physical environment to encourage healthy behaviors; as a result, 61 percent of employees agree that they have made healthier lifestyle choices due to the implementation of their company's wellness program. As the hybrid workforce grows and the future of the pandemic remains uncertain, the desire for physical movement has increased across the globe; however, multi-use facilities and offices that proactively promote this are not as common. Designing a multi-use facility with movement in mind promotes physical health, as well as increased collaboration for both workers and public usage.

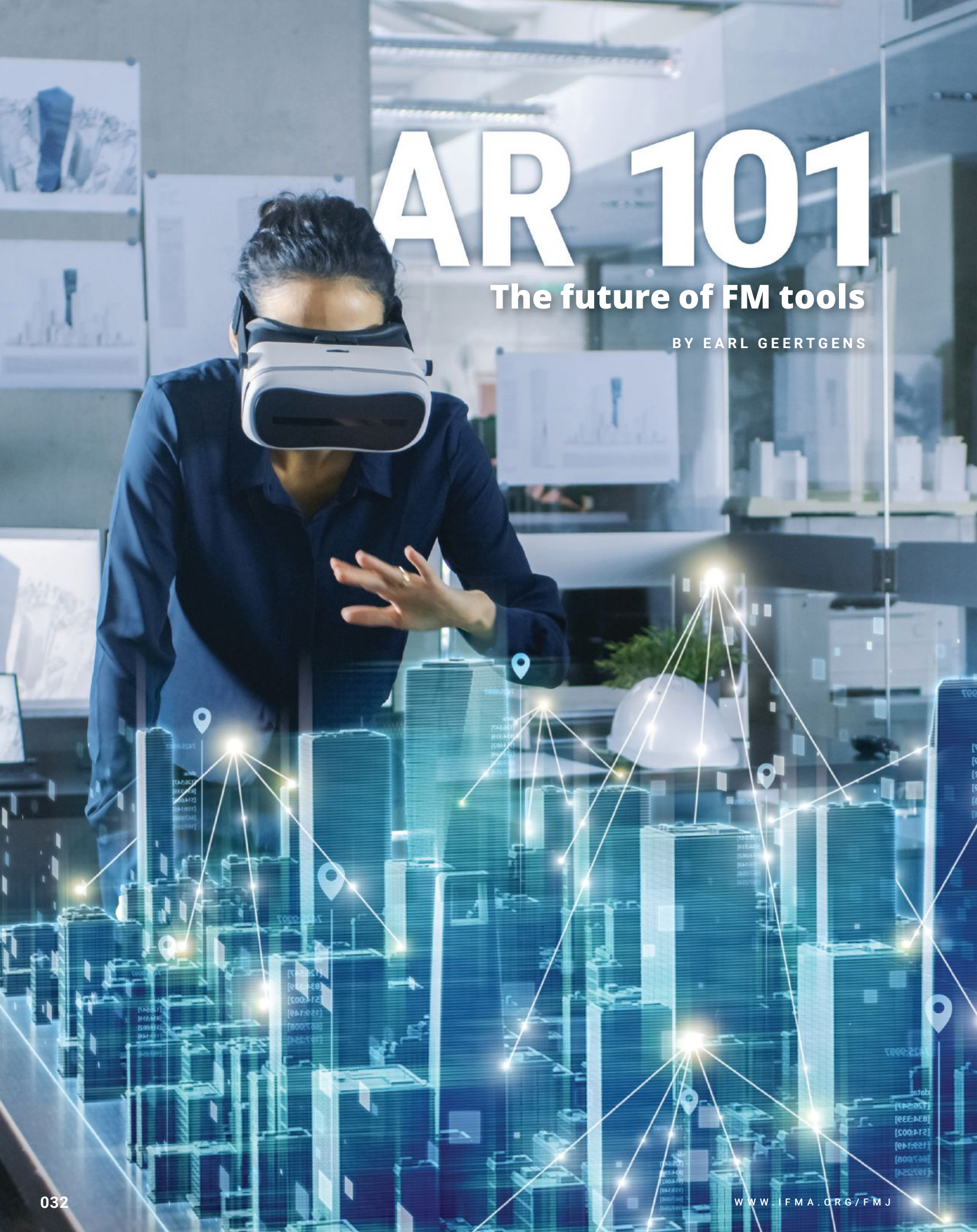
Active design is one solution to promote physical health within a multi-use facility and can be accomplished in a variety of ways. For general design guidelines, actively designed facilities should incorporate circulation systems, designing interior spaces, lobbies and hallways that connect with ease. Appealing individual elements — many of which can be done through biophilic design — to promote exploration of a facility, such as abundant natural light, innovative and differentiated architecture across the entire facility, and collaborative environments

such as exercise rooms, and standing or walking desks should be incorporated. For multi-use facilities, this provides invaluable benefits, especially if used in an office space. Face-to-face collaboration is fostered through visually pleasing and effective design that remote workers do not have access to. Not only does active design promote a healthier and more productive workforce, but it also improves sustainability costs across facilities. Without the additional use of elevators, escalators and other high-energy design elements, facilities will see monetary, emotional and physical benefits from these design choices.

Next Steps for Facilities Design

There is no doubt that there is a shift happening in the facilities design and development field. With ever-growing technology and a rising demand for beneficial natural and lifestyle elements within facilities, the facilities design industry is focused on harnessing tools such as BIM, VR and AR to craft environments built for longevity, sustainability and productivity. No longer are buildings being designed according to traditional layouts, but rather, by considering the unique needs and wants of the local community, patrons and employees who will be occupying the space. As the workforce adapts to a new normal, as individuals make changes to promote their mental and physical well-being, and as facilities design advances, modern building design will surely culminate into advantageous spaces for all. FMJ

Delia Burl *is the content marketing specialist for SCLogic, an international in-building logistics software company. She has spent the past three years working in both agency and in-house marketing positions, focusing on industries including facility management, food and beverage, law, finance and more. Her role includes marketing strategy development, website development, content creation and search engine optimization. Burl also holds a dual bachelor's degree in integrated communications and advertising, with a minor in marketing from Towson University.*



AR 101

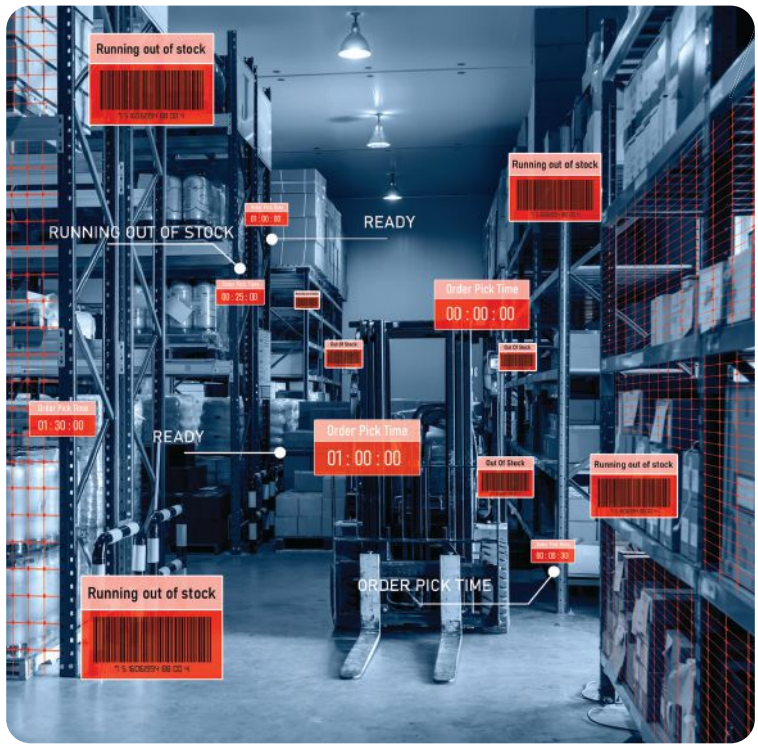
The future of FM tools

BY EARL GEERTGENS

Machines are often depicted cinematically in a post-apocalyptic world where humans and machines are at war. They are so advanced they no longer require humans to operate. Meant as a warning of over-reliance on technology, these depictions fall short, failing to acknowledge the ingenuity and thought leadership that brought the machines to life in the first place.

Smart technologies are intended to enhance lives, not replace them. This puts people in a watershed moment – one in which both the built environment and how people interact with it through technology are in a delicate balance.

The Internet of Things (IoT), now gaining traction as a household term, is exactly as the name implies — a wireless connection between inanimate objects that are able to interact with and even respond to each other.



Far from the self-sufficient robots of a fantastical future, the term is most approachable by the smart speakers now found on most kitchen counters and the smart objects they connect to such as lights, locks and appliances. While their true functionality is still debatable, the idea of the smart home appeals to the everyday user for functionality and efficiency in our ever-busy modern lives.

While it is convenient to have the ability to lock the house or turn out lights from anywhere with a cell phone signal, outside of the home, IoT is less of a gadget and more of a necessity when it comes to design, building operations, security and sustainability. Adding luxury to spaces throughout a smart building is an undeniable benefit; however, IoT technologies also monitor, and along with building control systems, can send important alerts. Each system (or limb) of the building, be it HVAC, electrical, lighting, shading, security or any other component. can be tied to a central nervous system (brain) that can filter and interpret information in real time.

Sensors can be placed to track and identify heat sources. If triggered, they send alerts and maintain exit passageways. These outperform smoke alarms, which may have not only taken longer but also failed to locate the source accurately and prevented the spread of fire. Another example is indoor air quality monitoring for both the health and productivity of occupants.

Optimization and efficiency are two words that come to mind when thinking of IoT; however, the true potential is limitless. The impact is incalculable as buildings (and their subsequent limbs) begin to incorporate this interconnected system of parts.

But what of the role of the facility manager, whose job it is to ensure functionality, comfort, safety and efficiency of the built environment by integrating people, place, process and technology?

The premise is that while buildings are evolving, this does not necessarily replace the need for human interpretation and intervention. The FM's tools too must change to keep pace with the growing intelligence of the building itself. While the computer has been a longtime tool for processes like asset management, work and service orders, and scheduling, new technology allows FMs to pinpoint, predict and prevent issues by interacting with the built environment in unprecedented ways. Beyond simply interacting with the building, the IoT is now being offered for equipment tracking, space utilization, conference room scheduling and hot desking.

The two fairly common ways of visualizing the world are through virtual reality (VR) and augmented reality (AR). Both require a wearable object to alter the view but are distinctly different in their approach to such visualization.

In virtual reality, a fictional reality is enhanced by a headset device. The entirety of the surroundings within the headset has been replaced by a virtual world.

Augmented reality, on the other hand, uses a real-world setting, accessed by a headset, goggles or smartphone, to visualize a virtual object or action.

Within an application in a smartphone, for example, an object (furniture) or system (mechanical unit) can be viewed in the real-world setting for a near-exact size measurement.

Big box stores offer free apps that, through AR, place a specific piece of furniture in a space, or even measure the amount of tile required for a new flooring job. The capabilities of AR are beyond the home-improvement stages, but its growing availability to the general public provides clues to how the user can implement technology to interact with their environment.

AR is but one asset in the overall realm of IoT, but it is one that can play a major role in the future of tools for facility managers. Buildings (via the IoT) now have the ability to self-regulate temperature and lighting, independently locate inefficiencies or issues, and interact with their occupants.

AR is one such tool that allows architects, owners, FMs and users to interact with both the physical space as well as potential outcomes in three distinct ways that each affect a different aspect of the lifespan of the building.

AR aids in planning and design (prevention), pinpointing the location of an issue in real time (resolution) and in maximizing the efficiencies of building systems (optimization).

PLANNING/DESIGNING (PREVENTION)

The first stage in the life of a building is to design the systems (structure, mechanical, electrical, plumbing) in harmony such that each is located in proper proximities and clearances and is accessible for future maintenance. AR can help designers, owners and FMs visualize the location and placement of everything before and during construction. While VR can definitely play a role in early designs in terms of virtual walkthroughs and renderings with programs like Lumion and Enscape, AR allows the architects, engineers, contractors and owners to see an outcome (or possible outcome) in the field prior to the construction of a parking garage under five stories of apartments above. The ceiling of this garage space acts

as the "physical plant" from the apartments above. It is a maze of hot- and cold-water circulation pipes, as well as black and grey water drainage, not to mention the required fire sprinklers. Each system is designed separately and often by engineers across state lines. The two-dimensional drawings often line up well on paper and provide a different outcome when installed on site. AR allows the architects, engineers and contractors to visualize the three-dimensional implications of required slopes and connections, thereby preventing problems during construction and in the future if installed improperly.

BUILDING OPERATIONS (RESOLUTION)

The second critical span is the life of the building that includes maintenance, security, grounds management, etc. Where buildings previously required special, intricate knowledge of their innards to locate and tackle problems, new products are paving the way with new technologies that make maintenance, security and management not only easier but more efficient.

SUSTAINABILITY (OPTIMIZATION)

The last (but specifically not final) life of a building and its parts is the future and adaptation. Fifty years ago, buildings were designed and built to last a single lifetime. While it might outlive the architect or the owner, buildings rarely lasted much longer simply because of the kit of parts that constructed them. New products are emerging that are not only built to last longer but, as mentioned before, built to be maintained inherently better. The systems within a building are ever leaning toward efficiency, not just for a reduction in cost, but in the reduction of building emissions (which may well be a reduction in cost). Window glazing and shading systems respond to solar orientation and can optimize both the lighting within the space depending on the task as well as the solar heat gain of the building (reducing or eliminating the need for HVAC).

There is little doubt that the foreseeable future is one that incorporates technology. However, rather than use technology to replace everyday tasks, it should be leveraged to enhance experiences. Buildings are the prime example of how owners and occupants can combine and leverage the IoT and augmented reality to create a more efficient, productive and safer environment.

AR offers advantages from the early design stages, through the lifespan of the building, and culminates with individual products finding new life in new buildings. It supports the long-needed move toward sustainable buildings and building products and provides access to important product information through use of QR codes. These store details such as the item's country of origin, its carbon footprint or a behind-the-scenes look at the manufacturing process.

FMs gain powerful insights on design, maintenance, adaptive reuse and access to information in real time to promote the rethinking of environmental impact of product choice. FMJ

Earl Geertgens *is president and CEO of FreeAxez LLC. For more than 30 years his leadership has produced adaptive cabling distribution systems, creating new trends in the built environment.*

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NOT IF, BUT WHEN

Choosing the right time for upgrades

BY BILL CONLEY

Information leads to knowledge, knowledge leads to decision making, learning from decisions leads to wisdom.

There always comes a time when external or internal factors require an upgrade of systems. Determining wants against needs is always an interesting proposition for facility managers. Interminable requests hit an FM's desk from the spectrum of their customer base. Acting on a customer service request takes experience and a modicum of common sense. An evaluation must be made based on several factors, not the least being the necessity of the work and the ramifications of any project on the whole of the organization. The same goes for FMs. They need to clearly differentiate what is needed versus the perception that their request is based on a want.

Needs are limited to essential things that are primarily focused on the present, looking to the future. They arrive based on those circumstances that tend to arise. There are many demands on FMs that must be met as regulations roll out; as technology advances; as the pressure for sustainable and efficient efforts become more insistent; and as equipment suffers from attrition. Money, which FM does not control, is the one thing FMs need most. Good arguments must be created to loosen the organization's purse strings. FMs must also emphasize benefits that may affect any ROI or payback criteria. Sometimes senior management focuses too much on immediate gratification and must be convinced that over time an investment will be worthwhile.

FMs should always prepare for the future.

When considering an upgrade or renovation, FMs must plan. Ensuring that a longer term than a one-year plan is in place will make changes easier. FMs should always prepare for the future, especially before budgets are made. Unbudgeted capital expenses are not looked upon kindly by upper management. Some companies do not treat software as capital, so any upcoming costs for new or improved systems may need to be reflected in operating expenses.

Even though an item may be budgeted, a business case will still need to be presented to attain approval for the expense. A business case explains the rationale for initiating a project or task. It is often delivered in a written document or a presentation, but could be less formal, such as a verbal agreement. Business cases demonstrate that whatever resources are needed, they should be in support of a specific business need. An example could be that a lighting upgrade to LED lamps will help save energy and boost employee performance. The business case must show that the improved lighting quality would enhance customer well-being as well as reduce system maintenance costs. A compelling business case captures both the quantifiable and qualitative characteristics of a proposed project.

Quantitative data relies on numbers and measurable data while qualitative data is subjective and holistic. Quantitative information is distinct from concepts and is grounded in reality. As qualitative and quantitative information reflects different data, their impact on a business case differs considerably. Although both are good to include in the business case, it will be numbers that sell the project.

Change for the Better

The right time to upgrade or renovate is when the time is right. There are several reasons that positive change must happen, especially given the certainties and uncertainties of FM. If everything is going well, something has been overlooked.

Sustainability has been one of FM's most pervasive and demanding influences for more than 20 years. It was once considered the right thing to do to protect the environment. Now government regulations, peer pressure, industry competition and efforts to improve corporate social responsibility have made it a must thing to do. From energy efficiency to carbon footprint analysis and mitigation, to carbon neutrality and net zero buildings, the bars have been set high and efforts to comply will cost money.

Despite the costs, sustainability initiatives help streamline operations, save money and improve quality of life.

Investing in the Future

Equipment will not last forever. All things break down with time, and this especially applies to isolated or untended systems. Whether due to planned obsolescence or just wear and tear, the longer a machine stays in service, the higher its maintenance cost and the lower its ability to provide optimal performance. There will come a time when it becomes more cost effective to replace the equipment. Determining any equipment's most economical age is a challenge. Manufacturer specifications and recommendations may form some guidelines, but they may not reflect the performance of the machinery. Measuring and monitoring helps with the assessment, and preventive maintenance may extend the life. Outside of complete failure, when to replace equipment is not an exact science.

In today's world, this is when technology raises its expensive head. There is a domino effect when dealing with technology. Once, an energy management system (EMS) or building automation system (BAS) was cutting-edge technology. As new developments arise, so does the opportunity to improve performance.

> **Investing in technology can be costly, but with the right approach to its application, it may be well worth it.**

Investing in technology can be costly, but with the right approach to its application, it may be well worth it. This is where a good business case and quantitative analysis are critical. Intangibles like computer programs are tough to justify.

The Internet of Things (IoT) is the collection and exchange of data between physical devices connected via internet protocol. It allows FMs to collect more data, respond quickly to changes and avail themselves of new business intelligence. As FM trends toward a world in which everything is connected, a smart infrastructure will need to be initiated, with assets and FM tools able to deal with the scale and life cycle with dispersed but connected assets. This will make it much easier for FMs to identify issues and potential challenges in their buildings and will help justify initial costs over time.

> **If there is one superpower that FMs could use, it might be the ability to be in two places at once.**

The next step can be to use artificial intelligence (AI) to monitor physical assets and gather intelligence. AI is a transitional software that enables FMs to shift from guessing about performance and the state of equipment to leveraging fact-based decisions. AI makes it easier to predict the performance life cycle of an asset before its performance is affected or before the asset fails. This can help FM teams perform preventive maintenance more effectively and address potential issues before they become problems.

While IoT allows an FM to monitor different building systems, AI facilitates the effective use of that information by bringing in data-driven intelligence for more informed decision making. It helps overcome challenges posed by high expenditures and major maintenance costs. Data can be used for predictive analytics to facilitate predictive maintenance techniques as opposed to reactive asset management.

Sensors have become more affordable and internet connectivity is faster and more reliable, driving the growth of IoT and AI. All those sensors generate data, which allows FMs to identify issues and potential problems more quickly and easily than in the past. This, though, depends upon the analytics capabilities of the systems, which leads to big data.

If each sensor provides one reading every second, that will produce 86,000 records in one day per sensor. FMs will need big data's advanced analytics to make sense of all that information to identify issues quickly. Advanced analytics will allow FMs to detect any problems with an asset when it begins to deteriorate and create an opportunity to remedy it.

It is a blessing and a curse that IoT's proliferation creates a requirement for

more innovative analytics; the shopping list just keeps getting longer. A major benefit is that FM teams can mine these data sets and easily detect poor performance issues as they develop and equipment failure before it occurs. The advanced analytics with big data will allow FMs to gain meaningful messages from the information constantly being collected from sensors.

If there is one superpower that FMs could use, it might be the ability to be in two places at once. Augmented reality (AR) has moved one step closer to that dream. FMs can sit at a desk and walk through an office layout at the same time. AR provides an interactive experience of an actual location which is enhanced by computer-generated perceptual information. It allows components of the digital world to blend into an FM's perception of the real world through the integration of immersive sensations, such as touch, smell and hearing. AR may seem like an extravagance, but given the right need and the right application, the money may be well spent.

FM on the Move…

FM also benefits from mobile technology and its improved communication, on-site access to computing functionality and accurate data recording. Mobile technology has been a game changer in the FM industry. It reduces downtime and gives managers greater control over projects with the ability to track work, take pictures and diagnose issues in real time.

…And Never Stopping

Necessity is the mother of invention. It could also be said that necessity is the demand for renovation and the need for better tools. This applies to equipment and technology, as they are more intertwined. There comes a time in every facility when change becomes necessary. Part of the art of FM is the ability to balance needs, plan for them accordingly, and time the upgrade or renovation appropriately.

Information leads to knowledge, knowledge leads to decision making, learning from decisions leads to wisdom. Change for the sake of change is not a good idea. Change for the right reasons, for the better, is smart. The drivers of change could be the impact of digital technology on the workplace, changing expectations and behavior, the urgency for sustainability, new regulations or just for the sake of efficiency and costs. Needs will continuously arise, and an FM will have to choose carefully to not break the bank.

The quest for continuous improvement necessitates the investigation and adoption of optimal systems. It could be for energy efficiency, security, employee health and safety, or the triple bottom line. However, it will be incumbent upon FMs to ensure the distinction between wants and needs are clear. The better FMs can do their job, the better their service to the company will be. That is a hard argument to refute. FMJ

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What the 5 Senses Say About a Facility

BY JOHN HARRIS

Customer experience begins the moment people step foot on a property, and it continues with every stride they take and every room they enter. Does the space look pristine or dirty? Does it smell fresh or pungent? Are surfaces smooth or sticky?

