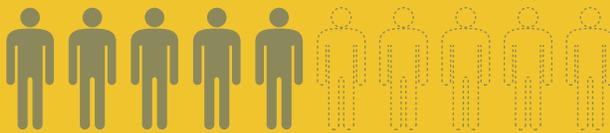


# Bri



More than 50% of facilities management personnel are expected to retire in the next ten years.

50%



From the Sloan Center on Aging and Work reports.

# digging THE Gap

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## between Building Intelligence and Facilities Knowledge

An emerging dichotomy of our times is that while buildings are becoming more intelligent, facilities are losing knowledge. The Sloan Center on Aging and Work reports that more than 50 percent of facilities management personnel are expected to retire in the next ten years.<sup>1</sup> At the same time, more and more data is making its way into facilities through building information modeling, building automation systems, work order management systems, and other related technologies. These sharply divergent trends will create significant challenges if business-as-usual models of operation persist. Alternatively, a new class of management functions and skill sets, institutional prioritization of strategic data and knowledge management strategies, and data analytics and building systems intelligence can exploit these trends to great benefit.

Colleges and universities are incorporating these measures into their facilities management master plans and are taking a step-by-step approach to executing them. Santa Fe College, in Gainesville, Florida, is providing its staff with hands-on training led by the college's annual services engineer to successfully transition into new facilities management leadership, as more than 75 percent of their facilities management staff retires in a span of two years. In Miami, Florida International University has optimized failure trending processes to initiate predictive maintenance that increases their operational efficiency.

### MANAGING MORE WITH LESS: THE CHALLENGE

Energy conservation and operational efficiency have been constant challenges for the past decade. As experienced staff members capable of adopting new tools retire and facilities are inundated with high-volume data from multiple new sources, these challenges only become harder to overcome.

Most institutions have a few key individuals that know what it takes to operate building systems on campus. They know all the unique system requirements, can recall 20-year-old renovations, and can remember where chilled water valves are buried, or where the rogue hot water heating system three-way valves are located. These individuals know what works on campus and know their preferences. All of this critical information is seldom found documented in an organized manner, but instead stays in their brains. This campus-specific knowledge goes with them when they retire.

Compounding the matter, facilities leadership has to eliminate these vacated positions due to lack of funding, and even when they can hire replacements, finding new staff with the right skill set match is a challenge. Meanwhile, most campuses invest in new buildings without investing in additional staff to maintain them. The expectation is for facilities management staff to do more with less, but the outcome is that they may actually be doing *less* with less.

## RECOGNIZING THE PROBLEM

Every major campus has a multimillion-dollar investment in building automation systems (BAS), fire alarms, access control systems, and computerized maintenance management systems (CMMS). If BAS are only being used as a monitoring tool, while their most powerful functions for troubleshooting and predictive analysis are rarely used, opportunities for increased operational efficiency are untapped. The introduction of Building Information Modeling (BIM) as another data source can cross the tipping point. Without strong data management standards, this kind of data coming into facilities will differ in type, naming convention, time intervals, and storage location. Facility managers complain that they are inundated with data when what they really need is information.

Furthermore, though today's BAS rely heavily on information technology (IT) and networking standards, this skill set is rarely part of a facilities management organizational structure. When facilities management relies on campus IT staff for help, IT capacity is compromised and facilities management suffers from a lack of full understanding of goals and challenges.

## MANAGING MORE WITH LESS: THE SOLUTIONS

The first step to increasing operational efficiency through intelligent building strategies amounts to taking a step back and prioritizing how to better use technology and more fully leverage data

### STANDARDS AND SYSTEMS: THE BASIS OF KNOWLEDGE MANAGEMENT

Standards and systems together can become knowledge repositories. Many institutions have mechanical, electrical, and plumbing services construction standards; however, most do not have BAS/controls, BIM, or software standards. Such standards can capture owner preferences and best practices so that this information is not lost when key staff members retire.

Standards also help drive performance expectations. The International Society of Automation promotes the use of standards to improve performance, lower maintenance costs, reduce downtime, enhance operability, and save money.

