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# FMJ

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# LEVERAGING LEAN
## FOR FM PROCESS IMPROVEMENT

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## ON THE COVER



## FEATURES



## FM SPOTLIGHT



## ON STANDARDS



## SECTIONS



**BEHIND THE COVER**
Do you know what steps are critical to your FM processes and which ones are superfluous? Utilizing the Lean Six Sigma methodology may gain some extra time in your team's day and allow you to focus on achieving your strategic, long-term goals.


**ABOUT IFMA** IFMA is the world's largest and most widely recognized international association for facility management professionals, supporting 24,000 members in 104 countries. This diverse membership participates in focused component groups equipped to address their unique situations by region (133 chapters), industry (15 councils) and areas of interest (six communities). Together they manage more than 78 billion square feet of property and annually purchase more than US$526 billion in products and services. Formed in 1980, IFMA certifies professionals in facility management, conducts research, provides educational programs and produces World Workplace, the world's largest series of facility management conferences and expositions. To join and follow IFMA's social media outlets online, visit the association's LinkedIn, Twitter, Facebook, YouTube and Flickr pages. For more information, visit the IFMA press room or www.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.

- **VIDEO:** "ISSA TV: The Buyer's Perspective" to accompany "Invest in Cleaning for a More Profitable Future" **(p. 18)**
- **ARTICLE:** "11 Ways to Reduce Cleaning Operations Costs" to accompany "Invest in Cleaning for a More Profitable Future" **(p. 18)**
- **ARTICLES:** "Selling the Value of Facilities," "Lowering Utility Costs and Increasing Performance" and "Digging Out of Deferred Maintenance" to accompany "The Hand-off" **(p. 24)**
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**Read online at www.ifma.org/fmj**

The online publication includes **FMJ Extended**, a special section following the end of the print magazine that contains additional articles not available in print. Navigate in the digital edition to the articles listed below to read contributions from councils and communities, and other supplementary content.



**ON THE GO?**
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# EDITOR'S COLUMN

**ERIN SEVITZ**
Editor

**HUMAN NATURE URGES US TO AVOID RISK.** For our earliest ancestors, taking a risk often meant decreasing the chances of survival. Our brains are still instinctually wired to seek safety in the familiar. However, it is through risk that we learn and grow.

While I touched on risk in my last column, it felt appropriate to continue the theme here since the topic is raised frequently in the articles that follow. In conceptualizing this issue, I didn't immediately envision such a strong focus on risk. But, as usual, I learned something by reading through the pieces submitted and editing to present a cohesive whole. In this case, it's how closely intertwined risk is with strategic planning.

On reflection, this makes sense: part of strategic decision making involves evaluating the potential liabilities attached to prioritizing some tasks above others. In fact, the key to strategy is often to identify your organization's (or your own) tolerance for uncertainty.

## Looking ahead

Speaking of uncertainty – are you ready for 2017 yet? Holiday season is nearly upon us, which means the new year will be here before we know it. If you're already accustomed to operating with a strategic mindset, you've likely begun thinking ahead to the projects you and your team will undertake and the goals you aim to reach next year.

Hopefully, FMJ will continue to be a part of your professional reading, but you might also consider sharing your insights by submitting an article in 2017. Whether or not you realize it, your unique experiences in practicing FM – whether you've been doing it for 20 months or 20 years – could hold the answers to someone else's challenges. If one of the themes below speaks to you, we invite you to contribute. (You can find additional details at www.ifma.org/fmj/editorial-calendar.)

You don't need to be a practiced writer; the first step is to get your thoughts on paper. What do you know now that you wish you'd known when you first started out? What procedures or methodologies have helped you overcome your obstacles? Follow in the footsteps of the "Share Your FM Story" keynote speakers from World Workplace. Each of them braved the vulnerability of addressing a crowd of thousands to create a memorable opening session for conference attendees, and in doing so, found an unforgettable experience for themselves as well.

I hope your experiences as you wrap up 2016 are filled with health and happiness. And, if you need an end-of-year gift for a colleague or client, don't forget to add an FMJ subscription to your shopping list.

### FMJ 2017 Editorial Calendar

| ISSUE | ARTICLE DEADLINE | THEME/FEATURES |
|---|---|---|
| January/February | Nov. 4, 2016 | Workspace as a Tool |
| March/April | Jan. 6, 2017 | Optimizing Operations |
| May/June | March 3, 2017 | FM and the Environment |
| July/August | May 5, 2017 | Safety, Security and Risk |
| September/October | June 30, 2017 | People, Process, Place |
| November/December | Sept. 1, 2017 | Technology and Next-Generation FM |

Erin

**STAFF**

**Editor**
ERIN SEVITZ
erin.sevitz@ifma.org

**Communications Coordinator**
EMILY BENNETT
emily.bennett@ifma.org

**Advertising Account Specialist**
DIANA MALDONADO
diana.maldonado@ifma.org

**Marketing**
CHABLIS LINDQUIST
chablis.lindquist@ifma.org

**Designer**
MICHELLE DOE

**MAUREEN EHRENBERG, FRICS, CRE**
Chair, Board of Directors

# A DIFFERENT VIEW: FM FROM A BUSINESS PERSPECTIVE

When daily priorities include keeping the business serviced and the premises safe, comfortable, clean and secure, you can't put them off for something less urgent like strategic planning...or can you? By carving out time to examine the big picture, FMs can boost long-term organizational value.

Consider the 3-30-300 principle. Let's assume that, on average, an organization spends US$3 per square foot a year on utilities, US$30 on rent and US$300 on salaries and benefits. If your organization is like most today, you are feeling pressure to reduce costs and boost productivity. But how and where, and with what mandate or buy-in from the business?

You know you can reduce utility costs by 3 to 10 percent by improving energy efficiency. However, you learn from your business leaders that their biggest concerns are not energy efficiency per se, but corporate social responsibility and sustainability, employee health and wellness, and new programs related to these areas.

That is where strategic planning comes in. By the 3-30-300 principle, a 2 to 3 percent improvement in workplace productivity could save US$30+ per square foot annually, and would likely improve employee satisfaction, talent recruitment and retention as well. Yes, energy efficiency can save money, but your team adds additional and potentially greater value by also addressing a critical need of the larger organization.

Reflecting on the recent World Workplace conference in San Diego, Chris Hood – a respected friend and a member of IFMA's Workplace Evolutionaries (WE) Community – wrote, "What is missing at the moment is the forging of a stronger dialogue between the tactical practitioners of facility management and the C-suite whom they are ultimately supporting. This is where workplace expertise comes in. The best examples of workplace strategy are those that start with business strategy and set in action a stream of discovery, planning and implementation activities tightly aligned with supporting effective responses to the business challenges that exist today and, perhaps more important, those that lie ahead."

He goes on to point out that IFMA has "perhaps the most creative, passionate and active group of 'workplace' thinkers anywhere in the world. This is not a U.S.-only phenomenon – the group has active participation from thought leaders and practitioners from across the globe."

FMs have an opportunity to tap into this expertise. Conversely, our workplace members can take advantage of the technical, engineering and operating skills of FMs to deploy smart building strategies, soft services and customer service programs, etc., that will deliver the service to execute these strategies. The support, expertise and resources are there to help you embark on a new approach to your FM and workplace strategies.

## Four steps toward a strategy-oriented FM practice

1. **Clearly link facilities objectives to core business strategies.** Uncover business plans for the coming years, and align them with facilities goals.

2. **Determine how best to measure results and gain executive buy-in and sponsorship.** Plan for change management and gain buy-in from the business, share your results and demonstrate the benefits these initiatives deliver to the bottom line of the business.

3. **Prioritize what is important and delegate the urgent.** What can only you do and what can you delegate? Pause and ponder whether others could handle that urgent stakeholder demand, or whether that demand truly is urgent.

4. **Plan thoroughly, execute thoughtfully.** Take the time to choose the right partners for the project and to establish a shared vision of the employee experience.

As Stephen Covey wrote, "Most of us spend too much time on what is urgent and not enough time on what is important." Not sure where your time has gone? Stop yourself mid-year and ask whether you have focused on a strategic issue yet. Then, act accordingly.

Maureen Ehrenberg


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# PRESIDENT'S COLUMN

**TONY KEANE, CAE**
President and Chief Executive Officer

**"THIS YEAR WE STAND TOGETHER ON THE BRINK OF AN EXCITING NEW FRONTIER FOR FACILITY MANAGEMENT."**

Sound familiar? These words were part of my opening remarks at IFMA's World Workplace 2016 Conference and Expo in San Diego, California last month.

As of today, more than 10,000 FM professionals have earned one or more of IFMA's credentials: the must-have Facility Management Professional™, the specialized Sustainability Facility Professional® and/or the highly regarded Certified Facility Manager® (turn to page 48 to see a list of the people who have recently attained these prestigious designations). I would like to continue to applaud and thank you for earning these designations, as investing in your careers strengthens the profession around us.

### THE TIME IS RIGHT

Throughout history, when conditions are just right, there are major leaps forward in culture and technology. Today's connected devices and the Internet continue to revolutionize the world around us, all made possible by building on centuries of human knowledge and innumerable advances in technology.

Right now, for the FM profession around the globe, the conditions are right for our own major leap forward.

We are seeing a profound global appreciation for what FM offers in a way that simply wouldn't have been possible a few years ago. By global I mean a world without borders — one that transcends physical boundaries, yet has multiple cultures and backgrounds interacting simultaneously at any time. Although our local information sources will continue to drive value, the emergence of global communities has opened additional possibilities to enhance the prominence and awareness of facility management.

### OPENING DOORS TO THE FUTURE OF THE INDUSTRY

My last several columns have touched on the landmark collaboration between IFMA and the Royal Institution of Chartered Surveyors (RICS) that was announced in April 2016.

If you attended World Workplace you witnessed first-hand the excitement behind the recently launched we.define.fm campaign. Together, IFMA and RICS are taking the leadership role for a discipline that has witnessed fragmentation in available resources, standards and education over the years.

Individually, as professionals and members, we recognize FM's current worth. The collaboration's aim is to add global value, making local conversations and FM positioning even more relevant. Adding a global component gives the profession amplified reach, allowing more in the C-suite to recognize FM's importance and vital part in every stage of the building life cycle.

As representatives for facility professionals, the association wants to further enhance the recognition of our industry, so global stature translates into an added layer of professionalism for the local level.

### THE OPPORTUNITY IS YOURS FOR THE TAKING

Whether you are a student preparing to enter the field or a seasoned professional, the opportunities to advance in facility management are yours for the taking. Through expanded professional recognition in FM offerings and the promise to bring a new level of consistency and common language to FM through global standards, you can join our journey to be the leader in built environment conversations.

In the coming months we will send additional details on upcoming virtual town hall meetings to provide updates and answer questions. To follow the latest news on the collaboration, get more details on benefits and/or to become an ambassador, please sign up to receive updates at www.define.fm.

I look forward to hearing your feedback as we — IFMA, RICS and the FM community — embark to define FM together.

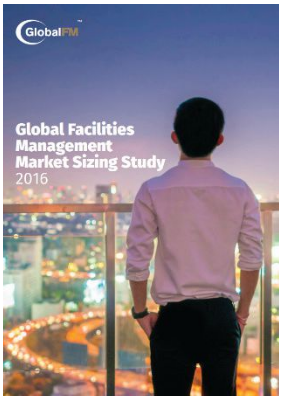
Tony

# NEW STUDY FINDS US$1.12 TRILLION ANNUAL FACILITY MANAGEMENT MARKET IMPACT

IFMA is pleased to join Global FM in sharing a detailed study that estimates the annual worth of the global facility management market to be US$1.12 trillion. The findings, which break down data for many individual countries across six regions globally, support the claim that FM is a dynamic industry poised for tremendous growth in the near future. The document is available for immediate download to IFMA members.

"The most compelling visions of the future include smart buildings and cities that require smart professionals to run them," said IFMA President and CEO Tony Keane. "The demand for facility services is growing globally, and independently of regional variations in the current levels of FM market development."

The study offers in-depth FM market analysis for 33 countries distributed between Africa, Asia-Pacific, Europe, Middle East, North America and South America. Among the findings are that the FM industry remains the most developed in Europe and North America, while tremendous opportunities can be found elsewhere if regional challenges can be met. These challenges include an undersupply of labor and FM industry fragmentation.




In April of this year, IFMA and the Royal Institution of Chartered Surveyors (RICS) announced a transformative collaboration to address both of these challenges by supporting unification through a shared suite of qualifications, an unprecedented breadth of research and information, and gold-standard FM training opportunities.

The study – which is supported by IFMA as a member of Global FM, a worldwide federation of FM member organizations – can be downloaded by IFMA members for free from IFMA's Knowledge Library at http://bit.ly/2eDsQEr.

For more information on Global FM, visit **www.globalfm.org**. For more information on the IFMA-RICS collaboration, visit **www.define.fm.**

## CBRE VIEWPOINT: THE RISE OF COWORKING SPACE IN ASIA PACIFIC: BOON OR BANE?

CBRE Research has released its Viewpoint, "The Rise of Coworking Space in Asia Pacific: Boon or Bane?" to address the growing presence and role of coworking spaces in Asia-Pacific countries.

Key highlights of the report:

- **Globally, coworking space has enjoyed tremendous growth in recent years – surging from just 75 spaces in 2007 to more than 7,800 in 2015.**
- **Most coworking spaces in Asia Pacific are located in gateway cities, including Hong Kong, Singapore, Shanghai, Tokyo, Sydney and Melbourne. CBRE Research estimates there are a total of 300 coworking spaces in these locations.**
- **Cities in Asia Pacific lag behind those in the West, such as New York and London, which each host at least 120 coworking spaces. Tokyo is home to roughly 100, while Hong Kong, Singapore and Shanghai host 40-60 each.**

Local and regional coworking space operators still dominate in Asia Pacific, accounting for a 60 percent market share. However, several international players are expanding aggressively.

## UPCOMING FM EVENTS

**SAME-IFMA FACILITIES MANAGEMENT WORKSHOP**
*Feb. 8-10, 2017*
San Antonio, Texas, USA | same.org/fmworkshop

**FACILITY FUSION EUROPE CONFERENCE AND EXPO**
*Feb. 21-22, 2017*
Frankfurt, Germany | www.mesago.de/en/inservfm

**FACILITY FUSION U.S. CONFERENCE AND EXPO**
*April 4-6, 2017*
Las Vegas, Nevada, USA | facilityfusion.ifma.org/las-vegas

**WORLD FM WEEK**
*May 15-19, 2017*
Worldwide

**FACILITY FUSION CANADA CONFERENCE AND EXPO**
*May 17-18, 2017*
Toronto, Ontario, Canada | facilityfusion.ifma.org/toronto

**WORLD WORKPLACE EUROPE CONFERENCE AND EXPO**
*May 31-June 1, 2017*
Stockholm, Sweden | www.worldworkplaceeurope.org

## CAMBRIDGE SOUND MANAGEMENT ACQUIRES DYNASOUND

Cambridge Sound Management Inc., the global leader in sound masking and speech privacy solutions, and a Silver-level Corporate Sustaining Partner of IFMA, has acquired Dynasound Inc., a commercial sound masking manufacturer based in Norcross, Georgia, USA.

As more companies shift to open floor plans, the need for speech privacy and the reduction of noise distractions in the workplace is increasing. Additionally, with many organizations adding employees to a workspace without increasing the square footage, new productivity, privacy and security problems are emerging.

To prepare for the next stage of growth, Cambridge Sound Management will integrate Dynasound's award-winning products, dedicated partners and industry experts into Cambridge's proven sound masking business model, which is reshaping the industry. The companies will combine operations immediately under the Cambridge Sound Management brand.

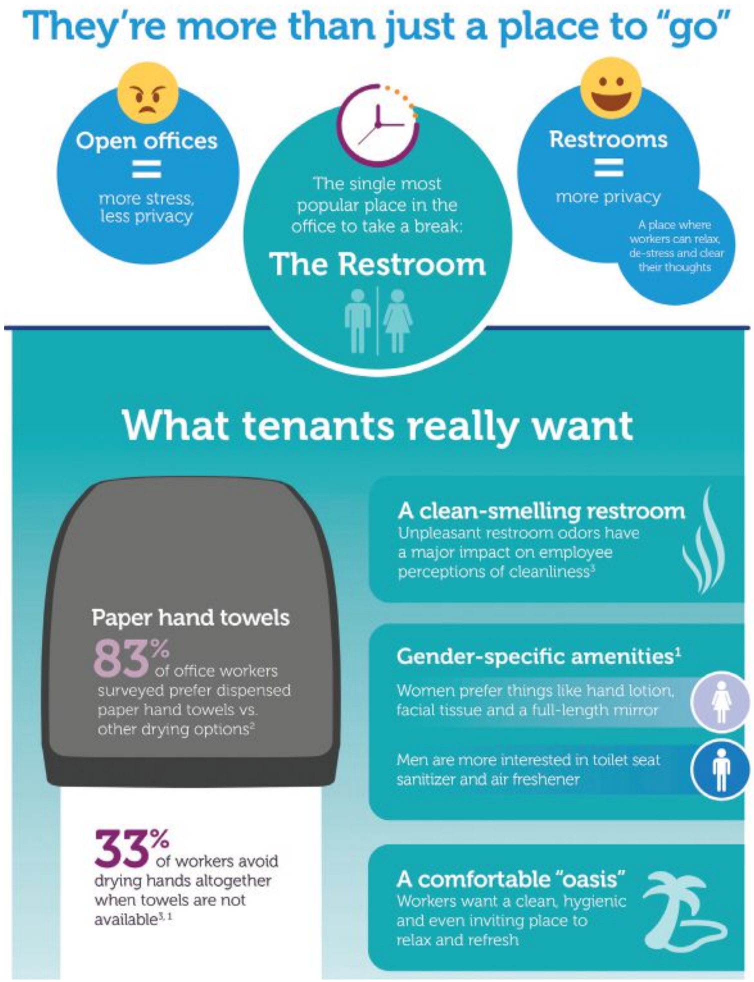
# NEW PROGRAM HELPS FACILITY MANAGERS TO ENHANCE THE RESTROOM EXPERIENCE

Perceptions of the restroom and its overall cleanliness are major factors in tenant satisfaction. To address these concerns, Kimberly-Clark Professional, a Gold-level Corporate Sustaining Partner of IFMA, has launched C.H.E.S.S., a first-of-its-kind program that helps building managers understand the role the restroom plays in tenant satisfaction and provides them with the tools to make measurable improvements.

C.H.E.S.S. is a global program that was initially launched by Kimberly-Clark Professional in Asia-Pacific and will be rolled out in other regions. To participate in the C.H.E.S.S. Program, facility managers are encouraged to take a short test to assess the current state of their restrooms. After identifying the areas most in need of improvement, the program offers tangible tenant satisfaction measurement tools that provide insights to enhance restroom performance in five key areas:

- **Cleanliness**
- **Hygiene**
- **Efficiency**
- **Sustainability**
- **Satisfaction**

For more information about the C.H.E.S.S. Program, visit **www.kcprofessional.com/chess1.**



## ISSA MERGES WITH NCSA, OFFERS THIRD-PARTY TRAINING CENTER VERIFICATION

ISSA, the worldwide cleaning industry association, has launched CITS Training Center Verification – the latest addition to ISSA's multi-faceted Cleaning Industry Training Standard (CITS) program.

The CITS program was established in 2014 to raise the level of professionalism in the cleaning industry and to empower frontline cleaning workers. Training courses offered through the CITS program give cleaning professionals the knowledge and credentials to validate their abilities and supervisors and trainers the opportunity to hone their training and leadership skills.

Training center requirements per CITS include, but are not limited to, a dedicated, permanent area for training that complies with safety regulations and addresses the comfort needs of all participants and has multi-media capabilities and materials and equipment for hands-on demonstrations.

For information about the CITS Training Verification standard and application, visit **www.issa.com/citsverifiedtrainingcenter.**

News of the training center verification program followed the announcement that members of the National Cleaning Suppliers Association (NCSA) voted to merge their organization with ISSA. Under terms of the agreement, NCSA members will retain their NCSA memberships on a local level, but those memberships will expand to include global ISSA membership and benefits. Once the merger is finalized, NCSA members will have access to ISSA member benefits, including market exposure, networking opportunities, business tools and data, and industry information.

For more information regarding the merger, visit **www.issa.com/data/moxiestorage/news/ncsa_faqs.pdf.**

## DATA CENTER STANDARD PUBLISHED BY ASHRAE

A newly published energy standard for data centers by the American National Standard Institute (ANSI) and the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) features a performance-based approach that is more flexible and accommodating of innovative changes that rapidly occur in design, construction and operations in that industry.

ANSI/ASHRAE Standard 90.4-2016, Energy Standard for Data Centers, establishes the minimum energy efficiency requirements of data centers for design and construction, for creation of a plan for operation and maintenance and for utilization of on-site or off-site renewable energy resources.

High plug loads and rapidly advancing IT technology make data center applications significantly different from their commercial building counterparts. Standard 90.4 specifically addresses the unique energy requirements of data centers.

To learn more about Standard 90.4-2016, Energy Standard for Data Centers, visit **www.ashrae.org/bookstore.**

## IFMA'S KNOWLEDGE LIBRARY: **New look, new content**

There's a fresh look to IFMA's Knowledge Library, and it's all thanks to the input of industry professionals like you. Our feedback-based design has been tailored to improve your browsing experience by placing featured resources front-and-center, with new content being added every month.

IFMA has also worked with numerous FM industry organizations to deliver new collections of valuable content, which were debuted at IFMA's World Workplace 2016 Conference and Expo in San Diego, California, USA.


The Knowledge Library now features scholarly research from the International Journal of Facility Management (IJFM) and thought leadership resources from the Royal Institution of Chartered Surveyors (RICS). If you haven't visited IFMA's Knowledge Library, there's never been a better time to come see what it has to offer.

*Visit the Knowledge Library at* ***community.ifma.org/knowledge_library*** *to access this new content as well as many more resources for empowered facility management.*

# INVEST IN CLEANING FOR A MORE PROFITABLE FUTURE

FMJ EXTRA
CLICK TO READ:
11 Ways to Reduce Cleaning Operations Costs

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CLICK TO WATCH:
ISSA TV: The Buyer's Perspective

**BY BILL BALEK**

Strategic planning is essential to running a successful, profitable business. This extends to the finances that fund business initiatives, the marketing that raises brand awareness and the operations protocol that keeps a company running. However, when considering operations, one area that may not immediately come to mind is the cleaning procedures put in place to maintain a company's facilities.

While this operations area is often placed low on the list of priorities, it can have a profound effect on a business's bottom line. A clean and sanitary facility positively impacts employee health and well-being, and helps protect physical assets, which provides a significant return on investment in a high-performing cleaning program. Training your in-house cleaning employees and choosing wisely when selecting business service contractors can dramatically reduce costs – including those associated with employee absenteeism – and increase profitability.

## Employee illness comes at a high price

The cleanliness of a facility directly corresponds to the amount of bacteria, viruses and other contaminants on the available surfaces. The presence of these contaminants increases the likelihood for employees to become sick and spread illness to other employees.

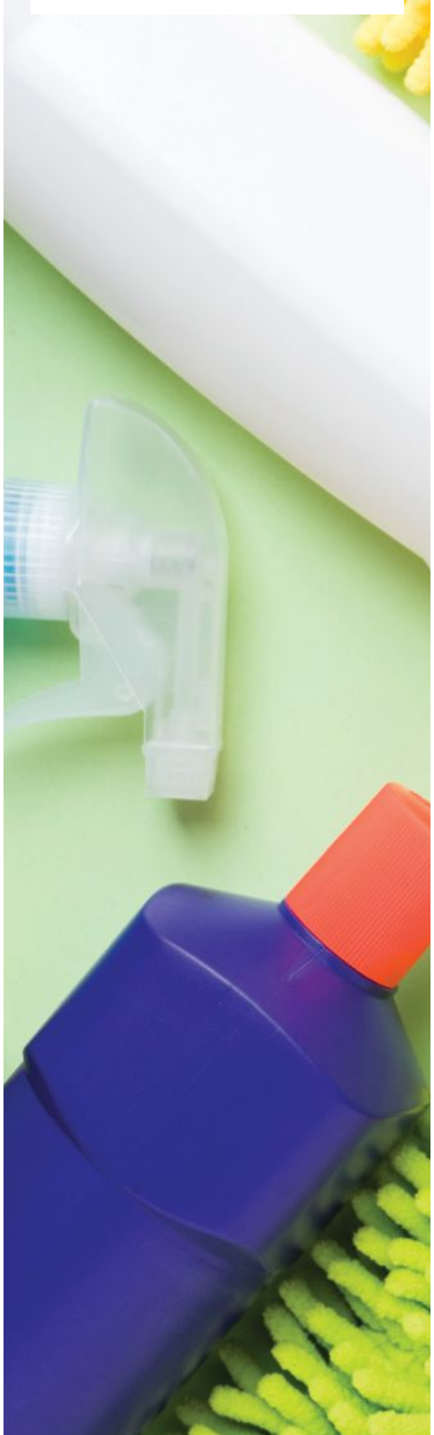
One employee falling ill may seem to have small implications for a company. But, factoring in the data that employees take an average of 7.7 sick days per year, this can add up to US$225.8 billion annually. This revenue loss does not stem simply from the employee's absence, but also from the many lesser-known costs that accompany it. Businesses must factor in the time human resources personnel must spend accounting for the absence, in addition to hiring temporary replacements, which takes away time that could be spent accomplishing the department's responsibilities. Some of the more detrimental expenses, however, result from absenteeism and presenteeism.

When employees are unable to come to work due to illness, this is called absenteeism. In addition to the human resources expenses that accompany it, absenteeism can have a variety of other negative impacts on a company. In an industry that employs workers with extensive training and high levels of schooling, it can be difficult to find qualified replacements. Temporary employees may not possess the same levels of training necessary to maintain productivity rates, which can directly lower company revenue.

A lesser-known side effect of employee illness is presenteeism. Presenteeism occurs when sick employees still show up to work but experience limited productivity due to preoccupation with their symptoms. Cold and flu symptoms can cause an overall loss in an employee's performance by 3 to 8 percent. Even if an employee is not already sick, the presence of contaminants such as dust can affect workers' cognitive skills, including typing, logical reasoning, memory and creative thinking skills, by up to 6 percent.[1] Employees' work suffers under these conditions, leading them to take longer to complete tasks, lose motivation and produce lower-quality work.

EMPLOYEES TAKE AN AVERAGE OF **7.7 SICK DAYS PER YEAR**

THIS CAN ADD UP TO **US$225.8 BILLION ANNUALLY**



## Extending the life of assets

Beyond the repercussions a dirty facility can have on a business' workforce, it's important to consider what other assets in your company could be affected by a lack of cleanliness. The daily wear-and-tear incurred by physical assets, such as carpeting, flooring and bathroom fixtures, is easy to ignore until it becomes necessary to purchase replacements.

The life cycle of these types of assets can be extended with proper maintenance and care. When companies cut cleaning budgets to save money in the short term, it can have a detrimental effect on overall return on investment once expensive replacements need to be made for items that could have lasted months — or even years — longer with regular maintenance.

The Carpet & Rug Institute (CRI) estimates that properly maintained carpets can last nearly three times longer than carpets that don't receive the proper care. The CRI breaks down the appearance of a carpet into five categories: new, good, fair, poor and unacceptable (needing a replacement). Assuming a carpet's useful life to be approximately 10 years, ensuring the proper maintenance can allow for a carpet's appearance to still rate as "good" in 10 years.[2]

This mentality should carry over to all assets contained within a company's facilities. The concept of "spending money to save money" certainly applies when considering extending the life cycles of these valuable pieces of property.