Sight. Smell. Sound. Touch. Taste.

These five senses kick into high gear and form immediate impressions that affect how visitors and occupants feel about, and act toward, an organization.

They impact how productive occupants and visitors are while on site. Whether they will recommend a company or university to potential employees, partners, shoppers or students. Whether they will happily return to the facility, minimize the time they spend there or, if they can, avoid it all together.

It is critical for facility managers to pay attention to how they impact all five senses and make each of the experiences a positive one.

Sight: The Eyes Don't Lie

What people see is incredibly important. When the first things they notice are manicured lawns and bushes with seasonal color, clean glass, and well-lit and shiny lobbies, people feel safe, comfortable and happy. Unkempt grounds, messy cafes and bathrooms produce a decisively negative effect.

For FM teams, attention to detail is critical when it comes to sight. A lot of little things can add up to create a positive or a negative impression. One piece of trash on the floor may go unnoticed, but four or five will not. Smudges on a glass door may be forgiven, but not if it is followed by crumbled papers on tabletops or spilling out of trash bins.

The impact a facility's appearance can have on occupants is significant. For instance, one study found that in offices where employees thought cleanliness was lacking, 72 percent said their surroundings made them less productive. Nearly half (46 percent) took longer lunch breaks and spent less time in the office, and a quarter said they took sick leave because their surroundings were depressing.

On the other hand, fresh flowers and healthy potted plants placed throughout the building, orderly lobbies and water fountain filters with green lights instead of red ones, demonstrate that the team is attentive to even the smallest details.

It is also important to remember people are inclined to conform to the behavior of those around them. If occupants regularly see FM team members adhering to high standards — mopping spills right away, picking up a lone piece of trash or straightening out a chair as they pass through a room — they will be more likely to do their part in keeping the building clean. In kitchenettes, they will wipe up their coffee grounds and put away dishes. In lobbies, they will wipe their feet on entrance mats before tracking mud through the room.

Ensure the team adheres to these standards:

- **Communicate regularly** so they understand what customers expect in terms of cleanliness.
- **Discuss how to best interact** with occupants and visitors, including how to listen and react to feedback and complaints so people feel their presence in a positive way.
- **Encourage them to take their jobs personally,** to care about the smallest details, and recognize and reward them when they do.
- **Adjust cleaning schedules** based on occupancy and traffic, focusing on high-touch areas and restrooms.
- **Conduct cleaning inspections** and review reports regularly.
- **Provide staff with appropriate cleaning tools.** For instance, many elevators do not have electrical outlets inside. Consider arming staff with battery-powered vacuums so they do not have to worry about locked or propped-open elevator doors closing on them.

Smell: Keep it fresh

Some people may be able to look in another direction if they do not like what they see, but smells are a different story. The only way to avoid them is to leave the area – and that is not always possible. Too often, buildings smell stale or musty, or worse, they overpower occupants with the scent of cleaning products and air freshener — the latter of which is a sure sign of trying to cover up an odor or a poor cleaning job.

FM teams should aim for the highest air quality with a fresh-smelling environment that is free of pollutants. One that is natural and pleasant. Frequent cleaning is key, as are well-maintained HVAC equipment, the use of MERV 13 filters and frequent fresh air exchanges.

Smell is particularly important when it comes to bathrooms. Not surprisingly, in one study 77 percent of respondents said it is the first thing they notice when they walk into a bathroom. In men's restrooms, urinal cakes are one of the biggest culprits. Custodial staff sometimes pile them up to mask the smell, but the high-perfume scent can be overwhelming. If bathrooms are cleaned regularly, there is no need for them.

Other areas where smell can be an issue are custodial closets. If used supplies and buckets of dirty water are stored there, their smells can seep into the hallway. In older buildings, sewer smells can also come up through custodial closets and other rooms. Preventive maintenance – such as adding water into the sewer traps and ensuring appropriate air filtration systems are in place — can help contain and eliminate these odors.

Proper maintenance also goes a long way toward passing the café sniff test. Nobody wants a cafeteria that smells like grease or a break room and surrounding office space that smells like the lunches people have been heating up in microwave ovens. Make sure kitchen equipment, filters and ducts are maintained so the mechanicals do not break down, air circulates and smells can be whisked away.

Sound: Quiet is best

People are in a building for a purpose, whether working, holding meetings, studying or shopping. Noise gets in the way of these activities. A Radius Global Market Research study showed that noise negatively impacts concentration levels, productivity and creativity for 69 percent of employees.

It is the FM team's responsibility to provide spaces that are free of distractions so occupants can focus on their task at hand. This means making sure ceiling air vents do not rattle, equipment does not clang, vacuums are not humming and hammers are not banging away.

FM teams should think of themselves as guests in their occupants' environment, where respect for their audio privacy is paramount. Off-hour cleaning is a good way to help deliver a distraction-free environment. When that is not possible, and cleaning and repairs need to be done in occupied areas, make every effort to notify occupants in advance and accommodate their needs.

Alarms are another big source of noise pollution. Preventive maintenance can help minimize the chances of alarms going off. Proactively look for signs of failing electrical equipment. Take regular readings during daily rounds to identify potential issues and schedule fixes before they become problems.

Touch: Smooth is serene

Nothing says "yuck" more than touching an elevator button, desk or countertop and coming away with a sticky, dirty substance on your fingers. Not only does it repel people, it can make them feel uncomfortable in a facility, sometimes to the point of avoiding certain areas. Frequent and proactive cleaning and dusting are a must, because trying to catch up after the fact will only leave teams falling behind.

COVID-19 made people ultra-aware of keeping surfaces clean. Custodial organizations are using high-level disinfectants on high-touch areas. While this is good for maintaining healthy environments, it can also create residue that feels strange to the touch. To avoid this, follow-up the disinfectant with another lower-level one that smooths out the surface and feels clean.

To alleviate concerns and help people to feel more comfortable, particularly as they return to offices, shops, entertainment facilities and colleges, keep hand wipes at the ready. Have them available at building and room entrances so people can grab and wipe door handles, buttons, café tables and other surfaces.

Another way to comfort commercial space occupants is to put door hangers on every office door that say "Please Disinfect" on one side, and "Office is Clean" on the other. Employees leaving the room can flip it to the disinfect side. When they return, they will see "Office is Clean" and feel better using the area.

Taste: Literal and Metaphorical

People are very particular about their food and want the food to taste like they expect — not like the equipment it was cooked in, the smell lingering in the air or the last dish that was heated in microwave.

Properly maintained equipment, including air exchanges, are important here. Recycling fresh air pulls out occupant-generated smells that can affect how food tastes. Improper or infrequent cleaning of food preparation and storage equipment can also affect how food tastes. Paying attention to the use of food areas makes a difference in the overall daily experience.

When people visit a facility, their senses will give them a gut feel about how they perceive an organization. And metaphorically speaking, FMs do not want them to leave with a bad taste in their mouth.

By keeping customers' senses top of mind, FM teams can give occupants an experience that keeps them coming back, working productively and enjoying their environment. FMJ

John Harris *is the director of facilities management at UG2. He is a highly accomplished FM leader with more than 20 years of industry expertise. He has extensive experience overseeing facilities and campuses, and ensuring pristine and healthy environments for employees, tenants, visitors, staff and students. Prior to UG2, Harris served in general manager and director of facilities positions for Sodexo, where he was responsible for the operation of maintenance, custodial, grounds, transportation and life safety functions.*

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A Global Focus

IFMA BENCHMARKING

BY NICKALOS ROCHA

While IFMA has long been known for producing benchmarking reports for the facility management industry, these reports have been based on North American data. Now, as IFMA underscores its position as the most trusted global provider of benchmarking metrics for the facility management and wider built environment industries, focus has shifted to making these same high-quality reports applicable to regions around the world.

Authentic data specific to countries, business sectors and facility types is extremely important to FMs who want to take the guesswork out of decision making. As IFMA expands research efforts globally — covering more regions and exploring topics of the highest priority to those communities — acquiring facts, figures, practices and opinions of FM professionals via benchmarking and research surveys is essential.

Participating in IFMA studies helps to advance the industry, elevating FM influence in improving and optimizing the built environment. IFMA does not charge for survey participation; and executive summaries of published reports are provided free to IFMA full members. Product webinars are also provided free to full members with each launch of a benchmarking or research project. IFMA sells these reports in the online bookstore to help recoup the investment in product development.

> *"Taking a survey doesn't cost anything but time; and the payback of usable information to help forward FM objectives is inestimable."*
>
> — Don Gilpin, IFMA President and CEO

O&M GLOBALLY

Benchmarking operations and maintenance (O&M) on a broader, global scale is just the beginning of IFMA's efforts to expand availability of this essential resource for FM and the wider built environment. A range of regional reports will be available by the end of 2022, with South and Central America being reviewed for possible future inclusion.

In March, IFMA published its first-ever Asia Operations and Maintenance Benchmarking Report focused on maintenance, janitorial, utilities and sustainability. Thanks to survey participation from IFMA members throughout Asia — including Australia, China, Hong Kong, India, Philippines, Singapore, Sri Lanka and Vietnam — the report provides detailed performance metrics for total cost per square foot across several demographic factors. Of note, the report shows that space allocations per occupant — an important factor in evaluating worker productivity and environmental conditions — are nearly 70 percent less in Asia compared to North America.

An O&M benchmarking project is underway in the Middle East, and IFMA will soon begin a new O&M study in Africa.

A new North America O&M report is scheduled to be published in late May 2022. This report includes extensive discussion along with new FM-related metrics in response to COVID-19, including janitorial/cleaning best practices, occupancy rate changes, expectations for the future use of remote working, and facility operational changes (e.g., metrics related to MERV filter rating adjustments, UV lights, physical entry and more).

A new qualitative North America O&M report will also be published in early summer 2022. This report focuses on the processes FMs use to support their jobs. IFMA's O&M flagship report focuses on dollars per square foot, but this qualitative report provides insights as to what peers are doing to execute critical responsibilities.

FM TOOLS

IFMA develops FM-based tools to provide data analytics for the industry. Current and forthcoming tools will provide insight into:

- Global FM compensation and benefits;
- Space planning; and
- Global operations and maintenance.

A majority of these tools use a Tableau interface with multiple dashboards. Options include:

- Resource Advantage Platform resource tool, which is auto generated based on a customized query;
- Power User subscription-based tool utilizing the Tableau interface; and
- Customized queries are also supported.

ENHANCEMENTS

The past two years have been challenging across multiple industries — including FM. As a result, IFMA is improving its network of international FMs and increasing participation rates in targeted benchmarking and research studies. Specific to benchmarking studies, an emphasis is needed on operational and targeted data for FMs to support their key annual efforts.

Sustainability has received significant attention throughout the past year, warranting an updated examination of how best to measure O&M efforts specific to sustainability. IFMA will explore how sustainable processes in FM are being measured and what new sustainability benchmarks will be needed in the future.

As focus expands to international O&M efforts, IFMA welcomes involvement from interested members, individuals and companies. Much has been discovered about future needs, partnerships and desired data from a

practitioner's perspective over the last two years. Diverse regions result in different models, which need to be indexed for comparison purposes to equalize collected data.

Some of the limitations encountered from international O&M projects will be addressed when initiating future efforts. Given that a majority of limitations are related to governmental control/oversight, existing contracts and assumptions of proprietary information being sought, this will require information sharing and education. The publication of international O&M reports will show the type of information that benefits the FM practitioner and market. These first reports are just a glimpse at what could be possible with increased participation and partnerships.

WHAT'S TO COME?

IFMA benchmarking has evolved for more than 40 years, yet one constant has never wavered – benchmarking for operations and maintenance. Moving forward, IFMA will begin to examine FM-related benchmarking in several new areas. These areas will help the association build out supporting networks globally, which benefits the FM industry.

These new areas include:

- FM succession planning (multi-year study);
- Sustainability (O&M focus and non-O&M focus);
- Life cycle; and
- Workplace.

A new study examining an O&M approach in the world's 10 largest cities is also underway and will support the development of new data for targeted analysis at the city level.

IFMA's last space planning benchmark report was completed in July 2020 soon after the onset of the pandemic. Prior to the launch of this report, IFMA developed a brief COVID-19 survey to gain detailed insights. IFMA is examining the possibility of conducting an update to this study and building a model for which this type of study is conducted on a regular basis.

TYPES OF STUDIES:

IFMA will continue to support O&M benchmark reports, which benefit FM practitioners, while incorporating target benchmarks from the commercial real estate industry. Some of these potential benchmarks are specific to financial indicators:

- Lease type and costs;
- Cost of operations;
- Cost of providing the fixed asset;
- Occupancy cost;
- Total annual facility cost; and
- SLA insights.

These benchmarks will be built into global O&M benchmark studies in future updates.

IFMA will also continue to support health care O&M updates.

Space planning continues to be a critical topic, and COVID-19's impact within the workplace has heightened what defines the ideal hybrid workplace of the future. IFMA's targeted space planning benchmark studies will offer a glimpse into the office of the future. The use of space has been and will remain fluid, so how do FMs determine what the remote workspace will look like in five years?

IFMA is about to begin a return-to-office study incorporating a unique methodology. This study uses a quarterly engagement component with the public, resulting in the creation of quarterly briefs that will share the results. A final report will be published in a year consolidating the data. This effort will examine lessons learned from participants.

Sustainability has been elevated to a critical issue based on climate change research. IFMA is examining multiple options to support new insights for IFMA members and the open market. The output could be new reports on topics such net zero or the circular economy. Sustainability benchmarking has long been a component of IFMA O&M reports. Given the significant focus on sustainability, IFMA will evaluate what new metrics are important to FMs. Based on the most recent O&M benchmark studies, IFMA recognizes that not all parts of the world have the same sustainability interests. Also, while government support on sustainability varies, some businesses have still long been supportive. One goal is to develop each region with key products used by FMs, such as:

- O&M
- Compensation and benefits
- Space planning
- Life cycle cost
- Credential/certificate return on investment
- Technology
- FM succession planning tool kit

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- Sponsor a current or upcoming benchmarking report or practitioner research publication;
- Support the IFMA Foundation. FMJ

Nickalos (Nick) A. Rocha, MPA *is IFMA's director of benchmarking, where he provides quality global (O&M) benchmark data and research for FMs and the wider built environment. For more than 30 years, he has led and supported benchmarking and research products within multiple business sectors. To date, IFMA's O&M benchmark reports have garnered more participants and increased revenue. His current projects focus on FM technology practices, FM succession planning, global FM trends, return to office lessons learned and best practices.*

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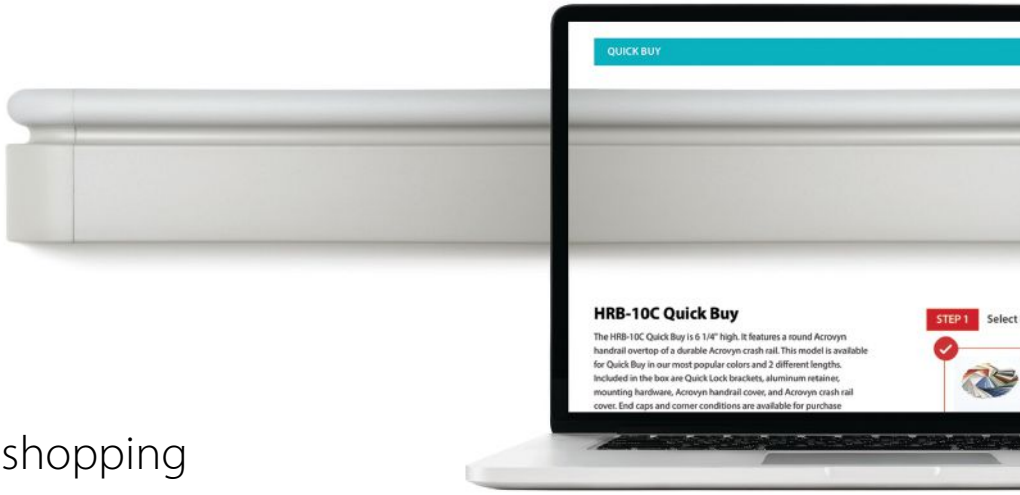

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Construction Specialties

AI ON THE PLANT FLOOR

What FMs need to know

BY MARK LUNDE

Automation is a dirty word in the lexicon of the American worker that may top all others. Long before the launch of "The Terminator" franchise or Isaac Asimov's "Bicentennial Man," automation had been a boogeyman for frontline workers across numerous industries — not just a sci-fi plot device, but a real threat to jobs and livelihoods.

Workers are right to be leery of new technologies designed to help businesses increase productivity and reduce overhead. Recent research substantiates concerns that automation can cost jobs and cut worker compensation, particularly within certain sectors. This inherent conflict cannot be brushed aside. After all, any benefits a company gains through the improved efficiency of operations do not trickle down to former employees.

Still, there are advantages to automation even for the frontline worker. On the plant floor, for instance, artificial intelligence (AI) has the sort of computing power that exists far beyond the reach of humans — including access to, and the ability to analyze, terabytes of data and information quickly. When this power is paired with human-specific skills that computers cannot replace — dexterity and creativity — the outcome is powerful.

Take computer vision, for example. It is an exciting field of AI that, when trained properly, can actually interpret the world visually. Imagine that a field technician is able to take a short video or a photo of a factory-floor problem, like a piece of equipment needing repair or a defective device. With an enterprise solution powered by computer vision, the AI can then scan the database for information, replying with feedback of probable causes and possible solutions. This process occurs in an instant, allowing the technician to focus on selecting one or more action steps based on the nuances of the situation (which requires creativity) and executing necessary fixes (which requires dexterity).

That is just one example of AI improving efficiency and worker productivity on the plant floor. However, AI's biggest asset to frontline and plant floor workers is its ability to remove some of the guesswork out of various processes. For a lot of FM teams , there is a great deal of on-the-job training that often involves time spent transferring tribal knowledge from team member to team member. Additionally, there can be times when the correct process is not clear at the outset or communicated accurately. In those circumstances, it would be helpful for managers and employees to have an advanced system to help guide their workflow processes — perhaps a type of technology to even automate workflow.

Due to advances in AI technology on the plant floor, particularly the use of predictive analytics, both FMs and plant floor employees can have access to centralized data and insights. Not only does AI point to the exact types of information needed to guide decision making, but it can assist in removing the guesswork behind selecting the next steps. Time is one of the most valuable assets on the plant floor for FMs.

With man and machine working in tandem, companies now have the capabilities to maximize productivity. But one does not truly function without the other. Even given the latest technologies, allowing AI to proliferate without appropriate guardrails in manufacturing environments would be unreasonable and dangerous. AI applications will have to be hyperspecific for years to come, and they will require worker oversight, intervention and operation. Man and machine need each other — and manufacturing businesses still need both.

Productivity aside, another major area of advancement in AI on the plant floor is in the area of knowledge transfer. The old methodologies of knowledge management on the plant floors likely will not completely disappear anytime soon — think of whiteboards, team huddles, paper checklists, corporate television screens, emails between managers and coworkers, and handover during shift change. With the help of AI, that entire process can be simplified and streamlined.

Just as there is a type of AI that can be trained to understand the visual world, there is another that can be trained to understand and interpret human language. Natural language processing (NLP) is an AI that helps computers decipher human language as it is either written or spoken. While the technology has been around for decades and has roots in linguistics, the proliferation of true AI has made the use of NLP common practice in knowledge transfer solutions.

One of the most common examples of NLP in action is the chatbot, particularly in customer service. Modern versions expand on those built off of scripts to actually learn from each interaction. Chatbots powered by NLP should closely reflect the experience of talking with an actual human.

On the plant floor, however, AI-powered enterprise solutions can have a similar, chatbot-like approach to simplifying knowledge transfer. One of the biggest issues with the old ways of transferring knowledge from employee to employee is a lack of understanding of tribal or institutional knowledge. Sometimes it can seem like two shifts speak an entirely different language. When a communication solution uses NLP, it can learn from the company's specific vocabulary and continuously train itself based on its given input. This allows teams to capture more and better information through voice, which is then visible to the FM who can get a full scope of the workflow and what is happening on the plant floor or in the field. Similarly, NLP communication solutions can cut the time needed to communicate effectively and accurately, which saves time between shift change and while completing a task.

FMs are highly experienced in their given fields and are efficient and effective problem solvers. FMs will be faced with a multitude of problems a day, and the buck stops with them. The stakes are usually very high, so thinking decisively and making decisions quickly sets FMs apart from other business leaders.

What if FMs could accurately predict a problem before it happened? What if they could forecast when a piece of machinery would break down? Thanks to advances in enterprise maintenance solutions powered by AI, they can do just that. FMs can use AI software to improve operational decision making by using predictive analytics. Imagine the possibilities of being able to incorporate predictive AI analytics into everyday processes. The FM would be able to schedule downtime to fix problems before they become emergencies. They would be able to forecast their inventory so they never run out of the essential parts.

While there will always be a need for on-the-fly thinking and creative problem solving by FMs, they should also take advantage of the technology available to them to strengthen their operations. Humans are capable of dexterity and creativity in a way that AI will never be able to replicate. Still, the willingness to use all of the tools in their arsenal is what sets a good leader apart from a great one.

Every technological breakthrough may feel like a threat to frontline workers, but new technology tends to take hold in most walks of life. Employees should continue to monitor the effects and implications of AI and other technologies, staying on the leading edge of new developments in order to learn how to make changes work for them. In the end, the companies and workers that embrace AI systematically will hold an enormous advantage over those who do not as the manufacturing industry hurtles into the future. FMJ

Mark Lunde *is CEO of Genba. For the past 20 years, Lunde has led manufacturing and industrial operating companies. He has focused on the deck plate worker from his earliest days as a submarine officer until today running factories.*

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MY FACILITY

>>>>>>>>>>> DEREK BACIGAL

Fairmont Orchid
South Kohala, Hawaii

With breathtaking views and luxury amenities, the Fairmont Orchid in South Kohala, Hawaii is a popular destination in the Pacific Ocean. IFMA member Derek Bacigal talks about his job and FM in an isolated paradise. Bacigal was also a recipient of IFMA's Forty Under 40 FMs in 2020 and is the young professional chair of the Americas.

Photos Courtesy of Fairmont Orchid

FMJ: Tell us about yourself and how you got into FM.

BACIGAL: I'm originally from Lansing, Michigan, USA. In high school I took all my electives in drafting, architectural education and took off-site classes at our local community college building trades program. In 2010, I started my path toward facility management while studying architecture in Michigan. The economic collapse hit hard in my local area at the time with many friends and family losing their jobs and assets. I asked myself who is still working in these poor financial times and who is making good money doing it as buildings were no longer being built. It was the operators. I began studying FM at Ferris State University where I volunteered for several nonprofits helping with their FM needs and served in IFMA's Ferris State Student Chapter.

After graduating magna cum laude, I started working for CBRE as an assistant FM at Dow Global Headquarters in Michigan. Knowing I had an inner need to travel and a desire to work in a tropical location, I joined Hyatt Hotels at their largest property, Hyatt Regency Chicago. Later I was internally recruited to San Francisco, California, USA, where I became the project manager of an US$80 million property improvement renovation at Hyatt Regency San Francisco Airport. During this time, I studied at Cornell University in system design and project leadership. From there, I became chief engineer for the U.S. Army at Hale Koa Hotel at Waikiki in Hawaii. Soon, I became the director of engineering for this 72-acre, 818 guestroom resort that runs at 99.8 percent occupancy annually.

With my skills in programming, design, construction and operations I developed strategic and tactical asset management plans. I secured funding and managed in house operations, design and construction for more than 200 construction contracts valued around US$150 million. Through my time here I won many awards for my FM, construction, leadership and sustainability efforts. I also served on the IFMA Hawaii board of directors, led the academic advisory board for the University of Hawaii FM program, Young IFMA Chair of Americas and director at large of the Hawaii Lodging and Tourism association – Engineering Advisory Council. During these years I also earned several credentials and studied strategic business management and leadership at Michigan State University.

I traveled the world helping the Army with their other Armed Forces Recreation Centers and attended and hosted several IFMA events for students and young professionals while speaking on panels at IFMA events. I also serve on the IFMA Americas Advisory Board representing the young professionals and taught at UH's FM program. I now serve as the director of engineering at the Fairmont Orchid in the luxury community of Mauna Lani in South Kohala.

FMJ: What is day-to-day life like at the Fairmont Orchid?

BACIGAL: My day starts early by leading the department through a variety of stretches getting them ready for the day. I oversee facility operations, landscaping, aquatics, engineering project and asset management for 32 acres of oceanfront property. My team consists of project managers, FMs and a variety of unionized trades.

Every day is a new adventure in the hospitality world, where you can find yourself on a beach, in a ceiling, collaborating on an international call in the C-suite or working in a sanitary lift station. That is what makes it fun.

MY FACILITY

>>>>>>>>>> DEREK BACIGAL

Fairmont Orchid
South Kohala, Hawaii

Our engineering team ensures quality in our work and product. In the early morning we work on projects and get our contractors lined up for their fieldwork, followed by an operations meeting between leaders. The Fairmont Orchid has about 90 leaders and 600 employees who deliver luxury services every day. We host various travel and business groups with an average length of stay of around six days. We have indoor and outdoor meeting space where we host Ironman events, medicals groups, academic groups, scientists as well as tourists.

The Fairmont Orchid opened in 1990 and features 540 guest rooms/suites, seven food and beverage outlets, The Spa without Walls, a tennis facility, more than 100,000 square feet of meeting space and a variety of recreational services. We wear many hats juggling operations, guest requests, strategic planning, managing service and construction contracts, and problem solving.

FMJ: What makes the Fairmont Orchid unique and what kind of unique challenges do you face?

BACIGAL: We deliver luxury hospitality on the remote Kohala Coast of the Big Island of Hawaii. This remoteness continually provides supplier and logistical issues with resources critical for operations. Coupled with the high housing costs and lack of technical education, there is an even greater challenge finding competent workers and contractors to meet our everyday needs. Oftentimes we must fly in contractors from outer islands or the U.S. mainland to accomplish our goals. FM on the Big Island and within Mauna Lani is also different from the physical place as majority of the ground is igneous rock (dried lava). The Big Island has three active volcanoes, which create consistent earthquakes and opportunities for tsunamis along with five months of hurricane season. These factors alone make our business continuity and emergency management planning a priority as we must react to protect our people and place. Other Hawaiian challenges include gases emitted by volcanoes which affect indoor and outdoor air quality, often resulting in increased filter changes in air handling units. With consistent hot weather along the coast, water quality management is important in treating a variety of water systems. We also have special operational and project requirements associated with preserving marine life in the ocean making sustainable operations paramount for the people and place.

FMJ: How much space do you manage and how is it used?

BACIGAL: We have 2 million square feet across a dozen buildings across 32 acres. Much of the property is broken up into front–of and back-of-house spaces creating a seamless Hawaiian luxury experience for the guest. Managing sights, sounds and smells is paramount in executing operations and maintaining the guest experience in a resort environment. We have a variety of spaces from the spa to tennis, to luxury lounges, restaurants, meeting spaces, offices, shops, fitness facility, aquatics facility, gardens and outdoor recreation spaces.

FMJ: Tell us about your FM team.

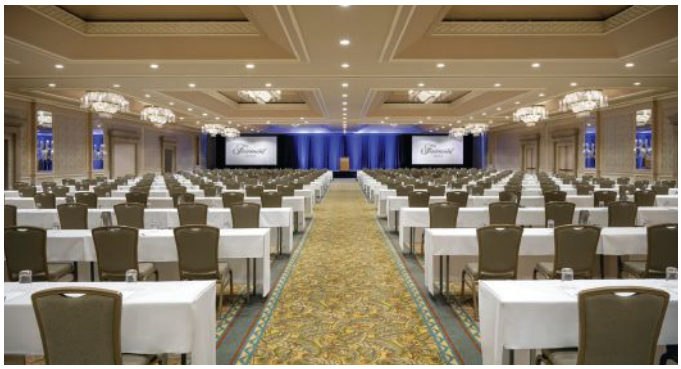
BACIGAL: Our FM team is a mixed culture of hard-working tenured staff on five continents, all of which share the Aloha spirt. Our team is skilled in maintenance, operations and landscaping all performed in house.

FMJ: How does being in Hawaii change FM strategies?

BACIGAL: The UV rays are very high causing degradation on surfaces of the built environment and limits working in the direct heat for extended durations in the middle of the day. The salty air also contributes to extreme corrosion on metal surfaces, so our team is well-versed in coatings to reduce the consistent degradation of surfaces and structural complements. We are also prone to high winds as they push through the valley at certain times in the month. Contracting work is difficult as there are few local options. Sometimes we must fly people in from other islands or the mainland. This makes contract competition and solicitation for multiple bids difficult as the Hawaiian construction industry is busy and competitive.

FMJ: What are some challenges you face that are common across the FM industry?

BACIGAL: Like other organizations, we share the same challenges of lack of trade workers, FM professionals and supply chain issues. Inflation is presenting its own challenges as well. We continue to compete for resources.



FMJ: How is FM changing for young professionals and how are young professionals changing the industry?

BACIGAL: FM is becoming more important than ever with increasing regulations on the built environment. There are a variety of roles for today's young professionals (YPs) all of which could send their career in different directions such as working for an owner, vendor, service provider or management company. As the older generation continues to retire more big FM roles become available. YPs are changing the industry through their value for flexible workspaces and greater adoption of technology. These values will continue to shape and change the built environment for the occupants and operators as we know it. Today's YPs are planning and building the workplace of tomorrow.

FMJ: What do you like best about what you do?

BACIGAL: Every day is different, and I have had the opportunity to lead all aspects of our FM program. This allows me to continually learn, create strategic change, and ensure life, health, safety and Aloha are present within our built environment. FMJ

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Facility Managers: Is technology making your job easier or harder?

BY GENA HAYES

Facility managers are constantly under pressure to meet daunting expectations:

- keep the facility running
- stay on budget
- know when assets will fail
- repair or replace them before they fail
- propose and justify a budget for repairs and replacements

...and do all of this without interrupting the use of the facility. In an effort to better manage these responsibilities, facilities managers have been trying to implement various digital tools over the past decades.

Are you managing your technology, or are you a slave to it?

Depending on the complexity of campuses, budgets, and staffing allowances, facility managers may be using a combination of PDFs, paper drawings, digital CAD drawings, GIS shapefiles and other systems. But do they work well together, or are they all siloed? Do they require dedicated professional staff, or can your full team use and benefit from them? Does your team trust the information, or do they have to spend time double and triple checking that they have the most current information?

Without trusting and benefiting from these systems (and with overwhelming workloads), FM are often tempted to stick to the status quo and focus on wrench time instead of computer training. Who can blame them? It's the responsibility of software companies to create a product that genuinely meets the needs of their users; it shouldn't be the responsibility of the users to overhaul their processes and lose valuable time to meet the requirements of expensive software, especially if the software doesn't make their job easier.

Is it time for change?

Digital tools have been around for decades. If your software isn't making your life easier, perhaps it's time to take another look at the new options and see if there is something different and better.

Consider these questions when evaluating current or potential solutions:

First and foremost — **does it make your job easier?**

- Is it difficult to manage? Does it require a dedicated or specialized administrator?
- Is it difficult to use? Will you have to fight your staff to implement it?
- Does it require duplicate work?
- Do you have to go into the field, make notes, then come back and enter your notes?
- Do you have to enter something in more than one system because they don't work together?

Is it an expense or an investment?

- Are you confident in the financial benefits it provides? Is it providing a significant ROI? Or any ROI?
- Does it make you more efficient? Are you able to take on more projects because of it or reduce your reactive maintenance?
- Would your team be more productive if you put that money towards staffing instead?

And finally: are you happy with it?

- Overall, can you see a positive difference in your operation with the tool compared to without?
- Are you glad you have it?
- Does your staff use it and appreciate what it does?

Don't underestimate the significance of your staff's opinion. It's a worker's market right now, and it doesn't take much for an employee to decide to jump ship — don't let your technology be the reason someone leaves.

You should be managing your facility, not your software.

If you're finding that your technology is making your job harder, it's time to take a look at what else is available. Today's technology allows you to access the entire internet from anywhere, and your facility technology should be just as powerful.

It should be saving you time, money, and stress. You should be able to access your facility data from anywhere in real-time, not be tied to a plan room or desk. Your contractors should have quick, trustworthy access during design and construction. You should be confident in your software's ROI. You and your workers should find it helpful and easy to use.

Gena Hayes *is the marketing director for InfraMappa and has been helping companies with digital transformation since 2013. She is based in Huntsville, Alabama, USA.*

InfraMappa is an intuitive, interactive Saas solution that meets the needs of facility management teams looking to modernize their processes and work more efficiently without causing unnecessary distractions. InfraMappa takes on the burden of loading your data by organizing and digitizing your plan room to capture legacy data, verifies captured data and within weeks, delivers your user-friendly interactive infrastructure map with no license limitations. In addition to an interactive map, the other relevant data (such as materials used, date of installation and original drawings) is accessible in context. Predictive budget reports are available at the click of a button. Contact us to see for yourself.

APPROACHING IAQ

The Maintenance Perspective

BY DAVID AUTON

Building occupants are increasingly focused on indoor air quality (IAQ) management and their level of safety as their return to indoor spaces. As facility management teams are tasked with demonstrating safe, adequate measures and solutions are in place, they are identifying where and how to adjust their building processes and procedures to accommodate new expectations for IAQ. With greater awareness of indoor health risks, returning to buildings must include a level of confidence that these spaces are safe for occupancy.

A worker's health is critical to well-being, morale and overall performance. To have a safe and healthy workplace, many facilities will require changes and upgrades. What efforts will be necessary? FMs should focus on several solutions and considerations regarding new expectations for indoor air quality.

Daily Process Checks

Walking into a building and smelling damp or otherwise unpleasant smells is cause for concern. At that point, how can an organization confirm the air quality in the building is safe? What should be done to maintain a safe building? There are some basic air quality prevention checks and instruments to utilize to maintain a safe workspace and limit the transfer of mold spores and other contaminants.

Daily process checks (also known as rounds) are routine inspections of the air management systems ensuring all equipment is operating as intended and noting any adjustments that may be needed. Daily process checks should include observations of zone evaluations, equipment inspections and follow-up on observations.

Zone Evaluations

It is important to walk different areas of the facility. A typical route check should be walkable in about an hour or longer depending on the size of the facility. Early morning routes ensure adequate heating of the areas, while mid-afternoon routes allow for proper cooling, especially for south-facing and areas with large windows. While walking, consider hot or cold zones or drafts that could indicate inadequate circulation or a component failure such as a damper stuck open or closed. Condensation around air vents or water stains on ceiling tiles suggests inadequate humidity control or a coil leak.

Listen for unexpected noises such as belts squeaking or excessive vibration. Something as simple as a rubber smell could indicate a slipping belt. A low-frequency vibration should be indicative of air balance concerns.

When walking around the building, check for air differentials between the office area and compartmental equipment room. If a significant pressure differential exists, the unit is probably overdriven. This could be due to cooling demand or other issues and will need to be investigated.

Equipment inspections

When inspecting the equipment, look for water leaks and condensate accumulation. Visually observe the drip pans to make sure they are not backing up. The pans should be in good working order with no drain occlusions or mold development. Condensate may be present in warmer climates, but ensure the moisture is not from coil leaks.

Pollutant Sources Impacting IAQ Management

IAQ is impacted by three specific categories of contamination: biological, chemical and particles. Improving the ventilation and building care can assist in preventing IAQ problems. The goal of IAQ management should be to reduce the impact and exposure of these contaminants.

- ***Biological contaminants*** refer to bacteria, viruses, fungi, pollen, humidity and similar pollutants. These pollutants cause most allergic responses in occupants.

- ***Chemical contaminants*** could include off gassing of new carpet or furniture, cleaning products or chemicals. This could also include combustion gases being present, such as carbon monoxide (think natural gas powered in-line heating units).

- ***Particles*** are substances that are capable of being projected into the air. Many particles are too small to be visible, but still present. New or ongoing construction could increase dust particles. There can also be particle dispersion for normal activities like copy machines, cooling fans, etc.

IAQ Testing

While airborne particles are a concern, there is also a significant concern for mold growth. As building occupancy increases, energy reduction measures should be implemented to reduce air exchange and conditioning in the unoccupied spaces. As a result, concern for mold has increased, due to indoor sweating, inadequate humidity control and air exchange reductions.

An obvious indicator of concern would be damp or wet smells observed in the facility. This would suggest the potential for mold spore growth existing. In these cases, confidence in the air quality and building safety should be a concern and indoor air quality testing should be conducted.

The most common method of IAQ testing is to do swab testing of areas suspected of mold development. This includes cooling coils, valve dampers, vent grills, etc. If the condition exists for the development of viable mold spores, one should be aware that these spores can travel through the air transfer system to affect other locations. As such, detection of mold should warrant more comprehensive evaluations and a program to ensure the building system is acceptable.

When mold is discovered, remediation plans must be developed and implemented. Some solutions may include a comprehensive disinfecting program. Many office buildings can benefit from technology for vent cleaning, aerosol disinfecting solutions and treatment programs to assist in their remediation efforts.

IAQ Monitoring

After remediation has been deemed successful, air sampling and monitoring should be established to maintain a safe environment. Air sampling solutions and air quality dashboards are available from multiple vendors. These can be installed at facilities in view of occupants to instill confidence and provide a monitoring solution for maintaining IAQ.

In-duct air sampling units are available that can be installed in return air ducts near the air handling system for sampling levels of humidity and CO_2. Additionally, building location sensors can be installed to detect occupancy levels and foot traffic. These can be used to adjust airflow and turnover based on occupancy levels.

Indoor air sampling units with cartridge type-sampling components can collect air samples and can be analyzed for the presence of viruses.

Most devices accessible today can connect to the cloud via the building's IP network or, in specific circumstances, a proprietary hotspot. These all send data to the cloud and typically require a subscription service and the vendor application software for viewing. Some systems can also use BACNet or Modbus (common communication protocols for building automation) to communicate with building automation systems (BAS).

A variety of solutions should be investigated to best suit the facility dynamics, occupancy levels and support staff. These monitoring options can be used to enhance the fundamental components of good air quality and should be part of the comprehensive FM program.

Maintenance Frequency & Additional Job Steps to Consider

With an increased expectation for IAQ, more frequent verification of HVAC system performance may be necessary. If continuous monitoring systems are not in place, the frequency of basic operational checks should be increased.

When reviewing the maintenance plan for the HAVC equipment, be sure that job steps include addressing components affecting the air quality. Some examples include:

- Ducting and enclosure corrosion typically indicates a source of dampness and potential for entry. Contaminants may enter the system downstream of the filtration. Also, check for missing screws and weather-stripping. Latches and doors should fit securely. Compartments should be kept clean; vacuum out as needed to reduce particulates being picked up and circulated.
- Operational checks should be conducted for excessive vibration. Increased filter resistance affects air balance and could produce harmonic vibrations across the system.
- Coils condition for cleanliness to reduce resistance and increase the conductivity and efficiency. Coil cleaning should include brushing, blowing, vacuuming and in some cases, pressure washing. Be sure to use only approved cleaners; incorrect cleaners can contribute to chemical contamination of circulating air. Coil leaks will contribute to moisture in the system as well as energy and water loss.
- Humidifier coils should be in good order with no mold growth. Steam coils and spray nozzles should be cleaned and inspected. Any corrosion should be investigated and remediated.
- Fans can accumulate debris. There are typically multiple fans in a system (supply, return, booster, make-up air, active valve boxes, etc.). Debris on the fan blades should be removed periodically.
- Condensate pans and catch basins should be clean with properly functioning drain lines. Disinfecting tablets or blocks should be present to eliminate mold spore development.
- If UV lights are installed, check the bulbs for proper output and operation. Ideally, UV lights are installed near the coils where most moisture accumulates but may also be installed in the duct chambers. Remember to wear proper eye protection and take appropriate precautions.

Disinfecting the Air Before Circulation

Air disinfection can be achieved using UV-C or similar disinfecting chambers inside the air ducts where passing air gets sanitized. This often requires an upgrade or modification to the ductwork near the output of the air system, ensuring the air being distributed is disinfected. UV-C solutions can be mounted to high ceilings where line-of-sight is managed for the occupants. This can be a minimally invasive solution for larger areas.

Conclusion

IAQ solutions should be sustainable and based on the building occupancy needs. Occupied building air systems needs to be able to provide the IAQ that occupants expect. FM teams must meet today's essential air quality standards and regulations as organizations increase building occupancy. Organizations and FMs should continue to educate themselves on the latest technology available and anticipate future occupancy needs. FMJ

David Auton, *senior director of engineering and maintenance, is on the C&W Services' Service Innovations & Optimization Team (SIOT). He has managed data analytic challenges, resolved systemic issues, worked through complex operations, and utilized Six Sigma DMAIC and reliability centered maintenance programs to improve facilities in his last five years with C&W Services. He has more than 30 years of facility services experience and has a thorough understanding of account management, stable control programs and resources to help clients achieve their goals. Auton is a Facility Management Professional™ (FMP®) and a member of the Society for Maintenance and Reliability Professionals (SMRP).*

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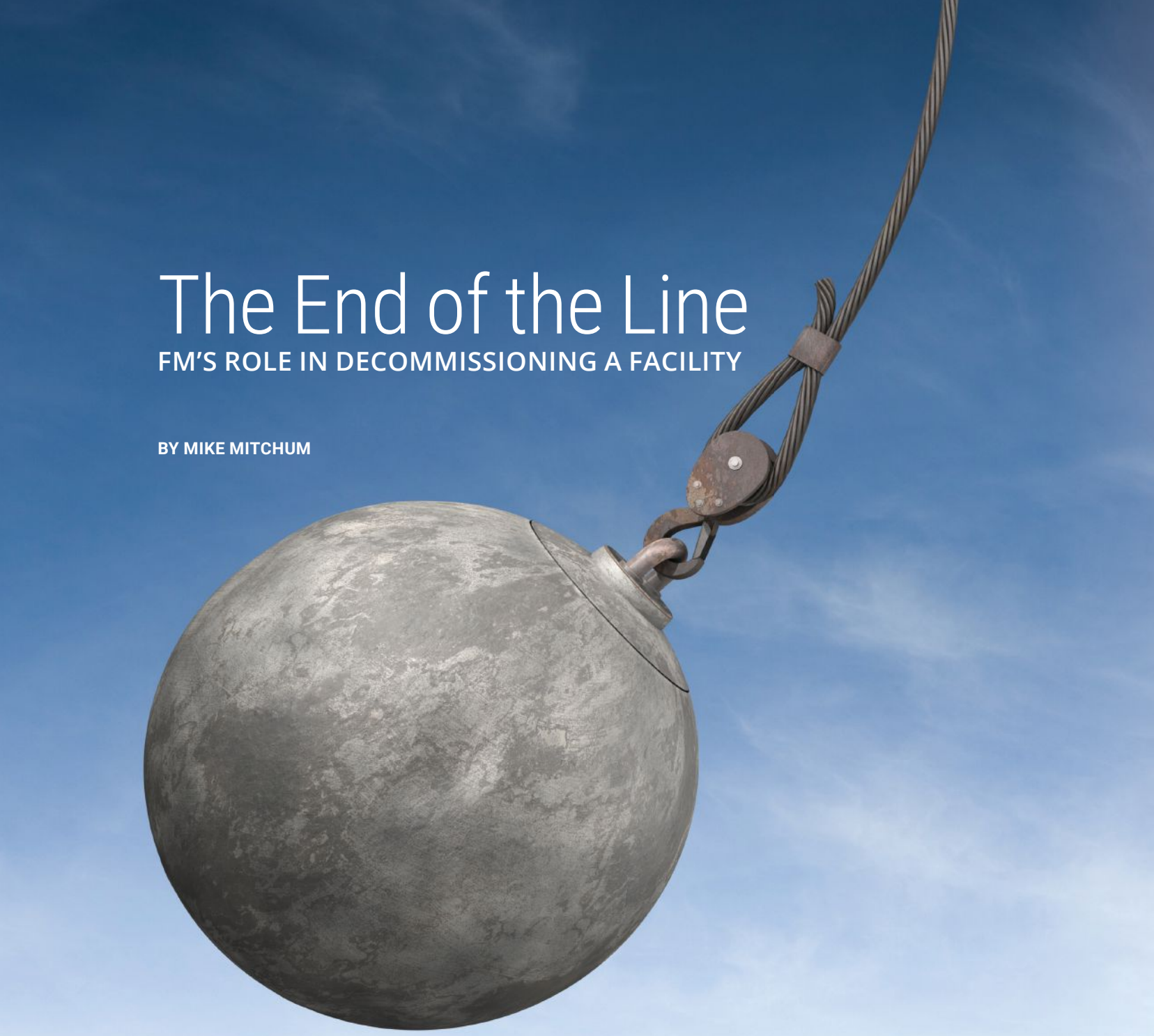


The End of the Line

FM'S ROLE IN DECOMMISSIONING A FACILITY

BY MIKE MITCHUM

Most of the time demolition projects are akin to watching paint dry, but bad things can happen very quickly if risk is not managed correctly. Management of change takes on an entirely new meaning on a project where the skyline is changing by the hour.