## Education and training

Many cost-incurring side effects of poor cleaning provide a strong case for improving cleaning techniques, whether in-house or by contracting with an outside provider. For in-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house services provided by company employees, many problems can be reduced through improved employee training. It's important to approach cleaning strategically in this sense, as a company would in any other area that needs improvement.

Contaminants can often be eliminated through a company's standard cleaning products and techniques. Everyday cleaning, done with the appropriate level of detail, can on its own effectively decrease the risk of illness spread to associates. Perhaps one of the most essential changes a company can make regarding cleanliness is the creation of a cleaning plan or guide for new employees. Standardization of cleaning protocols will allow employees to develop routines, as well as ensure that all employees have a firm grasp on company cleaning expectations.

Instructing employees to focus on "high touch" points is also important. Surfaces such as tables, door handles, telephones and bathroom fixtures are more likely to have high levels of microbes due to how often they're touched. Focusing greater attention to these areas can significantly decrease the number of germs in a facility's environment, making this method more effective than focusing the same level of energy on all areas.

Cultivating a culture of hygiene and overall healthy lifestyles among all employees will also improve the general cleanliness of facilities. By supplying resources for employees to foster attention to personal hygiene, including hand sanitizer, tissues and other similar products, will encourage the maintenance of both personal cleanliness as well as the cleanliness of employees' immediate surroundings.

## Choosing building service contractors wisely

If a company uses building service contractors rather than in-house cleaning providers, what goes into the decision-making process of hiring? Just as a company wants to be familiar with practices of its partner or vendors, it is important to know the standards and protocols of the chosen cleaning service provider.

The facilities services industry is one of the largest industries in the world, with more than 2.3 million service workers and 53,000 building service contractors that offer cleaning services in the United States alone.[3] These contractors often work for a large and diverse portfolio of clients, including distribution facilities, industrial plants, hospitals and office complexes.

While the flexibility of this industry is certainly useful to those it serves, it also lends itself to inconsistency. Janitorial services are often cost-driven, which has caused an increase of contractors finding the easiest, cheapest ways to complete tasks — often at the expense of work quality — to remain at an advantage among competitors. This can lead to poor-quality service that doesn't truly eliminate many of the expense-causing issues outlined above.

In the quality management book "Quality is Free," author Phillip Crosby estimates that poor quality could cost organizations up to 30 percent of revenue. When a job is done incorrectly, additional labor is required to remedy the error. The cost of having to complete a job multiple times due to low quality quickly adds up. One way to measure the impact of a company's investment in quality cleaning services is through monetary methods such as cost per work ticket (CPT). Simply divide the total annual operating expense by the annual number of tickets handled.

The cost of resolving a cleaning issue includes the following:

- Cost to receive added work requests resulting from poor-quality cleaning
- Time/cost to create a work ticket
- Time/cost to schedule someone to redo the cleaning
- Time/cost to assess the rework to ensure satisfaction
- Time/cost to communicate completion to the individual who issued the work ticket[4]

By applying metrics like CPT, it becomes easier to ensure the investment in your current service provider is a worthwhile one.

Select a building service contractor that aligns with the company's standards for cleanliness. Clearly outline what the company would like to accomplish and what fee the company is willing to pay for a service that will do the job well. By investing in a dependable service company, your business will save money in the long term.

The implementation of even a handful of these strategies can dramatically decrease workplace problems caused by employee illness. By approaching cleaning strategically, assessing what protocol may be missing, areas of weakness within current methods and putting into effect a more rigorous screening of prospective cleaning services, companies can cut avoidable expenses and improve their bottom lines. FMJ

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**Bill Balek** is the director of legislative and environmental services at ISSA where he oversees the association's legislative, regulatory and environmental programs. He has over 30 years of experience in the cleaning industry. Balek is an attorney licensed to practice in Illinois, and holds an MBA in marketing from DePaul University Kellstadt Graduate School of Business.

# the hand-off

## PLANNING FOR SUCCESSFUL TRANSITION FROM CONSTRUCTION TO OPERATIONS

BY JOHN RIMER

Consider this: A building is designed, constructed and turned over to the facilities team, often without adequate testing and with training that does not fully prepare engineers, defines only minimal operating parameters and lacks comprehensive documentation on how to operate and maintain the facility as a large, complex building consisting of a wide array of interdependent systems. Yet, facility departments are put at the frontlines to take on the barrage of occupant complaints and system errors with an insufficient amount of resources. What's missing here?

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Shouldn't operations and maintenance merit just as much attention as the design and construction phases? Think about all that goes into the design of a building and the various stages — defining the owner's requirements, multiple design sets and reviews, stacking plans, architectural renderings, specifications, and ultimately, construction documents. That is just design. The intent here is not to minimize all the efforts that architects and engineers put into the design of a facility; rather, it is to petition all involved parties to allow similar consideration for those that will operate and maintain the building for the foreseeable future, which is measured in decades, not months.

The reality is that most facility departments are often kept more than an arm's length from the design and construction phases and are brought in too late into the project to adequately prepare for a successful hand-off. The barely finished building is tossed over the fence to the facility department, with multiple contractors still tying up loose ends, furniture being set up, and occupants moving in because the deadline has been overshot. Not to mention, the building is still being commissioned, if commissioned at all, operations and maintenance manuals have not yet been received, and hopes to see accurate as-builts in your lifetime are quickly waning.

All the while, you and your team scramble around trying to learn the building, hanging dry erase boards, moving boxes and resolving occupant complaints as they get settled into their new digs. In all of the hustle and bustle, you do not get the opportunity to load the equipment information into your maintenance management system, preventive maintenance does not get scheduled, operating procedures are not written and service contracts are not put in place. It is a brand new building and you are already starting off behind.

On the flip side, thankfully, facility professionals are making great strides in getting more involved with projects and invited to the decision table. Even with such progress, there is still much more that can and should be done to ensure the facilities department is equipped and prepared to efficiently and effectively operate and maintain the facility for the unforeseeable future. In this article, we will discuss some of the steps that can be taken to help bridge that gap and prepare facilities for a successful transition from construction to operations.

## Get to the table

The first step is to build relationships and earn a place in the initial design discussions. Granted, you should not have to earn such, but that is reality. The value of your expertise and that of your team's needs to be sold up and down the management chain. Consider the collective knowledge your team of experts can provide to the conversation — you just need the chance to do so. Now, once at the table, the objective is to be seen as that expert, a trusted advisor, and to not use the opportunity to enlighten the architect or engineer of the deficiencies from previous projects. You are there to build bridges, not burn them, so that you get invited back to the table. (See the January/February 2016 issue of FMJ to learn more about selling the value of facilities.)

## Budget for success

In addition to providing guidance regarding design decisions, you should assemble and submit for approval an operating budget, staffing plan and startup costs. The operating budget should include personnel, service contracts, custodial, grounds, utilities, training and a contingency budget. Construction projects carry a contingency budget to cover the unknowns; facilities should do the same for the first year.

The staffing plan and hiring timeline are critically important. Ideally, those that will operate the building are on-board during testing and commissioning, if not sooner. Remember to allow for lead-time in finding and hiring personnel, especially the higher skill levels. Startup costs should account for initial staff training, computerized maintenance management system (CMMS) implementation (if starting from scratch), necessary tools and critical spare parts. Many of these items are discussed in the remainder of this article.

## Commissioning

Commissioning (Cx) can make for a strong ally in your endeavors. A good commissioning agent (CxA) can bring additional insight to the project and be of great assistance in preparing the facilities team for assuming ownership of the building and operations thereafter. Participating in the commissioning tests provides an invaluable learning opportunity for staff to become familiar with the building, sequence of operations and various failure scenarios. Testing procedures can be used again at a later date by facility staff to confirm continued performance through recommissioning (RCx).

Advocate for the hiring of a good, qualified CxA, as it is an investment in the long-term sustainability, operations and life cycle cost of the facility. Do not allow Cx to be relegated to the "value engineering" pile, as something that was not budgeted for or labeled unaffordable — your organization cannot afford to not do commissioning. (To learn more about the value and process of commissioning, read "Lowering Utility Costs and Increasing Performance – Commissioning and Retro-Commissioning" in the November/December 2015 issue of FMJ.)

## Information management

Along with a new building comes drawings, operations and maintenance manuals, test reports, panel schedules, specifications, etc. that provide information needed to operate and maintain the facility. This moment in the life cycle of a building affords your greatest opportunity for having accurate documentation and starting off on the right foot, so take advantage of it. Do not put yourself in the situation that most find themselves — running a building with outdated drawings and panel schedules. These design and construction documents should be received electronically and stored as such in the maintenance management system.

A document management protocol should be established to ensure that related documents are updated as changes to the facility are made (e.g. renovations, build-outs, equipment replacements and new electrical drops). Equipment information and specifications should be exportable from the schedules in the drawings and imported into the maintenance management system, so that the data does not have to be manually entered. The equipment schedules need to be generated by the design firm in an exportable format. Such electronic document requirements can be noted in the contract, so that they are supplied by the design and construction firms within a specified timeframe.

## Think critically

Business critical areas, departments and functions should be identified along with the systems and equipment that supports those spaces. Discuss with management and affected department heads their priority areas/functions and their expectations regarding uptime, reliability and maintenance windows. It is important to understand these requirements upfront, as design changes may be necessary. A criticality can be assigned to those spaces and equipment setting their priority. Criticality will be used in determining maintenance strategies, drafting operating procedures and prioritizing work orders.

## Get ready to run

Locations and equipment need to be entered into the CMMS, along with relevant data such as manufacturer, model, size/capacity and criticality. Warranty information, including expiration, contractor contacts and an electronic copy of the

## This moment in the life cycle of a building affords your greatest opportunity for having accurate documentation and starting off on the right foot, so take advantage of it.

warranty documentation, should be entered into the CMMS. Additionally, a consistent, intelligent nomenclature should be employed that concisely describes the location, system and equipment type, area served and unique identification number. Ideally, such nomenclature is used in the design and construction documents so that it carries through the life cycle of the facility. Spare parts should be identified and ordered as necessary, including critical spares.

### Maintain for life

To realize the expected useful life of assets and to ensure optimum building performance, the appropriate maintenance strategies must be employed. Asset criticality, replacement cost and condition will help to determine which maintenance to assign: run-to-fail, preventive, predictive, condition-based or some maintenance combination thereof. Once the strategy is determined, the maintenance must be scheduled in the CMMS. It is important to begin immediately so that warranty conditions are met. Make sure contractors are completing the required maintenance prior to you assuming ownership of the system, so that warranties are not voided or long-term performance hindered.

Second, those who will perform the prescribed maintenance must be identified, including the necessary training, tools and certifications. Evaluate if such maintenance can be performed in-house or if an outside service provider is required. If outsourcing, a provider should be selected and service contracts negotiated and approved prior to assuming ownership.

### Prep for operation

Commissioning documents, manufacturer manuals and contractor training can be used to draft standard operating procedures (SOP), maintenance operating procedures (MOP) and emergency operating procedures (EOP). Typically, SOPs are more administrative in nature, while MOPs script system-specific tasks, such as resetting a piece of equipment, putting it in bypass or returning to normal operations. EOPs tend to be more streamlined, step-by-step documents that are easy to follow, as they will be performed in emergent situations, such as loss of utility power and system failure. These documents should be written and tested during the commissioning process, before spaces are occupied.

The aforementioned procedures are great training tools for current and future staff. Initial training should also occur during commissioning and completion of such documents. Procedures should be reviewed annually to ensure accuracy and applicability, and staff should retrain on the documents each year thereafter.

### Save for the future

As discussed in the May/June 2016 issue of FMJ, a capital plan should be established that forecasts the replacement of assets as they reach the end of their useful life. The install date, costs and anticipated life expectancy should be entered into the CMMS or some other database. The time to start saving and planning for replacement is when the equipment is new, so you can get and stay ahead to avoid the deferred maintenance pit.

#### CONCLUSION

Now, here's the trick… all of the above should ideally be completed prior to assuming ownership of the space or systems. While this may seem unrealistic and far-fetched, we should be continually driving to get ahead of the curve, instead of always being behind, scrambling to catch up.

The key is to assemble a plan that encompasses the above areas. Incorporate that plan and its implementation into the construction schedule or maintain your own schedule that you share at construction meetings. Do not let management or the project team lose sight of all the moving parts and action items you need to resolve prior to substantial completion and before folks start moving in and the building goes live. **FMJ**

**John Rimer,** CFM, is president of FM360 Consulting and has 18 years' facility management experience in a variety of capacities and industries. He uses his breadth of knowledge and diverse expertise to provide a comprehensive perspective to his clients and students.

Rimer is very active in the facility management community and an avid proponent of education. As such, he is an IFMA Qualified Instructor and an approved Building Operator Certification instructor.

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# *defending your organization against* CYBER INTRUSIONS

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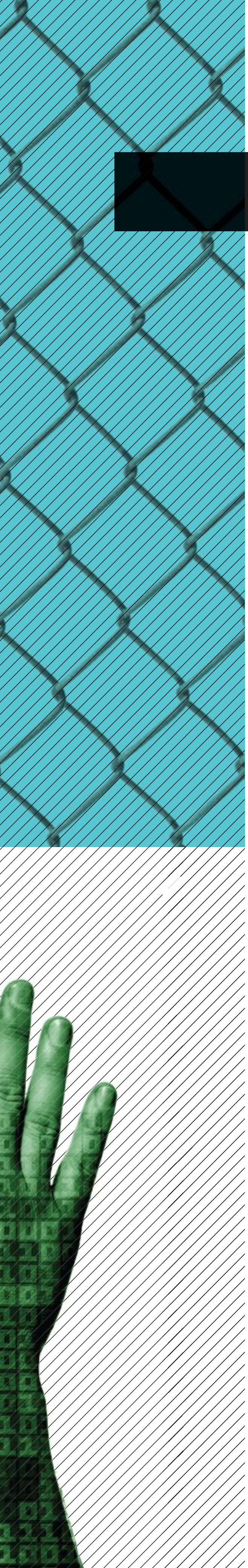


BY AL BERMAN AND ANTHONY PIZZITOLA

By now facility managers know the obvious threats to facilities: natural disasters and man-made and technological dangers. Most are prepared for natural and man-made threats, but may feel that the technological is out of our league. While we prepare for what we think will produce the greatest protection, we can be reminded of a quote from Mark Twain – **"What gets us into trouble is not what we don't know. It's what we know for sure that just ain't so."**

And while prevention and preparedness for the dramatic is easy to understand and justify, Twain would tell you it may not be the greatest danger.

## The real threat of cyber attacks

Over the last 20 years, cyber intrusion and now terrorism has become the invisible threat that attacks industry, government and individuals every second (and nanosecond) of every day. The number of attacks is incalculable, but one government agency in the United States estimates 10,000 attacks every hour. Facility managers must understand that any disaster can cause them to lose their jobs.

Often the most nuisance disaster is graffiti easily corrected by repainting. Similarly, in 1997 IBM conducted a survey on "who are the hackers" and found that 90 percent were amateurs determined to demonstrate their ability to penetrate systems for the bragging rights. These cyber joyriders were benevolent intruders whose only gain was the satisfaction of proving that they could just do it.

The world today is very different and very expensive — 65 percent of the hackers are business people whose only job is to create financial gain from their efforts. Ten percent are involved in cyber espionage, and the remainder are activists whose goal is to expose what they feel is unethical or illegal activities of government, companies or individuals. Their activities range from disclosure of documents, to interruption of operating sites through denial of service or the destruction of information and communications capabilities.

## Cyber-terrorism costs

It is the cyber-terrorists who present the biggest problem and require the greatest effort to contain. The hack for gain proponents come in many forms. The estimate of the financial impact on world economies is difficult to ascertain. In 2000 PricewaterhouseCoopers estimated the financial impact as in excess of US$1.5 trillion. Estimates today range anywhere from US$5-15 trillion.

We have spent a good deal of time looking at the economic model that today's hackers have developed, and if you want to see an efficient business model that has a sophisticated pricing model, the ability to create data warehouses that share information about victims of cyber intrusion, that has a quality control model that would shame some of our best institutions, plus the ability to create efficient joint ventures — then cyber intrusion is the future economic model.

Many of us are aware of the how institutions have simply paid hackers to give them back control of their systems and data. Cyber ransom has become one of the most efficient kidnap and ransom models in the history of civilization. It involves no physical risk of actually taking possession of a person or asset. No getaway cars, no hideouts, no money drops, no proximity to the victim and almost no chance of being apprehended. It involves simply encrypting the data of an organization or individual so that it is no longer usable. The cyber kidnappers then charge what is a nominal fee (ranging from a few hundred dollars for individuals to less than US$20,000 for organizations). Far less in terms of time and money than it would take for anyone to undo the damage, so it is truly cheaper to pay than to fight.


Those held hostage have ranged from hospitals, to financial institutions, to careless individuals. It is estimated that just one of these cyber-kidnapping organizations netted US$347 million last year. Yes, the typical damage from a hurricane is several billion dollars, but we know it's coming. We are not always prepared for the cyber pirates.

## The spread of cyber-crimes

The traditional stolen individual identification information hacking has taken on greater sophistication. It has taken 15 years for the U.S. to actually have chips embedded in their credit cards. The hacking of point of sales machines at Target and Home Depot made headlines around the world because of the magnitude of the intrusion. Tens of millions of individual accounts were stolen and the information sold on the dark web to the highest bidder. Our ability to defend against this has been ineffective and at times showed the futility of trying to react to the relentless and sophisticated world of cyber terrorist innovation.

To understand the sophistication of cyber criminals and their sole goal of financial gain, one has to look no further than the group of hackers known as the FIN4. This group has not stolen identities, has not sold the information to anyone, has not bragged about their conquests or gained notoriety by the magnitude of the information they compromised. They simply wanted to have a trading edge. Their targets were the pharmaceutical companies and more specifically the area involved in research and development.

Their objective was to find out the results of the viability of the new miracle drugs that were in the clinical testing stage. So they hacked pharmaceutical companies and their attorneys, hospitals conducting clinical tests, and even the U.S. Centers for Disease Control and Prevention to obtain inside information so they could gain by buying options on those companies with a high success probability before the information became public. None of the financial gains of the FIN4 are even calculated as part of cyber terrorism.

## Cyber-security in your facility

Just as safety is everyone's job in a facility, so is cyber security. How so? Facility departments typically use computerized maintenance management systems for project planning and maintenance routines. Operations are being tied to a computer more and more, and IT is a way of life and to the bank. Attacks can be generated simply by opening a phishing email advertising a free seminar or new product to save time, so check your sources prior to opening. As a solution, companies now have the capability of tagging a suspicious email and sending directly to security personnel for surveillance.

Faced with the daily onslaught of cyber probes and actual cyber attacks we need to provide at least the front lines of prevention. This calls for extreme vigilance and a need to ensure that we are communicating with organizations and individuals who are as safety minded as we are. This requires that we understand the cyber security environment of our vendors and suppliers. Increasingly, regulations are requiring “due diligence” in dealing with third parties. Make sure your organization has a policy for vendors and suppliers, and be sure to follow it. Be wary of suspicious emails and their origins. Understanding the contents of email headers (a relatively simple process) can help you determine that messages masquerading as legitimate communications actually originated from a suspicious source.

Passwords should never be compromised by open distribution. A complex password is more difficult to break, even when the cyber intruder is using a password breaking app. Establish a policy for everyone to change their passwords routinely. Create a policy that social media is banned while at work, even on cell phones. Control intruder access, and you control your career.

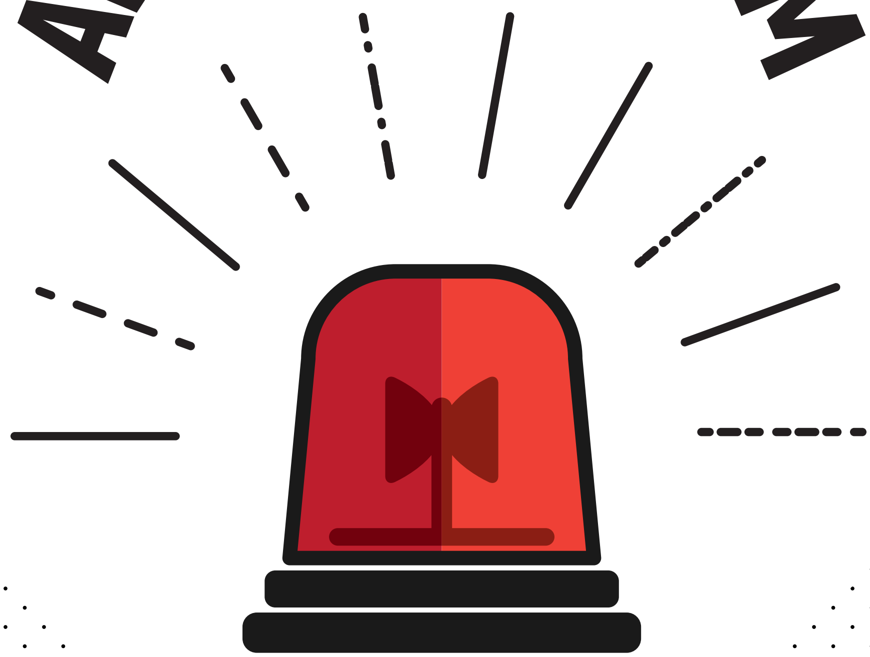
On the subject of cell phones: It is estimated that there are 120 million apps, 10 percent of which have malware intentionally embedded in them. As Android sought to overtake Apple in the creation of apps, the quality control and normal protection were relaxed in order to penetrate the marketplace. Two years ago, Forbes magazine reported that 97 percent of all smartphone malware was found in Android systems. Last year hackers managed to embed malware in the Apple toolkit that is used by developers to create Apple Store apps. Over 4,000 apps were later found to contain the malware which would steal information from smartphone users.

Finally, continue to communicate with your disaster and business continuity professionals. This is a culture that will enhance your knowledge. Participate in tours and help identify small issues that will become larger and more expensive to repair or replace in the future. Remember, cyber security attacks can destroy the security on which you and your department depend. FMJ

**Al Berman,** MBCP, CBLA, is the president and CEO of Disaster Recovery Institute International. An expert on disaster preparedness and recovery, he is an advisor to government and corporations.

**Anthony Pizzitola,** CFM, MBCP, FBCI is the only IFMA Certified Facility Manager to hold these three significant designations. With experience as a facilities, disaster recovery and quality assurance professional, he is currently a director of business continuity outreach with DRI International.

# THE ROLE OF SITUATIONAL AWARENESS IN FM



# THE ROLE OF SITUATIONAL AWARENESS IN FM

FMJ EXTRA
CLICK TO READ:
Situational Awareness in Construction and Facility Management

BY MIKE MACLEOD

Few jobs are more complex or require greater fluency in more disciplines than facility management. For decades, facility managers have been responsible for maintenance concerns, meeting fire and safety code standards, monitoring and improving energy consumption, managing staff, and ensuring the safety and well-being of employees.

However, in addition to these traditional responsibilities, the evolving security threats of the 21st century have presented new and urgent challenges in the field. Terrorism and active shooter events, once inconceivable, are now frequent occurrences. These new realities are what confront FMs working in schools, universities, hospitals, airports, retail establishments, office and government buildings and every other facility imaginable. Fortunately, situational awareness software solutions are empowering those in the field to address both routine issues and these new security threats.

### What is situational awareness and why is it important?

Situational awareness was originally a military term to refer to a pilot's operational status and knowledge of immediate threats. Today, situational awareness has a variety of applications for any environment. It refers to collecting real-time data about what's happening in and around a given facility, campus or enterprise for a single awareness experience.

It is a risk management strategy and technology framework that helps improve life safety, security, environmental monitoring and mass notification. It helps detect threats automatically and initiate the appropriate responses reducing panic, confusion and communication breakdowns. When facility managers have the ability to read, hear and see what's happening in and around their facility, they can respond appropriately. They can then analyze response times and protocols to identify problems and improve safety compliance and overall business performance. This is what makes situational awareness so powerful.

It all begins with the situation, from a life-or-death scenario to a routine maintenance call. Information is sent in real time to those most likely to be affected, as well as facility mangers responsible for investigation, containment and remediation. This knowledge is made available through the integration of disparate alarms and communication systems for centralized monitoring, alerting and reporting.

## MONITORING

Life safety, security and environmental monitoring systems produce alarms when triggered by events such as a fire, unauthorized entry or a faulty HVAC system. These systems usually provide local alerting in the form of sirens, lamps or annunciation panels. Situational awareness, with computer-telephone integration (CTI) and robust middleware, ensures that triggering events from numerous alarm systems and sensors are monitored from a central point. The benefit of centralized monitoring and alarm management is the potential for faster emergency response and the opportunity for early intervention.

## REPORTING

By recording triggering events, their associated alarms, managed alerts and subsequent notifications and acknowledgements, reports can be generated for important operational insights. Organizations can use this information to analyze response times and escalation protocols, and also demonstrate regulatory compliance. For example, hospitals can generate histories to show that temperatures within refrigeration units for medication, blood, etc., are kept within acceptable ranges. With situational awareness, it is possible to study data patterns to continually improve safety, security and service/operations.

## ALERTING

A fire alarm will sound when smoke is sensed, but it doesn't specify where the fire is or the location of the nearest exits. Alarms from stand-alone systems lack redundancy and scalability, and alerting is limited to a single communication device or channel such as email. Situational awareness provides real-time detailed alerts about triggering events to individuals, select groups or entire populations based on the organization's predefined emergency alerting protocols and escalation paths. This information is then delivered automatically to numerous communication devices. If any alerting method is unsuccessful the alternate channels provide the needed redundancy.

Alarm and communication unification transforms a facility from reactionary and piecemeal to holistic and strategic for emergency alerting and response management. Inefficient alarms from stand-alone systems are converted into detailed alerts for automatic delivery to the right people on the right devices so they can address an unfolding situation the right way.

## LIFE SAFETY

Life safety is the number one application for situational awareness. What's dangerous in and around an organization? What should be done to respond to an emergency and reduce its impact? Who needs to be notified? How should both on and offsite responders receive information about a triggering event?

In addition to conducting risk assessments and developing emergency plans that answer these questions, facility managers can use situational awareness technology to operationalize their crisis plans. In a life-or-death scenario, every second counts, and that's why life safety applications should run on a dedicated, end-to-end wireless network instead of an 802.11 broadband.

Here are some examples of the third-party integrations used to facilitate situational awareness for life safety:

- ✓ Fire panels
- ✓ Fixed duress (e.g., panic buttons, pull cords and emergency call stations)
- ✓ Local mobile duress (onsite)
- ✓ Wide-area mobile duress (offsite)
- ✓ Nurse call systems
- ✓ Telemetry devices
- ✓ Infant abduction systems
- ✓ Specialty call cords (air activated, light touch)
- ✓ Bed/chair sensors
- ✓ Wander management systems
- ✓ Mobile health monitoring systems

## SECURITY

Security has been driven largely by a law-enforcement mindset so it's prosecutorial in nature. However, prosecution doesn't have anything to do with immediate safety and security. An organization has to address a security threat as it unfolds and hopefully before it spirals out of control.

With situational awareness it isn't necessary for personnel and other staff to sit at a monitoring station waiting for an incident to occur. The information about a triggering event is sent to them automatically via the appropriate devices and can include live video. With this capability, video from security cameras closest to a triggering event is pushed directly to desktops so responders can see what's happening, plan and prioritize the appropriate response and allocate the necessary resources.