The safest and most cost-effective way to get a project through completion is to spend more time on planning upfront. Extra due diligence during the planning stage can also result in innovation.

Different people in different industries, or even different departments, use relative terms for the closure process, also referred to as demolition. In general, there are two types of demolition contractors:

1. **Commercial:** contractors that specialize in taking down buildings and houses in downtown settings outside of an industrial facility
2. **Industrial:** contractors that specialize in the partial or total removal of industrial facilities

Each project is unique and requires a custom technical plan to perform demolition safely and economically. While there are nuances between the different industries that may cause operational differences, most hazards, risks and procedures are similar.

Having a trust-yet-verify attitude, a well-defined plan and the selection of best-in-class contractors to perform the work is the proven means to achieve successful completion.

Lastly, an organization is encouraged to have a corporate end-state vision and communicate that vision in a manner contractors can understand. If an owner is not certain of the desired objective, how can a contractor be expected to submit a viable proposal?

It is also important to solicit input from all stakeholders on their end-state vision. There are too many instances in which corporate divisions voice competing goals after the contract is signed. This usually results in significant change orders. The divisions the contractor will typically meet and work with include procurement, engineering, maintenance, legal, real estate, investment recovery, operations and environmental.

OPTIONS ANALYSIS

Part of the due diligence process entails deciding which disposition option best satisfies the owner's objective. Some owners elect to sell the property to environmental liability transfer companies that might purchase the entire site, including the assets, then bond around the environmental liability.

Consequently, the environmental transfer company becomes responsible for the site clearance and final disposition. It is highly advised organizations thoroughly evaluate future liability with an environmental attorney before choosing this option.

Examples of other options include:

- **Scope and budget development** — The closure process does not start until the scope is framed and a budget is developed. A large part of every facility closure project is offsetting as much cost as possible through the strategic liquidation of surplus assets. Regardless of the strategy chosen, organizations need to be aware of the approximate value of the recyclable assets before going out for bids. Some organizations leave it up to the demolition contractor to determine that value during the bidding process. That equates to asking someone to hold your wallet without knowing what is in it. Companies learn to look at scrap and surplus as revenue that can be used to cover cost. Further, they should have a good idea of the value before going out for bids.
- **Asset retirement obligation (ARO) study** — In many cases, companies are required to have an ARO study performed to determine the financial obligation for returning the site to the original condition upon closure. This should have a matrix that includes inflation for the expected project start date.
- **Complete or partial site clearance** — Companies sometimes elect to perform the above-grade demolition first and wait to perform below-grade work/remediation when additional funds are available.
- **Retain property or sell/lease** — May require some partial demolition and remodeling. Interior demolition is normally selective and must be done under the guidance of an architect and professional engineer.
- **Repurposing** — Considers leaving and possibly remodeling certain structures to make property marketable for other applications.
- **Brownfield initiative** — Site redevelopment grants can help cover costs associated with clearing sites that meet brownfield criteria.

TYPES OF SERVICES

Each step of the process requires local, state and federal permits as needed to proceed.

Environmental

Phase I Environmental Site Assessment identifies any possibility the site might be contaminated.

Phase II Environmental Site Assessment is an "intrusive" investigation that collects original samples of soil, groundwater and/or building materials to quantify and analyze contaminants.

Phase III Environmental Site Assessments aim to delineate the physical extent of contamination based on recommendations made in Phase II assessments.

Decommissioning

- Preparation of the site for demolition – the selective disconnect of utilities and product purge
- Capturing or encapsulation of asbestos and lead paint
- Historical and environmental records retention, artifacts, etc.
- Hazardous and regulated materials surveys
- Procurement for deactivation

Deactivation

- Plant shut down
- Lock-out/tag-out
- Selective utility disconnects
- Procurement for decontamination/abatement

Decontamination/Abatement

(Can be considered Phase I demolition)

- Bringing the facility into environmental compliance
- Hazardous and regulated material abatement and disposal (including universal wastes)
- Subsurface remediation (either before or after the demolition)
- Procurement for demolition

Demolition

- Sometimes hazmat abatement occurs in this step
- Total or partial removal
- Recoup value of recyclable and salvage materials
- Site restoration

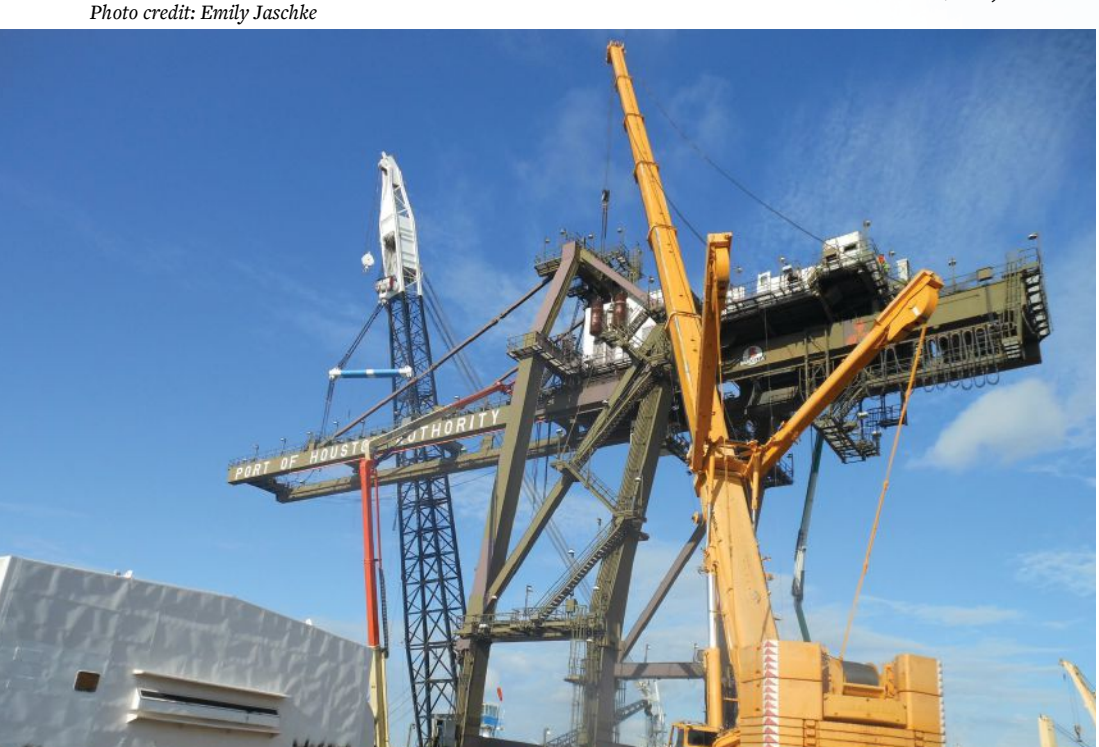
FRAMING THE SCOPE OF WORK

Once owners have chosen an option, the scope must be framed to clearly define what is and what is not included. Here are some do's and don'ts of scope development:

Do's

- Be clear, concise and eliminate gray areas.
- Define expectations and limitations.
- Provide relevant drawings that show weights, dimensions, elevations and metallurgy of major items.
- Provide locations where the contractor can find asset values that can be used to offset costs. While the ferrous scrap has a value, the nonferrous scrap can sometime reduce costs to close to zero, or even a net positive.
- Divide the project into sections that are defined on a color-coded plot plan. Require the proposals to be submitted by area. Not only will this help compare apples to apples during the bidding process but will provide definitive milestones for progress payments.
- Delineate boundaries of where the scope starts and stops on all sides.
- For purposes of bidding, include relevant assumptions to keep all contractors on an even keel.
- Clearly identify what will remain active and must be protected (i.e., live pipelines, process equipment, parking lots, roads, sewers, utilities, etc.).

Photo credit: Emily Jaschke



Don'ts

- Don't include too many finite details — the less significant items can be negotiated with the shortlist and eventually the successful bidder.
- Don't include too many drawings — if a contractor is inundated with unnecessary drawings there is a good chance critical information might be missed.
- Don't tell the contractor how to perform the work.
- Don't bury the scope and expectations in hundreds of pages of unnecessary documents. Both should be front and center.

CONTRACTOR SELECTION

Start by developing a list of trusted contractors. Whether prequalification services are used or performed in-house, remember junk in/junk out. It is important to verify the safety statistics. Other qualities to look for include, but are not limited to:

- Continuous employee training: mentoring is more the norm than the exception in demolition
- Adequate insurance and bonding capacity
- Contractual trickle-down policies of owner requirements to all subcontractor and suppliers
- A great safety record and HSE program
- Employee retention and experience
- Quantity and type of available company-owned equipment
- Financial stability and experience on similar projects in similar industries
- Experience to effectively use asset recovery to offset costs
- Commitment of the management and length of time in business
- Remember: A great company could have a mediocre crew or a mediocre company could have a great crew – evaluate both
- History of cost-saving innovations that have saved past clients' money
- Third-party waste stewardship protocols for scrap and other waste streams
- Litigation and record for regulatory compliance

Contracting Strategies

How many contracts should an owner issue?
Examples of common contracting strategies include:

- Lump sum — typically used in situations where the work can be visibly quantified
- Unit price — often used in situations where the work cannot be visibly quantified but can be billed in relevant units such as square foot, cubic yard, ton, etc.
- Time and material — situations where unit price or lump sum would not be appropriate
- Hybrid — all the above (on larger projects a hybrid strategy typically results in significant cost savings)

BIDDING PROCESS

- Provide the request for proposal and schedule the site visit to allow enough time for contractors to plan. If enough time is not allowed their costs will be loaded with unnecessary contingencies.
- Provide an accurate and complete hazardous material survey.
- Encourage innovations and alternate bids.
- Often the low bid is not the best bid. If a contractor finds a major mistake was made, they are going to request change orders over losing millions of dollars.
- Ask for a breakdown of quantities, grades of metals and values by area.
- Evaluate the schedule – is it realistic? Can the contractor move the quantities noted in the time allotted with the resources assigned?
- Develop a short list and negotiate with the contractor the best value proposition.
- Remember: If a contractor cannot explain how they plan to safely complete the work, they might not be the right choice.

TYPICAL PHASED WORK SEQUENCE

A phased approach to work performance is critical to managing schedule slippage. Using this approach, the work can start in multiple areas at the same time. In many cases, if work stoppage occurs in one area the crew can be moved to another area to avoid change orders associated with downtime. Examples include:

- **Mobilization by Discipline:**
  - Utility disconnect: electrical, gas, steam lines, water lines, sanitary and storm sewer lines, pressure air lines, tank vent lines, fiber optic lines, USTs, phone lines, etc.; followed by
  - Safe-out-hazard analysis and implementation of remedial measures, removal of combustible material, establishment of exclusion zone, issuance of necessary work permits, structural surveys, installation of barricades, both hard and soft, etc.; followed by
  - Removal of universal wastes; followed by
  - Purging and cleaning of lines and equipment; followed by
  - Hazardous and non-hazardous materials abatement; followed by
  - Removal of concrete to grade; followed by

- Removal of concrete below grade; followed by
- Removal or abandonment of below grade sewers and pipelines; followed by
- Site restoration

ASSET RECOVERY

Asset recovery is the process of recovering, reusing and recycling assets for the highest dollar possible. The more value a contractor credits from asset recovery, the less owners must come up with to have their work completed.

Organizations need to know the difference in value of the various metals and equipment at the facility. If something has value, even if only through landfill avoidance, it can be used to offset costs. While owners should not guarantee the presence, grades and quantities associated with value, it is beneficial to highlight this potential value to contractors.

In bidding, a contractor will evaluate the cost to satisfy all tasks associated with the scope of work including overhead and profit. They will then deduct the scrap and salvage credits to finalize their bid. If a contractor has a gross cost of US$1 million and a net salvage credit of US$800,000, owners can expect to be charged US$200,000 to have their work performed. Subsequently, if the cost is US$1 million and the credit is US$1.2 million, owners may expect to be paid US$200,000 for salvage rights to the work.

Put another way, if the contractor's composite cost to perform the work is US$350 per ton and the composite value is US$200 per ton, an owner could be expected to be charged US$150 per ton. If there are a lot of metal alloys or other asset salvage on the project and the composite cost is US$350 per ton, the composite value might reach US$8,000 per ton. The additional revenue could be used to pay for non-revenue producing tasks such as asbestos abatement and trash disposal.

The scrap market can be volatile, especially non-ferrous. Some contractors might not guarantee asset recovery credits over the entire course of a long project. Experienced contractors can coordinate with the recycling facilities to lock in value for negotiated periods of time. Hedging, as it is called, is an excellent tactic but has additional risks commensurate to the rewards.

If hedging is not a possibility, scrap prices can be tied into monthly indices such as COMEX, AMM, LME, etc. On projects with significant asset recovery credits, it might be advantageous for the organization to form a revenue sharing arrangement with the contractor. If set up properly this could yield significant additional revenue.

There is a saying in the demolition world, "Know what you have before you have it, because once you have it, it's yours." The following are more risks to avoid or manage:

- Establish a point of transfer of ownership for material leaving the jobsite. If a truck turns over en route to the recycling facility or scrap falls off the truck on the highway, who is responsible? If a worker at the recycling facility is injured handling scrap that might have come from the jobsite, who is responsible?
- The contractor should have formal agreements in place with scrap buyers, salvage buyers, landfills, trucking companies, subcontractors, etc., establishing limits of liability, indemnification language, insurance and remedial measures to protect the owner's interest.
- Product liability concerns: If the contractor sells an item of process equipment to an end-user and the item malfunctions, who is responsible? This risk can be mitigated by requiring a certificate of destruction on everything leaving the jobsite. The highest risks are from specialized items that were specifically designed for the owner's organization.
- All contractors should have a program in place to prevent blood lead levels from becoming dangerously elevated. That includes pre- and post-project blood lead level testing of all workers that might be exposed to lead. If the worker had high blood lead levels prior to coming to the project and it was not documented, it could be assumed the contamination came from the current project.
- CERCLA liabilities: In the current environmental climate, it is as important to prove what was done as well as what was not done 20 years from now. Require the contractor to provide a complete digital record of the disposition trail of everything removed (recyclable and nonrecyclable). Requiring a third-party waste stewardship program (TPWS) that implements best practices is one way to be a good steward and manage future environmental risks. Some elements of a TPWS program include:
- Ensuring the corporate safety and environmental culture is adopted by everyone in the chain of disposition
- Employ strict material identification, loading and waste management protocols at the jobsite to prevent mishandling, mischaracterization or cross contamination
- Require TPWS audits and monitoring at all facilities in the chain of disposition

Contractor frontloading the project: Never forget assets have value. Trust yet verify the contractor is operating in good faith. If the contractor is allowed to remove 80 percent of the value from the project while only performing 20 percent of the work, an owner's ability to negotiate a dispute is reduced since they might have to complete 80 percent of the work on a budget of only 20 percent of the revenue needed.

In these projects, it is important for facility managers to have subject matter expert guidance on all phases of the process including budget development, asset retirement obligation studies, go/no-go analysis, risk identification and evaluation, bid preparation, contractor prequalification and selection, safety/technical plan review, identification of work tasks that pose the greatest risk. FMJ

Mike Mitchum *has almost 50 years of experience in all facets of the dismantling, decommissioning, demolition and asset recovery process for petrochemical, refining and industrial facilities. In that time, he has been instrumental in establishing successful grass roots industrial demolition and asset recovery divisions for major companies.*

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COMPANY NAME: IAdea
EXPERTISE: Scheduling (Room)
CSP LEVEL: Platinum
CSP SINCE: 2020
WEBSITE: iadea.com

How is your company responding to the ever-changing needs of the FM world?

As the FM world continues to change at a breakneck pace, we'd be letting ourselves down if we did not also a pursue a policy of constant change and improvement. Rather than considering how best to return to normal, we ask the deeper questions, such as what is the purpose of the workplace now? Through conversations with FMs and figureheads in the industry, we can better evaluate this core shift and in turn develop products and solutions that simply make more sense in modern hybrid workplaces.

We need also examine what is driving this unrelenting change. The world's great work from home experiment has now been ongoing for more than two years. A majority of the changing needs in the FM world are driven by those that inhabit these facilities: people. We often face the question of how can we boost the power and feeling of control of these people in workspaces where flexibility has already been established.

Our response is then seeing how we can achieve that in a resilient way and in one that is sustainable in the long term. This translates at solutions that will work even as global conditions change, and that will continue to serve well into the future.

What research or product innovations is your company working on that will help FMs be more successful in their roles?

Adapting to the pandemic has been an incredibly steep learning curve for organizations the world over. While organizations have been doing research themselves into what works best for them, IAdea has also been hard at work researching these organizations to champion product innovations that encourage FMs to achieve success. Hybrid models of working have been adopted by huge swathes of organizations, and much of our research has been focused on challenges encountered in enacting these models and developing tech that can help.

Currently in the pipeline is a solution that builds and expands upon our existing desk booking solution. Hot desking, or desk hoteling as it alternatively called, has developed significantly over the last couple of years as organizations explore new working spaces. New challenges have reared their head, and this future development is designed to address those and to further increase the effectiveness of the solution and better systemize desk booking to meet user needs.

Finally, we will be expanding our smart workplace ecosystem with further IoT integration to support FMs in smashing their green sustainability goals by utilizing data from different sources to reduce wastage.

Why should FMs choose you as a partner?

Apart from a range of exceptional products for the smarter workplace, when you choose to partner with IAdea you will also be choosing our extensive and vibrant partner ecosystem. It is a hive of collective knowledge that offers huge flexibility for FMs in creating the ultimate customized solution for their new or improved smart workplaces.

When it comes to our products, they are, by design, happy to work with a huge range of partner software. No proprietary lock-in! This is a huge boon for organization by offering total software flexibility or easy-to-integrate solutions in environments that are already taking full advantage of an IWMS.

Finally, besides our products and partners, you will also be safe in the hands of experts who have years of experience working with large multinationals with globally dispersed offices, as well as smaller businesses. We know every FM has different requirements and challenges which we listen closely to. We then recommend the best mix of products and partner software — based on our years of experience — to extract the most value. With round-the-clock support and coverage for a majority of regions, you are never left stranded.

COMPANY NAME: LogiSon Acoustic Network
EXPERTISE: Acoustical/Sound Masking Systems
CSP LEVEL: Silver
CSP SINCE: 1999
WEBSITE: logison.com

How is your company responding to the ever-changing needs of the FM world?

Throughout our 44-year history, we have always taken great care to educate clients and building professionals, not only about sound masking, but — more generally — about how to achieve effective acoustics in the workplace. Given increasing emphasis on the role this key indoor environmental quality plays in employee productivity and workplace satisfaction, we launched SONARE — a magazine focusing on the concepts, factors and approaches that can help FMs better understand acoustical issues and how to address them, as well as new perspectives on acoustical comfort, privacy and equity within the workplace.

What's on the horizon in your field/industry, and how is your company meeting those challenges and opportunities?

Currently, there are no design or performance standards for sound masking systems and, despite having been in use since the 1960s, it remains a poorly understood technology; for example, some are still under the impression it emits "white noise." At the same time, the importance of managing the spectral distribution and overall level of background sound within the built environment is increasingly recognized in building standards, guidelines and codes worldwide. In an effort to ensure better integration of masking sound with overall architectural acoustical goals — and improve accountability within our industry — we have become an active member of many international standards organizations, including IFMA, ASA, ASHRAE, ASTM, GBI, IWBI, and USGBC. Our work within them reflects our long-standing commitment to the advancement of masking and ongoing quest to ensure facility occupants can enjoy its many benefits.

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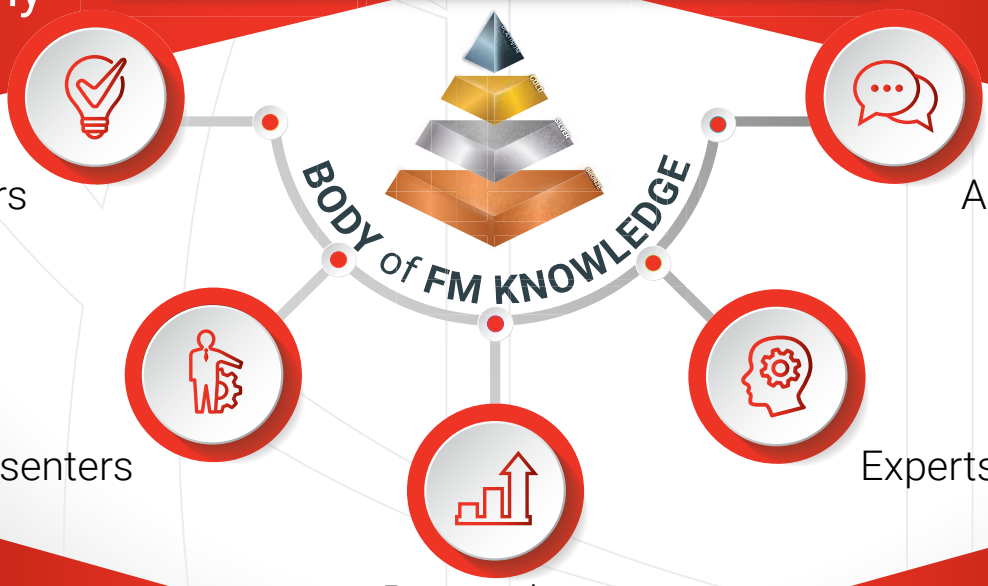

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Multifamily Housing A SMART TECH GUIDE FOR FMS

BY MIKE SLOVIN

Smart technology has been in phones, computers and cars for more than a decade. Now, it is officially signing its lease with multifamily housing.