Examples of the third-party integrations and sensors used to facilitate situational awareness for security include:

- ✓ Access control systems
- ✓ Security panels
- ✓ Door/window contact alarms
- ✓ Motion detectors
- ✓ Audio sensors (e.g., gunshots)
- ✓ Glass-break detectors
- ✓ Indoor and outdoor security cameras
- ✓ Social media monitoring
- ✓ Facial recognition
- ✓ Crowd counting

## FACILITY MANAGERS CAN USE SITUATIONAL AWARENESS TECHNOLOGY TO OPERATIONALIZE THEIR CRISIS PLANS.

### ENVIRONMENTAL MONITORING

Sensors exist to monitor just about anything in any environment. If the sensors and environmental controls are integrated for situational awareness, then real-time alerts are generated if a system fails, a sudden change occurs or a hazardous substance is detected. With alerts specifying the situation to the appropriate responders, potential threats to property, inventories and convenience/comfort can be mitigated or avoided all together.

By regulating lighting, temperatures and other building systems, facility managers can also improve energy efficiency and lower costs without impacting operations. They can also schedule reminders for preventative maintenance, including replacing lightbulbs, filters, batteries, etc., to keep systems maintained regularly.

Examples of the third-party integrations and sensors used to facilitate situational awareness for environmental monitoring include:

- ✓ Building management systems
- ✓ HVAC systems
- ✓ Power generators
- ✓ Boilers
- ✓ Pools/spas
- ✓ Equipment monitors
- ✓ Freezer/temperature monitors
- ✓ Smoke/flame detectors
- ✓ Moisture/humidity sensors
- ✓ Carbon monoxide, ammonia and detectors for other gases
- ✓ Cigarette busters
- ✓ Power on/off sensors

### MASS NOTIFICATION

The first step in mass notification is defining the "mass," meaning which individuals or alert groups should receive notifications and decide when and how they should receive it (via email, text, telephone, PA system, etc.).

Event-triggered alerts should be set for different kinds of situations and include specific instructions; for example, an alert to signal a tornado warning with accompanying siren and a shelter-in-place message. Mass notification also can be campaign-triggered; for example, tenants receive renewal reminders via phone call, text and/or email when their lease is nearing expiration. Mass notification also includes sending alerts on demand when unplanned events or changes occur, in addition to sending updates as an unfolding situation changes; for example, a school may need to announce inclement weather and subsequent closings, bus delays, etc., to staff and parents. In this instance the telephone is still relevant for organizations that need to contact large numbers of constituents. Alerting/mass notification is automatic once all of the protocols and escalation paths have been established.

Some examples of third-party integrations used to facilitate situational awareness for mass notification include:

- ✓ Smartphones
- ✓ Landlines
- ✓ Mass-dialers
- ✓ Two-way radios
- ✓ Public address systems
- ✓ Pagers
- ✓ Strobe lights
- ✓ Emails
- ✓ Closed-circuit televisions
- ✓ Wall boards
- ✓ Video walls

### Benefits of situational awareness

Situational awareness provides a platform for a holistic approach to life safety, security and environmental monitoring. It enables facility managers to have greater control over the sites they manage, as well as helps address and tackle security threats of today's world, while simultaneously streamlining the way building sites are managed.

Harnessing existing stand-alone systems, making use of centralized alerting capabilities, incorporating mass notification, and analyzing response performance through the use of reporting tools provides managers with an unprecedented amount of control over their environments. Situational awareness software is no longer a luxury, but is now instead an indispensable component of modern facility management. FMJ

A scientist and 25-year technology veteran, **Mike MacLeod** is president of Status Solutions, founded in 2001 following the deadly incidents of Columbine High School and 9/11. These incidents, combined with MacLeod's expertise in computer-telephony integration, led him to base the company on the idea of operational status, threat detection and response. With bachelor's degrees in biology and forestry, MacLeod combines the scientific method with business acumen to successfully bring new technologies to market to make a societal difference.

# ALIGNING FACILITY GOALS WITH SECURITY EXPERTISE

FMJ EXTRA
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Security Statistics by Industry

## how to select the right security provider

BY GREG FALAHEE

Facility managers, organizational leaders and anyone responsible for maintaining safe and secure environments for a specific population must lend careful consideration to the selection of a security provider.

Many facilities routinely entrust the security of their employees, tenants and physical assets to contract security providers to ensure an up-to-date and comprehensive program is in place. Choosing a security provider is an important decision. As there is no one-size-fits-all approach to security, it is vital that the security team is a good match for the facility's culture and security goals.

There is also a growing demand for the integration of security officer services and evolving technologies that enhance and/or augment traditional service delivery. The co-deployment of people and technology offers the opportunity to build an efficient and sustainable security platform that enhances the enterprise facility management plan.

## What to consider

The below are some of the key points to consider in identifying qualified service providers in this ever-evolving landscape.

- **Partnering mindset:** Determine if the security services company maintains site security standards that address your mission, culture and priorities. Today's quality contract security providers must be customer-centric and, as a result, focused on the individualized needs of the facility. A true partnership leads to a shared sense of ownership and a mutual commitment to the facility's success. With that foundation, you will gain efficiencies as the security team will look to add value, and realize a greater sense of accountability within the team and throughout the facility.

  Facility managers need a security provider that recruits the best people by screening for quality and suitability; understands the mission of the security program within the overall facility management framework; and enhances the facility and adds value to the entire facilities team. Relevant and objective performance metrics and reporting processes ensure the security partner you choose is committed to continuous improvement and can provide the deliverables to validate your investment in the program.

- **Employee-centric:** Every company would love to employ the best, most experienced security professionals. Quality security companies make that happen by establishing employee retention programs and a culture of excellence. Security professionals and managers who are motivated, appreciated and competitively compensated are loyal to both their employer and their job site.

  Wage pressure, changes to statutory laws and the need to leverage technology in their jobs requires a well-trained and sustainable security team. They also need to be capable of fulfilling a multitude of roles, with training and development tailored to the industry and specific requirements for the sites in which they operate. As technology use increases, it is vital to address the compensation of security professionals as compared to the market, and to be able to leverage technology to reduce your total operating cost while rectifying wage disparity between security professionals and other service providers. A greater emphasis on technology, training and sustainable skillsets makes the cost of turnover more expensive than ever before.

  As you are reviewing security services firms, inquire about the potential provider's turnover rates locally and throughout their broader coverage area. The U.S. turnover average for security professionals is 200 percent per year. A high-quality security services provider will experience turnover rates in the 50- to 60-percent range at average market wages. In order to drive sustainable programs, service providers and their clients must collaborate to drive turnover rates even lower to achieve the full return on the security investment.

- **Supportive culture:** As employment cost pressures continue to rise and industries see more consolidation, having a service provider that's close to you in all of your locations becomes increasingly critical. So does having a platform that is consistent and repeatable, so that you don't experience a high level of service in one area and a low level of service in another. Decreasing the level of management support to help offset rising cost pressures is a short-term solution to a larger problem.

  Companies should look for service providers who re-invest in their most important assets — their people — and support those assets with quality managers who aid in development. Technology provides an opportunity to bring greater visibility to what happens when managers cannot be onsite, and eliminates redundancy.

  Gone are the days where you need the shift supervisor onsite to validate that the front-line employees are performing to expectation. Tour route design and validation, hand-held devices, drop down checklists, GPS tracking, smart cameras, remote monitoring and emerging robots are all viable game changers in the world of manned guarding. These advancements make security professionals more efficient, automate unfulfilling tasks and make operating environments safer.


a successful relationship with a contract security provider is one based on trust, mutual goals and communication.

For all of these elements to function in concert with your goals, they must be supported. Managers must be technologically savvy to be able to sift through the data and reports created and translate it into useful information. Service in today's climate is not about how you respond to incidents, it's about how you leverage resources to see the future and resolve issues before they arise. Providing managers with more information means your service providers should be the first to know when issues arise, where trouble spots are and how they should proactively address them with their facilities stakeholders.

- **Technology integration:** With so many business functions becoming integrated through networked devices or systems, it is no wonder that one of the newly re-introduced buzzwords spreading throughout the physical security industry is integrated security services. Technology is a critical element of all security programs and is important to the provider selection process.

All technology has two primary components: the user and the tool. Many organizations make a mistake by only focusing on the tool. But it is just as important to consider the users, and how technology will impact their role. When developing a strategy to integrate security services, it's essential to understand what services yield the most value through assimilation. Something as simple as remote-managed door access control can save an organization with a national footprint millions of dollars in labor, versus physically inspecting and locally controlling access. Thus, it's valuable to consider where technology can impact or augment security labor. A quality provider can help determine what is the best fit for your facility.

Additionally, it is important to pinpoint areas where technology can enhance responsiveness. Through integrating cameras with video analytics and access control, together with a well-designed remote security operations center and onsite security professionals with smartphones, you can increase your situational intelligence and responsiveness to incidents while yielding a cost savings on your annual spending.

## Making the right choice

There are many global, national and regional providers and it is important to find one that best fits your needs. Forward-thinking security companies combine a problem-solving culture with the necessary investments to stay on the leading edge of technology. As with any important decision, you must be well informed to make the right choice. You can facilitate a review process

**the co-deployment of people and technology offers the opportunity to build an efficient and sustainable security platform that enhances the enterprise facility management plan.**

that will help ensure the company you select will be a long-time partner and resource by considering:

- **Geographic experience:** What is the provider's core geographic market — local, regional, national or international? Where do they hold a market-leading presence, and where are they heavily resourced?

- **Industry experience:** Are there particular industries or verticals that they focus on or service best? Ask for representative customers in your industry and don't be afraid to engage them. Service providers love it when prospects get to meet great clients.

- **Similar engagements:** It's one thing to service a geography or an industry, but how about the scale and the makeup of each engagement? Make sure the service provider can show a track record in solving your problem, not just a problem.

- **Meaningful performance tracking:** There's a saying, "you can't manage what you can't measure," and advancements in technology are creating more measurable data than ever. Ask the provider what reports and tracking tools they have in place, and how those translate into better outcomes for the security program.

- **Relationship governance:** Just like you, providers have different groups that support the overall business. Global accounts, regional leadership, technology teams and vertical markets are just a few examples. Network with at least three different parts of the business to make sure you understand what a company has to offer.

A successful relationship with a contract security provider is one based on trust, mutual goals and communication. Establish goals and objectives for both you and your contract provider and participate in regular reviews of the new security program in order to recognize milestones, gain insight from data produced by technology solutions, make adjustments and recognize the exemplary efforts of the security staff.

A high-quality contract security provider is one who views security as a team effort, understands the value of integrated solutions and truly believes in and is dedicated to the safety and security of your employees, tenants and assets. That commitment will be evident in the company's practices and training programs, as well as their ability to customize services to meet your individual needs. **FMJ**

**Greg Falahee** is the managing director, facility management for Allied Universal. He can be reached at gregory.falahee@aus.com. Allied Universal, a leading facility services company, the largest security force in North America and a Corporate Sustaining Partner of IFMA, provides unparalleled security services and solutions.


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# LEVERAGING LEAN

## *FOR FM PROCESS IMPROVEMENT*

BY STEVE WEEKS

Whether or not we realize it, facility managers are in the business of solving problems and reducing costs that are related to processes. The processes we manage can be as complex as understanding energy consumption and conservation measures or as simple as the process for cleaning floors within a space. At the root of these processes, and most problems and waste associated with these processes, is variation from a standard.

If you were told there was a methodology that would help you create processes and systems that helped you almost always meet the standard, would you use it? Fortunately, there is a process improvement methodology that is designed to seek out and eliminate waste and variation within a process. The Lean Six Sigma (LSS) methodology is designed to be used in all areas of business, including facility management. The LSS methodology is built on understanding what is critical to the quality of a process and then applying tools and building systems to reduce variation and waste.

Some industries, like manufacturing, have embraced LSS for many decades. Over the years since Bill Smith, an engineer at Motorola, coined the term "Six Sigma," the methodology has been adopted by many industries and provides a rigorous framework for realizing true process improvement that saves organizations' time and resources.

In order to understand how facility management professionals can use this tool to improve processes and gain credibility in their organizations, it's important to first define some basic LSS terms and tools.

## Defining LSS

Lean Six Sigma is used frequently as a single term; however, it actually references two different methods: lean and Six Sigma. These two terms are often used together, as organizations tend to adopt both tools at the same time to ensure a maximum return on their investment for training and implementation. In simple terms, lean refers to reducing waste, while Six Sigma refers to reducing variation in a process.

Before we dive into how LSS works, we need to define a few terms that will help in developing an understanding of continuous process improvement. The first is "process." A process can be defined simply as a series of steps that are taken to complete a task. This can be a repair, a preventive maintenance routine or even something as simple as completing a work order. The process is the basic component to which LSS is applied for improvement.

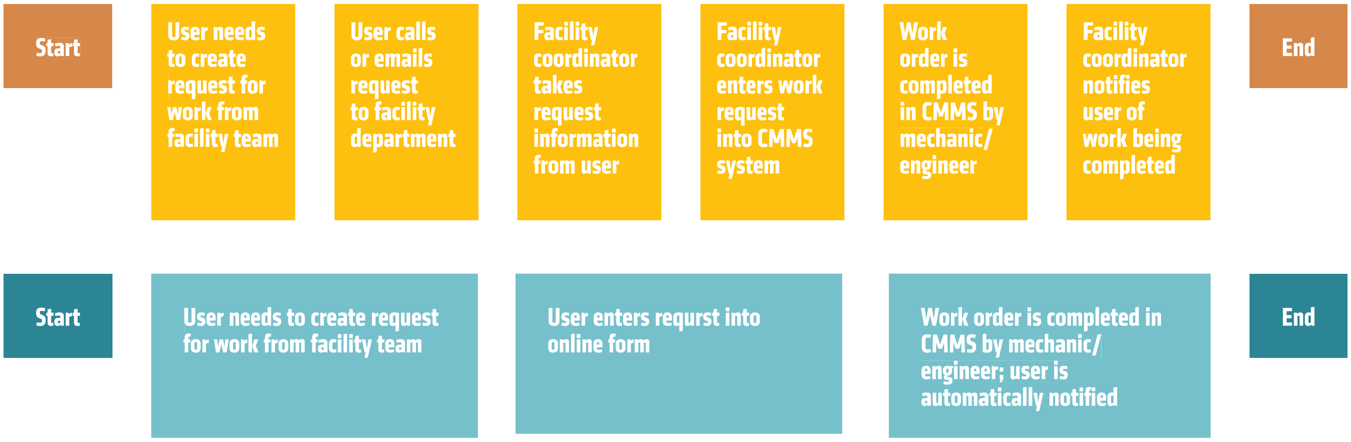
### LEAN

As described earlier, the term "lean" is simply defined as reducing waste. Organizations may define the forms that waste takes differently, but in general, most organizations identify between seven and 10 forms of waste. Waste could be unnecessarily large supply inventories, unnecessary movement of people, equipment or materials, or a process producing a defective result. To lean a process, you must define the steps in order to remove those that are unnecessary and make the essential ones more visible.

An FM-related example of developing a lean process could be creating an intranet-based form for users to create work

## LEAN REFERS TO REDUCING WASTE, WHILE SIX SIGMA REFERS TO REDUCING VARIATION IN A PROCESS.

**FIGURE 1**




requests that feeds into your computerized maintenance management system (CMMS). In the initial unimproved state, the process might require users to call or email a facility coordinator to enter work requests. From there, the process can be modified to remove the step of notifying the coordinator and allow users to enter requests directly into the CMMS. The system could also be set up to send an email when the status of the request changes so that users receive updates automatically. This automated feedback loop eliminates steps that would be necessary in the absence of automation and provides consistent communication for users.

If facilities leaders take a thorough look at the processes that their department carries out on a daily basis, they will likely find that even a small investment in evaluating and improving a process can free up resources, people and/or money. These improvements will allow better performance and service for the organization. Best of all, this performance and service level often comes with a smaller price tag than the previous method prior to applying a lean approach.

### SIX SIGMA

The term "six sigma" is a mathematical concept that indicates the amount of variation in a process. In simple terms, a process that is performing at a six sigma level would only realize around 3.4 defects per million opportunities (DPMO). Another way to look at defining a six sigma level of performance is process yield. A process yielding a 99.99966 percent defect-free product is operating at a six sigma level.[1]

You may associate references to terms like defects and yield more with manufacturing than with facility management functions. However, every job, no matter how far removed from manufacturing, has processes and every process, without improvement, has variation. Left unattended, process tends to move to a state with higher variation due to wear or lack of controls. This is where the Six Sigma methodology comes into play.

In the last sentence the term Six Sigma went from all lowercase to being capitalized. This is because six sigma is simply a mathematical term, but the process improvement methodology "Six Sigma" is a trademark of Motorola.

The primary Six Sigma improvement methodology is based around five steps that allow users to study a process, implement improvements and create systems to keep those improvements from eroding after implementation. The five steps or phases of a project are: define, measure, analyze, improve and control (DMAIC). As the steps are identified below, an example based on the lean improvement example above is given to assist in developing an understanding of each step.

1 **DEFINE:** Assemble a team that can evaluate the process and set boundaries for the project. This is the time to develop a detailed understanding of the process inputs and outputs.

With the CMMS improvement project example, the define phase would involve the LSS team creating a detailed map of the current work order entry process. The output of this phase would be the top line of Figure 1. The mapping would highlight that the work requester, facility coordinator and facility technician are all stakeholders in this process and as such should have a say in determining what is critical to quality for the process.

2 **MEASURE:** During this phase the LSS team will develop metrics to determine the level at which the current process is performing. When applied to the project example above, the measure phase might determine which metrics need to be measured and at what level the process should be performing. This is where the baseline process sigma is measured based on the DPMO calculated from the number of defects created in the process. While this is a fabricated process problem, a defect in the process may be the number of work orders called in or emailed that were missed due to poor communication strategies.

3 **ANALYZE:** This phase is where the process is evaluated for causes of variation, and tools like a cause/effect diagram are used to evaluate possible solutions to reduce variation. Applying the analyze phase to the CMMS example could involve identifying reasons for work requests not being entered when called in or emailed, and also proposing the solution of creating an online form that will enter the user's information into the CMMS system automatically.

4 **IMPROVE:** This is the fun phase of the DMAIC process when improvements are made and tested to see if they reduce variation. Tools like error/mistake proofing are used to remove or not allow variation to be introduced to the process. From the CMMS example, this phase is when the online work request form, including the automation of status alert emails, is rolled out.

5 **CONTROL:** This final step of the LSS process improvement methodology is likely the most critical to a project's success. This phase is where systems, documents or aids are put into place to prevent the process from digressing back to its pre-improvement state. Tools like standard operating procedures and control charts are used to keep the process in check.

To apply the control phase to the CMMS example, the team would roll out project training so that all users would understand the appropriate channels for requesting work and how to complete a work request. This would also include development of guidelines to ensure that the process for entering requests is followed and the proper communication channels used.

Each of the DMAIC process steps can take anywhere from a week or two to a few months to complete depending on the complexity of the process being evaluated. The DMAIC process is also iterative in that you may discover something in a latter phase that requires the previous phase to be modified.

It is critical to begin by building a team of individuals who understand the current state of the process, and utilize a Lean Six Sigma practitioner (Green Belt, Black Belt or Master Black Belt) to help guide the team through the process improvement project. LSS training can be obtained through various organizations, or a Lean Six Sigma consultant can be hired to work through process improvement projects.

You might think that this seems like a lot of effort to reduce the steps involved in a work request submission…and you would be correct. Utilizing the full-blown DMAIC may be too complex for something like evaluating the steps in a CMMS, but that shouldn't stop you from using the LSS methodology. A quick cost-to-benefit analysis can help leaders understand whether or not a process is a good candidate for a full LSS project.

You may also think this is simply a fad or a flavor-of-the-month method. For some organizations, this is the reality for various reasons ranging from leadership to cost of bringing in or training an LSS Belt to assist in project management. Others are able to take an improvement methodology that is robust and has stood for decades, apply it to real process problems and emerge with significant improvements. The key to LSS is that data are used to drive change. An organization has to be willing to dedicate the resources to the process and see it through.

As a facility manager, if your organization is utilizing LSS methodology to reduce waste and variation, it is important that you make yourself relevant in this process. Get the training and utilize the tools to make your department into an example of how LSS principles can improve processes and reduce overall operational cost. Like a familiar IFMA past president from Philadelphia used to say, "If you are not at the table, you are likely on the menu." FMJ

## REFERENCE

1. Visit www.vcalc.com to calculate DPMO and process sigma levels.

**Steve Weeks,** MCM, CFM, FMP, is the plant manager for the Oakland, Maryland, USA, facility of Simon Pearce, a manufacturer of hand-blown glassware and pottery. He also works independently as a facility management consultant (www.wfacilityconsulting.com) to help business owners make good decisions around their facility needs. Weeks was certified as a Six Sigma Green Belt in 2005 at Corning Cable Systems, a subsidiary of Corning Inc., where he worked for 10 years in various positions at the fiber optic cable manufacturing plant in Winston-Salem, North Carolina. He went back through the Lean/Six Sigma Yellow and Green Belt courses with the Juran Institute in 2015. He also served as president of the IFMA Piedmont Triad Chapter (North Carolina) from 2013 to 2015 prior to moving to Maryland.

# Credentials

The following people were awarded the Certified Facility Manager® (CFM®) certification in JULY 2016:

**Anupam Dixit, CFM**
Abu Dhabi
United Arab Emirates

**Drew Dickson, CFM**
Great-West Lifeco
London, ON, Canada

**Robert Bornert, CFM**
General Council of the Assemblies of God
Springfield, MO

**John Barrie, CFM**
Soros
New York, New York

**Darcy Rowley, CFM**
Cushman & Wakefield
San Francisco, California

## The following people were awarded the Sustainability Facility Professional® (SFP®) designation:

**Jerry Bogna, FMP, SFP**
University of Houston
Houston, Texas

**Dwyan Poggi, SFP**
Vi
Plainfield, Illinois

**David Efthemiou, FMP, SFP**
Ford Land Energy & Sustainability Office
Dearborn, Michigan

**Helen Monsees, FMP, SFP**
Olmsted County
Rochester, Minnesota

**Donna Howard, FMP, SFP**
National Board for Respiratory Care Inc.
Kansas City, Missouri

**Michael Chidane, FMP, SFP**
Sodexo
Hamilton, ON, Canada

**David Gallagher, SFP**
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Interactive Intelligence
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# INTEGRATED SUPPLY CONTRACTS: FOUR MAIN FACTORS TO CONSIDER

Integrating facilities services for multiple locations can provide substantial cost reductions by leveraging economies of scale. Though major organizations have started realizing the significant savings they can achieve through integration and are showing an increasing interest in global supply contracts, they still lag behind in preparing for this transition.

BY IYYAPPAN CHANDRAMOULEESWARAN

## Background

Procurement organizations have come a long way, transforming from mere purchasing teams to holding an important seat on boards and as independent organizations in their own right. One of the major drivers of this revolution has been a growing need for value generation, which has resulted in global supplier consolidation.

One of the clear trends in the current business world is that global organizations are increasing their operational presence in developing geographies, and as an obvious consequence, procurement organizations are seeking to attain benefits from integrated global supply contracts. For those who are able to achieve such integration, it efficiently consolidates the organization's overall supply bases. However, most companies struggle with determining the steps they must consider before opting for and implementing a global supply contract.

Generally, these organizations tend to focus more on analyzing market maturity, supplier capacity, gaining knowledge on developing geographies, etc., but miss the important step of preparing their business for the transition. Ultimately, execution is what separates those who deliver global supply contract models successfully from those who do not. Opting for a global supplier contract means entering what may seem like an ocean of processes. While the subject is vast, there are some basic elements that procurers can consider in order to ease the integration process.

# 1.

## Buyer readiness

The foundation of any big strategic move for an organization is getting ready for the change. When preparing to implement a global supply contract, organizations need to be able to manage the contract on both a local and global basis.

Organizations should prepare for such transitions by:

- *Ensuring that a strong central contract management team is in place. The team should have the overall responsibility for the contract, including the role of ultimate arbiter in the event of a dispute between the service provider and the individual site or region.*

- *Ensuring that the local team has the knowledge to manage the outsourced contract. Beyond operational delivery, they should also focus on the contract's overall benefit to the organization.*

- *Issuing a clear directive from senior management so that all impacted teams are aligned in understanding the outsourcing motives and procedure.*

# 2.

## Service provider maturity

It is impossible for any global service provider to have equal maturity in all markets. Though the global leaders are constantly working on developing their capabilities and geographical presence, they may still have maturity differences by location.

Therefore, it's necessary for organizations to consider the differences and analyze the potential impacts in advance of signing a supply agreement. Recommendations:

- *A key parameter in vendor selection is identifying a service provider with a strong global and regional management function in place, dedicated to managing multi-country contracts.*

- *Buyers must accept that even the best service providers will be stronger in some countries than in others due to factors such as heritage, other clients, general business focus, etc. Check with the service provider about these differences beforehand and make appropriate arrangements based on the response. For example: FM service providers for the EMEA region may have a strong presence in Europe but not in Africa or most parts of the Middle East. However, they may have relationships with affiliated companies that have a solid local presence to provide service in the African or Middle Eastern regions.*

- *Service providers are likely to subcontract some or all of their services in some countries. While this arrangement can work well, buyers should confirm that the contractor has the appropriate resources to manage subcontractors and avoid compromising service and management.*

| POTENTIAL OBJECTIONS | HOW TO ADDRESS THE CONCERN |
|---|---|
| *On a local level, managers may feel that they are losing control and may not support the change.* | **Always commence discussions early and try to mitigate issues and concerns before proceeding with the contract. It is important to ensure that everyone in the organization realizes the importance of the agreement.** |
| *Local stakeholders may protest on the basis that their location or country is different and has unique needs.* | **While regional differences may or may not be significant, providing stakeholders with visibility into specifications and the opportunity to give input will help prevent issues from arising.** |
| *Organizations may set initial expectations for the service provider that are too high or unrealistic.* | **Mobilization is a complex process and must be a joint exercise between the organization and the service provider if it is to succeed.** |

# 3.

## Contract model

The most common – and effective – contract model is a master services agreement (MSA) supported by country-specific local services agreements (LSAs).

The MSA should be executed in the country where the client is based or is legally mature. This applies to key contract details, including payment, termination and performance management.

LSAs will be executed locally but should be in the same language as the MSA, with any translations used for information purposes only.

LSAs should be concise documents with detail variations to the MSA for genuine and specific business reasons. LSAs should not repeat the MSA or its clauses and attempt to vary the main clauses of the MSA, as this creates non-operational inconsistency. LSAs should be supplementary to, rather than separate from, the MSA.

# 4.

## Information management and reporting

One of the keys to success for global supply contracts is information management, as this can allow:

- *different countries to be measured against each other to drive consistency,*
- *sharing of knowledge and best practices between sites and countries, and*
- *teams to continually identify, analyze and mitigate risk.*

While the information management system should be designed primarily for use by the central team, it should still offer site- or country-specific variations that allow local teams to manage the contract consistently. Information management should operate through a robust, integrated platform, such as a computer-aided facility management or enterprise resource planning system.

As with all such systems, it should be easy and intuitive to use and the data should be provided to people in the format and volume they need. For example, while senior management might require a flash report and summary dashboards, operational managers may need more detailed information and reporting tools.

## Final thoughts

Integrating any process across multiple locations can be a challenge. To ease the cultural and operational stresses that come with change, ensure that there is a solid business case (financial or non-financial depending on core imperatives) before beginning the process. Both the contract and the service must be able to evolve to meet the needs of the business.

Choosing the best service provider based solely on achieving a desired cost reduction is short-sighted. Keep in mind that this type of procurement project will involve change management and consider the human aspect of what internal stakeholders will go through. Regardless of the organization size, it's important to adopt a gradual rather than a radical approach.

While opting for an integrated contract for multiple locations with a capable service provider can provide substantial cost reductions, doing so without proper preparation and implementation will detract from the anticipated benefits. FMJ

**Iyyappan Chandramouleeswaran** is an experienced procurement analyst for the facility management category at Beroe Inc., specialized in understanding the market scenario and industry dynamics across the globe in the outsourcing arena.

As a category specialist, he has worked with various Fortune 500 organizations, assisting them in procurement-related strategies with a key focus on supplier consolidation, spending categorizations and engagement strategies in different geographies.


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# Bridging the Gap Between Research and Practice

## BENCHMARKING METHODS FOR FM IN HEALTH CARE SETTINGS

BY FRANZISKA HONEGGER, GABRIELA ZÜGER AND MADELEINE BETSCHART

The Institute of Facility Management at Zurich University of Applied Sciences in Switzerland is focusing on applied research and development for the benefit of practice in the field of facility management in health care. Below, we highlight this strong, mutually enriching bridge between research and practice through the example of recently developed benchmarking methods for health care institutions.

### Facility management in health care

The European Committee for Standardization defines facility management as "the integration of processes within an organization to maintain and develop the agreed services which support and improve the effectiveness of its primary activities." Simply put, FM supports the core business of any organization and therefore the nature of FM is very broad and covers both hard and soft areas. This is how the Institute of Facility Management at Zurich University of Applied Sciences looks at the concept of FM. Within the health care context, FM refers to the broad variety of non-medical support services and their corresponding processes in hospitals and other health care institutions, such as nursing homes.

## FMS NEED TO BE EQUIPPED WITH EVIDENCE-BASED DATA TO ADVOCATE FOR THEIR TASKS AND SERVICES.

For the past 10 years, one of the institute's research focuses has addressed FM in health care. National health care services worldwide are increasingly forced to operate with fewer resources and under greater economic pressure than they have done in the past. Switzerland operates one of the world's most expensive national health care systems and due to difficult economic times and demographic change, cost reductions are imperative. Within hospitals, FM is commonly seen as the preferred area in which to cut costs.

In order to discuss the pros and cons of such measures, facility managers need to be equipped with evidence-based data to advocate for their tasks and services. This includes cost transparency within the FM area, agreed service levels and sets of options for actions. Depending on the nature of the health care industry and hospitals' organizational structure, these transparency issues are at different maturity levels in the various national settings.

Currently, there is still much potential in Switzerland to align and improve the effective coordination of FM in health care institutions through proper management of the buildings, spaces, people and available infrastructure to increase financial efficiency. FM is an area worth looking at due to its cost relevance, as FM amounts to around one-third of health care institutions' total costs.

### Bridging the gap starts with a demand from practice...

As part of a university of applied sciences, the institute's task is to apply and develop scientific knowledge to practical challenges. To do so, an inevitable prerequisite for any applied research and development project is a clear demand from practice, which was the case for the development of benchmarking methods mentioned here.

Faced with the need for process and hence cost transparency, a group of expert practitioners, mainly heads of FM services including head of catering and cleaning departments in a range of hospitals, stepped forward to engage themselves in the initial development of aligned benchmarking opportunities. Led by researchers, the first project addressed catering activities in health care institutions, while the second dealt with cleaning activities.

### ...evolves as an interactive process...

For these joint projects between research and practice, two guiding research questions were posed: First, how existing sources of process and cost information could be used as a benchmark basis, as existing data sources are always prioritized to keep the data collection efforts for practitioners as feasible as possible. Second, the practitioners were asked which key figures they actually require to advocate for their business. This enabled a tailored development right from the start.

These two questions might seem rather trivial; however, they were a perfect fit for the heterogeneous nature of the Swiss health care system, where every institution has developed individual processes over decades and cost transparency was not an issue until recently. These questions were addressed very interactively in numerous workshops with lively and sometimes controversial — but always productive — discussions. The close collaboration between researchers and practitioners was not only interactive, but also iterative. Results were tested in practice and either agreed on, further developed or rejected. This approach led to sets of meaningful key figures, calculated out of explicitly defined base figures.

### ...ends with an applicable product...

The projects produced a benchmarking method which was made available for practitioners on an online platform. That concluded the initial collaboration of the development project teams. The benchmark product is now run by an industry partner, accompanied by a steering committee. This again consists of members from both practice and research to monitor and advise from both perspectives. Health care institutions wanting to benchmark their cleaning and catering services can join and become part of the benchmark community.

A more detailed look at results in terms of method and enabled benchmarking results can be found in the research papers published in the International Journal of Facility Management (see resources). To provide a glimpse: The key figure "total cleaning costs as a percentage of the hospital total costs" amounts an average of only 1.88 percent, based on data of 2015 from 18 hospitals. This information shows that cleaning costs do not account for a major part of the total hospital costs. However, when it comes to cost-cutting demands, cleaning services are an easy target.

Catering activities account for a higher percentage of total hospital costs with an average of 5 percent, based on 2015 data from 46 hospitals. Another insight into the structure of Swiss hospitals provides the key figure "annual turnover patients/external catering/restaurant," which shows on which of the three customer segments the catering at each hospital focuses. The average 2015

turnover of the same sample consists of 47 percent for patients, 17 percent external catering and 36 percent restaurant.

This raises the question as to where the primary focus of hospital catering should be. This is important, as price calculations in restaurants and for external catering are rarely viable and hospitals may not wish to cross-finance catering activities. To provide context, a typical meal tray served in Swiss hospitals consists of several component items, and this variety and quality come at a cost. Whether bed-bound patients truly need such a range of foodservice items is a question that should be considered. However, this should be balanced by the image impact hospital food has on patients' perception of the overall hospital experience, taking cultural variations into account.

## ...which is continually developed...

The catering benchmark was established in 2012 and the cleaning one in 2015, but since then, the continuing development process has brought many new features to sharpen their usability for practitioners. Development issues are nudged by the health care industry and scientific developments on the one hand and directly by benchmark community members on the other. The annual evaluation event held for the benchmark participants provides an excellent opportunity to both critically interpret and discuss benchmarking method and results and upcoming demands from practice.

The role of the researchers is also to inform practitioners on research results arising within FM in the health care context. This includes taking international aspects into account. Even though the institute focuses on health care institutions within the Swiss context, applied research and development cannot be conducted without looking beyond one's own borders. FM in health care happens everywhere, aligned with cultural customs and available resources. Keeping up with ongoing process developments is crucial as innovation does not only take place in Switzerland. Looking at alternative or improved process solutions to deliver effective and efficient FM in health care and to align them to specific requests is a key task to be performed by researchers for the benefit of practitioners.

## ...and provides benefits beyond pure cost information

One significant conclusion to this collaborative development is that the real advantage for participating health care institutions is less about the benchmarking results and corresponding ranking, but rather, more about the activities generated to prepare the requested data. This is because these activities urge practitioners to specifically and thoroughly look at their processes, which leads to more transparency and awareness within each of the participating organizations.

Moreover, this benefit applies not only to practice but also feeds back into applied research, where the gain of knowledge lies in a continually deepening understanding of the combination of scientific tools and practice. This exchange of knowledge also acts as one of the main motivators for both research and practice to encourage a continuing close collaboration.

## An ongoing process

Bridging the gap using applied research for and with practitioners for the benefit of FM in health care is an ongoing process. Within the benchmarking topic, the aim is to develop tailored methods for other aspects of FM, such as for technical practice.

Finally, the researchers involved in developing these benchmark methods and other activities within FM for health care all worked in practice before moving into applied academia. They are therefore equipped with substantial practical knowledge to bridge the gap between research and practice by actively engaging with practitioners. This opportunity is present in academic institutions worldwide, so practitioners around the globe are encouraged to engage with researchers to collaboratively advance FM not only in health care settings, but also in other industry contexts. FMJ

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All authors are engaged in applied research and development projects focusing on FM in health care for the benefit of this complex and captivating topic.

**Franziska C. Honegger** holds an MSc in FM and is a senior research associate.

**Gabriela V. Züger** holds an MSc in FM and is a research associate.

**Madeleine Betschart** holds an MSc in FM and is a senior research associate.

# DEVELOPMENT OF International Standards FOR FM

BY TED WEIDNER

Representatives of IFMA and other organizations have been working through the American National Standards Institute (ANSI) representing the United States and meeting with representatives from more than 25 other countries, developing a set of international standards for facility management. These standards are being developed under the International Organization for Standardization (ISO) technical committee, known as ISO/TC 267 – Facility Management. ISO/TC 267's standardization work began more than four years ago, and the committee has met several times each year, sometimes in person and often virtually. While progress is sometimes slow, the standards are taking shape and may begin to affect facility leaders worldwide in the coming years.

Although several European and Asian nations have FM standards affecting owners and organizations within their national boundaries, there are no international standards and no national standard for FM in the United States. The U.S. is catching up now. A recent draft to the U.S. Department of Labor Standard Occupational Classifications (SOC), proposed for 2018, recognizes facility managers as a separate and distinct classification. The new FM SOC code 1-3013 defines facility managers as those who:

***"Plan, direct or coordinate operations and functionalities of facilities and buildings. May include surrounding grounds or multiple facilities of an organization's campus."***

So as those performing the service are being recognized in the United States, so will the industry itself through the work of ANSI representatives to the ISO technical committee.

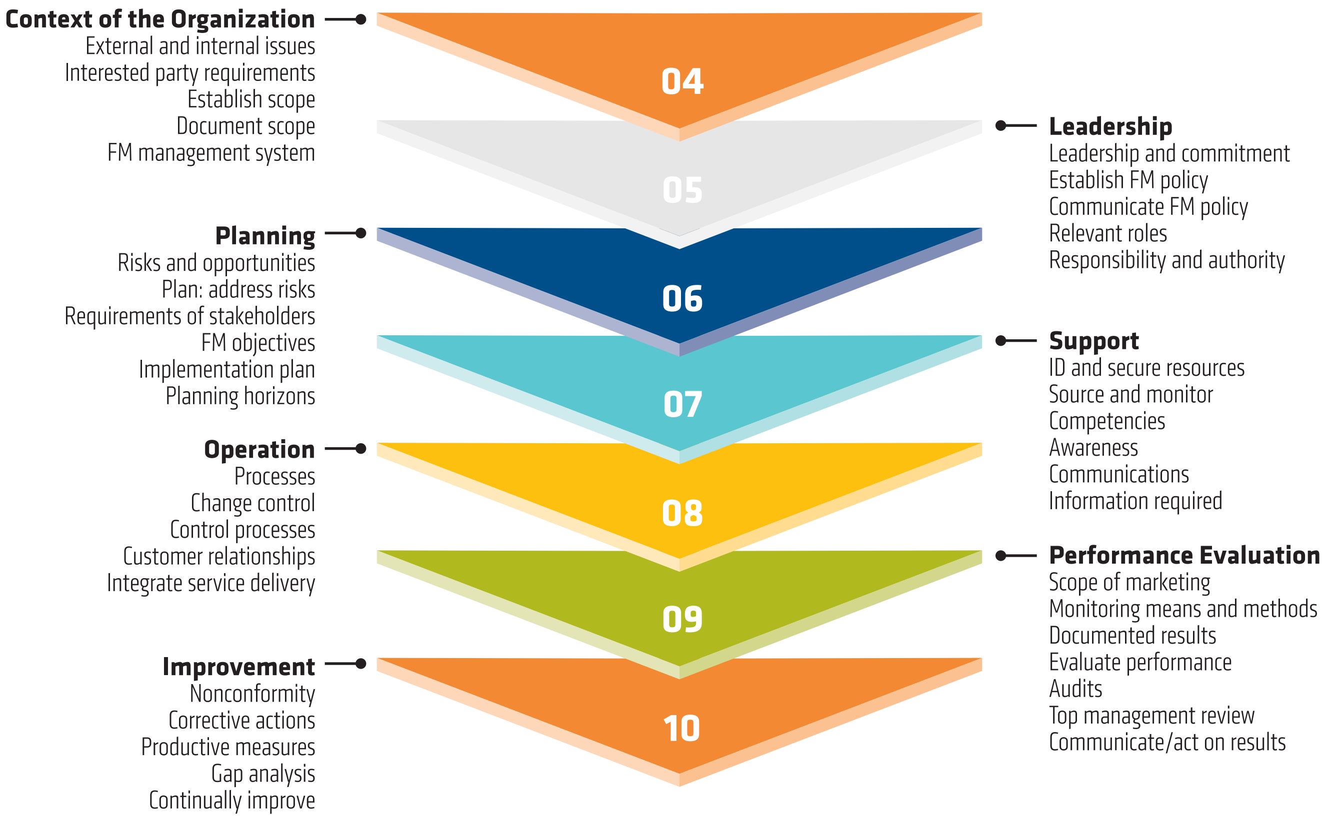
## Impact of standards

Why are FM standards important and why should IFMA be involved? The built environment plays a significant role in the world.

Consider the United States. While construction represents less than 10 percent of the U.S. annual gross domestic product, it is one of the most long-lived inputs to the economy and an asset that must be preserved, operated and maintained. There are facilities, both vertical (buildings) and horizontal (roads, bridges, utilities, levees, etc.).

Depending on the industry, individual IFMA members have a significant influence on the strength and value of the U.S. gross domestic production by providing and maintaining the facilities in which most other production occurs. Now consider this same example across a global landscape. Development of standards provides a needed measurement tool to demonstrate the effectiveness of the support provided and to help the industry improve.

In the 2016 September/October FMJ "On Standards" article, Jim Whittaker wrote:




*Jim Whittaker, ANSI TAG Meeting, Aug. 19, 2016, recreated with permission*

DEVELOPMENT OF STANDARDS PROVIDES A NEEDED MEASUREMENT TOOL TO DEMONSTRATE THE EFFECTIVENESS OF THE SUPPORT PROVIDED AND TO HELP THE INDUSTRY IMPROVE.

***"[ISO standards are] strategic tools that reduce costs by minimizing waste and errors and increasing productivity. They help companies to access new markets, level the playing field for developing countries and facilitate free and fair global trade."***

He also discussed ISO 41001, a facility management system standard (MSS) in development by ISO/TC 267 with the ultimate goal of enabling

***"...an organization to be able to demonstrate that it has a robust process through which to design, manage and improve its integrated facility management system..."***

to improve performance.

## Current work toward standardization

In summary, the FM standards work within ISO has focused on three areas to date. The first is clarifying what is meant by "facility management" and defining several terms that describe what the profession does. The definitions are high level, and focus on the profession overall rather than on specific definitions about what is in a facility or defining the services performed by a facility organization.

The "Facility Management – Vocabulary" document, ISO 41011, provides standard nomenclature used in FM and will be used in subsequent standards (described below). These definitions concern eight areas: FM, assets, people, sourcing, process, finance, general business and measurement. Without going into the details of each area or the definitions provided, the vocabulary standard identifies that FM is a complex field incorporating a wide range of knowledge and expertise.

Beyond the complexity and scope of FM, there are also a number of ways of delivering or receiving FM services. As facility operators, we can view this in the form of a matrix: From an ownership perspective, FM services may be self-operating or outsourced; while from an FM perspective, the services may come from an internal service provider or from an outside organization (contractor). All four perspectives and both sides of the issue must be covered via these two approaches. It's no wonder that it took over three years to reach agreement on the vocabulary document.

There are many terms in ISO 41011 whose definitions may be familiar to IFMA members: terms such as "contracting," "support service," "end-user" and "benchmarking" to name a few. However, while we may be comfortable with the general use definition, there may be subtle but important differences between what is presumed to be a common term and how it is defined by ISO. IFMA members will be generally comfortable with the definitions because they are consistent with those found in resources within the online Knowledge Library and other IFMA publications.

The next standard is ISO 41012, "Facility management – Guidance on strategic sourcing and the development of agreements," developed concurrently with the vocabulary document. This standard provides a management model for owners of facilities and their FM organizations to assess and determine if certain FM services should be retained or replaced.

This is becoming — and will continue to be — an increasingly important issue. Consider, for example, the rapid changes occurring in facilities technology and the rise of data-driven management practices, leading to more complex and specialized FM requirements that may require external support. Alternatively, an organization may decide to focus on its core mission and obtain production and operation facilities from an outside provider. From the perspective of users, the standard supports the FM organization/owner in establishing expectations, defining what services will be delivered, overseeing the management of services and measuring performance.

As the above standards near publication and use after four years of development, review and approval, it is necessary to start tying things together at a higher level. The next significant standard, ISO 41001, "Facility management – Management systems – Requirements with guidance for use" is in development now. It looks at an organization's structure and shows how it can focus on continuous improvement via a Plan-Do-Check-Act cycle. This is a well-known management approach along the lines of ISO 9001 but, in the opinion of the drafting committee members, the complexity of FM requires a separate standard to help bring the pieces together into an informative plan and approach for consistent improvements.

There are a number of tools to identify and develop performance excellence as described by the Baldrige National Quality Program publication "Criteria for Performance Excellence." APPA: Leadership in Educational Facilities, developed a tool 25 years ago called the Facility Management Evaluation Program (FMEP).[1] They use the tool, among other things, to identify organizations for the APPA Award for Excellence. While there are thousands of educational facilities organizations, only 55 have been internationally recognized. But hundreds of organizations have used the FMEP to measure and improve their organization over the years.[2,3] Lander Medlin previewed the work of APPA's the 2016 Thought Leaders symposium (TLS),[4] during which participants discussed two major topics: "Creating the Customer-Centric Facilities Organization" and "Creating a New Facilities Team/Workforce." This is exactly the goal of the MSS: helping an FM organization develop the tools needed to address customer needs and to improve effective delivery of FM services through a coordinated work team that changes as demands change.

## Management system standards development

The ISO 41013 working group for the MSS, led by Jim Whittaker, was subdivided into two parts: The first part looked at the four sections of the standard focusing on development of the Plan step; the second looked at three sections addressing the Do-Check-Act steps. Comprising the Plan section are the following: Context of the Organization, Leadership, Planning and Support. Comprising the Do-Check-Act steps are: Operation, Performance Evaluation and Improvement. These are further described in the figure and discussion above.

The figure lists the sections in standard with each specific area addressed. Sections 1 through 3 are standard to any ISO document and are skipped here. Sections 4 through 10 are addressed by the work of the committee.

### CONTEXT OF THE ORGANIZATION

Who is the customer? What are the customer's strategic objectives? What services are needed? And how will the system be organized? In simple terms, these can be described as addressing the needs of the programs inside the buildings and not the buildings' needs (materials, components and systems). However, within the ISO standard, it gets a little more complex, just like running an educational FM organization. FM customers are both internal and external; they comprise both human and nonhuman (plants and animals) products and services. The organization being served also has goals and objectives that must be understood, legal and regulatory requirements that must be met and risks that must be managed in some manner. Because the FM organization affects everyone (and everything) working in a facility, it is essential to understand all these elements to develop a meaningful management structure and to document how it works.

### LEADERSHIP

This section looks at the leadership of the organization being served as well as the leadership providing the FM

BECAUSE THE PRIORITY OF ANY FM ORGANIZATION IS THE PEOPLE AND PROCESSES WITHIN THE FACILITY, CUSTOMER RELATIONSHIPS ARE ESSENTIAL.

services (whether internal or external). Since leadership is more about creating an atmosphere where the entire team can work effectively, this is also the section that looks at policies, roles and responsibilities. Leadership also establishes the policies of the organization and communicates the policies, roles, responsibility and authority throughout the FM team.

### PLANNING

This section is not about architectural or master planning; it is about planning for normal operations and responding to the unexpected — in other words, how the FM organization will meet the larger organization's goals and objectives as well as identify and respond to risks, opportunities and other external influences. As a standard, no answers or mandates are provided about how to do these things; rather the standard identifies what to consider and include in an operating plan. The plan also sets up requirements for the next section, by identifying what is required to address the needs of the organization being served.

### SUPPORT

While it would be nice to have an outside organization dictate that the FM organization must have a specified level of resources to meet its responsibilities, such a standard would fail and not be adopted. Instead, this section outlines the factors that must be considered to provide the required services. Those factors include people, funding, equipment/tools, competencies, communication (both internal and external to FM) and information required often in the form of metrics (see Performance Evaluation section below) to measure success and identify gaps.

### OPERATION

Implementation of the prior four sections into a coherent plan happens next. Whether this is an annual or longer plan is dependent on how the organization wishes to structure itself. The operation must have processes to organize its work, i.e., work management, prioritization of work and execution. It must also have ways to deal with changes due to customer requests or unforeseen conditions at the worksite. Because the priority of any FM organization is the people and processes within the facility, customer relationships are essential, e.g., communication. Finally, how do other services such as external contractors integrate into the overall delivery of FM services?

### PERFORMANCE EVALUATION

They include the following: measuring what occurs and coordinating the operation with customer needs and goals; monitoring the operation and measuring against goals and performance indicators; then addressing nonconformity or opportunities for improvement. These all comprise, in an organized way, an international standard for FM organizations. Development of the tools and evaluation is left to the individual organization but identified in the standard as a necessary step. IFMA members have some excellent examples of measurement and evaluation, one can be found in a recent IFMA webinar provided by Peter J. Stroup of Harvard Medical School.[5]

### IMPROVEMENT

Last, the "check" step provides an opportunity to make improvements to the organization either by closing gaps in service or finding better ways to deliver the service. Normal practices such as annual performance reviews, evaluation of expenditures, review of customer feedback and benchmarking occur in this step. The step also includes the opportunity to use audits to assess how the organization is operating relative to documented policies and procedures identified by leadership.

ISO 41001, "Facility management – Management systems – Requirements with guidance for use" is nearing the draft international standard stage. The target for publication is early 2018. While standards development is a process that never ends, the end result of the MSS will be an overall format for any FM organization to serve its customers better. **FMJ**

*If you are interested in getting involved in the development of ISO FM standards, or for more information, contact Laverne Deckert/IFMA Standards at ifmastandards@ifma.org. Help us form the DNA of the FM profession of the future.*

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**Theodore J. Weidner,** Ph.D., PE, AIA, CEFP, F. ASCE, is an associate professor at Purdue University in West Lafayette, Indiana. He has more than 30 years of experience leading higher education facilities organizations and more than 10 years consulting in the U.S., Canada and Asia. Weidner is a member of APPA's Credentialing Board and its Standards and Codes Council.

# IFMA FOUNDATION
MAKING FM A CAREER OF CHOICE

Building the Future of FM

# IFMA Foundation Celebrates Successes in Making FM a Career of Choice at World Workplace 2016

## 2016 Scholarship Winners

With the support of our sponsors, the Foundation annually awards scholarships to deserving FM students worldwide. Individual scholarships range in value from US$1,500 to US$10,000, and are awarded to undergraduate (two- and four-year) and graduate students enrolled in facility management or FM-related programs. Scholarship recipients are provided fully funded travel, accommodations, meals and registration to attend IFMA's World Workplace.

The total amount awarded this year was over US$160,000. Please join us in congratulating the following students, and in thanking each sponsor for their generous support.

> "The Foundation's scholarship allowed me to pursue a post-graduate degree with less worry about the financial implications of graduate school. The Foundation's investment in FM students creates a better-prepared workforce, which leads to a better recognition and understanding of the profession by the organizations we serve." **-Steve Weeks,** 2012 & 2013 FM Scholarship Recipient

**Alfredo O. Rivera** of Arizona State University: Airport Facilities Council Scholarship

**Alicia Van Goor** of Ferris State University: Southeastern Michigan Scholarship

**Amy Cho** of South Seattle College: Academic Facilities Council Steven Strickland Showers Memorial Scholarship

**Anelia Marinova** of Hanze University: Public Sector Council Scholarship

**Anke Janssen** of NHTV Breda University: International Student of the Year

**Benjamin Costello** of Brigham Young University: Sodexo Scholarship

**Brianne Rose White** of Temple University: Greater Philadelphia Chapter Scholarship

**Emily Cross-Wilkinson** of Conestoga College: Doug Underwood Utilities Council Scholarship

**Esther de Boer** of Hanze University: ISS Scholarship

**Eva Buurma** of Hanze University: Capital Chapter Barbara Pryor Scholarship

**George J. Davis, III** of Weber State University: Houston Chapter George Graves Scholarship

**Heleen Arends** of Hanze University: Western New York Chapter Scholarship

**Jake Alan Gunnoe** of Arizona State University: Karen Marciel Chapter East Bay Chapter Scholarship

**Jason Gonzalez** of Temple University: Greater Philadelphia Chapter Scholarship

**Jeremy Rock** of Conestoga College: Toronto & South Central Ontario Chapter

**Jing Zhang** of Hong Kong Polytechnic University: Hong Kong Chapter Scholarship

**Jorge Luis Rincon Fonseca** of Texas A&M University: Dallas/Fort Worth Chapter Scholarship

**Joshua Krawiec** of Temple University: Aramark Scholarship

**Kent Andersen** of IUPUI: Greater Louisville Chapter Scholarship

**Lauren Boyle** of Pennsylvania State University: Greater Pittsburgh Chapter Scholarship

**Lina Bartkiv** of Conestoga College: Houston Chapter Doug Underwood Scholarship

**Manuel Böhm** of Zurich University of Applied Sciences: EFMC ePoster Winner

**Mary Paschos** of Temple University: Corporate Facilities Council

**Megan E. Paulus** of Ferris State University: Jim Hickey Memorial West Michigan Chapter Scholarship

**Melanie Sue Lobsinger** of Ferris State University: Suncoast Chapter Scholarship

**Nguyen Tran Khoi Le** of Arizona State University: ISS Scholarship

**Niels Peters** of HAN University of Applied Sciences: EFMC ePoster Winner

**Nolan Rinta** of University of Minnesota: Airport Facilities Council Scholarship

**Norma E. Tompkins** of South Seattle College: Seattle Chapter Scholarship

**Patricia T. Secor** of Cal State University Fullerton: San Diego Chapter Scholarship

**Pauline W. Karanja** of University of North Carolina Charlotte: Buck Fisher Scholarship Greater Triangle Chapter

**Ruchika Bhavik Shah** of Pratt Institute: Staples Business Advantage

**Ruud Jilesen** of HAN University of Applied Sciences: Facility Management Netherlands FMN Scholarship

**Saba Shahverdi** of Texas A&M University: Doug Underwood Utilities Council Scholarship

**Sea Young Oh** of Georgia Institute of Technology: Atlanta Chapter Scholarship

**Sungjin Kim** of Georgia Institute of Technology: Pat Harris Denver Chapter Scholarship

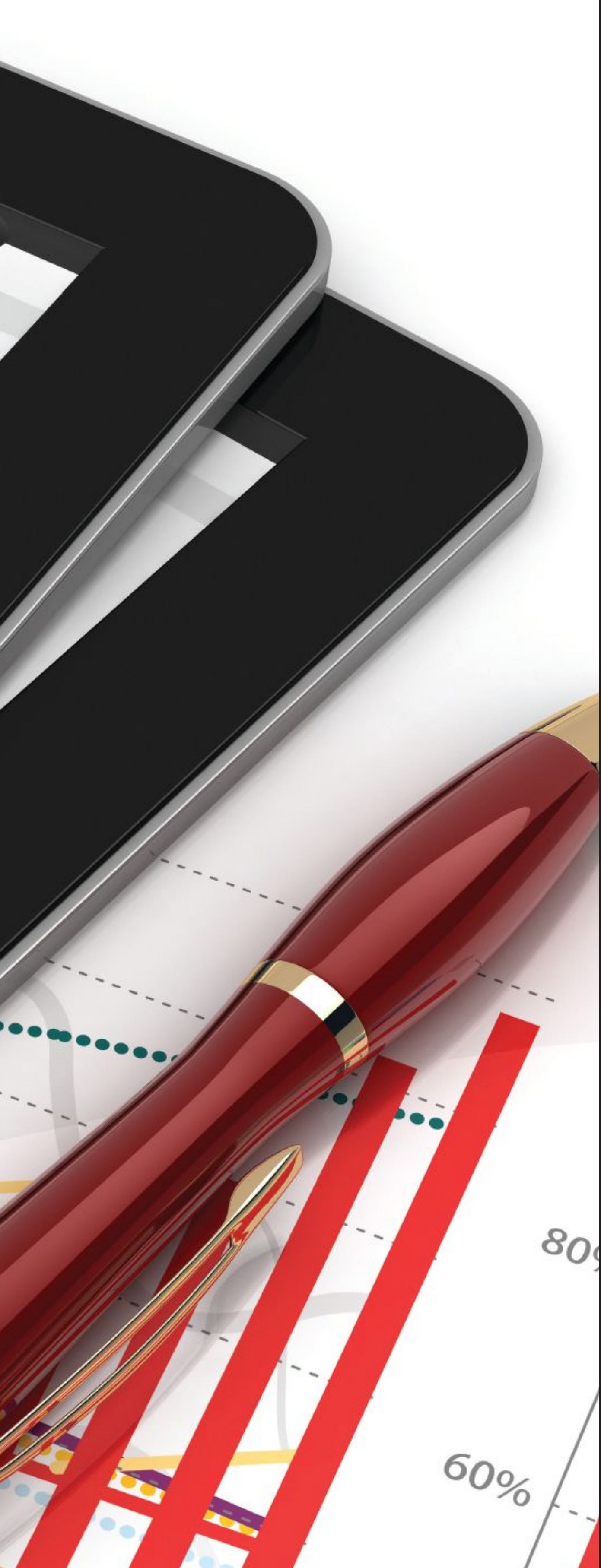
**Yang Liu** of Texas A&M University: Houston Chapter George Graves Scholarship

**Benjamin Sotomayor** of Temple University: Central Pennsylvania Chapter Scholarship

**Charles Joseph Zulanas, IV** of Arizona State University: Sacramento Valley Kit Tuveson Scholarship

**Sejal Vegel** of IUPUI: Indianapolis Chapter Scholarship

# AN ARGUMENT FOR DATA ANALYSIS




BY BILL CONLEY

If data talks and no one listens, does it really say anything? As facilitated by the technology that runs rampant through facilities today, data is everywhere. It collects, amasses and stares facility managers in the face.