Smart home assistants, doorbells and lightbulbs have become increasingly popular in single-family homes and now they are integrating into apartment complexes, town homes and condominiums. The need for more innovative and connected solutions in multifamily units has been increasing as more property owners track vacant units from a distance and residents are requiring elevated safety and advanced tech functionality in their homes.

While in-home smart tech may seem easy to navigate upfront, the reality is that most systems were not designed for multifamily homes and apartment complexes. Instead, they were made to meet the needs of single-family homes. Now, as more residents look for multifamily homes with smart tech included, it is important that property owners and facility managers take advantage of their full capabilities to accurately manage vacant units and meet tenants' needs.

The first step is knowing what smart tech options there are and how they function.

Smart Tech Basics: Systems, Functions and More

Smart home technology is a newer phenomenon, and it is even newer to the multifamily space. To understand how property owners and managers can use smart home technology in their units, they need to start with the basics.

Smart technology for homes can help regulate temperature, turn on and off lights, secure locks and monitor who is at the door or entering a home, offering elevated efficiency and convenience for residents.

Don't want to get up to turn off the lights? Simply ask a smart home assistant to do it. Not at home to answer the door? Check the smart doorbell camera to see who is there.

At the surface, these are great tools for residents living in and occupying apartment units. However, they can also be an excellent resource for FMs to use for managing unoccupied units, common areas and monitoring overall building safety.

Smart technology systems include smart home assistants, doorbells, thermostats and more.

Each comes with its own specifications and benefits, some more focused on residents than others, so understanding how smart home technology can contribute to easing the day-to-day responsibilities of managing a multifamily property is key.

Choosing the Right Tech

When it comes to choosing the right systems, start by identifying the areas that require the most attention. For example, if a property has five vacant units that all need daily check-ins to ensure internal temperatures are regulated and all doors are appropriately locked, monitoring smart tech may be the right fit.

Systems like smart thermostats and internal/external monitoring cameras allow access to see what is going on inside and around the unit without having to spend the time inspecting them daily.

Smart camera systems can also be programmed to send notifications to FMs every time someone requests to enter the unit. They also allow systems to be connected to automated locks, meaning owners would have control over who is entering each unit without needing to get up.

Systems like smart home assistants could be good fits as well, specifically for FMs needing to make their vacant units look occupied. Smart home assistants can connect to lamps, overhead lights, TVs and Bluetooth sound systems, and can be controlled through an app, allowing FM and property teams to turn on and off lights, sound and TV remotely.

Having these options can prove useful, especially during peak seasons of home-related break-ins. However, smart tech needs will vary depending on when vacant units turn over and become occupied. As residents move in and out of units, it is important to know how control of smart home technology systems can be transferred to residents as property and FM personnel hand it over to their tenants.

Handing Over Control

Smart technology systems are made to be user-friendly, but they are not without their quirks.

The biggest issue with smart technology now is that it is not made for the multifamily living space. Meaning, adjusting systems for each individual unit can present a few challenges, as they were designed to be set up and used in one static home. While investing and implementing smart home technology systems may seem daunting, the truth is that residents find value in having these technologies already equipped and, for the most part, ready to go.

Once a vacant unit becomes occupied, one of the first things that should be done is handing over smart tech access. With FM no longer needing to oversee the monitoring of the unit, all functions should be granted to the new resident. For most systems, controls can be handed over through a mobile app or online platform. Others, like smart doorbell systems, may require a bit more lift as they need to register lock access to certain devices through mobile registration.

Another item to think about when handing over control of smart tech is understanding how to take back control after a lease is up. Overall, multifamily units will need systems that can automatically transfer control back to the owner once the resident vacates.

When Issues Arise: Troubleshooting Smart Tech Problems for Residents

Smart technology is just that, technology. And no tech comes without some issues now and then.

Smart tech is usually user-friendly, meaning issues are likely to be handled by the resident on their own time. However, there will be instances where they will need support.

For example, if there is a power outage and all smart tech devices become disconnected at once, it may require the FM team's assistance to restore systems properly as most will need administrative authentication to connect to certain servers and networks. There is also concern from residents about fire hazard with smart doorbells and locks, but these systems are on battery power and not connected to electricity of building or unit.

Depending on how many residents are in a building and how many devices need to be reconnected, this process can take some time. However, many of these issues can be solved or avoided by educating residents. Helping residents understand how issues can be avoided or what to do in the event something goes wrong is helpful to both the property personnel and residents, as it cuts down the time needed troubleshoot and solve an issue.

Smart technology issues can also be minimized by implementing a troubleshooting process and training staff ahead of time. For example, if there is an outage affecting only a certain subset of smart tech devices, property managers and staff should have a resource that can be used to help all affected residents get their tech back up and running in their units.

Not only will these established processes help get things back up and running in less time, but it also helps ease the stress staff may face when technology issues come up. Instead of panicking, they can swiftly take care of the issue.

Creating efficiencies together

Smart tech is the way of the future, not just for multifamily homes, but for everyone. Soon, smart tech will no longer be a luxury for residents, and it will make a lasting mark on the multifamily housing market as more renters are looking for homes with smart technology included in their units.

By understanding how smart tech works, what the different options are, how it can be utilized in vacant and occupied units and what to do when issues arise, residential FMs are able to add further value to their property for potential and current residents.

Technology is not going anywhere. Adding smart tech into a property may save property owners, FM teams, staff and their residents a lot of headaches down the line. Smart technology can add tangible value to a property and property teams will likely notice a difference, especially when it comes to their own peace of mind and residents' satisfaction. FMJ

Michael Slovin *is the vice president of national field sales and marketing at Xfinity Communities. In this role, he develops the strategy for how Comcast serves the multifamily community and develops products and solutions that improve the community and resident experience. With more than 20 years of experience in the telecommunications industry, Slovin's background serves as the perfect tool for helping facility owners and managers understand the ever-changing needs of residents.*

RESOURCES
multihousingnews.com/what-todays-renters-want/
techhive.com/article/583408/smart-home-guide-for-beginners-how-to-make-your-home-more-convenient-to-live-in.html
technoroll.org/smart-access-control-for-tenants-and-landlords/
nachi.org/problems-smart-home-tech.htm

THE FUTURE OF PORTFOLIO MANAGEMENT

3 mindset shifts FMs must make

BY KENDALL PAIX & CAMILLA NEWMAN

The landscape of facility management is rapidly shifting. As Internet of Things (IoT) technologies and evolving tenant expectations continue to drive change in the real estate sector, there is increasing demand for a scaled, portfolio-based approach.

Over the last two decades, technological advancements have galvanized the shift toward a more connected infrastructure ecosystem. The number of IoT-connected devices is predicted to jump to more than 25 billion by 2030. As these IoT devices have become more accessible, they have opened new possibilities. One of the most urgent needs that these IoT capabilities are addressing is reducing carbon emissions.

The demand for energy optimization has fueled the proliferation of smart buildings: intelligent built environments run by a network of self-regulated systems. This has only been accelerated by tenant expectations evolving over time. In the wake of the COVID-19 pandemic, tenants are increasingly seeking smarter, healthier and more sustainable spaces in which to live and work. Overwhelmingly, tenants expect automated technology solutions as part of their leasing agreements.

As this wave of digital transformation continues, building owners see greater opportunities to maximize their fixed assets and improve cost margins. From lighting to security, every element of infrastructure can now be analyzed and optimized for cost efficiency. However, siloed data can make it difficult to gain the transparency required to make informed decisions. Despite innovations across the industry, many buildings continue to run on antiquated data systems of print outs, PDFs and hard drives. Even for those connected to IoT devices, the use of proprietary software and different programming languages means that data is often fragmented and siloed. This makes it difficult for owner-operators to aggregate and compare data to see the larger picture.

These challenges translate to a tangible change in the FM's role. Demand from owner-operators to provide more comprehensive, real-time data requires a macro approach to asset management. What was once seen as a primarily hands-on operations role will evolve to become far more multifaceted. The use of virtual modeling technology like digital twins to drive decision making will become part of the day-to-day for FMs.

The shift is already underway, and this is only the beginning. To effectively adapt, FMs must move with changing technologies, not resist them. By making these three simple mindset shifts, FMs can confidently navigate and adapt to the new frontier of asset management.

MINDSET SHIFT 1:

From a single-building focus to portfolio-wide visibility

THE CHALLENGE

The rate of multi-facility portfolios is rising exponentially in Australia. Data from Property Update shows that more than 19 percent of property investors own more than one property: up by 2.7 percent over the last year. As such, the focus is no longer solely about squeezing better profit margins out of one singular building. Building owners and operators are thinking more about managing, comparing and contrasting multiple assets. Driving efficiencies now requires a bird's-eye view across their entire portfolio.

This demand for greater visibility is transforming FM's roles. Today, the sole focus is managing their singular asset. However, the "portfolio-level FM" is a role building owners will soon require. FMs will be expected to monitor not only their own facility, but other peer buildings in their portfolio. This requires a widespread mindset shift: zooming out with a macro lens to view their facility as part of the bigger picture.

THE SOLUTION

For the modern-day FM, knowledge is power.

Technology will provide greater transparency in asset performance and with that, greater accountability for each FM. However, by embracing this same technology, FMs can ensure they are always one step ahead. Virtual modeling software like digital twins equip FMs with real-time data across the entire asset portfolio. From profit margins to occupancy rates, this comparative data is readily available without the need for complex analysis.

If FMs have visibility of peer buildings, they can understand how their asset compares with other facilities. In turn, they play a crucial role in upholding high standards across the portfolio: making them even more indispensable to building operators.

MINDSET SHIFT 2:

From specific systems to a single source of truth

THE CHALLENGE

FMs know how to run their buildings like clockwork. They understand their systems inside-out and have their finger on the pulse of everything from plumbing to air quality. Often, FMs have an intuitive understanding of how these moving parts work together. However, bringing visibility and transparency around these operations is another story.

Many IoT devices are controlled by proprietary software to prevent third parties from accessing data and to preserve maintenance contracts. Incompatible programming languages and varying protocols across locations further siloes the data. Without a single source of truth, it can be difficult to relay important data to key stakeholders like leasing agents, asset managers, engineers and security operators. The low trust and accuracy in this data can block crucial problem solving and decision making.

THE SOLUTION

Having one unified data source goes a long way in minimizing operational headaches. Technology like digital twins brings data from disparate systems together into a live, digital representation of the asset. Using virtual modeling, they provide real-time insights into everything happening in the building. With remote access to cloud-based data, owners, contractors and tenants can instantly see relevant data in context. This reduces the pressure on FMs to be the intermediary and minimizes miscommunication and error.

With more comprehensive reporting in place, FMs can also be more efficient in their daily responsibilities. Real-time remote data also allows FMs to diagnose problems and devise solutions without making a trip on site. This not only saves time but also generates cost savings: it is estimated that predictive practices can reduce a building's maintenance and energy cost by up to 20 percent.

MINDSET SHIFT 3:

From dispersed data to greater data governance

THE CHALLENGE

Managing data with discipline is the first step in building an enterprise portfolio. However, greater interconnectivity comes with its own distinct challenges. Sensitive information is dispersed across various IoT devices, each with varying levels of security. There is a lack of uniform classification across proprietary software packages, and data protocols differ widely between countries. Further complicating matters, many individual software solutions use their own costly and insecure third-party integrations.

In the move toward scaled asset management, the role of data governance and security will become a primary concern for FMs. As the first port of call for information, managing complex data will become an unavoidable part of their role. Cybersecurity is part of that equation, too. A comprehensive strategy is required to protect operational technologies from cyber threats such as malware and hacking.

THE SOLUTION

Intelligent digital systems will prove crucial in helping FMs adapt to the new demands of their role.

Common misconceptions about modern data-management solutions are that they are expensive, intricate, time-consuming to roll out and not scalable. While that may be true of the siloed data solutions of the past, new innovations in technology are quickly changing this.

By providing accurate, near-instantaneous data in a single source of truth, these technologies help FMs navigate key trends in managing their assets. Rather than producing individual, high-fidelity solutions that are as unique as snowflakes, this technology provides the essential components of digitization at scale. In doing so, they empower FMs and operators with the tools for proactive, data-led decision making.

In creating a common data environment with a normalized data language, digital twins also provide robust cybersecurity solutions. Using baseline digitization and incorporating OT threat protection allows recognition, identification and elimination of malware, ransomware technology disruption and physical threat attacks.

How digital twins can help FMs navigate the future of scaled asset management

Digital twins are not just another cumbersome tool that FMs must learn on top of their existing operational duties. Nor do they exist to replace the discipline of the FM. Instead, technologies like digital twins act as a highly intelligent ally in the inevitable shift toward scaled asset management. They amalgamate and augment building data that already exists to help FMs oversee and manage multi-facility portfolios.

Their role is to make FMs more effective in their day-to-day role.

In doing so, digital twin facilities make the role of FMs even more valuable. As the discipline continues to evolve, the responsibility of the portfolio-led facility manager will focus less on putting out fires (both real and metaphorical), and more on preventive action and high-level decision making. Armed with the right mindset and tools, adaptable FMs will not only survive, but thrive in their expanded roles. FMJ

Kendall Paix *has more than 25 years in software, hardware and product development specifically for the built world. Starting his career at Honeywell from commissioning building and energy management systems through to serving as chief technology officer for Honeywell Building Management Systems worldwide, Paix has extensive knowledge of the breadth and diversity of technology and systems used today for smart and intelligent buildings. With Willow, Kendall is focused on high-impact outcomes for owners and operators.*

Camilla Newman *is a marketing technologist who is passionate about communicating the possibilities and value of technology products. Having started her career in brand management and then in management consulting at Deloitte, Newman has several years of experience helping major organizations along their digital transformation journeys, from strategy and inception through to delivery. She is particularly passionate about her role at Willow where she combines her passion for technology products with marketing.*

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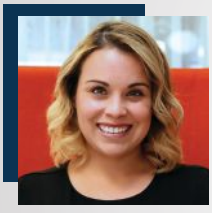

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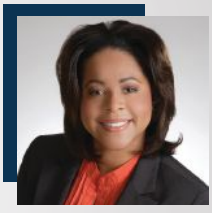

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APPLYING TECHNOLOGY TO CONVENE, CONVERSE & MANAGE CHANGE

The COVID-19 pandemic impacted and catalyzed the workplace like no other event in recent history. Facility management and real estate professionals' ability to adapt to such events and manage related change indicates skill and value. Recently, volunteers, a leadership coach and a furniture showroom manager teamed with 15 industry subject matter experts and seven North American IFMA chapters for holistic conversations about the future of work. The result was a take-away document to serve as a lasting resource.

Throughout the pandemic, industry conversations shifted from cleaning safety, HVAC and indoor environmental quality, and other operational processes to more human-centered discussions on the negative impacts that trauma, endless days of Zoom meetings, and mounting deaths and illness were having on individuals, teams and cultures.

IFMA members partnered with industry-adjacent professionals to convene a discussion series for industry professionals anywhere by industry professionals anywhere, that applied technologies (Zoom, Mural, PDF, etc.) as tools to:

- Level the participation playing field and meet stakeholders wherever they are;
- Support engagement between the broadest range of industry subject matter experts (SMEs) and peers possible; and
- Capture a written record to be created; that would facilitate synthesis and summary of the raw data into a digestible and easily shared document similar to being there live.

IFMA member John Mackay (Capital Chapter) used his IFMA contacts to assemble a team of volunteers across time zones, disciplines and markets. Joining Mackay were Jasmine Kernaleguen of Rhythmic Leader Science; Lauren Pollack of Steelcase, providing workshop design, facilitation and research expertise; and Merryl Effron, host from the New York City Chapter leading logistics and marketing. The team designed the agenda and strategy for the four-part, 90-minute discussions. Kernaleguen and Pollack moderated the discussions and created an asynchronous experience to gather and synthesize information. In each post-event debrief, the team innovated and adapted future session design based on changing context, needs and feedback.

Using people, process and change management as general session topics, agendas

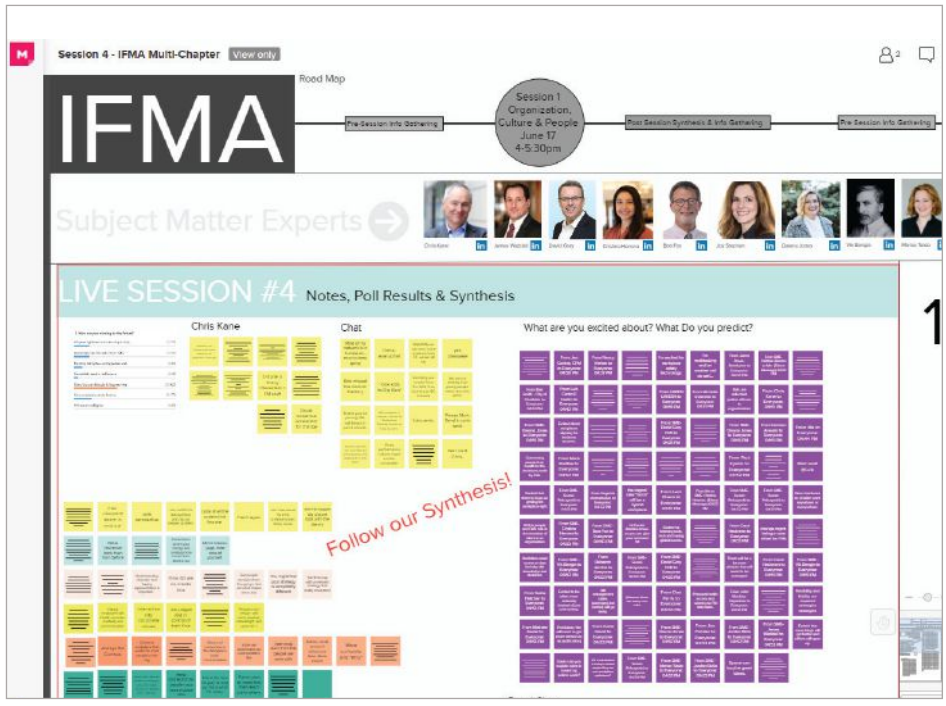


Figure 1 – Mural document available to attendees prior and after sessions to encourage participation, reflection and further conversation

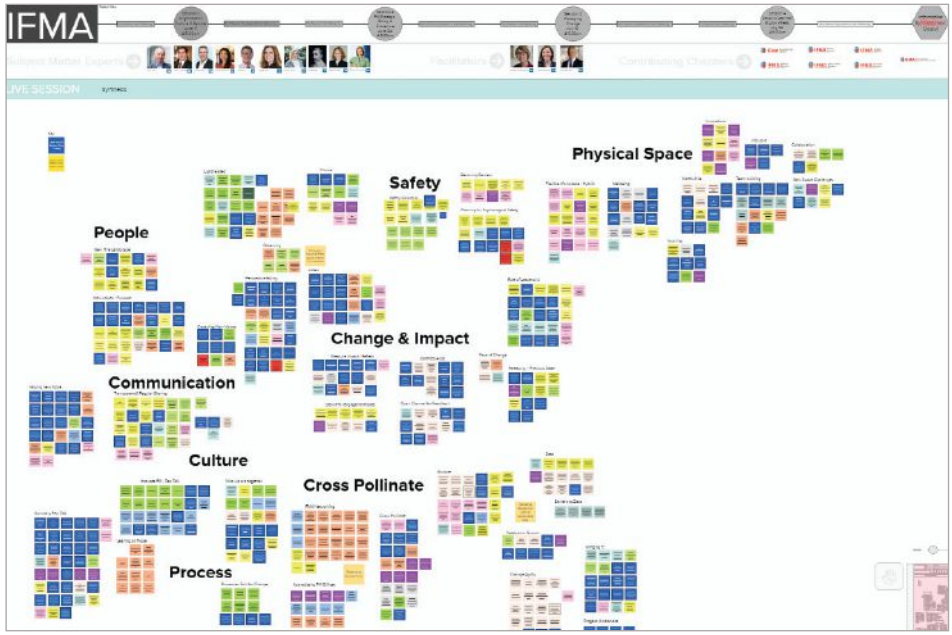


Figure 2 – Sample Mural document capturing ideas, chat and emerging themes

followed a format of short SME presentations followed by small group breakout discussions to explore paths forward. Participants from FM/CRE, IT, HR, vendor/service providers, project management, consulting and general contractor backgrounds all contributed, adding their voices to the Zoom session chats and Murals. Chat comments were copied to help identify themes and synthesize the information for participants and were shared. Registrants had access to the Murals in between the sessions to encourage further review, consideration and conversation.

The sessions created almost six hours of recordings and filled four sessions. Mackay compiled and documented the video, tagging quotes and themes for participants to search and revisit. After distilling them for about a month, four themes emerged:

1. We can embrace change, through expanding our perspective and learning from other departments and industries.
2. We can explore and test a future that works best for our organizations by involving our people to gain buy-in, creating solutions that innovate our culture.
3. We can support our employees by communicating consistently, allowing them to feel engaged and heard.
4. We can ground our approach in new values, shaping the way we celebrate our reunion and envision the future.