It is an age in which topics such as big data and the Internet of Things (IoT) are playing a larger and larger role in facility management. Yet the truth is, data is just a bunch of characters unless it is analyzed and understood. If data is available, but is unused, ignored or viewed inaccurately, not only does that constitute the waste of a valuable tool, it could also lead to the downfall of systems. Entropy may set in as a physical measure based on the indifference related to pertinent information: ignoring the microscopic details of a system.

Data is normally collected and analyzed to measure and monitor the status and performance of systems. The process of analysis refers to identifying separate components in a collection for individual examination. It is a *process* for viewing raw data and converting it into information useful for decision making.

Several phases can be distinguished in this process and each is iterative, as discoveries from any of the later phases may shed light on previous ones. Data must be referenced, interpreted and acted upon, and conclusions or improvements reported. Each of these steps plays a critical part in the successful operation of a facility.

# DATA IS JUST A BUNCH OF CHARACTERS UNLESS IT IS ANALYZED AND UNDERSTOOD.

One of the more important tasks a facility manager can undertake is the tracking and understanding of energy utilization. Energy management is both the discipline and the measures executed in order to achieve the minimum possible energy use and cost while meeting the true needs of the facility. Actions intended to achieve such energy efficiency focus on reducing unnecessary end use, increasing efficiency, mitigating wasted energy and finding superior energy alternatives. Data is the staple of determining such possibilities.

One story that stands out is decades old, but is still relevant when talking about data analysis. Back in 1991, a facility manager was instrumental in the design and construction of a truly sustainable facility. Climate control was delivered by an indirect/direct gas evaporative chiller; skylights and clerestories abounded, providing natural light throughout; photometric sensors were added to the lighting system to adjust to the amount of sunlight entering the building; energy costs were 50 percent less than comparable buildings; absenteeism declined by 42 percent. Part of the package was an energy management system (EMS). Unfortunately, this is where the wrinkles started to develop.

To be fair, neither this manager, nor many of the personnel in the building, were very sophisticated users of technology. The company was just then migrating from a VAX (Virtual Address eXtension) operating system to Windows. There were even typewriters (electric, of course) and 10-key calculators sitting next to keyboards and towers.

Unfortunately, the EMS computer sat in a closet, collecting data, collecting trends, collecting dust. As proud as the manager was to actually have an EMS in the facility, it was never utilized, and the building performance started to deteriorate. Whether this was due to the ignorance of the benefits of the EMS or the general nature of things is a moot point. The lesson to be learned is that data may be ready and available; but it does need attention. This is a cautionary tale proving that having the right tools is only part of any solution.

## Interpreting data

Energy can be neither created nor destroyed. A particular consequence of the law of conservation of energy is that the total energy of an isolated system does not increase or diminish. It does, however, change forms and flow from one place to another. It's this transformation of energy that costs money and this is where the focus should lie. Heeding the messages that data provides can help make the process more efficient and, thereby, more cost effective.

There are software systems available to achieve these ends, such as energy management systems (EMS), building automation systems (BAS) and energy information systems (EIS). All of these programs can be broadly defined as the software, data acquisition hardware and communication systems used to store, analyze and display building energy data. EIS, for instance, can also include analysis methods such as baselining, benchmarking, utility and carbon tracking, load profiling, and energy anomaly detection.

The Internet of Things has attracted quite a bit of attention over the last few years, in both the public and commercial sector. The concept is that facility equipment, or "Things," have sensors and/or software embedded. This allows the devices to communicate with managers or facilities staff, offering an exchange of information between physical equipment and the Internet. The collected data can then be deposited in a central database, offering facility departments a wealth of detailed information. This can lead to improving efficiency and reducing costs, while providing the information to make decisions about the health and future of a facility.

However, these systems produce a massive amount of data. Interpretation of that output requires an understanding of the information while determining what is relevant to the facility processes. This requires an accurate assessment of the data so that meaningful corrective, preventive and predictive actions can be planned.

It is a common goal in facility management to lower energy consumption. However, it's important to first answer questions such as "lower it from what," or "lower it to what." Data and its proper analysis can develop guidelines that will help supply answers. It will provide faster identification of opportunities to reduce energy and lead to smarter capital decisions related to energy savings and more efficient operations.

Data will also facilitate more effective reporting and faster access to sustainability efforts. Accurate tracking of sustainability project expenses and higher sustainability performances across the portfolio will be more easily achievable. The right application and communication of data can highlight occupant energy usage. If a facility or business utilizes a chargeback system for other departments or tenants, data can provide relevant statistics so that occupants will have access to energy and sustainability metrics. This can lead to better forecasting for occupants and managers.

## Value of data

One way to really observe data is through a sub-metering system. Having a sub-metering system with reporting capabilities provides a service that can't be found anywhere else. It supplies raw data and provides an optimal opportunity to segregate usage and drill down to investigate localized challenges.

One particular facility can be used as a case in point. A new manager of a multi-use facility found that not much attention was being paid to energy use and efficiency. One of the challenges was that although the facility was comprised of three buildings connected by a hallway, there was only one electrical meter. This made it difficult to track usage by occupancy.

A sub-metering system was put in place to measure energy consumption by different areas of the facility. The data that the sub-metering system supplied was varied. Energy could be tracked by kilowatts (demand), kilowatt hours (usage) or amperage (current). To accurately read this data, it became incumbent upon the users to actually understand what each separate graph was reporting and how it could be translated to action.

One thing that was learned was the operational definition and relationship of different terms. For those less technical than others, it was critical in understanding how to interpret the data. For instance: knowing that current drives everything; that voltage should be constant; that if amps go too high over a prolonged period of time, equipment can burn out; and that watts equals amps times volts.

The reports provided immediate clues as to where energy was used most. Consumption anomalies were discovered due to unbalanced phases, voltage fluctuations and bad power factors. Measures are being put into place to manage the health of the power and to mitigate both energy spikes and dirty power. Other issues that were exposed through the sub-meter reports dealt with peak demand management. Witnessing dramatic consumption increases led to investigation of how usage could be shifted, especially in the case of high and possibly detrimental amperage ranges.

In one case, a major spike in usage was discovered occurring every morning at 7 a.m. in the warehouse. It brought electrical demand for the area dramatically high and this level stayed constant throughout the day. Upon further investigation it was found that this was when the lights were turned on (all 1,500 of them). This space, with no climate control and limited plug load, was still consuming more energy than any other part of the facility. This data was instrumental in the decision to research a lighting retrofit to LED tubes to minimize this impact.

It was noticed that on the weekends one of the building sections experienced equipment being turned on and running throughout Saturday and Sunday when the space was vacant. It was found that the HVAC fans were coming on when no one was home. The timers were adjusted so that this consumption was eliminated.

During the weekend, there are some staff working in one area of the facility, which necessitates one of the chillers to run. On the Monday morning report, it was noticed that the chiller had been cycling on and off every few minutes for the entire weekend. Upon investigation, it was found that the arm that controlled the pre-rotation vanes actuator had fallen off its spindle. Because the apertures of the vanes weren't being controlled, they kept opening and closing, causing the chiller to start and stop. Without the sub-metering report, it may have been days before this anomaly was discovered.

Besides equipment running off-schedule and not performing to standards, other types of building drift that the sub-meter system caught were related to the BAS malfunctioning. Due to a communication error between the BAS and two of the roof units, their economizers were stuck open at 100 percent on the hottest day of the year. Temperatures in the space approached 90 degrees Fahrenheit. This led the active chiller to draw over 190 amps and still not cool the area. Turning on a second chiller to reduce the demand dropped the amperage down to 111 and 91 respectively. Granted, this meant a bit more energy consumption, but the space started cooling down and it reduced the possibility of over-extending the single chiller as it tried to compensate for the influx of heat.

## Utilizing data

Corrective actions and future improvement is possible when decisions are driven by data. It allows building operations teams, executive leaders and companies to embark on projects that improve bottom line performance, create new efficiencies and increase occupant satisfaction. The understanding of actual building use patterns and cost helps inform sustainability, energy and use strategies. It provides insights about how decisions will affect other departments and will serve to enable greater collaboration and better organizational efficiency.

Information on building and financial performance can reveal opportunities to make sound investment decisions and will aid efforts in monitoring operations so that exceptions can be resolved quickly. Data will empower facility departments to engage occupants in achieving goals, while maintaining their comfort.

Progressive companies use data to meet aggressive efficiency goals and to better support capital planning, production improvements, team structures and operational performance. As is the case for all corporate investments, there must be a strong financial rationale to improve systems and drive successful sustainability projects. With constant pressure on the bottom line, companies often delay or minimize investments when it comes to long-term efforts.

Measuring, monitoring and data analysis will help address these strategic plans. Projects such as the implementation of renewable energy sources, upgrading older mechanical systems by installing variable frequency drives to equipment and lighting retrofits are all decisions that can be made when supported by data. Many sustainability efforts and investments have been made based on a strong business case.

With more data available, there is an immense opportunity for facility managers to accurately understand the financial value of sustainability projects, and to communicate the benefits to stakeholders and management. With a common language supported by solid data, facilities and senior management can come together to understand what sustainability investments really mean to financial performance and the company's bottom line.

Data does talk. It tells a powerful and meaningful message that can increase productivity, ensure efficient operations and save money. By paying attention to the raw information and analytics and by taking action based on what it says, a facility manager will be able to successfully fine- tune operations and give back to the organization. Most FMs are well-versed in the art of active listening. Tending to data is just another application of that practice. **FMJ**

**Bill Conley,** CFM, SFP, FMP, LEED AP, IFMA Fellow, is facility manager at Yamaha Motor Corp. in Cypress, California, USA. Prior to that, he served as owner and chief sustainability officer of CFM2, a facility management and sustainability consulting company. Conley has more than 40 years of experience in the facility management profession and has been a proponent of sustainable operations for more than 20 years.

Conley has served on the IFMA board of directors, is a recipient of IFMA's distinguished member of the year award and has received the association's distinguished author award three times. He has been a regular contributor to FMJ for more than 20 years and has authored more than 50 FMJ articles.

# Capital Recap:
## IFMA'S ADVOCACY DAY 2016

**BY JED LINK**

A popular saying among IFMA's perennial Advocacy Day and Public Policy Forum attendees is that, in terms of public policy, "if you don't have a seat at the table, you may be on the menu." For a thriving FM community advancing rapidly around the globe, this is truer than ever.

No matter where you go around the world, policymakers are making decisions that will help shape the future of FM. It's up to industry stakeholders to make sure those decisions are well informed, and that's what IFMA's Advocacy Day is all about.

This year, in early September, FM professionals from across the United States traveled to Washington, D.C., to participate in the largest Advocacy Day yet. After a crash course in policy, process and politics, FM professionals took to the hill to hear from and talk directly to their elected representatives. It's a two-day whirlwind of action and excitement that has to be experienced to be fully appreciated.

### A peek behind the scenes

FM advocates get to look behind the curtain to see how this historic city actually works. This year, this unique access included a special tour of the Library of Congress Jefferson Building, featuring some rare books and an ascent to the top of the second most famous dome in D.C.

FM advocates also get to see first-hand their government at work — from the breakneck pace on Capitol Hill with senators and members of congress rushing to votes, to the importance of committees where a lot of the work actually gets done — without any Hollywood or media filter.

### Up close and personal

While there is a lot of dysfunction in contemporary American politics, elected officials and their staffs are usually thoughtful, intelligent people who are trying to act in the best interest of their constituents. From a distance, it's easy to dehumanize politics, but you get a different perspective when it's up close and personal.

During the annual public policy forum, when U.S. Senators and Representatives take the time to speak with and answer questions from FM advocates, there is a certain statesmanship and cordiality. Here, officials from both parties find common ground to solve real problems — and FM advocates weigh in to help. The best moments are the one-on-one interactions between elected officials and FM advocates from their district. These are the levers of influence that help shape policy to move mountains.

## Making a difference

Getting a look behind the scenes and rubbing elbows with key influencers are thrilling experiences that bring FM advocates back to Advocacy Day year after year. But what gets them fired up is that they are actually making a difference.

As they attend meetings with elected officials and their staffs on Capitol Hill, the primary job of FM advocates is to offer expertise and experience as a resource to shape better policy. A victory may not be the passage of a law; it may be as simple as someone picking up a phone to ask for input on an amendment being offered in an obscure subcommittee. For example: This year a hill staffer recognized one of the FM advocates from a previous advocacy visit. That staff member has thousands of meetings with tens of thousands of people every year, so the fact that she remembered IFMA and understood what FM is indicates progress.

We're making progress on policy as well. Earlier this year, the Department of Labor published a draft list of occupations it tracks. On this list, for the first time ever, facility management is included as a stand-alone profession. Without IFMA's advocacy efforts, this would probably not have happened.

Advocacy Day is just one important part of IFMA's larger global advocacy. The EU FM Coalition is working with lawmakers in the European Union, while many local chapters in the U.S. have hosted state advocacy days to address policy on a more local level.

If you would like to get up close and personal with your elected officials so you can make a difference, please contact Jeff Johnson (jeffrey.johnson@ifma.org) to find out how you can attend IFMA's 2017 Advocacy Day and Public Policy Forum. **FMJ**

Before joining IFMA as Communications Manager in 2013, **Jed Link** worked as a Capitol Hill staffer for nearly a decade, serving in both the United States Senate and House of Representatives.

Behind every successful FM is a host of product and service providers that offer solutions to make the hectic task of ensuring seamless facility operations a little smoother. This showcase goes behind the brand to reveal the culture that makes these powerhouse businesses the best in their class.

IFMA's Corporate Sustaining Partners (CSPs) are trusted vendors that support the operational excellence of facility management teams. By partnering with IFMA, this elite group demonstrates the highest commitment to creating a more comfortable and efficient built environment.

**COMPANY NAME** CORT
**EXPERTISE** Furniture – New/Rental/Used/Refurbished
**CSP LEVEL** Silver
**CSP SINCE** 1988
**WEBSITE** cort.com/workplace

### FMJ: WHAT TRENDS ARE ON THE HORIZON FOR COLLABORATIVE WORKSPACES?

**CORT:** Moving beyond the workstation and chair, many office environments are becoming more relaxed and casual. Soft seating and lounge areas once reserved for breaks and eating lunch are being used throughout the day, furnished with comfortable furniture including leather sofas, upholstered chairs and small tables.

### FMJ: HOW DO CORT'S WORKPLACE SOLUTIONS HELP ORGANIZATIONS MEET THEIR BUSINESS GOALS?

**CORT:** CORT's customers choose furniture rental for its ability to keep employees productive during periods of transition. We offer delivery throughout the U.S., flexible rental options and the convenience of using our furniture for as long as you need it without the cost of long-term ownership.

**COMPANY NAME** enVerid
**EXPERTISE** HVAC/Indoor Environmental Quality Solutions
**CSP LEVEL** Silver
**CSP SINCE** 2016
**WEBSITE** enverid.com

### FMJ: WHY SHOULD FMS CONSIDER IMPLEMENTING AIR TREATMENT TECHNOLOGY?

**ENVERID:** First, treating the air in general is an immense portion of a company's electricity expense – mechanical systems treat the air every time it's heated or cooled, ventilated or cleaned in any way. So implementing new technologies can significantly improve the efficiency of HVAC systems to save both energy and expense.

More specifically, molecular air cleaning technologies clean the air of contaminants, such as hard-to-extract toxins like formaldehyde and volatile organic compounds. This significantly reduces the need to bring in and retreat outside air, while keeping indoor air quality top-notch. This is excellent for the health and productivity of the people who live, work and play in the buildings a facility manager cares for. Finally, a well implemented molecular air cleaning technology will reduce the overall size of an HVAC system, and extend the life of the equipment, so it's also a good capital expenditure improvement.

### FMJ: AS A WINNER OF MULTIPLE AWARDS IN INNOVATION, HOW IS ENVERID SHAPING THE OUTLOOK OF HVAC SOLUTIONS?

**ENVERID:** Our team is comprised of hard core scientists: physicists, mechanical and systems engineers, building experts, software experts, material scientists. We have dozens of patents for novel ways of treating the air. Our sorbents, for example, are specifically developed for each contaminant they clean, and they are built to self-clean and regenerate as needed. The HLR® (HVAC Load Reduction) system also includes sensors and responders, so the system is interacting in real time with the actual conditions of the air in a building.

enVerid is helping to create the HVAC systems of the future. HVAC systems will be responsive to the micro-environments in a building, always optimizing to create the most efficient use of energy while ensuring the quality and purity of the air for the people who breathe it. Systems will be integrated with building management systems and IoT so that they are controllable and trackable from anywhere, and will eventually teach themselves how to improve even further.

And yes, the technology continues to get recognition! enVerid's HLR system was just named a finalist to the 2016 R&D 100, known as the Oscars of Innovation.

**COMPANY NAME** Cambridge Sound Management
**EXPERTISE** Acoustical/Sound Masking
**CSP LEVEL** Silver
**CSP SINCE** 2014
**WEBSITE** cambridgesound.com

### FMJ: AT WHAT POINT IN THE BUILDING LIFE CYCLE SHOULD FMS CONSIDER SOUND MASKING PLACEMENT (LOCATION)?

**CSM:** Sound masking is best considered at the beginning of the building life cycle. Installation costs will be lower in an unoccupied space and employees will benefit from a more comfortable and productive work space from the start.

If you have an occupied space with acoustic issues affecting privacy and productivity, sound masking is still a great option. Many sound masking solutions are easy to retrofit and are designed to slowly increase or modify the sound masking provided so occupants can become accustomed to it. When you consider actual location of the sound masking speakers, you'll want to treat the areas where the unintended listener resides. For example, the cubicles outside of a private office, or the hallway alongside a conference room.

### FMJ: COMPREHENSIVE. INTEGRATED TECHNOLOGY IS INCREASINGLY IMPORTANT FOR STRATEGIC FACILITY MANAGEMENT. SO HOW CAN SOUND MANAGEMENT BE OPTIMIZED IN THE BUILT ENVIRONMENT?

**CSM:** There are three ways to treat sound. The first is to absorb through carpet, acoustical ceiling tiles or acoustic panels. The second is to block sound as you would with walls or cubicles. And the third and most flexible solution, is to cover or add a background sound through sound masking.

Sound masking is a cost-effective solution to increase speech privacy without changing the construction of a building or drastically altering the aesthetics. All of our sound masking solutions can be controlled through a network-connected computer, so facility managers have the ability to adjust sound levels and set up time-of-day ramping. If your business expands or remodels, sound masking is easily scalable to meet your new privacy needs.

**COMPANY NAME** Emaar Properties
**EXPERTISE** Real Estate
**CSP LEVEL** Silver **CSP SINCE** 2016
**WEBSITE** emaar.com

### FMJ: WHY SHOULD FMS GET INVOLVED ON THE DEVELOPMENT SIDE OF THE BUILDING PROCESS?

**EMAAR:** The involvement of FMs on the development side of construction is important to create a clearly structured FM policy that will contribute to the long-term value of the development. From Emaar's perspective, through our Community Management division, we have been actively working with all stakeholders in the industry, including facility management companies, and we understand the value-add that the integration of scientific FM practices play in driving the all-round efficiency in property management.

While our remit is extensive – from setting up owners associations to advocacy, to educating our residents about sustainability, we contribute to facility management through our active involvement in community management.

Today, with sustainable development as a key focus of the region, seeking the feedback of FMs during the pre-planning and development phases will enable us to achieve higher energy and water efficiency. Their inputs also help during the design process to ensure the well-being of residents, and in addressing any potential concerns faced by residents.

### FMJ: EMAAR PROPERTIES' THE TOWER AT DUBAI CREEK HARBOUR IS UNDER DEVELOPMENT. TELL US MORE ABOUT THIS NEWEST HIGH-RISE BUILDING'S ROLE IN THE MASTER-PLANNED COMMUNITY.

**EMAAR:** The ground-breaking of The Tower at Dubai Creek Harbour was held on Oct. 10, 2016, by His Highness Sheikh Mohammed bin Rashid Al Maktoum, UAE Vice President & Prime Minister and Ruler of Dubai. The Tower brings incredible value to the 6 square-kilometer Dubai Creek Harbour, which is one of the world's largest master-planned developments, that also integrates the latest design, engineering and sustainability features. A next-generation smart hub, it will also usher in an advanced digital lifestyle defined by the latest developments in artificial intelligence.

When completed in 2020, The Tower will provide stunning 360 degree views of the city and beyond. It strengthens the UAE's reputation for innovation and excellence in architecture, engineering and construction. Re-defining the nation's already spectacular skyline and setting a new global referral point, The Tower will serve as a magnet for tourists and visitors from around the world.

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IFMA's **Corporate Sustaining Partners (CSPs)** are an elite group of companies that have made a powerful statement in support of facility management by partnering with IFMA. It goes beyond just selling a product or service - these companies believe in the FM profession and believe in supporting its future.

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# Predictive Data for Construction Costs

BY LAURA DEMPSEY AND TIM DUGGAN

Bare material, labor and equipment costs account for 79 percent of total construction costs.[1] With the U.S. commercial construction starts estimated to be US$712 billion in 2016,[2] this relates to a US$562 billion expense line item nationally this year alone. So there is a clear and evident need for diligent management of construction material and labor costs.

Commercial construction companies and real estate owners use commercially available construction cost data to obtain current material and labor cost estimates for new construction and renovation budgeting. They have depended upon economic forecast providers to support future cost budgeting and capital planning of these expenses. In the last decade, these stakeholders have increasingly come to realize that traditional forecasting methods do not meet their needs to predict costs at the local market or individual material level. This is not surprising. Traditional forecasting methods were never designed to provide robust forecasts at such a micro market level.

Due to this shortcoming, predictive data breaks from tradition with an alternative approach. The chosen methodology is a data mining approach.


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45.6 %

This family of processes and analyses has evolved from a mix of classical statistical principles, more contemporary computer science and machine learning methods, and engineering and decision science techniques. It is a robust methodology that takes advantage of recent increases in computer power, data visualization techniques, and updated statistical procedures to find patterns and determine causative relationships in data. Measures of these drivers and their relationships to each other and to construction costs, along with their associated lead or lag times, are then represented in a statistical algorithm that predicts future values for a defined material and location.

Recent construction cost research has shown this approach, known in academic literature as "multivariate causal modeling," to be more accurate for predicting construction material cost. An additional strength of this approach is that it is capable of identifying turning points in construction cost before they occur.[3] This is paramount — unequivocally what the industry is increasingly demanding at the same time that data mining approaches to decision-making and strategic planning have become more prevalent and expected in all industries.

## Data and methodology

Best practice in data mining methodology involves the use of at least two datasets — training and validate datasets. Ideally, data in each dataset is unique; no overlap or reuse of data across the two datasets should be allowed. This is the data mining gold standard for developing accurate, robust algorithms that predict well for future time periods in 'out-of-sample' datasets, i.e., data previously unseen by the predictive algorithm.

Each dataset is composed of a "target" – the variable values to be predicted – and "features" (also known as "dimensions"), the set of input variables that have been selected as potential predictors. The training dataset consists of historical data for a given time period, and the validate dataset consists of a unique dataset of historical data for a different time period. In all cases commercially available construction cost data (either material or labor cost) is the target, and a set of general economic, construction industry-specific and material-specific indicators are features.

Data mining techniques require a minimum of 40-50 data points for acceptable accuracy. Chances are electronically recorded cost data was unavailable prior to the turn of the millennium. However, assuming a switch over to the digital field occurred around this time, a substantial amount of data should still have been recorded in the subsequent years. For instance, if you began recording electronically since 2002 and measure up to 2015, you will have yielded 12 year-over-year percent change data points, the metric chosen as best for modeling. These 12 data points could then be statistically "expanded" to quarterly values, resulting in 48 data points, sufficient for predictive modeling. (Expansion converts time series data values from one sampling interval or frequency to another and interpolates interim values.) This expanded dataset of 2002-2015 cost data would be the target in training datasets.

Subsequently, data from 1990-2001 could be manually extracted from past physically recorded sets and automated as the target for a validate dataset. That data could also be expanded to have 40 data points for validation of the algorithms resulting from the training efforts.

Data mining techniques could then be used to select the most promising economic, construction industry and material-specific indicators as features for predictive models. Then multivariate causal statistical modeling was used to develop a predictive algorithm based upon these indicators.

Consistent with data mining principles, multiple predictive analytic approaches should be selected and executed for this effort – auto regression, stepwise OLS (Ordinary Least Squares) regression, stepwise MLE (Maximum Likelihood Estimates) regression, ARIMA (AutoRegressive Integrated Moving Averages regressors), and VARMAX (Vector Autoregressive Moving Average with exogenous regressors). Candidate models should consist of 3 to 7 features. The final predictive algorithm will be the best model surviving training and validate phases from these five individual modeling efforts or an ensemble model which is a composite of best models.[4]

## Predictive data in use

- **Real estate (build to suit and tenant fit-out):** When real estate negotiations take place, several factors are considered. Site selection and cost of land reside at the top of this list. On the other hand, predictive data dives deeper, providing a view into the market for labor availability and material price increases that could support building in the identified location. Or conversely, providing insight that indicates the land is within budget, but the cost to build on the site could prove too costly for the project.