EMBRACE CHANGE

Comments from the session findings covered an array of opinions and observations including:

- Unprecedented readiness for change because of the pandemic, but outlined several challenges regarding equity, career opportunities and compensation, all of which themselves implied a need for change.
- Comparing FM to flying a plane through a storm while changing windows and twisting the propeller around.
- Organizations are navigating uncharted ground.
- FM must be intentional in design with the needs of the community in mind, and there are different and better ways for organizations to think and inquire about what it is that workers need.
- Challenging the idea that organizations would be able to return without change.
- People and health metrics will drive space design and metrics moving forward, not cost or utilization. Measuring connectedness, resiliency, purpose and meeting quality and impacts those measurements for all stakeholders.

Dr. Tracy Brower, sociologist and participant, said risks, cognitive dissonance and trauma influence thinking and decision making. As a result, traditional lines of communication and relationships governing policy and process between FM/CRE, IT and HR have become complicated and pose real threats to solutions and pivots.

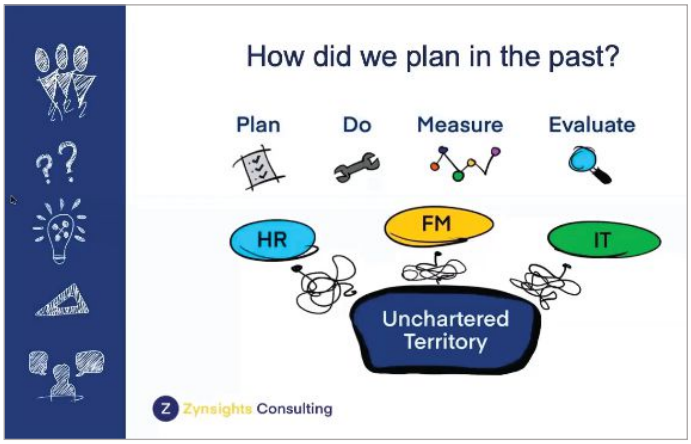


Figure 3 – Complications and threats to traditional lines of communication and relationships by Susan Pelczynski

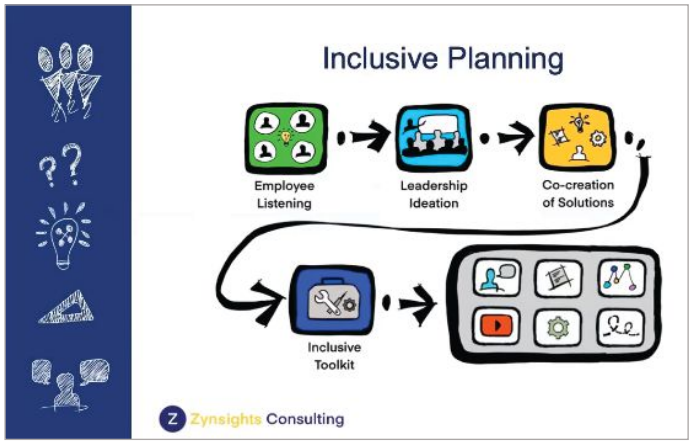


Figure 4 – Inclusive planning as a mitigation of disrupted process and channels because of the pandemic's impacts

Figure 4 describes inclusive planning, which requires employee listening, leadership ideation and co-creating solutions to create an inclusive toolkit to facilitate change and buy-in. Kernaleguen challenged leaders to look beyond buy-in to involve others, innovate and create psychological ownership.

Other change-related themes are agility, the need to explore, chart progress and impact, and flexibility. When an organization sees change as a norm and no longer refers to such activities as "change management" it is a milestone for success.

Conversation starters for teams seeking to embrace change are:

- How might we cultivate agility to navigate pivots as standard practice?
- How might we build exploration and testing into processes to allow future solutions to be informed from experience?
- How might we acknowledge the journey of progress through micro-milestones?
- How might we measure the impact of change on our employees?
- How might we grow with a level of flexibility that benefits our organization and employees?

CHANGE SUPERPOWER: ADAPTABILITY

Expand Your Perspective

As important as embracing change is broadening and expanding one's perspective. Being genuinely curious and compassionate, observing and seeking out input from those who have not yet responded are all key strategies for broadening perspective, as are cross-pollination between departments, industries, and stakeholders. Data and transparency in its collection, collation and intended application are integral parts of a fact-based strategy that conveys comfort and safety to employees.

Conversation starters for expanding an organization's perspective include:

- How might we engage with other departments and industries to create new ideas? (e.g., the impact that the hospitality industry is having on health care and office space designs)
- How might we develop alignment with existing and emerging leaders?
- How might we gain qualitative insights by observing employees?
- How might we use quantitative data from new sources to inform our approach?
- How might we transform experience and accessibility through new tools and technologies?

PERSPECTIVE SUPERPOWER: RESOURCEFULNESS

Involve People

One of the greatest challenges presented by traditional, top-down organizations is determining the right level of input and involvement of staff, particularly line staff and service providers. While the pandemic underscored organizations that truly cared for staff of all levels, it also shined a light on organizations that were not truly welcoming, inclusive and did not empower people. In such cases, separation and work-from-home have only amplified challenges to engage, inspire and supervise staff. Many participants shared experiences of all-hands Zoom calls that were one-way and under the auspices of inclusion and open communication but only reflected cultural challenges that preexisted. The mantra for involvement is to seek to understand before seeking to be understood. Assume that ideas and solutions can come from anyone, not just leaders.

Conversation starters aimed at involving people are:

- How might we use empathy to build trust and gain valuable feedback?
- How might we gather perspectives from around our organization?
- How might we create inclusive and equitable experiences that reduce barriers to success?
- How might we design a workplace that supports collaboration and connection?
- How might we integrate emerging employee values into amenities and culture?

INVOLVEMENT SUPERPOWER: EMPATHY

Communicate Consistently

In the absence of information, people speculate. Speculation and a lack of clarifying information provide a fertile environment for imagination and rumor. Communication and involvement are the best ways to nip rumors and misunderstandings in the bud. Protocols, new methods that support retention, communities and conveying a general feeling of safety are all key strategies when addressing the highly uncertain and ever-changing environment that surrounds organizations during this pandemic. Focus on explaining the why and involving people to clarify the how. Many SMEs stressed that clarity during uncertainty is also a critical success factor for good communications.

Others challenged and encouraged the audience to lead by example in their organizations regardless of their role. Silos existed before the pandemic and may certainly linger after, but this is a great time to encourage others. Missing this opportunity creates risk because, as new policies, plans and processes are developed, good communication is a must.

Conversation starters for communication are:

- How might we enhance channels for leadership to trade information with employees?
- How might we establish and share clear implementation plans for protocols and policies?
- How might we ensure retention of information by communicating using varied approaches?
- How might we locate or create communities of practice to exchange and validate ideas?
- How might we overcome fears by addressing safety concerns and practicing preparedness?

COMMUNICATIONS SUPERPOWER: MAKING THE COMPLEX SIMPLE

Celebrate Reunion

Fun and psychological safety are connected. Organizations wonder what will entice or convince employees to come back to an office on a routine schedule. Flexibility is critical; arbitrary mandates will not retain staff. The evidence is already mounting that employees who are dissatisfied with their overall work-life experience are moving on. Celebrating a reunion can help mitigate those collective individual reservations by promoting well-being, the space itself, supporting DEI&B, and creating genuine fun. Fun releases tension, is contagious and helps promote a positive culture that both existing employees and new hires alike will respond to and perpetuate.

Conversation starters for celebrating the reunion are:

- How might we build well-being and psychological safety into organizational culture?
- How might we design compelling spaces and team rituals that welcome people into the office?
- How might we innovate the scope of FM to optimize our organization?
- How might we review decisions through a lens of diversity, equity, inclusion and belonging?
- How might fun rebuild culture and ease the tension?

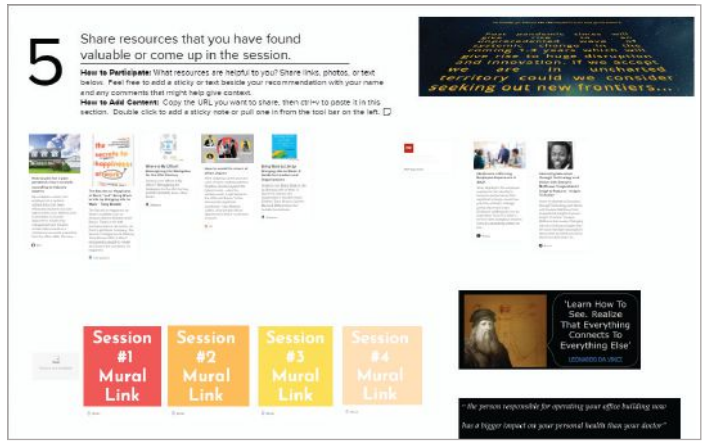


Figure 5 - Mural allows participants to share resources such as articles, pictures, videos, etc., which can be linked and shared

CELEBRATION SUPERPOWER: HUMOR

The team used a simple Google slide deck and transformed it into an interactive document that behaves more like a website than a traditional slide deck. This created both a reference guide for attendees (it was emailed to all registrants), but also offered anyone who missed the event to experience it for themselves, then start conversations of their own.

The FM industry must continually think of new ways to convene meaningful, inclusive and lasting conversations that will bring insight and value to the workplace and apply technology in new ways that broaden conversations and lowers barriers to participation. FM can help create safe spaces where all have a voice and create lasting relevance and value in the face of continuous change. FMJ

Project Links:

For a copy of the complete interactive PDF synthesis document or to discuss these topics further, contact John Mackay.

Mural 1 | Mural 2 | Mural 3 | Mural 4 | Mural 5

URBAN & Community-based FM

USERS THAT CREATE THE VALUE, NOT THE BUILDING

BY JEFFREY SAUNDERS

Click the screenshot at left to watch Jeffrey Saunders' interview with Kathy Michell (left).

Dr. Kathy Michell is associate professor and deputy dean for undergraduate studies for engineering and the built environment at the University of Cape Town, South Africa. Dr. Michell is a member of IFMA's Research Advisory Committee, and her research passions lie within urban and community-based facility management. Through community-based approaches, FMs can become advocates for communities and end-users. Urban FM can leverage locations and skillsets to deliver better services and mitigate emerging risks posed by service failures from urban networks.

> *"The key difference is that facility managers work with communities through a grassroots bottom-up approach through community-based FM,"*
>
> - Kathy Michell

Looking beyond individual buildings to the urban neighborhood and community

Urban-based FM looks for ways to take the principles of FM, which are applied at the building (micro level) and use them at the macro level — urban precincts (neighborhoods) and cities. Community-based is different: It is about identifying and developing managerial frameworks that empower marginalized communities to take ownership of and manage and operate built assets. "The key difference is that facility managers work with communities through a grassroots bottom-up approach through community-based FM," said Michell. Both approaches are founded upon the belief that

EDITOR'S NOTE: *In 2021, IFMA announced the creation of its Research Advisory Committee, an international panel of world-leading, multidisciplinary subject matter experts keen on helping reshape the built environment to improve people's well-being and buildings' sustainability. As part of this initiative, IFMA is conducting a series of interviews with the members of the Research Advisory Committee. These interviews will introduce readers to this fantastic and inspiring group of thought leaders, their passions and how they see the facility management industry evolving during this period of tremendous societal transformation. Click here to read the third interview in the series.*

a building never sits in isolation in contrast to traditional methods utilized by "property owners, landlords, facility managers, and asset managers who only see their buildings as a line-item on a spreadsheet," Michell argues.

Research in urban and community-based FM is upending traditional notions of value creation in the industry. A widely held belief in the FM industry posits that it is the management and maintenance of the building that creates the value. According to research from urban and community-based FM, the users generate the value of an asset. This realization, Michell said, "shifts the facility managers' focus from primarily leveraging the economic value of assets towards a greater emphasis on leveraging the social value assets ... if you pay attention to the social aspects inherent in your building or the spaces around your building, the economic and the environmental value will follow."

To leverage the social value of office environments, buildings, or spaces surrounding buildings, FMs must look beyond the confines of the buildings and engage with the local community and understand human behavior and needs. "Facility managers need a greater focus on understanding human behavior and people management to predict what the users of buildings might need and want and thereby unlock greater value from their assets."

One way to do so is by employing a framework like Maslow's hierarchy of needs, which covers three major categories: safety, belonging and self-development. FMs can leverage the value of their buildings and assets when they move up the hierarchy and stop thinking about their buildings in isolation. Understanding users' experiences in and around the buildings is as important as understanding their experiences inside buildings. For example, "a key concern for facility managers in Africa is ensuring that people can get to a building safely and securely," said Michell.

This is not only an African challenge; it is a challenge that should concern all FMs. A 2021 study by the United Kingdom's Office for National Statistics (ONS) asked people about feelings of personal safety when walking alone in different public settings in Great Britain. The ONS found that both men and women feel less safe after dark, but the extent to which women feel unsafe is significantly greater. Disabled people, too, are more likely to feel unsafe, even in the daytime in busy public places. Given that many companies want their workers to return to the workplace, are FMs doing enough to ensure that workers' — especially women and disabled workers — commutes are safe and free from harassment?

FMs: advocates for end-users

While it is easy to say FMs should focus on human behaviors and end-users, many struggle with this opportunity. If FMs leverage user-centric approaches, they could become advocates for end-users to senior management.

Reviews of innovation trajectories within the FM industry show that the industry places greater emphasis on the economic and environmental aspects of innovation to the exclusion of social. This focus on FM's technological, economic, and ecological facets can reinforce top-down orientation among professionals. However, Michell contends FMs should avoid overly top-down approaches: "All professionals tend to assume that we have the solutions so that your life will be perfect when we walk away," she said.

Manifestations of top-down approaches are rampant in the industry and across urban contexts – especially in developing countries and neighborhoods in decline. When buildings open in socioeconomically marginalized areas using a centrally determined, professionally sourced idea of what a community desires or wants, the structures do not often align with community wants or needs. "When you speak to the community, it is not what they wanted or needed. ... these buildings often have high asset value on asset managers' spreadsheets, but they quickly become vacant and derelict."

"Traditional designers argue that their design is what creates the value. And, yes, their design is often amazing," she said. "Still, facility managers manage and operate that design element and space. They are the ones that will leverage the social value from it." This is of particular concern when dealing with marginalized users who have not traditionally had a voice.

> *"When designers come with traditional design approaches, there can be a disconnect. The philosophical position of what is designed may not suit the local community's or neighborhood's actual needs and designs. In many ways, you could argue the design becomes culturally inappropriate,"*
>
> - Kathy Michell

To develop sustainable solutions (i.e., buildings and spaces that people want to use), professionals in the built environment need to understand a local community's needs, wants, desires, and contexts. These become critical in design. FMs need to acknowledge that professionals do not have all the solutions as they do not know everything about a community's needs or wants. FMs need to engage with communities, think in participation, and be willing to think out of the box to identify ways to leverage opportunities and build value.

"Facility managers should engage the community (internally and externally) with genuine empathy and listen to their desires and wants to develop solutions for which these communities genuinely attach value," said Michell. "The facility manager needs to embark on a genuine and participatory journey. This is not a box-ticking exercise. If facility managers understand the needs of their end-users and communities, they can become advocates for communities internal and external to the organization."

However, social value cannot always be captured directly in a spreadsheet. The inability to capture value in a spreadsheet does

not mean that building owners and facility managers do not feel the economic value of these interventions. "If the community has a sense of cultural or social attachment to the building or development, it is less likely to be vandalized or destroyed. Research from South Africa and elsewhere shows that if a community attaches social value to an asset, they will go out of their way to protect it," she said.

Fostering social and community value is particularly important when dealing with traditionally marginalized users and communities and urban areas experiencing decay. Managing community involvement will become more critical for FMs as some countries and their urban and rural regions decline due to economic transition or population aging. Cities like New York, Los Angeles, San Jose, Boston, San Francisco, Philadelphia, Chicago, Sydney, Hong Kong, and Tokyo have lost population over the past decade. Several local factors are at play, but aging will be a significant driving force in the decades to come: Demographers expect that countries like Italy, Portugal, Georgia, Poland, Hungary, Estonia, Greece, Romania, Japan and Croatia, will all decline in population between 10 and 22 percent by 2050.

Urban FM helping contend with environmental shocks

Environmental shocks related to climate change, the lack of investment in infrastructure, and surging demand mean that FM needs to develop innovative ways to be less reliant on municipal infrastructures — e.g., electrical grids and water systems.

In South Africa, the grid is volatile with a great deal of load shedding. Businesses and communities in South Africa typically have two hours without electricity for every 12-hour cycle, and businesses and communities can sometimes go up to four to six hours without power. As a result, property owners strive to be less reliant on electricity supply. Renewable energy solutions, energy storage, generators and local energy sharing systems are solutions for the lack of stable access to energy.

> *"Some of the FM practitioners I spoke to recently want to share renewable energies within urban precincts. They are developing a neighborhood view and discussing how to share energy across a neighborhood or collection of buildings,"*
>
> - Kathy Michell

Water security is another issue challenging FMs in South Africa and elsewhere. Drought, less predictable rains, and populations straining underinvested infrastructure almost caused Cape Town to run out of water. It is also posing challenges for cities and facility managers globally. In 2019, Cape Town was 90-days away from "day zero," when the city would close its taps to most residences and commercial properties to maintain supply for hospitals and other critical infrastructure. The government had to enact an entire city approach to reduce usage. This approach involved engaging citizens in limiting residential water use to 50 liters (just over 13 gallons) a day. For context, that is enough for a 90-second shower, two liters of drinking water, a sink full to hand-wash dishes or laundry, one cooked meal, two hand washings, two teeth brushings and one toilet flush."

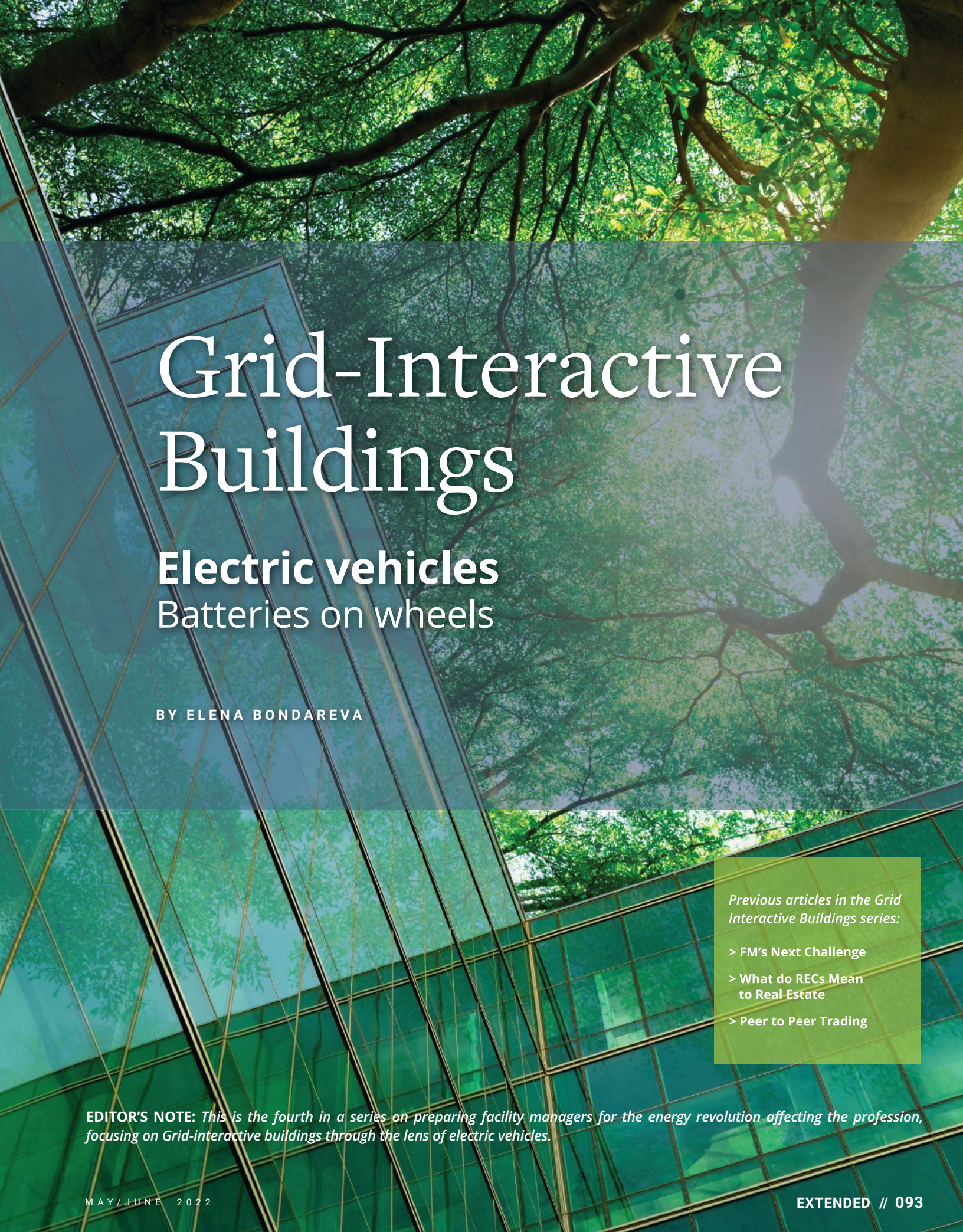
Meeting such a challenge involved several FM solutions, such as installing reducers, which reduce the water flow out of taps to a mist, and switching to using paper cups and plates to avoid washing dishes. Other solutions involved installing meters that limited property water use, increasing the use of recycled or greywater, banning certain types of water usage, reducing water pressure throughout the city, and hunting for leaks.

Exploring alternative approaches to energy and water security is not only a challenge in middle- and low-income markets. It is also imperative in Europe and North America due to the ongoing war in Ukraine and concerns over European energy security and instability of energy and water systems due to climate change. For example, in 2021, 40 percent of US residents will live in counties struck by climate-related extreme weather, including fire, flood, hurricane, mud/landslide and severe storms. Harvard University predicts "around 50 years from now, many US regions may see water supplies reduced by a third of their current size, while demand continues to increase." This potential reduction in water supplies will increase pressure on the already strained US water supply system. 30 million people — or 9 percent of the US population — currently live in areas where water systems violate safety standards.

Research into community-based approaches to FM can provide methodologies and inspiration to become advocates for communities and end-users. Urban FM can help FMs leverage their locations and skillsets to deliver better services and mitigate emerging risks posed by service failures from urban networks. FMJ

Interview 1 with Pa Sinyan
Interview 2 with Ryan Anderson

Jeffrey Saunders *is an expert in strategic futures studies and foresight. He is CEO of Nordic Foresight. Saunders formerly served as Director, Copenhagen Institute for Futures Studies, Chief Consultant and Head of SIGNAL Arkitekters Workplace Analytics team.*



Grid-Interactive Buildings

Electric vehicles
Batteries on wheels

BY ELENA BONDAREVA

Previous articles in the Grid Interactive Buildings series:

> FM's Next Challenge

> What do RECs Mean to Real Estate

> Peer to Peer Trading

EDITOR'S NOTE: *This is the fourth in a series on preparing facility managers for the energy revolution affecting the profession, focusing on Grid-interactive buildings through the lens of electric vehicles.*

Electric vehicles (EVs) to grid-interactive efficient buildings are like a catalyst to a chemical equation: they take it to a whole new level. **Why?**

- EVs are a powerful link to the energy user. Like other personal property, they tend to reflect owner's values and ideals and have proven to shape human behavior.
- If used correctly, they dramatically reduce peak energy demand while unlocking revenue and contributing to climate goals. Like all cars, EVs are parked 95 percent of the time, effectively making them batteries on wheels. If charged when clean energy is abundant and discharged when it is scarce, an EV acts as a distributed energy resource (DER).
- If used incorrectly, they can readily undo the hard work on flattening an asset's electricity consumption because they guzzle up energy. This is one of the reasons that electric charging stations lose money when catering, without sufficient batteries, to users who's commute pattern has them charging at peak electricity prices.

EV owners are Prosumers In the context of clean energy trading, a prosumer is an entity that both supplies and buys energy. The EV owner is a prosumer if they charge its batteries when renewable energy is abundant and then discharge it to other users.

EVs can amplify the grid-interactive potential of a real estate asset. To illustrate the discussion, the diagram below ranks available scenarios from the least (1) to most transformational (12) to the industry, each scenario adding to the ones before. Asset owners or operators may find a slightly different order to be the easiest. Whatever the order, start at the top and move down the pyramid down to unlock the most benefits for all.

EV charging

It all starts with an EV charging station.

SCENARIO 1: **BASIC CHARGING**

EVs charge at a real estate asset, increasing overall electricity demand, and the owner does not influence how or when that happens. Whether the owner charges for this service or not, this is the basic most passive, and most common solution today.

SCENARIO 2: **BASIC BEHAVIOR INFLUENCE**

Encourage EVs to charge when it is best for the overall electricity demand. This can be achieved through price signals, e.g., making charging cheaper or otherwise more attractive (think: non-financial perks) when clean energy is abundant.

SCENARIO 3: **TRACE CARBON FOOTPRINT**

Need to know the exact carbon footprint of the corporate fleet? Gain absolute visibility of the attributes (carbon intensity, time, location, price) of energy consumed by the EVs and have the data streamlined into ESG reporting.

SCENARIO 4: **GREEN CHARGING**

Track and disclose the providence of the electricity pouring into EVs. People are increasingly willing to pay for this because for most, that is the main driver behind EV ownership; a motivation only accentuated where there are organizational commitments to climate action (e.g., to net zero carbon or to 100 percent carbon-free energy) because vehicle emissions are part of Scope 3 carbon accounting.

Imagine if a consumer could choose the energy's source at a charging station the way they choose fuel grade at a gas station. Now, imagine choosing between a number of renewable energy sources — near and far; solar, wind, hydro, geothermal, hydrogen; commercial or community solar — and consumers supporting their preference with their wallet. Now, multiply the impact of that by the entire EV fleet of multinational corporations. That's why EVs are a superpower.

SCENARIO 5: **GREEN CHARGING + RECS**

When renewable generation is limited, FMs may be able to offer EV drivers the option of topping up with Renewable Energy Certificates (RECs) on the spot for that 100 percent clean-energy charge.

Want an Uber powered by 100% clean energy?

Initiatives to rank and reward car-share drivers on their cars' operational carbon are underway. Specifically, Uber's Green Future program provides access to resources valued at $800 million to help hundreds of thousands of drivers transition to battery EVs by 2025 in Canada, Europe, and the US.

SCENARIO 6: **BATTERY-SUPPORTED CHARGING**

Adding a battery to the real estate asset means organizations can supply more guaranteed clean energy around the clock, unlocking further revenue if that helps.

SCENARIO 7: **MONETIZE "GREEN CHARGING" CREDITS**

Where they exist, FMs can unlock another revenue stream by monetizing incentives for clean EV charging. For example, California issues Low Carbon Fuel Standard (LCFS) credits that can generate revenue for a regularly used car and more than US$10,000 a year for a truck. Consider automating this cumbersome process with software.

Two-way charging

Much more becomes possible when bi-directional EV charging meets intelligent software.

SCENARIO 8: **EVS AS EMERGENCY POWER**

EVs plugged into the real estate asset can serve the role of emergency power. Rather than invest in diesel or other carbon-intensive generators, a facility may choose to activate its fleet and visitor EVs through an arrangement where EV batteries are discharged in emergencies for a price that suits all while preserving sufficient charge for the vehicle owner to get home. As EVs become more prolific and the market transitions to the all-electric future, imagine the value of this scenario to mission-critical operations such as hospitals.

V2X means vehicle-to-everything. It includes many different use cases such as vehicle-to-home (V2H), vehicle-to-building (V2B), and vehicle-to-grid (V2G) services.

SCENARIO 9: **EVS AS DEMAND MANAGEMENT**

EVs become a regular lever of demand management. Imagine if a movie theater offered to paid customers to discharge their EV battery (again, without compromising their ability to get home) during an afternoon screening. Now, imagine how useful this can be for assets constrained in on-site generation but where customers park for extended amounts of time, e.g. airports. They may be able to reduce or even avoid infrastructure upgrades while the customer comes back to cash rather than a parking bill. A win-win, plus one for the planet.

SCENARIO 10: **EVS IN P2P**

Layer peer-to-peer energy trading (P2P) within the real estate asset or campus to fully activate the carbon and financial potential of EVs. In this case, EV owners can choose to put the clean energy stored in their batteries for sale within their local energy community, e.g., when they know they are not going out during peak demand times.

SCENARIO 11: **EVS IN LOYALTY P2P**

Imagine converting the clean energy stored in an EV battery directly into goods and services. Imagine earning store-specific dollars while shopping there or airport vouchers while on vacation. Bi-directional charging can turn every EV into a source of liquid funds, perks, goods and services.

CASE STUDY

Carlton United Breweries: Peer-to-Beer

Clean EV power becomes a source of goods and services. Asahi's largest brewery in the Southern Hemisphere wanted to create a carbon-neutral beer but was unable to generate enough on-site electricity. Rather than engaging in a PPA, it is sourcing excess solar from its residential customers and paying them in beer! A van pulls up to each participating curbside and offloads as many cases of beer as that customer earned through this cashless exchange. This solution is enabled by a SaaS solution that provides real-time tracing, tracking, and trading of energy and environmental commodities.

Not only has this become a 99 percent self-funding marketing campaign — the dream of any marketer — but it attracted more than AUS$3 million in earned (aka, free) media within months.

SCENARIO 12: **V2G**

V2G stands for vehicle to grid (also known as car-to-grid) and describes solutions where the EV battery is discharged to the grid. Real estate assets can make money by selling energy to the grid during peak hours, helping balance natural variations in energy production and consumption while earning several times the amount usually paid per kWh. This is a grid flexibility service; a revenue stream potentially open to all DERs.

These scenarios illustrate how powerful electric vehicles are in accelerating the whole-system transition to the clean-energy future. To unlock the full benefit, start at the top and work down as far as leverage goes. By looking at your electrical vehicle as a distributed energy resource, organizations can reap benefits beyond carbon reduction; can shave years off payback period, drive meaningful behavior change and enhance customer loyalty. FMJ

Elena Bondareva *WELL AP, WELL PTA has a solid record of transformative innovation around persistent problems, which is the focus of her advisory practice, Vivit Worldwide. Bondareva has held public, private, teaching and board roles in Australia, New Zealand, Russia, South Africa, India, and the United States; delivered CPD training to thousands of professionals; participated in globally significant events such as COP17, G20, and the World Green Building Council Congress; published in peer-reviewed and public journals; and presented at countless international conferences.*

Resources:
LCFS basics: arb.ca.gov/resources/documents/lcfs-basics
ekWateur case study: powerledger.io/clients/ekwateur-france
Peer-to-Beer case study: powerledger.io/clients/cub-australia
Peer-to-Beer Video: youtu.be/0dqav74H2AE

In One Place

Establishing a digital materials library

BY EMILY NEWTON

Facility managers must keep track of massive amounts of information. Having all the relevant content in one place is an excellent way to avoid reaching incorrect conclusions during decision making. Additionally, a centralized information repository streamlines ease of access for all relevant parties of a facility management team.

Another benefit is the peace of mind from knowing that people have necessary records and resources stored digitally and not just in a paper format. Theft, fires and floods are some of the numerous disasters that could put physical record accessibility under threat, which is why FMs should create a digital materials library.

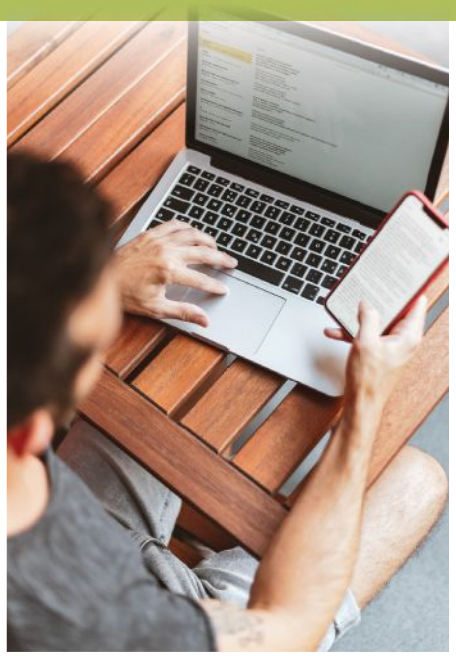
It Provides a Reliable Reference Point

FMs have so many day-to-day tasks that it is unrealistic to remember everything without help from technology. Plus, the people who know the correct information are not always available. They retire or go on vacation. A digital materials library can answer questions like:

- When was the building's main climate control system installed?
- Which company supplies the gravel in the uncovered parking lot?
- Which type and color is the carpet in the conference room?

Having information in a digital format makes it easy to update as needed. Maybe most of an apartment complex features a particular brand of paint; however, a wing added within the last two years might have paint from a different provider. Having those details captured digitally saves people from scrambling to find physical receipts, order forms or other paperwork.

A digital database can easily accommodate physical records, too, making it easier for FMs to stay organized and on top of the tasks they need to do or the things they must buy.



It Minimizes Disruptions

Facility issues can span from mild annoyances — a broken intercom system – to matters requiring temporary operational shutdowns — a gas leak that closes the facility for a day or more, depending on what caused the problem.

A recent survey of FMs in the educational sector found that 93 percent experienced emergencies from infrastructure malfunctions over the past year. Relatedly, 71 percent said they would like to reduce downtime and disruptions.

Consider a situation in which a violent storm damages part of a facility's roof, but the issue has not yet caused enough of a problem to put people at risk or otherwise warrant a closure. Once an FM becomes aware of the problem, having one place from which to retrieve the necessary details about replacement supplies or the service people to install them reduces the chances that fixing the problem will cause a long-term operational pause.

A digital materials library could also help FMs track which products work best. Perhaps someone vandalized a prominent college building only four days before campus tours are set to start. A digital materials library could contain specifics about the best product to clean graffiti and a note that two other options also in the system do not work as well. As long as the FM team can obtain the best product quickly, there is probably no need to delay the planned tours.

It Supports Issue Management Plans

Besides containing details about the type of flooring used in a cafeteria, the manufacturer of the faucets in the restrooms and the brand of furniture chosen for the main lounge, a digital materials library can also contain information about which parties to contact when things go wrong.

For example, a commercial energy supplier can assist with a an organization's cost-control efforts by suggesting ways to save and find hidden expenses. The contact person at such companies can also provide accurate information during immediate challenges, such as a power outage at a busy hospital.

That is a significant crisis, but consider a smaller snag. Maybe the smart lights in a room will not respond to commands from the accompanying app, yet people can still turn them on manually. It is in an FM's best interest to sort out that problem, especially because doing so allows getting the maximum return on investment from the technology.

A digital materials library could contain scans of the user's manual included with the smart lights, allowing the FM team to quickly access it and use the content as a first step in the problem-solving process.

It Enables Consistency Across Sites

Having a database of materials is also valuable when property managers may oversee sites in multiple locations and want them to look the same or similar regardless of the place. There is no need to guess which shade of blue paint to use in the bathroom if the FM team can find it by looking at a database.

As decision makers prioritize eco-friendly upgrades, many choose materials to create cool roofs. These send more heat into the atmosphere than conventional roofs. However, the appropriate options vary depending on the local climate and the roof's average sun exposure. A digital materials library can confirm the differences across various buildings overseen by a member of the FM team, making maintenance more straightforward.

Designers commonly use digital materials libraries, and one particular use case shows how property managers could benefit from approaches that originated in the design world. That indexed and cross-referenced library contains more than 1,000 materials, including less common ones, such as a leather-like material made from bark.

Besides inspiring users about materials to consider, this collection also contains direct sourcing links. That way, once a person finds an option that seemingly fits their needs, it is easy to research it further or even plan to purchase it.

It Supports Safety

Hazard reduction is a significant part of FM success. Servicing a boiler on the recommended schedule or applying non-slip material to areas of heavy foot traffic are two practical ways to cut down on accidents and injuries.

A digital materials library can support such efforts by clarifying the precise products purchased for a facility's upkeep. Such information becomes vital when news breaks of recalled products.

In early 2021, consumer product regulators in the United States recalled containers of a spray-on product that prevents corrosion. They noted that a flaw in the product's pressurized container could cause the bottom to suddenly detach and hurt users. The regulators provided a batch number of the affected products.

If the digital materials library includes enough supporting details, verifying whether a purchaser ended up with the faulty cans is easy. Plus, the product in question helps with galvanized steel repairs. Any database of primary materials used by a facility manager should ideally include supplementary information about the products used to treat such surfaces.

Relatedly, a digital materials library can contain content about all of a building's fireproofing measures. For example, a wall's fire rating varies from 20 minutes to 4 hours, while door fire ratings are typically for shorter periods. Additionally, using fire-safe furniture is another measure to keep blazes more contained. A database can specify the location of all flammable products, such as alcohol-based cleaning products.

It Facilitates Team Member and Contractor Communications

The FM sector is one of many experiencing a labor shortage. One global market report anticipates a 6.6 percent compound annual growth rate in the industry through 2027. However, the authors noted, "...There is a stoppage in adopting of facility services for maintenance services owing to shortage of manpower and capital." The report also said, "...the non-availability of staffs is causing hindrance in the facility management services around the globe."

Some potentially compounding issues are contractor and materials shortages in the construction sector, which could both come into play if FMs must coordinate urgent building maintenance. A June 2021 report found 35 percent of contractors turned down work due to the labor shortage. Plus, 46 percent of respondents felt concerned about the reduced availability of building materials.

Having a digital materials library could help with both of these challenges by streamlining the communications between a facility management team and any applicable third parties. For example, that database might include a log of area contractors contacted, including their estimated lead times for sourcing the supplies they need. It could also contain any records of communications between the parties involved.

Then, a digital materials library can become a helpful resource if an FM needs to hire new permanent or temporary team members. Giving them access to the information it contains as part of their onboarding process is a practical way to help them hit the ground running while also familiarizing them with the contractors used to complete work in the past.

Start Creating a Digital Materials Library

These are only some of the compelling reasons why FM professionals should seriously consider taking the time to build and maintain a digital materials library. Such an endeavor takes time, but it can pay off immediately and over the long term. FMJ

Emily Newton *is editor-in-chief of Revolutionized, an online magazine exploring innovations in science and technology. She has more than five years of experience writing stories for the facility management, manufacturing and construction sectors.*

Resources

honeywell.com/us/en/press/2021/07/honeywell-survey-security-and-safety-top-the-list-of-education-facility-priorities

uschamber.com/infrastructure/new-report-finds-construction-contractors-struggling-find-workers-building

einnews.com/pr_news/557391993/facility-management-services-market-outlook-growth-opportunities-by-2027-key-segments-benefits-key-players

Optimizing Real Estate

It's never been more important than now

BY JENNIFER HERR & ALLISON PFEIFER

JCI HAWLEY ROAD, WAUWATOSA, WISCONSIN, USA
An open atrium with a café, communicating stair and two-story media wall equips this corporation to host an 800-person town hall meeting, in addition to providing general circulation, chance encounters, and adjacency to open collab spaces and kitchenettes.

Whether owned or leased, there is an inherent and significant cost to real estate. With many corporate portfolios spanning multiple locations, real estate is one of the largest overhead costs impacting profitability. Add the complexity of the COVID-19 pandemic, and the office setting may never be the same.

Now, the predicament is determining how to evolve corporate real estate strategies to respond to rapid change. Deciding to reduce footprint, maintain existing, or even expand, is not easy, especially in this climate. When evaluating portfolios, facility managers must consider employee insights into how space is used, which spaces are underutilized, how often people are physically in the office and what technological changes are required to adapt to feedback received. Even more challenging is the fact that these evaluations are not static; space utilization is, and for the near future will remain, dynamic and fluid. For corporations with a hub-and-spoke model of regional or branch locations, there is also the coworking strategy to consider. This strategy offers an enhanced ability to extend reach beyond current corporate locations, which comes with real estate implications and decisions.

Real Estate Strategy is More than Just an Equation

Traditional real estate ratios, such as square foot per person or dedicated 1:1 seats per person, have lost validity with the recent and rapid workplace upheaval. The future corporate real estate equation needs to be more than just a numbers game; it must also be with the lens of employee engagement, culture and work style changes to make the office an attractive destination.

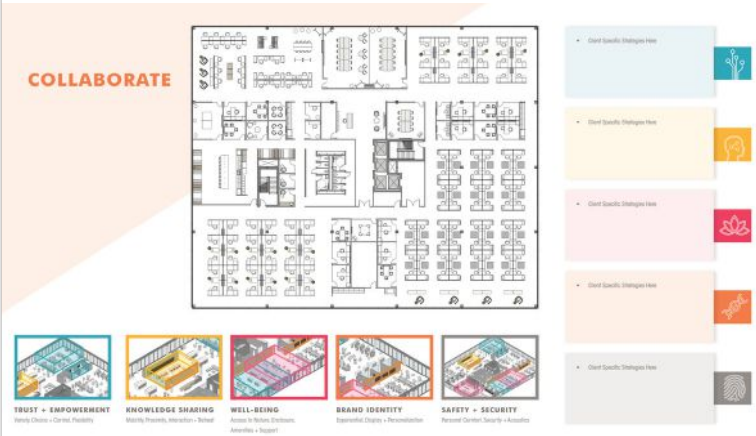
It has become increasingly clear that the quality of space is more important than the quantity. When spaces align with corporate policies and are flexible to support the type of work conducted as well as the employee experience, they can play a significant role in attracting and retaining top talent. Changing work policies, like offering a hybrid approach, have introduced a new equation to the mix. With a hybrid model, real estate needs to adapt; establishing levels of mobility to influence the ultimate flexibility of the space. Executed correctly, a hybrid strategy can also significantly reduce the need for real estate.

Whichever real estate strategy and associated policies are chosen, it is vitally important that corporations align each with their specific culture, goals and values.

Understanding Space Needs

The first step in understanding real estate space needs is gathering current state data as part of a basic pre-planning exercise. Identifying how people work best today is a good place to start when planning for tomorrow. Pairing these findings with the amount of space needed for tasks will provide more direction on square footage needs. This can be done by surveying the approximate number of staff in the office per week, or through digitally monitoring room usage and overlaying this data with policies on office presence to help drive decisions. Other methods for data collection include occupancy sensors, chair monitors, physical observations, badge usage, or assessing room reservations and number of attendees.

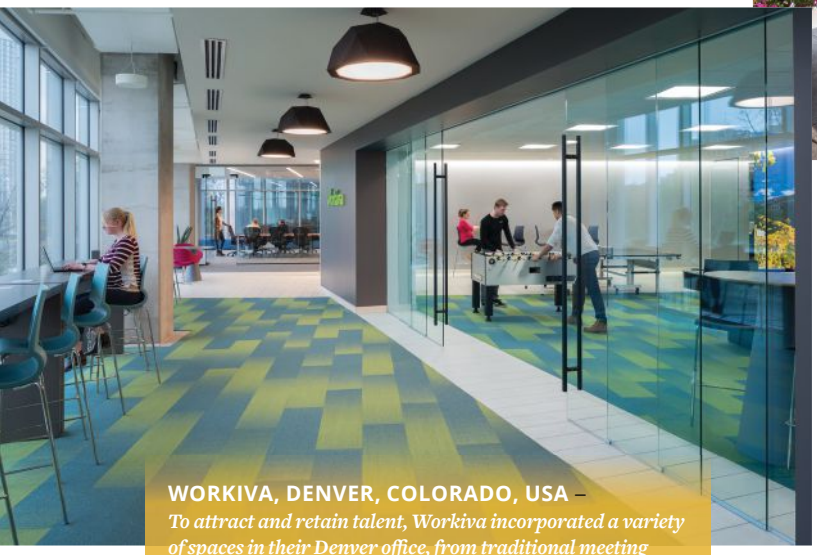
Analyzing this data is where strategy comes into play. Understanding employee expectations, reasoning and schedules can help establish some baseline cultural preferences. Surveying at the employee level is one of the best approaches to gaining this valuable insight. Going a step further and understanding psychological, physical and socioeconomic preferences to find the right balance of space to job function and office presence can result in a space that supports productivity, with a positive impact on employee satisfaction and inclusion.