  Furthermore, real estate departments often negotiate tenant fit-outs and build-to-suit projects. These negotiations include locking in the price of certain items like concrete for curbing and sidewalks up to two years in advance. If the price of concrete is more by the time the project begins, then the overall project is under budget before construction begins. The predictive data allows real estate divisions to evaluate markets for labor availability and accurately predicted material prices to negotiate better future contracts and increased ROI for long-term project success.

- **Design and construction:** One of the big challenges for design and construction teams is managing the budget presented by either the architecture or contractor teams. More importantly, the D&C teams need to understand cost discrepancies to accurately predict future costs as time approaches to build and engage the contractors. All too often a mix of numbers come from the field and contractors for the price to build, and the big questions for any owner remain: Does it align with the predicted budget? What is the variance? Where are the differences?

  Predictive data has been used by clients to more accurately predict the cost of new builds and renovations up to 36 months before the project breaks ground. The ability to have predictive data that accounts for real market conditions (amount of construction versus labor availability) and commodity price impacts on material prices has proved a critical insight in managing the budget from the design through to construction phases.

- **Facilities and maintenance:** There are two main functions where predictive data has provided additional insight for the facilities department. The first is in providing a more accurate operating and maintenance budget upstream. The common practice is to provide a rolling three- to five-year budget plan where the facility manager is required to prioritize projects and estimate future costs for budgeting. What is missing for the FM is the ability to understand what market conditions will affect their budgets to effectively prioritize projects and predict budgets accurately.

  While FMs typically have some form of life cycle data or condition assessment data to assist in the budgeting process, the ability to accurately predict future costs is problematic at best. Predictive data users have incorporated the predictive data to understand the impact of material prices on their budgets up to 36 months in advance, which allows them to adjust major projects. For example, an FM plans to replace a roof on several buildings — a plan projected at two years, but labor availability predictors indicate that 18 months is the ideal time for a more cost-effective project cost. The predictive data has allowed FMs to better forecast the budget needs, as well as time the market for project execution to maximize budget dollars. The end result allows the FM to use saved budget dollars for deferred maintenance backlogs.

Ultimately, the core value of using accurate predictive data at the material, labor and equipment level is the unprecedented ability afforded to owners and FMs to understand future costs of projects. FMJ

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*NOTE: Ensemble modeling is the process of running two or more related but different analytical models and then synthesizing the results into a single model in order to improve the accuracy of the final algorithm. Data mining research shows ensemble models to often be more robust.*

**Tim Duggan** is director of cost analytics with RSMeans, a Gordian company. In this role he advises clients in the corporate and institutional sectors. Recent projects include developing a forecasting model for predictive cost data, and designing an interactive dashboard for building product manufacturers to monitor and evaluate specification influence in the marketplace. Duggan earned a bachelor's degree in mechanical engineering at New Jersey Institute of Technology and began his career as an engineer with the U.S. Army Research and Development Command.

**Laura Dempsey**, MBA, is director of consulting and analytics for RSMeans of the Gordian Group. She has been consulting for more than 15 years with Fortune 500 and U.S. state and federal agencies on the use of data, life cycle costs, models and predictive analytics in construction, capital planning and operations and management. Some of her clients include: Firestone, Georgia Pacific, EMA, the U.S. Department of Energy, Wells Fargo, Taco Bell and Tim Hortons. Dempsey holds bachelor's degrees in both philosophy and biology from Agnes Scott College, as well as a master's of business administration from Lake Forest Graduate School of Management.


# NOISE AND VIBRATION CONSIDERATIONS FOR DATA CENTERS AND IT FACILITIES

BY ETHAN BRUSH

Information technology is a crucial aspect of virtually all business and organizational operations around the world. The number and size of data centers to support these operations have been rapidly increasing in recent years. Firms must design and construct spaces that provide suitable environments for the data center equipment.

When in proximity to other human activities, the design of data centers must also consider the environmental effects produced in surrounding areas. For instance, large amounts of heating, ventilation, cooling (HVAC) and power are needed to keep the massive amounts of electronics operating together smoothly. The noise and vibration produced by the supporting mechanical and electrical systems should be considered in the design and maintenance of the facility. Failure to do so could result in not meeting project noise requirements or in receiving complaints from building occupants.

So, what steps can be taken to mitigate unwanted noise and vibration from data centers?

## Nature of data centers

Data centers are facilities that house computer hardware that manages operational information for companies and their clients. They perform what is commonly referred to as mission-critical functions because if they become unavailable, even for a brief period, operations may be impaired or stopped completely. Recently, a major airline was forced to cancel flights throughout the world due to an outage at one of its data centers.

Data centers often exist as standalone facilities whose sole purpose is to provide a company's information infrastructure from one large central location. They also exist as smaller installations co-located within a multitude of facilities to provide the same functions on a smaller scale. These smaller data centers may support any number of institutions such as hospitals, universities or smaller companies.

In recent years, the size of computer hardware components has decreased, allowing for a higher density of equipment in a space to keep up with the demand for more data storage. Consequently, this often increases the energy required for powering and cooling the equipment. Whether in a standalone building or part of multiple facilities, it's important to address noise and vibration considerations when planning for and operating data centers.

## Noise and vibration sources and options for mitigation

### NOISE AND VIBRATION PRODUCED BY DATA CENTERS

Many components of building heating, ventilation and cooling systems should be considered as likely noise and/or vibration sources. The air needed to cool computer equipment will need to pass through inlet and outlet vents, and through associated ductwork, creating noise concerns at high-flow velocities. Large fans with rotating motors will be needed in air-handling units, as well as compressors and chiller towers to provide air conditioning. Standby generators are often employed as well to mitigate the risk of the loss of power.

### NOT EVERY FACILITY IS THE SAME

The level of concern for noise and vibration is not the same for every facility. For example, a university science or hospital building may house powerful microscopes and other equipment that are very susceptible to relatively low levels of noise and vibration. In this case, significant mitigations in the design of data center support equipment would be required.

A less extreme and more common example is data centers in office buildings, where noise and vibration concerns could disrupt office activities. Noise from associated HVAC equipment can make it difficult to communicate, especially in conference rooms, and continuous perceptible floor vibrations can be quite bothersome to employees at their desks.

For standalone data center facilities, there may be no sensitive noise or vibration receptors inside the building except for the hardware and infrastructure equipment, which generally have higher tolerances than most human uses. Here the largest concern is about avoiding outdoor noise from equipment that may exceed local regulations or be bothersome to neighbors. In fact, community noise should be a concern for any data center facility with rooftop or outdoor HVAC components.

### MITIGATION METHODS

Facility managers have an important role in managing equipment maintenance and upgrades for data centers, which is why it is important to consider various methods to lower noise and vibration for sensitive receptors in the building or the surrounding area.

Specifiers can treat noise and vibration at the source by choosing and designing for quieter equipment. Slower fans speeds and higher-quality balance requirements are examples of how to lessen noise and vibration emissions at their source. FMs can also address these challenges via the path that noise or vibration travels to a sensitive receptor. They can apply this several ways, such as by adding resilient mounts and fasteners to everything from large reciprocating engine generators to the smaller pumps, fans, pipes and ductwork.

This can also mean housing generators and other loud equipment inside acoustic enclosures or behind sound barriers. Silencers affect the path of noise through airflow chambers, reducing the amount of sound at the inlet or outlet orifice. Most facility managers are probably generally aware of the products and designs for these mitigation methods as they are used in virtually all other HVAC systems that serve general building use. The important takeaway is that noise and vibration concerns should be addressed as early in a data center project as possible. Many of the methods for mitigation might require shutting down the data center temporarily if installed retroactively, which can be costly and difficult to manage.

## Project examples

### DATA CENTER IN AN URBAN ENVIRONMENT

In the financial industry, the proximity of a data center to stock trading activities is of utmost importance. The enormous amount of data that is transferred daily means that even though it is moving at the speed of light, proximity to the financial markets ensures the information reaches its destination as quickly as possible. A data center performing this function thousands of miles away would not have this benefit. Therefore, many data centers are installed and planned in urban settings.

A project in New York City planned for the use of its own combined heat and power generation at its facility in support of high-density data center operations. The benefit of generating electricity onsite can be a financial decision as well as a way to mitigate the risks associated with relying solely on commercial grid power.

In this case, the power plant was to employ two combustion turbine generators on an upper floor of a multi-story building and three large diesel generators in the sub-basement. Associated radiators and air cooling towers on the rooftop of the building were also part of the design, as well as air inlet and exhaust louvers at various locations of the building façade. The project was required to meet New York City noise limits at the nearest residential and mixed-use properties, which were very close to the existing building.

The project team developed a sound model to address each source of noise to the community. The analysis of air inlet and exhaust systems identified the need for significant mitigation and several sets of silencers were included in the ventilation design. The two combustion turbine generators on the upper floors were required to be housed inside acoustical enclosures. Analysis of the rooftop cooling towers estimated that their noise contributions would be negligible and that the radiators could be made compliant by using reduced-noise fans.

There were potential sensitive receptors of vibration in addition to noise within the building and adjacent properties, so a robust vibration isolation plan was also specified throughout the project. The generators, cooling towers, fan motors and even chilled water pipes were attached to the building and foundation through resilient mounts and fasteners.

## STANDALONE DATA CENTER NOISE MITIGATION

A provider of high-volume internet-based transactions planned a major addition to an existing data center in a remote location. At the time of the construction of the original facility, it was not near any sensitive receptors (residences, hotels, schools, etc.). However, an adjacent property was expected to be developed in the future and new city noise regulations were to be imposed on the expanded facility. The risks of not addressing a noise regulation could result in fines or the requirement to install costly retroactive mitigations.

First, the team developed a sound criterion for the facility using baseline ambient measurements and the anticipated new local noise regulations. Predictive modeling of sound levels based on manufacturer's information aided in the selection of appropriate equipment and mitigation treatments to adhere to the project goals. The team conducted a post-construction sound survey as part of the commissioning of the newly upgraded facility. The sound levels observed at nearby community property lines demonstrated the project's compliance with the established criterion.

## STANDBY GENERATOR FOR A DATA CENTER IN A CORPORATE BUILDING

A global investment company sought to reduce the risk of downtime to its servers by installing a backup diesel electric generator on the building rooftop. Executive suites and conference rooms were located on the top floor of the building, and the company was concerned about the noise and vibration that the new generator would produce. The company could tolerate a certain amount of noise or vibration in the event of lost power, but as most facility managers know, large generators are operated frequently as part of routine maintenance.

The team conducted a study to investigate the potential for noise and vibration transfer into the office and conference room areas. First, they brought a large speaker up on the rooftop near where the generator would be located. The speaker produced large amplitudes of sound at all frequencies and the team measured the resulting noise levels in the office area. The team combined these data with the generator manufacturer's sound data to estimate the expected amount of airborne noise intrusion. Second, they used a large-force hammer to impart vibrations atop the capped steel columns where the generator was to be mounted and measured the resulting floor vibrations in the offices below. The team used data collected near similar generators to predict the level of vibration that could be expected in the occupied areas of the building below.

This study confirmed that both noise and vibration would be an issue for occupants of the building, and the team chose proper mitigations for the generator. They placed a large enclosure around the generator that featured silencers for the air inlets and outlets, and the entire enclosure structure was placed on isolated spring mounts to reduce the transfer of vibration into the building. **FMJ**

**Ethan Brush** is a senior consultant in the noise and vibration group at Acentech, headquartered in Cambridge, Massachusetts, USA. Acentech provides world-class consulting services in architectural acoustics, audiovisual design, noise and vibration control, security systems, and information technology design. Brush can be reached at ebrush@acentech.com. Headshot by Robyn Ivy Photography.

# MITIGATING RISKS OF COMMERCIAL KITCHEN FIRES

**BY DOUG HORTON**

Commercial kitchens are located in increasingly diverse types of buildings. In addition to restaurants, commercial kitchens are found in hotels, retail complexes, schools, universities, airports, office buildings, residential buildings, convention centers, hospitals, factories, elder care facilities and nursing homes, and in catering, cooked food packaging, military feeding and correctional facilities.

With more commercial kitchens, there are more fires. What's surprising is that some fires in commercial kitchens are not being reliably detected and extinguished by conventional fire suppression systems in exhaust hoods, causing damage to buildings, business interruptions, lost revenues, lawsuits and injuries.

Some of the increase in commercial kitchen fires is related to the increasing use of solid-fuel cooking. When moisture is present when wood is burned, incomplete combustion produces highly combustible creosote deposits in hoods and ducts, which adds to the usual fire risk of grease and complicates fire detection and suppression.

Creosote has relatively low flashpoint and auto-ignition temperatures, and many creosote fires start initially in exhaust ducts, above conventional fire suppression

system detectors, from sparks, embers and high temperatures. Alternatively, they start in hoods and move into ducts faster than they can be detected by conventional suppression systems.

## Selected case studies

The headquarters of a famous comedy club, theater and performance school experienced a three-alarm fire that ignited in a restaurant's natural gas cooking line in the multi-story complex of buildings. Quoting the fire department spokesman, "the blaze made it past a fire suppression system and spread through vents to the roof."[1] The conventional fire suppression system actuated, but the fire was already burning in the exhaust duct and spread to two floors of offices and the roof structure. Estimated damage and lost business was US$9 million.

A privately owned restaurant recently experienced its third significant fire from a wood-burning combination charbroiler and rotisserie. Significantly, the 11,000-square-foot (1,022-square-meter) restaurant is located on the ground floor of a city-block sized, multi-story condominium building. After the latest fire, the restaurant space was offered for lease, and condominium sales lagged.

In another restaurant, on the ground floor of a three-story building, fire ignited in a pizza and baking oven fueled with both natural gas and wood. According to the fire report,[2] "The heat became so intense, that it burned the buildup of creosote off the inner wall of the oven." The fire was not detected by the conventional fire suppression system and it did not discharge.

An analytical report describes 13 typical commercial kitchen fires, and close reading reveals that in five of these fires, suppression systems did not operate properly.[3]

## Fire suppression issues and solutions

- **Conventional systems.** There are several manufacturers of conventional commercial kitchen fire systems. These systems are sometimes unreliable in extinguishing some cooking fires, especially with solid fuel cooking, for several reasons.

- **Detection.** Conventional systems typically detect fires with fusible links, which is a century-old technology. Detection requires time for the solder holding the brass links together to fuse (melt) when temperature is above set point such as 360 degree Fahrenheit (182 degrees Celsius). Even if the links separate, there are numerous mechanical actions that must occur to actuate typical conventional systems, and even if the system is actuated, a fixed amount of liquid suppressant is dispersed for only about one minute.

- **Fire speed.** Another detection and suppression issue is the speed with which cooking fires can travel. As a minimum, fires travel at the speed of exhaust airflow. With an example duct length of 15 feet (4.6 meters) and exhaust speed of 1,500 feet per minute (457 meters per minute), it takes less than one second for fire to travel the length of the duct.

- **Fuel shut-offs.** Unlike the ability of conventional fire suppression systems to automatically shut off natural gas and electricity to appliances, there is no means of automatically turning off burning solid fuel.

- **Reliability analysis of conventional systems.** There are about 30 sequential actions and component functions necessary for setup, detection, actuation and suppression with typical conventional systems. Many of these actions and components are "go" or "no go," with resultant system failure if only one action or component fails. Examples include grease-encrusted fusible links and fouled detection cables.

- **Spark arresters.** Though "spark arrestor filters" are available, there are no known standards or listing tests for application of these products to hoods over solid fuel cooking.

## Fire suppression system improvements

Manufacturers are making progress with improved systems. One newer system dispenses liquid chemical suppressant for about one minute, as usual, and then dispenses building water through system piping and nozzles, but this system is still constrained by fusible links detection.

Another system incorporates electronic detection, but it's still constrained by a fixed amount of suppressant and limited spray time. A U.K. company offers a system with electronic detection, operation, and monitoring, with battery backup. This system has approvals for the European Union, though its operation is limited by a fixed amount of suppressant.

## Advanced fire suppression systems

The most technologically advanced fire suppression systems incorporate electronic detection, operation and system monitoring, with backup power supply and optional network communications. Suppression is provided by unlimited water with surfactant added to enhance fire surface wetting.

Coating fire surfaces with water and surfactant limits fuel surface temperatures, and it deprives fire surfaces of oxygen, to rapidly extinguish fire and eliminate spread. Also, as the droplets vaporize, the increase in water vapor volume also displaces oxygen. One manufacturer's advanced system also automatically cleans the hood plenum, lower duct and lower duct detector with hot water and surfactant, as more fully described in Reference 4. Jurisdictional acceptance of fire suppression systems is based on conformance to applicable codes and standards.

## Exhaust duct issues

Applicable codes and standards also provide requirements for exhaust ducts connected to grease and smoke emitting exhaust hoods. In the U.S., for example, for buildings with three stories or less, it's common practice to install unlisted, welded-on-site ducts. These ducts are intended to conform to country standards for materials, welding, connections, slope, drains, cleaning access and other requirements, but despite good intentions, there are many fire challenges with welded-on-site ducts, such as:

- Welds not continuously liquid tight;
- Instability when exposed to high temperatures;
- Poor connections between exhaust ducts, hoods and exhaust fans;
- Insufficient duct clearance to combustibles or noncompliant duct insulation;
- Improper penetrations of fire-rated barriers;
- Noncompliance with required slope and drainage means; and
- Lack of required access panels and required spacing for cleaning.

A U.S. national standard requires that listed, factory-built ducts must be utilized with solid fuel cooking in buildings with exhaust systems of four or more stories.[5] Depending on location and application, ducts and accessories can be tested to several standards. When tested to grease duct standard UL 1978 by a large U.S. manufacturer, unlisted ducts enclosed with insulation performed poorly, collapsing from retained heat and thermal stresses.

Based on robust design, versatility and safety as a result of rigorous evaluation and fire testing, specification and installation of listed factory-built duct products makes sense, especially for solid-fuel cooking, with which combustible creosote adds to grease as fire risks.

## Clearance to combustibles

Non-compliance with code and standards requirements for clearance to combustible construction components often causes small fires to spread and cause significant losses. The most frequent non-conforming issue is appliances, hoods and ducts installed without required clearances to often-hidden wood construction. Examples are the installation of hoods against stainless steel backsplashes, mounted on a single sheet of gypsum wallboard attached to wood studs and similarly, hoods installed on gypsum wallboard mounted to wood ceiling joists.

With reference to U.S. codes and standards, neither of the preceding examples meets the general 18-inch (46-centimeter) clearance requirement. However, codes and standards provide methods for reducing clearances, such as using metal beams, joists, studs and trusses near planned locations of appliances, hoods, ducts and exhaust fans.

## Hood and duct cleaning

The U.S. National Fire Protection Association (NFPA) 96 Section 11.6.2 states that kitchen exhaust components "shall be cleaned to remove combustible contaminants prior to surfaces becoming heavily contaminated with grease or oily sludge." The "oily sludge" is likely creosote, grease or a combination of the two. Section A.4.1.6 states: "When solid fuel is burned in cooking operations, increased quantities of carbon, creosote and grease-laden vapors are produced that rapidly contaminate surfaces, produce airborne sparks and embers, and are subject to significant flare-up."

NFPA 96 Section 11.4 indicates, "The entire exhaust system shall be inspected for grease buildup by a properly trained, qualified and certified person(s) acceptable to the authority having jurisdiction and in accordance with Table 11.4," which shows a monthly inspection frequency for "systems serving solid-fuel cooking operations." On the other hand, a prominent fire investigator and writer about commercial kitchen fires suggests, "buildup from solid fuel cooking can create a serious fire hazard in as little as a week."[6]

## Mitigating risk

Solid-fuel cooking is a growing trend in commercial kitchens, and there is increasing fire risk of related creosote deposits from incomplete combustion of wood, particularly in exhaust ducts that likely have grease deposits also. Mitigation of this risk calls for improved kitchen fire suppression systems, use of listed factory-built ducts, full compliance with clearance to combustible construction, and frequent inspection and aggressive cleaning of exhaust systems. FMJ

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**Doug Horton,** MSEE, MBA, is a Certified Foodservice Professional and principal consultant at D. J. HORTON and Associates, Inc. in Batavia, Illinois, USA. Following service as a naval officer, Horton managed equipment engineering issues with a large international restaurant chain for 14 years. Among other achievements, he developed a comprehensive planned maintenance system, and he founded and directed the chain's regional facility management program. He currently consults on commercial kitchen ventilation and fire suppression issues, including investigation and analysis of commercial kitchen fires. Horton is a popular speaker and has presented more than 200 professional development seminars on commercial kitchen equipment topics.


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## STREAMLINE MEETING MANAGEMENT WITH INTEGRATED CLOUD SOFTWARE

Booking the perfect meeting space just got easier, thanks to the recent collaboration between NFS Technology Group, providers of Rendezvous room booking software, and Crestron®, a leading global manufacturer of integrated technology for automation, control and management.

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With this joint solution, employees can find a meeting space, book the room and catering, set-up lighting, control temperature, lower window shades, and bring remote offices into the meeting by video conferencing seamlessly for a timely start. Adding the Crestron PinPoint™ app provides employees with a personal, mobile, dynamic scheduling tool; contextual information enables them to book spaces based on where they are, what they're trying to do, and with whom they are working.

Learn more about connecting your workplace by visiting **www.myrendezvous.net** or **www.crestron.com.**

## WEB TOOL HELPS EMPLOYERS FIND CERTIFIED CLEANING PROFESSIONALS

The International Executive Housekeepers Association (IEHA), a leading non-profit organization providing education and resources to individuals who manage professional cleaning operations, announced the release of a new website tool that makes finding qualified cleaning professionals easier than ever.

The "Find a Certified Member" feature allows employers to identify individuals in their area who hold the Certified Executive Housekeeper (CEH), Registered Executive Housekeeper (REH) or Master Registered Executive Housekeeper (MREH) status earned by completing IEHA's Professional Education Credentialing Program (PECP).

Located under the "About Us" section of the website, employers can click on "Certified Members" and find an up-to-date list of individuals who currently hold IEHA designations, along with their expiration date. The new tool also has a search function so employers can look for members by name to validate their designation.

For more information on IEHA and to see the new "Find a Certified Member" tool, go to **www.ieha.org/certifiedmembers.php.**



## FREE APP SERVES AS PERSONAL TRAINER FOR STANDING DESK USERS


The TableAir app is designed to help the first time user of a standing table make an easier and healthier transition to standing more while working. It also benefits advanced users by creating the optimal sit-to-stand schedule to follow.

Compatible with any standing desk on the market, the TableAir app suggests sitting and standing intervals based on various case studies and recommendations from ergonomics experts. An optional infographic feature allows the user to see a visual record of how he or she is doing for the day and enables them to compare the actual training progress with a suggested daily program.

The TableAir app is offered by TableAir UAB, the Lithuania-based company that recently released TableAir, a smart table workstation. The TableAir app can also be used to adjust the height and LED color settings on the TableAir workstation and is now available for free download worldwide at the Apple App Store. Visit **www.tableair.com** for more information.

## OCCUPANT REPORTING TOOL REVEALS HIDDEN BUILDING PERFORMANCE ISSUES

CrowdComfort has taken its user-friendly building management app and built a supplemental data visualization platform called CrowdSense, wherein users can view overall building performance as well as granular issues. It's an informational tool that includes more than 200 occupant reports across seven floors of one anonymized CrowdComfort customer.

CrowdSense offers a way to understand the data that CrowdComfort's "two-thousand sets of eyes and ears" provide. Facility managers can view specific details of a maintenance report and thermal report including time submitted, photo included and location down to the nearest square foot. These detailed reports are highly actionable: CrowdComfort was able to identify two HVAC issues that were causing employee discomfort in two separate parts of the building, all because of employee smartphone reports.

Currently, CrowdSense is viewable as a demo and requires no external software as it is web-hosted. View the tutorial version of CrowdSense at **www.crowdcomfort.com/crowdsense.**

## NEW THERMOPLASTIC ROOFING MEMBRANE LEADS INDUSTRY IN UV, AGING PERFORMANCE

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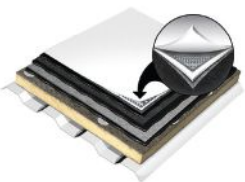
For more information, visit **www.garlandco.com** or call **+1-800-321-9336.**



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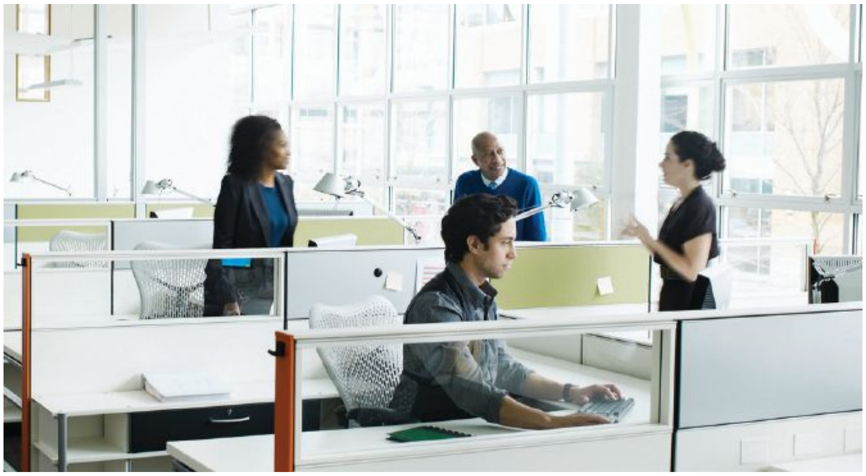

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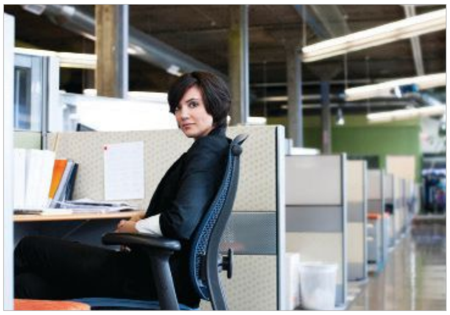

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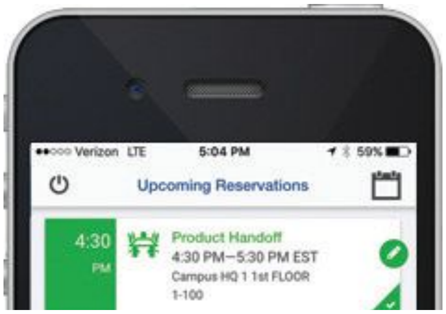


Mobile Technologies

# FMJ EXTENDED

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THIS EXCLUSIVE ONLINE SECTION FOCUSES ON EXPANDED FM COVERAGE.

# IFMA Fellows Class of 2016 and Chair Citation Recipients Honored at World Workplace

## 2016 Class of IFMA Fellows

The 2016 Class of IFMA Fellows was inducted at IFMA's annual Awards of Excellence banquet on Friday, Oct. 7, in San Diego, California, USA, held during IFMA's World Workplace 2016 Conference and Expo. IFMA Fellow is the highest honor the association bestows upon members.

"IFMA Fellows are luminaries, not only within the IFMA community; but throughout the FM profession," said Maureen Ehrenberg, FRICS, CRE, chair of IFMA's Board of Directors. "They are respected leaders who have distinguished themselves through many years of service and notable accomplishments in education, research, writing, speaking, advocacy and in their professional careers."

IFMA's fellowship program was established in 1992 to recognize members' lifetime contributions to the association and the facility management community. When considering a candidate for fellowship, the nominating committee assesses professional experience and accomplishments; association involvement; and how that person has enriched the profession.

Fellows form a core of IFMA advisers and ambassadors, frequently called upon for their unmatched knowledge of the facility management profession. Below are summaries of contributions made by each of this year's Fellows:

- **Peter Ankerstjerne, MBA, FRICS, COP, IFMA Fellow,** has worked to advance the facility management profession for more than two decades, contributing to the professionalization and growth of the Nordic FM market, and raising the professional profile of the global outsourcing industry. He is a Fellow of the Royal Institution of Chartered Surveyors (RICS), and a Certified Outsourcing Professional. He has served on IFMA's International Research Committee and the board of directors. He served on the Advisory Board for International Business Development at Copenhagen Business School, and the Strategic Advisory Board at the International Association of Outsourcing Professionals. He established the Integrated Facility Services Academy, and chairs the academy's Steering Committee

- **Stephen Ola Jagun, CFM, FRICS, FNIVS, IFMA Fellow,** is an Associate and Fellow of the Nigerian Institution of Estate Surveyors and Valuers, and a Fellow of the Royal Institution of Chartered Surveyors (RICS). He participated in the formation of IFMA's Abuja Chapter, and has served in numerous offices with IFMA's Nigeria and Lagos chapters. As the only Certified Facility Manager® (CFM®) instructor in Nigeria, he champions IFMA credentials and education, and has been a key initiator of IFMA Facility Management Professional® (FMP®) training in Nigeria. He continually promotes the FM profession in Nigeria to ensure that facility management is prioritized in the region's burgeoning development. An advocate for young professionals, he established an annual IFMA education grant and mentorship program for University of Lagos students pursuing a master's degree in FM.

- **Jon Seller, IFMA Fellow,** has contributed technical, operational and executive expertise gained from more than 35 years of international FM work to the promotion of IFMA and FM. As an IFMA organizational leader and ambassador, he committed to advancing FM and IFMA in Asia and globally. He served as chair of IFMA's Strategic Planning Oversight Team, and as an original member of IFMA's Sustainability Committee. As a member of IFMA's board of directors, he served as director, second vice chair, first vice chair, chair and immediate past chair. He guided the refinement of IFMA's mission, vision and prioritized initiatives, contributing to IFMA's rebranding process; as well as the launch of IFMA's Essentials of Facility Management program; IFMA's increased presence in India; and the launch of IFMA's Knowledge Strategy initiative.

- **David Wilson, CFM, IFMA Fellow,** has advanced the strategic importance of FM across Europe. He served on the International Credentials Commission and IFMA's Knowledge Strategy development team. He served as a

**LEFT TO RIGHT:** *Maureen Ehrenberg, Dave Wilson, Jon Seller, Stephen Ola Jagun, Peter Ankerstjerne, Tony Keane*

member of the IFMA Foundation's Council of Academic Affairs, and as a Foundation ambassador to the United Kingdom, promoting FM scholarships, awards and accredited degree programs in Europe. He was involved in the international development of IFMA's Certified Facility Manager® (CFM®) certification. He has made significant contributions to international FM standardization through his roles within the International Organization for Standardization, the British Institute of Facilities Management and EuroFM.

## 2016 IFMA Chair Citations

Four longstanding members and four employees of IFMA were honored for their contributions to the association and the facility management community with Chair Citations issued by 2016-17 IFMA Chair Maureen Ehrenberg, FRICS, CRE. Individual citations were presented to: James E. Loesch, P.E., CFM, IFMA Fellow, Nancy J. Sanquist, IFMA Fellow, Steve Lockwood, CFM, IFMA Fellow, and Rick Corea; with two joint citations presented to Cathy Pavick and Brenda Varner, RCFM; and Andrea Sanchez and Geoff Williams, FMP.

The presentation of the citations was part of IFMA's annual Awards of Excellence banquet, held Friday, Oct. 7, in San Diego, California, USA, during IFMA's World Workplace 2016 Conference and Expo.

"There are a great many members and dedicated IFMA employees whose leadership, hard work, selfless actions and exceptional achievements take place behind-the-scenes," said Maureen Ehrenberg, FRICS, CRE, Chair of IFMA's Board of Directors. "As chair, I'm grateful for the opportunity to recognize these outstanding individuals for their roles in elevating the FM profession."

Each IFMA chair may elect to honor individuals whose association involvement and professional achievements may not be widely known or formally acknowledged. Chair Citations recognize those who help drive IFMA's success by serving, supporting membership and enhancing IFMA's values.

See summaries of contributions made by each of this year's Chair Citation recipients on the next page:


**LEFT TO RIGHT:** *Tony Keane, Rick Corea, Geoff Williams, Andrea Sanchez, Cathy Pavick, Brenda Varner, Steve Lockwood, Nancy Johnson Sanquist, James Loesch, Maureen Ehrenberg*

- **James E. Loesch, P.E., CFM, IFMA Fellow,** has dedicated more than 25 years to the advancement of FM education and credentials. He served on IFMA's Education Committee, and participated in the development of the IFMA Education Strategic Plan and the Leadership Institute. He's been a champion for global FM standardization through service as the immediate past chair of the International Credentials Commission, and was instrumental in the process to certify IFMA's credentials through the American National Standards Institute. He served on the IFMA Research and Development Council, and provides continued consulting on the direction of IFMA's Global Job Task Analysis.

- **Nancy J. Sanquist, IFMA Fellow,** has inspired others to imagine the future of the built environment and fostered opportunities for aspiring facility professionals to forge the path in FM technological change. She has shared her passion and vision for the role of the workplace through countless speeches, seminars and noteworthy publications such as the award-winning "Work on the Move: Driving Strategy and Change in Workplaces." Serving as chair of IFMA's Knowledge Management Committee, she has championed knowledge cultivation and imparted innovative thought leadership to the FM industry.

- **Steve Lockwood, CFM, IFMA Fellow,** has supported the future of facility management for more than 35 years through teaching and leadership. He has fostered FM workforce development through research, scholarship and mentoring opportunities for ambitious FMs; and diligently pursued creative partnerships that position FM as a career of choice. He developed the IFMA Foundation's Facility Management Accreditation Commission Regional Task Force Committees; and enhanced the FM profession through dedication to the mission and purpose of the IFMA Foundation.

- **Rick Corea** has dedicated more than 35 years to excellence in FM industry leadership and education, serving as a mentor, advocate, researcher, teacher and advisor to undergraduate and graduate FM students. His professional, intellectual and sponsorship contributions to Arizona State University programs are foundational to FM student growth and instrumental to the future of FM practice. He has developed mentorship resources and internship opportunities facilitated by the IFMA Foundation; and devoted time and expertise to the cultivation of the FM community at all levels, from students to peers.

- **Cathy Pavick and Brenda Varner, RCFM,** have a combined service to the association of 20 years. Dedicated to creating IFMA's quality educational programs and maintaining global accreditation standards, their significant contributions to IFMA's world-class education and credential offerings include achieving accreditation with the American National Standards Institute, as well as receiving seven ANSI commendations recognizing IFMA as a model of industry best practices.

- **Andrea Sanchez and Geoff Williams, FMP,** have cultivated IFMA's Knowledge Strategy to support information sharing that leverages the valuable collective experience of FM professionals. They facilitated the design and creation of IFMA's Knowledge Library, the first online collection of expert-vetted facility management resources, are are recognized for leading change and forging new paths in technological implementation within the disciplines of communications, education, organizational development and management of the built environment.

# ASK THE **EXPERTS**

*Contributed by IFMA's Facility Management Consultants Council*

IFMA™ FM Consultants Council
International Facility Management Association

In each issue of FMJ, IFMA's Facility Management Consultants Council shares some commonly asked FM-related questions accompanied by advice from top FM consultants. The questions and answers presented in this section align with IFMA's core competencies following the themes outlined for the given edition of the magazine.

While the following answers are intended to be helpful, these responses should not be deemed complete and are limited in context by the space allocated. Please contact the individual consultants directly for further explanation of the opinions expressed.

The theme of this edition of FMJ is "**Strategic Planning.**"

*The Facility Management Consultants Council (FMCC) represents more than 300 FM consultants from various countries around the globe. Its mission states, "The FMCC is the resource and voice for facility management consultants worldwide to leverage our collective expertise to benefit IFMA members, and the facility management profession."*

*Questions regarding the Ask the Experts section of FMJ can be directed to Mark Sekula, CFM, FMP, LEED AP, IFMA Fellow, president of Facility Futures, Inc., at msekula1@wi.rr.com.*

*Visit FMCC online at fmcc.ifma.org or join the conversation on the council's LinkedIn group at http://linkd.in/1gAa8ae.*

**QUESTION: I understand how important strategic facility planning is. I have tried to develop a plan but then the phone rings and I'm off solving a crisis. Can you give me some hints as to how to start the strategic planning process and build momentum?**

ANSWER: Delegate the day-to-day tactical tasks to your FM support staff so that you can focus more on the high-level strategic tasks.

ANSWERED BY:

**Richard Fanelli, CFM, AIA, IFMA Fellow**
Fairfax, Virginia, USA
+1-703-563-0379
rfanelli@fanellimcclain.com

Fanelli is president of Fanelli McClain, Inc., a commercial interior planning and design firm headquartered in Fairfax, Virginia, USA. He is the former president of FMCC and of the Capital Chapter of IFMA, and served on the IFMA Board of Directors from 2002-2004. He has been an IFMA instructor since 1993, has taught FM certificate programs at George Mason University since 1999 and teaches in the FM graduate program at the Catholic University of America.

ANSWER: First, you have my sympathies regarding the phone ringing with crises to solve. FMs shouldn't have to attend to everything personally, and delegating to staff is important for FM learning and growth. However, some things cannot be delegated effectively — strategic planning is one.

The good news is that your foundation work is most likely already done. FMs typically operate in the second tier of an enterprise, just below top executives. Most organizations use a strategic management system to formulate and communicate top-level strategy. Your strategies and objectives, performance measures, targets, initiatives and approaches to change and risk would reflect the same topics expressed by the tier above, but with FM particulars. This is not a "fill in the blanks" situation, but you will have a model strategic plan and themes to work from and toward. Your input will be more concrete, and specifically innovative.

If you are an administrator, executive director, managing partner, president, etc., of an enterprise too small to have FM with a strategic view, you should, and possibly must, still give strategic input about facilities. Talk about this with your board president or executive committee. It ought to be feasible to sketch a plan-do-check-act cycle to initiate with your board, to ease your own burden and theirs, while serving your customers and staff.

Now, let's see if we can reduce the crises somewhat. Oh — there's the phone.

ANSWERED BY:
**David Reynolds, CFM, FMP**
Jackson, Mississippi, USA
+1-504-481-2627
davidreynoldsfm@pobox.com

Reynolds is with FM-CONSULT-CREATE. His background is in systems, project management and consulting in small companies serving a variety of clients and industries. He holds degrees in science, engineering and allied health areas.

He focuses on FM as organizations adopt asset and risk management principles and practices, where clear, visible, interactive, maintainable, processes and models, data and measurements can better frame FM in alignment with organization strategies and objectives. Reynolds' pro bono work includes construction, maintenance, safety and health. He is also a member of IFMA's Operations and Maintenance, Health and Safety Community.

ANSWER: Being pulled between strategic planning and operating crises is not uncommon. The following steps will give you a jump start that doesn't take long or consume many resources:

- Recognize these are significantly different activities in terms of thought processes and tangible products, so segment your times during the week for each and stick to them.
- Read IFMA documents on facility strategy, especially from related workplaces. Then write an executive summary of the points that will mean the most for your organization and establish an elevator speech for executives.
- Engage key members of your staff and user community with question-and-answer sessions and/or focus groups on the critical needs and potential outcomes that strategic facility planning might answer.
- Pick any format that fits your organization and style, draft it for content and metrics (no more than a few pages), and then try it out on trusted stakeholders. Use the feedback to adjust your thoughts and plans.
- Choose two to three elements (e.g., project feasibilities, outsourcing changes, space standards) and introduce them into those planning organizational activities. Field questions/skepticisms openly.
- Iterate the above steps so you become the recognized catalyst and steward of strategic planning in your organization.

ANSWERED BY:
**Dr. Doug Aldrich, CFM, IFMA Fellow**
Denver, Colorado, USA
+1-720-253-8974
doug.aldrich@comcast.net

With five decades of industry experience and FM consulting, Aldrich is a strategic leader, laboratory expert and globality advocate. He was chair of the IFMA Board of Directors, cofounded IFMA's Research and Development Council, has served on advisory boards, communicates in word and print, and helps nonprofits.

ANSWER: Having recently taught IFMA's Facility Management Professional™ (FMP®) course on project management in Jeddah, Saudi Arabia, reminded me that even strategic planning can be dealt with as a project, which is how you can work through the process of developing your strategic plan and be more successful. You can do this whether it's for a single issue you are trying to resolve, or a strategic plan for your entire portfolio.

The main steps include defining the project, planning the project, managing the project and then closing the project.

- Defining is understanding the purpose, creating a charter and defining requirements before you begin.
- Planning is about timing, resources, inputs, outputs, dependencies and essentially how you will get everything done on time.
- Managing is where the real work begins as you work to your plan and adjust as needed.
- Close-out is your finished strategic plan along with final approvals and sign-off so you can start to implement.

An important step before undertaking strategic planning as a project is to get approval in the first place. As you would for a capital project, develop a business case to get senior management excited about the possible outcome, approval for possible costs, time and resources it will take, and ultimately a commitment from senior management to support the planning process. This is what builds momentum.

Undertaking strategic planning with senior management knowledge and support is more likely to lead to success as well as demonstrate your value. A bonus is that this sets a schedule and an expectation for completion, which is the best way to ensure you focus rather than being distracted by day-to-day issues.

ANSWERED BY:
**Michel Theriault, FMP, RPA, LEED AP**
Guelph, Ontario, Canada
+1-519-803-5401
michel@strategicadvisor.ca

Theriault has been in FM for 25 years, working in-house and with an outsource provider and has been an FM consultant for nearly a decade. He is an award-winning author, international speaker and a qualified IFMA FMP instructor. His award-winning book, "Managing Facilities and Real Estate," emphasizes strategy, management and leadership in the FM role.

As principal and strategic advisor of FM Insight Consulting Ltd., Theriault focuses on management and strategic issues, helping facility managers in a wide variety of industries analyze, justify, plan and implement their initiatives with a strategic approach. For more information, visit his website at www.strategicadvisor.ca or his blog at thebuiltenvironment.ca.

ANSWER: Strategic planning should not be plotted in a busy office. It requires careful thinking, full involvement of all important business and operational stakeholders, and time governance.

Meetings should be conducted in a calm environment (this could be even outside of company premises) with a crystal-clear agenda, pre-meeting homework assignments and agreed action points after each session.

Use your risk management expertise to educate stakeholders about upcoming business challenges and available options for mitigation.

ANSWERED BY:
**Dr. Hany M. Idreis, Sc.D, FMP**
Jeddah, Kingdom of Saudi Arabia

Idreis holds a Doctorate of Science degree in work environment policy from the University of Massachusetts Lowell. He is qualified by the National Examination Board in Occupational Safety and Health and is an ISO 14001 lead auditor.

Idreis works as a head of health, safety and environment for Abdul Latif Jameel Co. (the sole distributors of Toyota, Lexus and Komatsu in Saudi Arabia for more than 11 years).

CASE STUDY

# Energy Benchmarking **in St. Louis**

BY CHRISTOPHER LAUGHMAN

It is often said that what gets measured gets done. But why are we measuring? What are we trying to accomplish? After all, facility managers are busy handling issues, preventing complaints and maintaining assets, not to mention trying to work through budgeting.

But what if you knew that you likely have a 7 percent contingency built into your utility budget? What if simply paying attention could help you align your facility operations with your corporate business goals? This is why you should use the ENERGY STAR Portfolio Manager®, a free online tool. According to the U.S. Environmental Protection Agency, buildings that used the tool consistently over a three-year period reduced energy use 2.4 percent each year, yielding a 7 percent savings over the period.

*Contributed by IFMA's Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group*

ENERGY STAR Portfolio Manager allows building users to track energy use, water consumption, waste and greenhouse gas emissions and compare usage against other similar facilities. From schools[1] to office buildings and stadiums, any building can be entered into the tool — in fact, 40 percent of U.S. commercial building space is already benchmarked in Portfolio Manager.

In addition to office buildings, entire cities have used Portfolio Manager to benchmark the energy usage of their building stock, as have colleges and universities, major league sports teams and half of the largest U.S. health care organizations according to ENERGY STAR. As of 2014, over 35 billion square feet of property had been recorded.[2]

In fact, benchmarking in ENERGY STAR Portfolio Manager is gaining momentum across North America, with some jurisdictions even requiring it because it is such a practical way to lower energy and water use. To date, 16 cities and one county have adopted local benchmarking requirements for public and private buildings, covering over 6.8 billion square feet of property.

As recently as October, New York City adopted an expansion of its 2009 benchmarking law to cover mid-sized buildings 25,000 square feet and larger, and several other cities have legislation in the works. Clearly, benchmarking requirements are widespread already and gaining momentum as a best practice to meet increasingly present climate and energy goals.

The good news is that they appear to be working. Recent results from analysis of energy benchmarking in New York City,[3] San Francisco[4] and Washington, D.C.,[5] show that buildings have reduced their energy consumption from 6 to 14 percent over the first several years of reporting.

A survey[6] by the National Electrical Manufacturers Association found that 77 percent of facility managers in New York City made operational changes in their properties because they benchmarked their buildings for the local law. This means real energy and operating cost savings for buildings.

Since 2010, IFMA has encouraged members to voluntarily benchmark their facilities through our ENERGY STAR Challenge.[7] This initiative has reduced operational expenses for participants without tradeoffs for performance or quality.

This annual challenge has included a goal of a 15 percent energy reduction from a baseline of 12 months as well as recognition for members, chapters and councils that enter the greatest number of participating facilities. To participate is as easy as signing up for the challenge through IFMA and then enabling your ENERGY STAR Portfolio Manager account to share facility data with IFMA.

## Case study: Saint Louis

The St. Louis Chapter of IFMA took this a step further when it partnered with other organizations representing the built environment to launch the High Performance Business Challenge. This challenge represented a benchmarking effort with a goal of reducing emissions in the St. Louis region by 20 percent, by 2020.

So, what does reducing energy usage have to do with emissions? The two metrics are related: when you reduce energy usage, you typically also reduce associated emissions, and vice versa. And, when energy usage decreases, so does your energy bill. It's a win for your budget, a win for your organization's sustainability goals, a win for the region that's trying to get cleaner air, and a win for utility providers, which are likely trying to figure out how to satisfy increasing demand.

The IFMA St. Louis Chapter, in concert with other organizations such as BOMA, IREM and the USGBC, now had a goal and a new way to bring value to members. To communicate the importance of the High Performance

Business Challenge goals, the chapter established a Sustainability Liaison to help educate both the board and the general membership on the question of why sustainability matters in facility management. Two local members (myself and Grant Lanham) also became the first in the chapter to earn the Sustainability Facility Professional® (SFP®) credential.

After the initial push, the chapter realized that it needed to help explain the why, but also the how. Now that members saw the value in benchmarking and trying to save energy, they were unclear on how to take the next steps. The chapter could provide that path and help members learn to leverage ENERGY STAR in their own facilities.

The St. Louis Chapter developed a program where it hosted workshops in which members could learn to use ENERGY STAR Portfolio Manager by benchmarking their own buildings with the support of chapter mentors.

When facility managers attended the "How to use ENERGY STAR" session, they were paired with a mentor, and guided through the whole process from setting up their building profile to entering a year's worth of utilities, and were benchmarking their buildings before they walked out of the training session. The program was so successful that associate members started signing up their buildings as well.

Once buildings were benchmarked, facility managers now had data and something to compare their energy usage against. Was their facility performing well or was their utility spending higher than other like buildings?

This no longer was a guess, or a hunch. ENERGY STAR provides most buildings with a 1-100 score, which helps you compare your building's performance to similar buildings and the national average (50). Buildings that score 75 or above are eligible for ENERGY STAR certification, which distinguishes them as top performers.

Knowing where your building stands compared to others is an important first step, but it is just the first step. Once you know your score, you can work on improving it. In St. Louis, local utility providers offered several programs that could help buildings improve their operations and lower their energy usage, including the building operators certificate and retro-commissioning programs, as well as incentives for lighting retrofits, HVAC controls and high-efficiency boilers. Many utilities offer similar incentives and rebate programs, so check with your utility provider to see what is available in your area.

Often those first efforts are low- or no-cost measures with attractive return on investment rates in which the financial analysis clearly illustrated the case for the improvement and often the improvements were not capital in nature. But what do you do when the easy targets have been met?

Benchmarking provides the ability for a deeper dive once the low-hanging fruit has been harvested. Chapter members have begun to look at projects that can provide benefits in areas like control, occupant health and comfort, and productivity. They are also examining the potential implications of reputational and competitive risk when analyzing whether these initiatives make sense. In each case, data makes the difference.

The more data we have, the more informed we can be at the building, portfolio and even industry level. Places that have collected city-wide benchmarking data are able to make better decisions about how to design incentive programs, reach specific utility customer segments and lower barriers for facilities investing in energy improvements.

By participating in the IFMA ENERGY STAR Challenge, you can contribute to the growing dataset and help identify the most cost-effective ways to reduce utility consumption in IFMA members' buildings.

EPA's ENERGY STAR program provides a range of training topics that can help maximize the use of the free Portfolio Manager tool, and even guidance on how to improve operations after you've benchmarked. However, the first step is often the most difficult.

In St. Louis, the IFMA chapter found that providing an introduction and assisting facility managers through the initial data entry helped our members take the first, most difficult steps. It's a great way to provide a service to chapter members while positively impacting organizations' bottom lines and reducing the impact of the built environment. **FMJ**

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**Christopher Laughman,** CFM, SFP, LEED AP O&M, is assistant vice president and director of facilities at the Federal Reserve Bank of St. Louis. In this role, he oversees all facility and real estate operations for the 8th District of the Federal Reserve System, including facility-related sustainability initiatives. He is also the past president of the St. Louis Chapter of IFMA and is a member of the IFMA Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group.

Throughout his career, Laughman has been an advocate for the optimization of facility operations in a manner that does not negatively impact the communities in which facilities are operated, the people who work in or around those facilities and the greater environment in which we all live.

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# YEAR IN REVIEW

In the 2016 fiscal year, IFMA continued to focus on initiatives to strengthen infrastructure through process and product refinement. These initiatives contribute to the enhancement of the member experience in alignment with our people-first credo — to enable, empower and equip facility management professionals.

JULY 1, 2015

JUNE 30, 2016

In addition, IFMA's landmark collaboration with the Royal Institution of Chartered Surveyors (RICS) is setting the groundwork to align the FM industry and provide global recognition for facility management professionals. These commitments to building IFMA stakeholder value, paired with the association's dedication to fiduciary responsibility and accountability, have positioned the association for a truly global scope and influence.

## IFMA FY 2016 ANNUAL REPORT

**Left to right — standing:** *Jeffrey J. Budimulia, CFM, MBA; Wayne Harvey, CFM, SFP, LEED AP; James P. Whittaker, P.E., CFM, EFP, FRICS – past chair; Tony Keane, CAE – president and CEO; Michael D. Feldman, FMP, CM – chair; Maureen Ehrenberg, FRICS, CRE – first vice chair; William M. O'Neill, CFM – second vice chair; Stephen P. Ballesty, MBA, CFM, FRICS, FAIQS, ICECA; Geoff Williams, FMP*

**Seated:** *Lynn N. Baez, CFM, SFP, FMP; Diane Coles-Levine, MCR; Pat Turnbull, MA, LEED AP, IFMA Fellow; Larry Allen Morgan, CFM, SFP, FMP;* **Not pictured:** *Ian H. van der Pool, MFM*

## Financial standing

Total revenues for FY 2016 were US$14.23 million, up US$524,000 (3.8 percent) from the previous year. Total expenses for the fiscal year were US$14.65 million, up US$953,000 (7 percent). Direct expenses associated with the delivery of products and services were US$9.7 million, and indirect operational expenses were US$5 million. The net impact on income from operations was a negative US$354,000, a decrease of US$430,000 over fiscal year 2015.

At fiscal year-end, revenues from conferences and exhibitions stood at US$4.36 million (33 percent of total revenue), up US$435,000 from the prior year. Professional development revenues stood at US$4.7 million (31 percent of total revenues), down US$328,000 from the prior year. Rounding out the major revenue business units, membership revenue was at US$4.5 million (29.3 percent of total revenue), up US$145,000 from prior year.

Please refer to the Statement of Financial Activities (figure 1) and the Statement of Financial Position (figure 2) for additional details.

## Membership

A total of 6,500 new members joined IFMA during the 2016 fiscal year. IFMA members (27 percent of whom reside outside of the United States) are part of a network of 133 chapters throughout the world across 105 countries. As a result of improved data accuracy made possible through IFMA's new association management system, membership numbers corrected and declined 3 percent for 2015-16.

In 2015-16, the membership team continued its focus on defining the value proposition for members and nonmembers to understand how IFMA can best support member needs. Staff gained deeper insight into the value of IFMA membership and the global perspective through member-centric focus groups at the Facility Fusion 2016 Conference and Exposition in Indianapolis, Indiana, USA, and through a membership survey that ran from July 2015 through January 2016.

IFMA also launched a membership recruitment campaign aimed at leveraging the strength of the diverse, energetic and dedicated IFMA chapter and council leaders. The "Race to Indy" campaign kicked off in October 2015 with monthly "pit stops" to provide new and additional resources for IFMA's chapter and council leaders to grow and improve their communities. The chapters and councils recognized for the largest percentage of growth were: Beijing Chapter, Oklahoma City Chapter, Hong Kong Chapter and the Information Technology Council.

In FY 2016, IFMA's Environmental Stewardship, Utilities and Sustainability Strategic Advisory Group began updating pieces within the IFMA Foundation's Sustainability How-to Guide Series, first published in 2009. Guides that have been updated include: Getting Started, EPA ENERGY STAR: Portfolio Manager, Green Building Rating Systems and Lighting Solutions. Webinars on each of the newly updated guides were presented to members throughout the year.

During 2015-16, IFMA's chapter networks expanded. One new chapter in China, the Beijing Chapter, was formally chartered in December 2015. Seventeen councils and eight communities of practice continued to serve niche FM audiences along industry verticals and topic-specific horizontals.

Over the past fiscal year, the Councils Committee re-examined IFMA's councils and communities to clarify, define, align and strengthen these components with the ultimate goal of:

- *Better serving IFMA's members and the FM profession*
- *Driving personal and professional growth and engagement*
- *Building alignment around IFMA's mission, strategic plan and balanced scorecard*
- *Building member-valued content*

IFMA's Board of Directors unanimously approved the recommendation of the Councils Committee to adopt the following new structure to be implemented in FY 2017:

- *Chapters, to help connect members in a given geographical area*
- *Councils, to help connect members who practice FM in similar industry sectors or facility types*
- *Communities, to help connect members who share an interest in a particular FM topic, regardless of location or industry*

## Education and credentials

In FY 2016, the International Credentials Commission conducted a global job task analysis (GJTA) to identify the tasks and work activities conducted, the context in which those tasks and activities are carried out, and the competencies (knowledge areas, skills and abilities) required to perform the FM job role competently.

Facility management professionals from around the world (figure 3) participated in focus groups, interviews and a global survey to inform the study, an update of the GJTA from 2009. Additionally, individuals representing a wide variety of work-related characteristics such as years of experience, work setting, geographical location and areas of specialty served as subject matter experts to help develop a scope of practice that is reflective of the roles and responsibilities of the facility management job role and is relatively free from bias.