This EUA developed work mode planning diagram is customized based on client space plan and core culture goals with identification of zones and design considerations to support five core workplace design drivers for an engaged workplace.

Fortune 500 Headquarters Corporate Office: Data gathering was the first step to understanding target capacities in a recent project that included the consolidation and renovation of an existing headquarters in response to changing office volume expectations and new remote work policies. Teaming with human resources, the

LBA REALTY, DENVER, COLORADO, USA
In addition to maximizing interior real estate, outdoor space should be considered in the real estate equation, especially when weighing less objective factors such as culture and employee well-being.



WORKIVA, DENVER, COLORADO, USA –
To attract and retain talent, Workiva incorporated a variety of spaces in their Denver office, from traditional meeting spaces to social zones.

FM group created a survey asking managers to reflect on the number and frequency of staff coming into the office. This data helped establish an initial baseline of required dedicated seats versus shared seats, for both workstations and private offices. The survey, in tandem with manager interviews, also established five new work mode profiles that supported the individuals' job function and proven frequency in the office. The identified profile space needs were combined with several collaborative areas to form an initial test fit, acting as a means of assessing density and testing the ratio of dedicated seats to shared seats, as well as the amount of focus zones to collaborative areas. Through working sessions, the test fit evolved into a final space plan, resulting in an exciting, unconventional "neighborhood" strategy in support of the density the company was striving for.

Regardless of the designated work mode, it may not be realistic to ask employees to spend their entire day in the same environment. Based on the type of work being performed, there could be several ideal work settings each day to perform at the highest level. Activity zones — like neighborhood, connect, social, recharge or support areas, for example — offer variety and choice throughout the day. Striking a balance between activity zones and focus areas offers employees a level of inclusivity for their unique workstyles and needs.

The Impact of Policies and Culture on Space

Space is only part of the equation. The ultimate policies put in place and culture of the organization will also influence real estate decisions. With the Great Resignation underway, policies that attract and retain staff are rising in importance. The workplace strategy may directly translate to in-office, hybrid, free address or work-from-home policies.

With the Great Resignation underway, policies that attract and retain staff are rising in importance.

Designing for Remote or Hybrid

With the increasing prevalence of remote work, companies are being tasked with establishing their level of support for employees outside of the office. This can include decisions such as providing additional furniture or technology resources in addition to the brick-and-mortar office space.

New Corporate and Manufacturing Headquarters: A discussion regarding the ideal meeting experience was paramount to the design of a new campus during the pandemic. Meeting spaces required extra attention to ensure the "mixed reality sessions" are inclusive and collaborative for those within and outside the room. Basic solutions involve larger digital screens and high-powered, strategically located cameras with the ability to optimize the viewing experience from both sides of the screen. In addition, heightened awareness of what is in the virtual attendee's

DOUGLAS DYNAMICS, MENOMONEE FALLS, WISCONSIN, USA
An effective way to optimize real estate is by creating spaces with dual purposes, such as a break room which can also function as a meeting space.

viewing area is critical. Everything from workstation orientation to acoustics and lighting can impact the overall experience.

With the rise of the virtual or remote workstyle, another element found in more corporate settings is green rooms or recording studios. These spaces are trending to not only larger, but also in more easily accessible areas. They are shifting out of the back corner of the building, adjacent to the executive or marketing suite, to support the demand and increase of leadership videos, virtual trainings and digital communication methods.

Options for Reimagining Space Use as a Smart Investment

Everyone wants to know: Is there a silver bullet to making the office a desired place to work and attract people back? Is the right strategy for reducing real estate portfolio and liability, or is it changing existing areas to increase flexibility or adding new amenities? Facility investment decisions will be unique to each corporation based on their individual culture, work type and desired employee experience.

- **Reducing Space Liability through Portfolio Reduction or Leasing |** Many organizations have used the pandemic as an opportunity to reexamine their lease agreements and where possible, decrease space. In addition to the option of leasing extra space to a new tenant, there are a few other creative real estate solutions to explore. For law clients, standardizing office sizes is becoming more prevalent, providing long-term flexibility by allowing rooms to switch between conference or office space in an instant. With many having nationwide real estate portfolios, releasing the hierarchical expectations of the past allows them to free up or eliminate significant real estate. Still other companies in different industries are taking large swaths of unused warehouse space and leasing to remote servers, receiving historically high rent for the space, while reserving it for future growth and use.
- **Identifying Revenue Generating Solutions |** Another growing trend in urban settings is to segment off first-floor retail space to double as a café space for employees as well as being open to the public and functioning as a revenue generating business.

Flexibility in Office Space

Employees are expected to multitask day in, day out; so, why should space not be expected to do the same? Providing flexible spaces sends a loud message: "Life is not stagnant, and things can change at any moment. By incorporating flexibility, we are planning for the future." When space can dually function, it gives employees more options for how they want to work as not everyone needs the same thing to be productive. Providing variety allows the office experience to flex, mold and change, giving users more control and resulting in happier, more satisfied employees. That is what many people enjoy about being home, the control over their environment; it can be compelling to have a comparable level of control in an office setting. There are many ways flexibility is being heightened in the office environment including:

- **Furniture-based solutions |** These offer a user control aspect, with the ability to seamlessly divide open office spaces into collaboration zones or provide visual and acoustical privacy when needed. Also, movable furniture, like adaptable workstations on wheels, allows employees to create their own work environment, enhancing collaboration and connection with the option to easily shift back.
- **Conferencing and Assembly Spaces |** Increasing flexibility in large rooms is of increasing importance. Telescopic seating maintains the appearance of auditorium seats, but functions like bleachers, collapsing and banking across a wall, allowing the space to function as a tradeshow, banquet hall or event space.

ROCKWELL AUTOMATION, SAN JOSE, CALIFORNIA, USA
Movable partition and furniture allow employees at Rockwell Automation to transform their surroundings to adapt to their needs, increasing satisfaction and encouraging innovation.

- **Dual Purpose Space |** Real estate can (and should) support more than one use, like an atrium with communicating stairs that double as an all-hands space.
- **Operable Partitions and Demountable Walls |** By providing ease in reconfiguring and expanding conference/training space types, these reduce overall costs in the short and long term.

The Rise in Amenity-based Spaces

Another real estate strategy is to focus on providing amenities and experiences that cannot be duplicated at home to entice people into the office. There is a growing realization after working remotely that some portion of dedicated employee space can be reallocated to collaborative space. Some examples of this include:

- **Conference Centers |** Many clients are rethinking entire swaths of traditional workstation office space and reconfiguring them into shared spaces that function as flexible and collaborative, social and customer-facing conference centers.
- **Outdoor Spaces |** When talking about real estate reuse, it is not just indoor spaces that should be considered. The outdoors can be harnessed and reinvented with outside gathering spaces, gardens or rooftop patios to offer employees relaxing views and access to nature.
- **Fitness and Wellness |** To support the ever-increasing emphasis on well-being, employers are looking at ways to provide social and healthy outlets for employees with class-based fitness, meditation spaces and increased quiet and private spaces to take telehealth visits.
- **Gathering Spaces |** Providing social interaction is often one of the most cited attractions to the work setting; defining spaces that support happy hours, eating and social activity are important to foster and build culture.

So, What is the Right Real Estate Strategy to Attract People Back to the Office?

As real estate strategy for the future develops, office planning will need to be done with a thoughtful lens to support meaningful employee engagement, innovation and positive cultures. Looking at the real estate equation as not just a metric or ratio but a meaningful tool to promote engagement, will help revive cultures that have suffered during the pandemic. Understanding worker modes to balance personal and shared spaces that promote connection among employees will be key as companies start to attract employees back to the office. FMJ

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COVID-19'S RIPPLE EFFECTS

Supply chains, costs & staffing

BY ARTHUR GWIN

Despite COVID-19 precautions remaining at the forefront of the conversation, life and needs for the building envelope goes on. Capital projects, day-to-day operations, and talent acquisition still create challenges for facility and campus operation. Focusing on the major institutional master plan and achieving a better-built environment for owners and occupants is key.

Navigating the constraints of what the pandemic has placed on supply chain bottlenecks, constant waves of COVID-19 infections that slow down revenue streams for hospitals from elective surgeries to focusing on patient care exclusively. Understanding these hurdles can help put into perspective a facility's needs and push back critical infrastructure projects for years. Competition for capital dollars becomes more of a priority when the last two-and-half years have been a pivot to managing day-to-day operational challenges through keeping a hospital environment safe for patients and staff. The facility management industry must focus on a few hurdles in the coming years.

Technology is ever-changing and the evolution of the Internet of Things (IoT) in building automation systems is only getting more sophisticated and more expensive. In the health care sector, budgets are leaner and integration of newer technology for buildings is a push and pull scenario. FMs can sometimes find themselves in a break/fix cycle but finding the right systems to integrate with older building technology is a challenge. Managing equipment through technology is only as good as convincing the C-suite and FM leadership to improve the systems.

Merging data and minimizing technological debt can make it work. For example, if in an 11-story hospital, and the pneumatic tubes no longer work, the organization cannot lose the ability to easily send laboratory items or pharmaceuticals from the 11th floor to the second floor. An FM can hire more staff members to fix the system while operating the hospital, but that cost directly affects patient care and the budget. Digital system conversion can be expensive, for example, a 200-point data system on digital controls conversion for one hospital was $50,000 just for the controls. Digital systems are moving more to the cloud. The price to convert to digital automation system controls or replace an HVAC unit can be a huge part of a budget and can be difficult to justify to leadership. The competition for capital dollars is fierce and FMs want to make the right decision for their stakeholders and patients. Weighing the cost benefits of fixing now or upgrading can reduce energy consumption and the hospital's carbon footprint but it is not always smart to be on the cutting edge of emerging technology without analysis, data models and cost analysis.

Cyber security has become a critical aspect of an FMs scope of responsibilities, especially over the last five years where ransomware attacks focus on hospitals and harvesting patient data. The 2017 global WannaCry ransom attack of Nation Health Services (NHS), affected encrypted hospital data and demanded US$300 million in bitcoin to release the data.

Hospitals using older Microsoft operating system versions lacked the security patches which left systems vulnerable. Cyber hackers have adapted their tactics quicker and more efficiently. According to the latest figures, 295 cyberattacks are known to have been conducted in the health care sector between June 2, 2020, and Dec. 3, 2021. The attacks have been occurring at a rate of 3.8 per week and have occurred in 35 countries.

Building automated systems are moving to the cloud and making tasks such as data analysis, troubleshooting, monitoring HVAC and lighting schedules, start-up information easier. IoT building systems bring risks of vulnerabilities presented by VoIP telephones, sensors for HVAC systems, or office equipment, for example, creating backdoors into hospital networks. Spearheading an update of operating systems and keeping security patches up to date is a vital component but can come at a cost if networks and computers need to be updated as well. FM is not meant to be the IT department, but a partner and a conduit for cyber security solutions. FMs should analyze the security practices of their cyber security vendor and install best practices in line with the facility's IT security needs and patient data protection goals and hold cyber security vendors responsible for developing proper cyber hygiene to protect vulnerabilities. Strengthening cyber security will

secure patient data, lives and protect health systems from paying unnecessary ransoms.

Staffing is the backbone of the health care industry, and the pandemic made staffing retention and acquiring quality talent challenging. Because the pandemic coincided with a time when older staff close to retirement left the workforce, there is a void of institutional knowledge. Organizations are challenged to find leadership and knowledgeable maintenance staff to fill those positions without loss of quality.

Some FM positions, such as maintenance and repair, experience low turnover because employees tend to be compensated well which leads to people aging in roles. However, when the highly skilled tenured employees retire, it can be difficult to find their replacement. Building security and environmental services tend to have more turnover because the positions are considered entry-level and wages are typically lower.

Preparing the next generation of FMs and trade workers has been pivotal in recognizing the need to create more industry-specific programs to prepare the next generation of professionals. However, health care FM has its own hurdles including on-the-job training and unique industry terminology. Understanding everyone's role from doctors to infection control to environmental services to FMs and where they fit in and complement each other makes for a stronger team.

Supply chain and budget issues are a critical hurdle for FMs throughout the pandemic and will continue long after the pandemic ends. The cost of materials has been rising to unprecedented levels across every industry. According to Dale Gai, research director of Counterpoint Research, chip developers are paying 40 percent higher production fees for legacy chips that are in the shortest supply.

Bottlenecks in manufacturing, not enough workers to produce items and stretching the manufacturing sector to its max have caused a bullwhip effect. Rising costs have affected budgets and postponed projects that have been scoped and approved. Budget forecasting is becoming more complicated with rising material costs (sometimes up to 40 percent) and lead time (which has extended to months rather than weeks) for capital projects and critical infrastructure needs.

The pandemic's disruption of impact of the supply chain created an unforeseen impact on the care of patients and investments in staff. An influx of patients caused shortages in staff from medical professionals to cleaning personnel. Sick leave, staff working overtime to cover for sick coworkers and hiring vendors to cover shortages also affected staffing budgets. However, FMs must continue planning improvements and investments because the shortage could turn into a surplus and material prices return to pre-pandemic levels.

CONCLUSION

FM has a tremendous responsibility to the owners, patients, and staff to ensure the environment is safe and exceeds standards for all occupants. All the while, they must also maintain their daily responsibilities of bridging old and new equipment, managing systems, navigating climate change, implementing the organizational masterplan and investing in capital needs. FMJ

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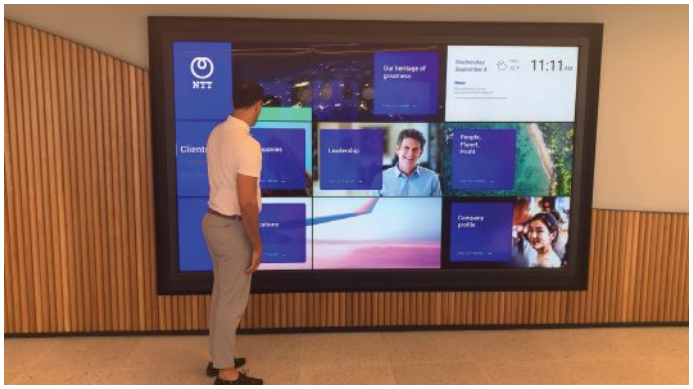
SHOW THE WAY

Using effective signage in facilities

BY TOMER MANN

Facilities' radically changing landscape has sent managers on an operational roller coaster. Organizations are eager to resume pre-pandemic professional and recreational activities, but several challenges persist, including evolving public health guidelines and new hybrid work models. Today's facility management professionals and business leaders must shift to accommodate the organizational, spatial and practical demands of the modern public space.



The facility must be navigable and welcoming but equipped with adequate access control. Many spaces also need a mechanism to reserve spaces and monitor their use and occupancy. These systems must be user-friendly and simple to operate, control and update. That is no small feat, and the clock is ticking. Many facilities have already moved from a remote work model to partial or fully staffed in-person activities, and no organization wants to lose momentum or take steps backwards. To preserve business continuity, operational efficiency and public health, businesses must be prepared to respond to evolving circumstances, recommendations and protocols that are still very much in flux.

FMs are at the epicenter of overseeing new operational realities, with a comprehensive look into how employees work, customers behave, supply chains operate and businesses perform. The global outlook is still hazy, so it is critical to remain flexible and most importantly, keep employees and customers safe and informed. Omnichannel visual communication can play a critical role in supporting a successful reopening.

NEW STANDARDS FOR ACCESS CONTROL

Amid the COVID-19 pandemic, companies across industries pivoted their attention to building access. The latest advancements in access control solutions are delivered via kiosks. Welcome screens positioned at the entrance of facilities have been a staple in communicating critical safety information and prompting visitors to follow directions, but recent updates in plug-and-play software have unlocked more advanced capabilities. Designed to reduce viral spread, the solutions can be easily programmed to monitor who is entering, determine whether they are wearing a mask, trigger check-in via surveys or badge scans, and allow administrators to automatically allow or deny access.

For the end user, access control streamlines protocols for entry. Health or check-in surveys can be completed directly on the screen of a kiosk or via a QR code scan to a mobile device to reduce touch points. Kiosks can also be equipped with a virtual receptionist who can safely and instantly video chat to provide information and direction. The most essential feature FMs should look for to provide an excellent end user experience, however, is interoperability. The best solutions for access control should be automated seamlessly with existing signage and visual communications features to ensure consistency across the entire visitor journey — from the entry to the endpoint.

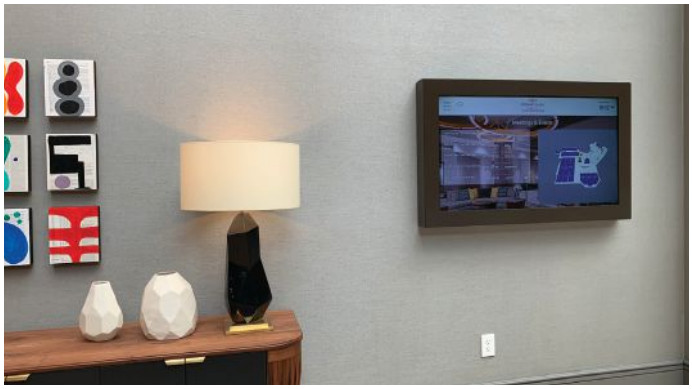
TAKE IT TO-GO: MOBILE, INTERACTIVE WAYFINDING SOLUTIONS

Statistics from Deloitte have shown that 30 percent of first-time visitors report confusion entering facilities, and 25 percent of staff members cannot find some destinations within their workplace or campus. Luckily, there is a lot the modern smartphone can do, and thanks to today's adaptable and device-friendly interfaces, interactive wayfinding can be a fully touchless experience. Interactive wayfinding is an extension of the visual communications experience, integrating into existing systems to empower staff, visitors and customers within any facility to get to their destination quickly. Users can look up directions to their destinations on an interactive wayfinding kiosk or sign, then carry those directions to their mobile phone with a simple QR code scan. Facilities have a range of options for mobile wayfinding experiences, from lightweight, browser-based maps and directions to rich, native app experiences with customized features like 3D wayfinding, augmented reality (AR) directions with popups for promotions and turn-by-turn "blue dot" directions.

This experience does not involve touching any shared surfaces. Touch-free technology allows enterprises to offer a fully interactive experience for digital signage and wayfinding. For example, mobile control is on the rise for reducing public touchpoints, eliminating hygiene risks associated with touching and physically interacting with screens. Upon entering a facility, users can use any mobile device to scan a QR code on the display or kiosk they wish to interact with. They can then operate the interactive controls from their mobile device's web browser – without downloading or installing an application. Occupancy control features can also integrate with a wayfinding app to ensure safety protocols and space utilization limitations in alignment with CDC recommendations.

MANAGEMENT WITH SPACE UTILIZATION, HOTELING AND HOTDESKING SOLUTIONS

Management of rooms, desks and spaces is a critical component of building efficiency and safety. As another layer to the visual communications portfolio, deploying a collaborative mobile experience allows end users and FMs to gain oversight into booking meeting rooms and shared spaces. From a public health standpoint, this feature is especially advantageous: Space utilization software can provide an up-to-date interface for all employees that shows



vacant or recently sanitized rooms, as well as what rooms need to be cleaned or are occupied, and even deliver content to the mobile devices of meeting attendees. With automated occupancy reporting, facility professionals can make decisions about how they use spaces for optimal efficiency.

In addition to the public safety benefits, room booking solutions can provide greater productivity and safety, ensuring there is always a clear direction on where to go and when. This technology allows FMs to set business leaders up for success with a central application to manage meeting spaces throughout a facility. When integrated into the visual communications suite, room booking technology can integrate seamlessly into signage, welcome kiosks and wayfinding to ensure that occupants can access directions and information from anywhere within the facility. The right content management software makes this all possible, so it is essential for FMs to choose a partner that provides easy, customizable set-up for the needs of the organization.

DELIVERING THE "WOW" FACTOR WITH VIDEO WALLS

Visual communication technologies are no longer a novelty; instead, they are an expectation. While facilities have primarily focused on pandemic-friendly technology lately, it is important to recognize that there is more to the digital signage opportunity. With the right content, a video wall can make people feel excited about returning to public life. Well-designed interactive screens and apps offer a dynamic medium for entertainment and inspiration, which ultimately enhances customer and employee experiences. Video walls especially have evolved from static displays to highly interactive components of communication in buildings. Integrating content management software that allows for more dynamic visitor interaction is a growing trend, from QR code-enabled mobile control to automated video messages, and from marketing promotions to directories.

The technology for video walls is changing quickly as more facilities opt to use them over single displays to inform, entertain, engage and inspire action from visitors. For these features, customization is essential. The content management solution should be flexible, easy-to-update and robust with opportunity.

DIGITAL TRANSFORMATION MADE EASY: PLUG-AND-PLAY HITS THE SCENE

Leveraging omnichannel visual communications for a combination of access control, wayfinding, information-sharing and visitor experience allows FMs, administrative teams and thin-spread IT consultants to prioritize safety and efficiency in day-to-day operations while helping visitors, employees and users. These technologies can play a pivotal role in maintaining a healthy facility as the public health situation continues to evolve, promoting safety, connectivity and communication across organizations. But extensive programming is outdated.

A template-based, drag-and-drop software suite allows for simple management of visual communications systems that supports each facility's branding, layout and content needs into a unified system that spans the full facility. When the backend is simplified, FMs can design a uniform, easy-to-navigate interface that is just as informative and helpful as it is visually stimulating. Plug-and-play solutions alleviate the strain that traditional proprietary programs cause, so anybody can have a functional and well-designed visual communications experience.

Technology is changing fast and installing a responsive, convenient, and stimulating system can be an intimidating demand for FMs. To successfully implement a suite that enhances user experiences, overcomes communication challenges, and ensures organizational workflows and safety, it is essential to select the right content management software. Plug-and-play templates take the hassle out of upgrading digital signage, wayfinding and space utilization technologies – while also allowing them to operate consistently with an intuitive, customized and impressive user interface for both the administrator and the end user. Effective signage and guest engagement bring a competitive edge to facilities while also allowing managers to take full control of their technology offerings. FMJ

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