***Figure 3***
*Geographical diversity of subject matter experts who contributed to the global job task analysis*

The GJTA results will provide the basis for the profession's body of knowledge which are used to make updates to the Sustainability Facility Professional® (SFP®) and Facility Management Professional™ (FMP®) certificate programs and to ensure that IFMA's Certified Facility Manager® (CFM®) certification measures all candidates against one global standard.

### ADDITIONAL 2015-16 DEVELOPMENTS IN IFMA EDUCATION AND CREDENTIALS

- Released a new online course series entitled, "Performance Management in Facilities: Measuring What's Most Important." The new series consists of two modules covering the following content areas: Strategies for Facility Performance Management and Delivering a Performance Management System.

- Translated the first online workshop of the Essentials of Facility Management Program into Spanish – Introducción al Facility Management. The Essentials of Facility Management Program is a series of entry-level training workshops created to meet the educational needs of emerging FM professionals in global FM markets. The program focuses on basic concepts that describe the field of facility management and how it can be of value to an organization.

- Translated all of the Essentials of Facility Management Program workshops (classroom) into simplified Chinese. A Train-the-Trainer program was conducted in the spring of 2016 and 16 new registered instructors participated. The program is currently being debuted in China via the IFMA China Office and the local chapters.

- Conducted two Qualified Train-the-Trainer programs in FY 2016 for IFMA credentials, with a total of 16 participants. One program was delivered in the United States and one in Dubai, United Arab Emirates.

- Conducted a needs assessment to identify the top priority training needs for facility management professionals and determine the knowledge level for such training. The results will be used for future development projects.

At the close of the fiscal year, the number of IFMA credential holders stood as follows:

- **CFM:** 2,746
- **RCFM:** 386
- **FMP:** 6,604
- **SFP:** 673

Additionally, a total of 4,855 Essentials of Facility Management program modules were issued. ("Issued" means access to the program and does not equate to credits completed or earned.)

## Research

IFMA's FY 2016 efforts in research focused on two distinct areas: internal research supportive processes and external programmatic efforts.

Internally, staff redesigned research tools that necessitated further development to improve data quality and efficiency. These newly designed research data points are to be included in the association management system in FY 2017. Among the processes examined were key methods for avoiding association survey burnout. One primary solution being researched is developing an application program interface to help with seamless acquisition of IFMA member responses within integrated AMS research data points. This solution would keep to a minimum the number of times a member answers repetitive questions on future IFMA surveys.

Additional internal research processes assessed include IFMA's review of possible locations for developing a dedicated location for all IFMA request for proposals to be posted online; examining the current AMS for future inclusion of research data points; and a research collaboration with RICS. IFMA also continues to assess survey administration processes to find what methods work best for IFMA members, as IFMA survey response rates (satisfaction-related, project-specific, etc.) fluctuate regularly.

The IFMA research study, IFMA Return on Investment (ROI) on Attaining Credentials/Certifications, will assist IFMA employees in measuring the ROI for past and current IFMA credential/certification students. This ROI study, instrumental in assessing credential/certification benefits from an individual and organizational level, will be crucial in supporting the added value focus IFMA staff can use to support advancing credentialing and certification attainment.

In addition to these internal efforts, the external focus included developing new research products for our membership and updating highly used past products. These products will be completed over a span of five months extending into FY 2017. The identified research products below are listed by title, release month/year:

- FM Outsourcing (October 2016)
- FM Outlook (October 2016)
- FM Asia Trends (November 2016)
- Operations and Maintenance Benchmarking Report (January 2017)
- IFMA Return on Investment on Attaining Credentials/Certifications from a student perspective and company/employer (September 2016 with update February 2017)
- Best Practices/Good Practices (August 2017)

*Figure 1*

## Consolidated Statement of Financial Activities *Amounts listed in USD.*

| | FY 2016 JUNE 30 | FY 2015 JUNE 30 |
|---|---|---|
| **REVENUES** | | |
| Member dues and fees | $4,576,822 | $4,054,345 |
| Conferences and exhibitions | $4,362,205 | $3,996,458 |
| Professional development | $4,368,447 | $4,676,296 |
| Publications and information sales | $612,596 | $676,484 |
| Foundation administrative fees and other | $379,236 | $372,000 |
| **TOTAL REVENUES** | **$14,299,306** | **$13,775,583** |
| **EXPENSES** | | |
| Program services | $9,817,551 | $9,178,941 |
| Management and general | $3,370,204 | $3,150,980 |
| Membership maintenance and development | $1,465,306 | $1,369,911 |
| **TOTAL EXPENSES** | **$14,653,061** | **$13,699,912** |
| *Change in unrestricted net assets from operations* | *($353,755)* | *$75,671* |
| **OTHER INCOME (LOSS)** | | |
| Net investment loss | ($175,209) | ($96,887) |
| Interest expense | ($24,965) | ($25,649) |
| Income taxes | ($9,969) | – |
| Gain on disposal of property | $348 | $285 |
| **TOTAL OTHER LOSS** | **($209,795)** | **($122,251)** |
| *Change in unrestricted net assets including noncontrolling interest* | *($563,550)* | *($46,580)* |
| *Less: change in unrestricted net assets attributable to noncontrolling interest* | *($17,248)* | *($17,059)* |
| *Change in unrestricted net assets attributable to IFMA USA* | *($580,798)* | *($63,639)* |
| *Unrestricted net assets, beginning of year* | *$2,768,129* | *$2,831,768* |
| *Unrestricted net assets, end of year* | *$2,187,331* | *$2,768,129* |

IFMA staff continue regular planning meetings to ensure year-to-year strategic alignment, including meeting with RICS research staff to design a collaborative plan on joint products to meet the stakeholder needs of both organizations. The FM Research and Benchmarking Institute, projected for FY 2017 formation, will help guide IFMA's approach to the diverse and evolving direction of industry research.

## Standards

IFMA continues its goal of advancing the FM profession through its involvement in international standards activities. IFMA plays an active leadership role in the development of FM standards. The current focus is on the FM management systems standard, the purpose of which is to provide specific requirements for individual organizations to establish and manage a management system standard for the practice of FM. The goal is "for an organization to be able to demonstrate that it has a robust process through which to design, manage and improve its integrated facility management system."

### OVERVIEW OF IFMA INVOLVEMENT

- Since 2012 the International Organization for Standardization (ISO) technical committee, ISO/TC 267, IFMA has been the administrator on behalf of the American National Standards Institute (ANSI) for the U.S. Technical Advisory Group (TAG).

- The ISO technical committee was formed to develop international consensus standards for facility management and requires participation through a national standards body (ANSI for the U.S.). ISO/TC 267 is comprised of 26 participating countries and 15 observing countries.

- The U.S. holds the convenor position for "ISO 41001 Facility Management – Management system standard requirements with guidance for use" with IFMA's past chair, James P. Whittaker, serving as convenor. ISO 41001 is currently in committee draft stage.

- Two standards will be published in early 2017: "ISO 41012 Facility Management Terms and Definitions" and "ISO 41013 Facility Management – Guidance on strategic sourcing and the development of agreements."

- A technical report, "ISO TR 41013 Facility management – Scope, key concepts and benefits" will be published in 2017.

- As of January 2016, IFMA's FMJ magazine began to include a series of articles related to standards to showcase the benefits of FM standards in achieving business objectives.

## Events

Overall IFMA's events experienced a strong year in FY 2016 and are positioned to enhance the association's global reach.

### IFMA'S WORLD WORKPLACE 2015 CONFERENCE AND EXPO – DENVER, COLORADO, USA

In 2015, IFMA's flagship conference was held Oct. 7-9 at the Colorado Convention Center. Themed "Collaborate to Innovate," the event drew more than 4,600 registrants from 57 countries.

In addition to preconference workshops, the event introduced a new Wellness Activity to kick-off the conference with a healthy start. The highly popular "High Heels and Hard Hats Deeper Dive Workshop" was transformed from a one-hour session in the general program into a four-hour preconference workshop. Another attendee favorite "Workplace Evolutionaries Deeper Dive Preconference Workshop" almost doubled in size from 2014. This year's full-day workshop was held offsite at Bandimere Speedway.

More than 100 learning opportunities across 13 concurrent educational sessions were organized into four learning labs to assist attendees in customizing their educational experience. The conference mobile app gained tremendous momentum; downloads doubled from 2014. Six facility tours, featuring locations such as IKEA Centennial, Colorado State Capital, National Renewable Energy Laboratory, etc., sold out in record time.

The expo component of the event was wildly successful and exceeded budgeted revenue by nearly US$250,000. Attendees had the opportunity to visit with 295 exhibitors and attend 15 presentations in the Solutions Arenas. IFMA "FRED" talks on facilities, real estate and design (inspired by TED Talks), also premiered on the expo floor to overflowing crowds.

New for 2015 was the Twitter Scavenger Hunt game in which attendees had to post "selfies" to Twitter taken at selected exhibitor booths using the conference hashtag #IFMAWW15. This encouraged social media activity for World Workplace and increased expo floor traffic flow.

### IFMA'S WORLD WORKPLACE ASIA 2015 CONFERENCE AND EXHIBITION – SINGAPORE

World Workplace Asia was held Aug. 3-5, 2015, in Singapore with joint support from the IFMA Singapore Chapter and the Building and Construction Authority. The event was held at Marina Bay Sands, one of the most recognizable icons of Singapore's skyline. The conference included more than 25 educational sessions presented by speakers from throughout the region, as well as a host of industry-specific panels. There were 227 attendees and 20 exhibitors in attendance, along with numerous high-profile sponsors. Bringing forward-looking strategies and solutions to the Asia-Pacific region, World Workplace Asia continues to grow and elevate the IFMA brand in Asia.

*Figure 2*

## Consolidated Statement of Financial Position

*Amounts listed in USD.*

| | FY 2016 JUNE 30 | FY 2015 JUNE 30 |
|---|---|---|
| **ASSETS** | | |
| Cash and cash equivalents | $227,772 | $844,583 |
| Accounts receivable – trade, net | $1,044,906 | $789,428 |
| Accounts receivable – related party | $422,802 | $239,001 |
| Prepaid expenses and other assets | $477,811 | $327,083 |
| Investments | $3,924,795 | $3,998,621 |
| Intangibles, net | $264,345 | $224,164 |
| Program development costs, net | $394,344 | $462,132 |
| Property and equipment, net | $1,954,819 | $1,621,991 |
| **TOTAL ASSETS** | **$8,711,594** | **$8,507,003** |
| **LIABILITIES AND UNRESTRICTED NET ASSETS** | | |
| Accounts payable and other accrued expenses | $1,073,986 | $609,544 |
| Accounts payable – related party | $205,316 | $166,282 |
| Deferred revenue | $4,250,176 | $4,237,365 |
| Portfolio loan | $910,478 | $658,624 |
| **TOTAL LIABILITIES** | **$6,439,956** | **$5,671,815** |
| *Controlling interests* | *$2,187,331* | *$2,768,129* |
| *Noncontrolling interest* | *$84,307* | *$67,059* |
| ***TOTAL UNRESTRICTED NET ASSETS*** | ***$2,271,638*** | ***$2,835,188*** |
| ***TOTAL LIABILITIES AND UNRESTRICTED NET ASSETS*** | ***$8,711,594*** | ***$8,507,003*** |

### INDIA WORKSPACE 2015 – BANGALORE, KARNATAKA, INDIA

The final year of India Workspace was held Nov. 6-7 at the J.N. Tata Auditorium. It brought attendees from all over India and a variety of workplace-related industries — including technology, engineering, architecture, security, real estate and facility management — together. This event, previously the largest conference and expo for the South Asia facility management community, has been rebranded to World Workplace India for 2016.

### SAME-IFMA FACILITIES MANAGEMENT WORKSHOP 2016 – SAN ANTONIO, TEXAS, USA

The 2016 SAME-IFMA Facilities Management Workshop was held Feb. 25-26 at the Grand Hyatt San Antonio. This educational workshop, cohosted by IFMA and the Society of American Military Engineers, attracted leaders from the FM, architecture, engineering and construction fields to share their knowledge and expertise through three main tracks: energy, asset management and executive leadership.

### IFMA'S 2016 FACILITY FUSION U.S. CONFERENCE AND EXPO – INDIANAPOLIS, INDIANA, USA

Facility Fusion U.S. was held April 12-14 at the JW Marriott Indianapolis. Participation and programming from IFMA's councils and communities fostered high levels of engagement. The opening keynote featuring Derek Daly, international racing champion, best-selling author and TV's face of motor sports, energized attendees for the dynamic and engaging days to follow. Newly launched event tracks such as Cutting Edge Solutions were specifically designed for IFMA's Corporate Sustaining Partners, and IFMA volunteers enjoyed specific programming to assist them in their leadership roles, including an association expert on membership and leadership training.

The big hit on the expo floor was a racecar simulator in keeping with the Indy 500 theme, and the newest addition this year, The Hub, was the focal point for peer-to-peer networking, career resources, professional pointers from FM leaders and effective solutions for every facility challenge. Several scheduled meet-ups for chapter and council leaders were introduced, and the welcome reception was revamped to include a progressive menu that encouraged networking. The IFMA Foundation had a notable presence at the conference, and attendees were highly engaged and supportive of the foundation's mission.

### IFMA'S FACILITY FUSION CANADA 2016 CONFERENCE AND EXPO – MONTREAL, QUÉBEC, CANADA

Facility Fusion Montreal was held May 4-5 at The Fairmont Queen Elizabeth. This event marked the third year for IFMA's Canadian Facility Fusion offering, and attendees enjoyed presentations on cutting-edge topics, as well as a robust expo floor with a variety of products and knowledgeable industry experts. IFMA's Workplace Evolutionaries preconference offering was a notable success with more than double the registrations from Facility Fusion Canada in 2015. IFMA incorporated French into all marketing materials to increase relevancy and more effectively promote the event. The conference opened with an interactive and hands-on technology session where participants worked with products from Microsoft (HoloLens Mixed Reality with holograms) and Google (Project Tango on a special Android device that can see through walls), as well as drones and other tech-savvy solutions.

During the conference, the importance of IFMA's credentials was evidenced by a young FM receiving a job offer onsite (due in part to his new FMP credential). IFMA's team enhanced the Canadian content offered, highlighting the French-Canadian culture with several French-Canadian exhibiting companies as well as local French Canadian speakers.

The lunch closing panel, "Where is the Next FM?" featured several faces from the FM sector in Canada, speaking to the future of FM and looking at research reports. IFMA received strong support from the Montreal Chapter as the host city chapter and from the Toronto Chapter as next year's host city. Both chapters provided valuable input into the conference planning and 2017 is projected to be the strongest Facility Fusion Canada event yet.

### EUROPEAN FACILITY MANAGEMENT CONFERENCE (EFMC) 2016 – MILAN, ITALY

EFMC was held by EuroFM in conjunction with IFMA, June 7-9 at MiCo Milano Congressi. This year's theme was "Enhancing People and Business" and featured a unique blend of research and business tracks.

### INTERNATIONAL SUSTAINABLE ASSET MANAGEMENT (ISAM) CONFERENCE – ATLANTA, GEORGIA, USA

The second annual ISAM Conference was held June 22-24, 2016 at the Georgia International Convention Center. IFMA partnered with Hartsfield-Jackson Atlanta Airport, and the conference served as a platform to demonstrate the synergy that exists between asset management and sustainability, while shedding light on the challenges and successes of integrating sustainable management practices around the world. The IFMA Airport Facilities Council held its annual meeting during preconference, with some members participating in both events, and the newly implemented Women in Sustainability panel created a forum for the industry's sustainability thought leaders.

## Communications

### FMJ MAGAZINE

In FY 2016, FMJ focused on addressing the challenge of declining readership by engaging in activities to increase awareness of the magazine within and beyond IFMA membership. In addition, the FMJ team began exploring possible new delivery models (beyond the current print and online versions of the magazine), interaction with IFMA's Knowledge Library and opportunities for additional revenue generation.

To increase overall awareness of the magazine, FMJ was showcased at IFMA and related industry events via placement in publication bins, booths, attendee packets, etc. FMJ hosted its third annual FM Expert Panel and held a reader focus group at World Workplace 2015. In addition, the top features from FMJ in 2015 were highlighted as the January 2016 IFMA Member Benefit of the Month. FMJ continues to engage the IFMA community through stakeholder-focused content such as regular submissions from councils, committees, alliance partners and both U.S. and global perspectives.

In December 2015, the FMJ area of the IFMA website was greatly simplified to increase focus on the magazine's value proposition as the official magazine of IFMA, written by and for workplace professionals. As of the May/June 2016 issue, the digital magazine is presented in HTML 5 format instead of in Adobe Flash format, which ensures a consistent reading experience across all devices.

At Facility Fusion Indianapolis, IFMA's Board of Directors unanimously approved a motion to make the digital magazine an open-access resource beginning in FY 2017. The goal of this is twofold:

- *To increase overall FMJ readership among both members and nonmembers by making the digital magazine more visible and easier to access, and*

- *To leverage the magazine as a platform to showcase the value of IFMA and the thought leadership of the FM community.*

Working toward the above will ultimately make a more compelling case for both existing and prospective FMJ advertisers, whose support helps make publication of the magazine possible.

FMJ continues to leverage social media to both engage with readers and expand the magazine's reach. At the close of FY 2016, FMJ's Twitter page had 5,035 followers, an increase of 30 percent over the prior year. The FMJ Facebook page ended the fiscal year with 1,492 likes, a year-over-year increase of 6.4 percent.

## KNOWLEDGE STRATEGY

In the past fiscal year, the IFMA Knowledge Strategy (KS) Task Force and internal staff focused on:

- *Launching the first iteration of the Knowledge Library at World Workplace 2015;*

- *Refining the processes and strategy for collecting, organizing and reviewing content;*

- *Reviewing new content and refining submission standards;*

- *Expanding the content offerings in the Knowledge Library in accordance with the publishing strategy and schedule;*

- *Developing a Content Expert exclusive forum to increase participation and engagement and hosting a content review promotion;*

- *Overseeing new technical developments; and*

- *Devising a marketing strategy to ensure members and potential members are aware of the benefits of having a digital content library.*

In May 2015, IFMA member Mary Gauer joined the KS Task Force as the newly appointed lead for the Content Experts focus area. Her primary responsibilities center on Content Expert recruitment and engagement efforts. She joined existing members, Knowledge Strategy Task Force Chair Geoff Williams, Strategy Lead Buck Fisher and Content Lead Isilay Civan. Toward the end of the fiscal year, the task force officially became a committee.

Additional Knowledge Library content submission channels have been developed to increase the amount of content available for review and potential publication. During the 2016 fiscal year, the team partnered with the IFMA Foundation to archive the International Journal of Facility Management. The team also coordinated with content authors to increase content offerings and collaborated with the Royal Institution of Chartered Surveyors to feature RICS content in the Knowledge Library by World Workplace 2016.

The content review process has been completely redesigned. Now hosted using a promotional format on a quarterly cycle, content can be reviewed and processed for publication more efficiently than before. This will continue to support the growth of available resources for our members and serves to increase the diligence of our review process.

The second phase of technical development expands upon the phase 1 development and initial launch and focuses on enhancing the user experience and increasing adoption and use of the Knowledge Library by:

- *Offering higher-quality and more relevant content via the Knowledge Pass subscription service*

- *Enhancing the "featured content" functionality within the Knowledge Library*
- *Clarifying the end-user content access and permissions within the Online Community platform through user interface enhancements*
- *Generating usage and publishing reports to inform and direct publishing and promotion efforts and future content strategy*
- *Building clear paths for end-users to become IFMA members or Knowledge Pass subscribers*

### EXTERNAL COMMUNICATIONS

Pursing the goal of helping FM professionals share their own stories and value within their organizations and the general public, IFMA hosted several educational webinars in FY 2016 to educate and train FM professionals on effective communication and basic media relations.

The landmark collaboration between IFMA and RICS provided an exciting opportunity to expand on and leverage existing public relations efforts to promote the FM profession to external markets. Specifically, the combined resources of the two organizations made it possible to retain a global public relations firm to help shape messages meant to elevate FM by developing narratives around the unification of the global FM industry and the integration of FM into the larger built environment industry.

### SOCIAL MEDIA

IFMA's social media outlets are managed by a cross-departmental team of comprised of marketing and communications staff to represent IFMA's voice online.

Participation in IFMA's social media outlets continued to increase during the fiscal year:

- **LinkedIn:** 51,456 group members (up 15 percent over FY 2015)
- **Twitter:** 17,663 followers (up 15 percent over FY 2015)
- **Facebook:** 6,022 likes (up 19 percent over FY 2015)
- **YouTube:** 600 subscribers (up 47 percent over FY 2015)

## Government relations

Throughout the 2016 fiscal year, IFMA continued to expand its External Affairs program with the aim of educating decision makers and stakeholders on the role and impact of effective FM. The program provides reliable information on legislation with the potential to impact the built environment and seeks to empower FMs to effectively share their knowledge and perspective with relevant decision makers.

In the United States, IFMA's Government Affairs Committee hosted the largest Advocacy Day and Public Policy Forum in IFMA's history. More than 60 chapter leaders from across the country came to Washington, D.C. for two days, participated firsthand in the legislative process, met with elected officials, discussed their chapters and learned about important advocacy tools that can be used in chapter programs. These efforts are key to IFMA's ongoing efforts to provide the FM perspective on legislation relating to workplace health and safety, energy efficiency, workforce development, life cycle costs and many more.

IFMA's advocacy efforts continue to deliver results for the FM profession with an ever-increasing number of elected officials reaching out to IFMA, speaking to our chapters and engaging our subject matter experts on related legislative initiatives. Most recently, the U.S. Department of Labor, in its draft update to the 2018 Standard Occupational Classification has included a separate classification for facility management which for the first time will allow the department to gather information on the profession and help students and other job seekers to view FM as a career of choice.

In Europe, IFMA and its European chapters continued to support the EU FM Coalition, which is similarly dedicated to elevating the FM profession within the European Union. As part of those efforts, the coalition regularly met with European decision makers and stakeholders, participated in relevant consultations, created visibility during European Sustainable Energy Week and provided feedback on upcoming directives related to heating and cooling, energy performance of buildings and resource efficiency in the building sector.

## Technology

In early 2015, IFMA initiated a major project to replace the existing association management system (AMS). The first phase of the project went live in December 2015 and offers increased benefits and functionality to IFMA staff and external stakeholders. This project will support other IFMA projects such as the Knowledge Strategy, content management system (CMS) and learning management system upgrades from a security/role standpoint, integration to databases, etc. While this project was delivered on time and under budget, it did require a few months to stabilize the new system, but the major issues have been resolved and will continue to be fine-tuned moving forward.

In addition, IFMA's web and IT teams launched a new website service for chapters, councils and communities with cloud-based hosting using a well-known open-source CMS called WordPress. This allows IFMA's technology team to rapidly create new websites for components that are easy for leaders to edit and find available resources to make additional improvements to their site. The standard features offered at launch of these sites include: rotating banner images, news feed, calendar, rotating sponsor images, customized branding and event management. IFMA's web team also helped communities convert their websites to sites that are hosted and partially supported by IFMA staff.

Currently, single sign on (SSO) is active as an additional feature to IFMA's websites. This SSO deployment begin in early 2015 on the Online Community and was completed by December 2015 in conjunction with the new AMS conversion on IFMA's remaining websites. By adding this feature, visitors to chapter and council websites can easily navigate to the respective groups held within the Online Community where the components share resources with their members. The SSO also offers the ability for members to log in with a social media account, easily reset their password and remain logged in to IFMA websites that share the same solution. IFMA's technology team has continued to refine the functionality for a better user experience, minimize member confusion with the right username/password combination to access the system, and clean up duplicate records in the AMS which can cause issues until they are merged or inactivated.

In the coming fiscal year, the team will improve website designs for IFMA's major events (such as Facility Fusions and World Workplaces) while continuing to refine SSO functionality, the online renewal process and many other discrete projects.

## Organizational change

During the 2016 fiscal year, continued coaching on team building, trust and accountability took place with IFMA staff. Strengths assessments and training, as well as the kickoff of the IFMA Champions team in January 2016, were among the multiple efforts launched to assist with better understanding individual potential and strengthening communications.

Besides working on socialization projects, the IFMA Champions received individual empowerment sessions to assist in understanding what motivates them, leading to greater employee engagement and empowerment. Initial research and planning has also been underway to extend the IFMA Champions into IFMA membership, forming a framework that provides a learning pathway to those interested in pursuing IFMA leadership positions.

With the IFMA-RICS collaboration announcement in April 2016, extensive work on initial change management messaging and stakeholder participation took place, providing a starting point for enhanced engagement opportunities with IFMA membership, industry leaders and those interested in the FM profession.

## Special initiative – Collaboration with RICS

In the 2016 calendar year, IFMA and the Royal Institution of Chartered Surveyors (RICS) initiated an unprecedented collaboration to strengthen industry support and representation for the 25 million FM practitioners around the world.

RICS is a global body that offers accreditation for professionals in the land, real estate, construction and infrastructure disciplines. Incorporated in 1868 by a U.K. Royal Charter, RICS is required to develop the profession for public advantage and act in the interest of consumer protection, which means that all RICS qualified professionals are subject to ongoing quality assurance.

As FM has grown in recognition and prominence over the past several decades, the need for other stages of the built environment to include FM in their strategic conversations has increased dramatically. IFMA elected to work with RICS in the capacity of the collaboration, not only because of its nearly 150-year legacy of excellence on the global stage, but because it represents sectors across the entire spectrum of the built environment, from conception to disposition. Within RICS, a relatively recent FM community was growing, and rather than operate in isolation, RICS looked to IFMA as the established representative of the facility management industry. Together, the collaboration bridges the gap between FM and other professions that impact the built environment, and increases the network, resources and opportunities available to facility management practitioners.

The collaboration was formally signed by IFMA CEO Tony Keane and RICS Chief Executive Sean Tompkins in front of attendees at IFMA's Facility Fusion conference in April 2016. Since that time, both the IFMA and RICS staff have met on a continual basis to begin to align several key work streams, such as credentials and professional development, training, standards, research, and events.

### STRATEGIC GOALS

- *Unite the FM community through a globally consistent definition, protocols and professional standards*
- *Serve as the platform to connect FMs with practitioners in related disciplines in order to drive unification of strategy across the life cycle of the built environment*

- *Increase training and recognition opportunities for FMs of all educational backgrounds, skills, work experiences and career goals*
- *Strengthen the FM labor market by clearly articulating to hiring managers what skills and knowledge are needed to effectively execute the FM role*
- *Foster an inclusive, robust global FM knowledge-sharing and networking community*

Continuing into FY 2017, the collaboration will seek input on how best to share existing (and shape new) resources for the benefit of the FM community through member focus groups, leaders' forum gatherings of global service providers, involvement of the International Credentials Commission, etc. In addition, the collaboration is developing an awareness campaign, which will have a significant presence at World Workplace San Diego. **FMJ**

## YEAR IN REVIEW

IFMA's mission to advance the professional discipline of facility management worldwide is enabled by our credo to enable, empower and equip practitioners. Through the shared knowledge, expertise and commitment of members and staff, the association continues to serve as the platform for defining the value of facility management and connecting the global FM community through industry-leading initiatives and resources.

On behalf of the board of directors and staff, thank you for your contributions to the world's leading organization for facility management and related industry professionals.

Sincerely,

**TONY KEANE, CAE**
*President and Chief Executive Officer*

**MICHAEL D. FELDMAN, FMP, CM**
*Chair, 2015-16 Board of Directors*