BAS standards can lead to enhanced operability when they include such details as sequence of operations, required data points, hardware and software requirements, and open protocol preferences. Standards can define BIM to be an information repository for almost every aspect of a building, from its equipment and systems to its structure. Capturing important operational information in BIM can lead to more efficient performance from staff. BIM standards can lead to consistent information delivery from each construction project—for example, getting a detailed inventory of all major equipment out of the model via COBie (Construc-

tion Operations Building information exchange)<sup>2</sup> to upload into the CMMS system without a manual inventory. BIM can also make it easier for staff in the field to access system drawings.

Software standards establish a consistent format for storing data, information, and knowledge, and such industry standard databases as MSSQL, MySQL, and Oracle allow flexibility and future-readiness, as most IT professionals are well versed in them. Having a common database backend allows for better interoperability and data exchange between other software. For example, having a common database between CMMS and space and scheduling management systems can automatically resolve location record discrepancy issues.

### TAKING AN ENTERPRISE APPROACH

An enterprise approach that optimizes or automates work processes has long been successful in the business world. A similar approach to facilities management can be implemented using systems integration, data visualization, and BAS to do more with less. Operations departments can take advantage of mobile technologies specifically for BAS and CMMS to provide quicker response times to work orders, document field conditions with pictures, and access operations and maintenance manuals and system drawings onsite, without visiting a plans room.

### NEW SKILL SETS NECESSARY TO LEVERAGING TECHNOLOGY INVESTMENT

To leverage existing investment in technologies such as BAS and CMMS, some new skill sets and job functions will be required. Powerful BAS trending and reporting functions typically require the skills of a BAS manager or a continuous commissioning engineer to enhance campus operations. The need to organize large amounts of data from disparate systems to look for patterns and to mine data for anomalies and faults calls for a data analyst who can also focus on data quality and consistency, factors which are critical to maximizing data use. Data planning skills resolve work orders when multiple systems and departments need to interact, preventing the problem of technicians arriving onsite to resolve work orders only to find that required materials are not present. Planners can also use the data collected by the CMMS to determine if the preventive maintenance program is running efficiently.

### ORGANIZATIONAL STRUCTURE CHANGES

As more data flows into facility operations, it should be easily accessible to staff members so they can verify its quality and make good business decisions. IT personnel are trained in managing and organizing data, thus having dedicated IT staff within the facilities management function is ideal. Alternatively, sharing resources with campus IT departments may be sufficient.

## DATA MANAGEMENT

With the goal of using data to drive operational decisions, completing the simple statement “I wish I knew—” will generate responses that determine what information is required for facility operations and allow the organization to prioritize needs. Furthermore, asking whether data already being captured can address those needs, and assessing the quality of that data, will determine the proper processes for capturing missing data. For example, using text fields for reporting can lead to errors such as misspelling that compromise reporting at an operational level. Pull-down menus and codes are a much more effective way to capture reporting data.

Once the right information is being collected, data can be used to predict future problems. Every organization has data in various systems but in most cases this data is not interconnected. Answering the subsequent question, “Can the various systems exchange information?” initiates the transformation of a reactive organization into a predictive one.

For example, integrating occupancy data from the existing space and scheduling system into the BAS can determine when to operate equipment, leading to huge energy savings across campus. And integrating occupancy data into the CMMS system will prevent staff from going out to perform work in occupied spaces. Exchanging information between the BAS and CMMS can drive preventive maintenance scheduling. The CMMS is great at housing historical data about work performed, and the BAS is great at capturing data about equipment performance in real-time. Integrating them improves accuracy and efficiency over rigid calendar projections.



## CASE STUDY: FLORIDA INTERNATIONAL UNIVERSITY

Florida International University (FIU), with a 9.6-million square foot campus, has increased operational efficiency through better use of its CMMS system by capturing failure information and staff knowledge. The staff use the CMMS software to enter and close out work orders. They are required to enter their time and materials and report back

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what they did to correct the problem. The CMMS also tracks work performed by outside contractors.

Management traditionally used the information from the CMMS for productivity reports (i.e., number of work orders) and to determine the cost of labor and materials separated by location.

#### CHALLENGES

The challenge at FIU was to manage more buildings while not adding staff. The operations group had lost a lot of collective knowledge when staff retired across the various disciplines. FIU wanted to capture this collective knowledge and at the same time needed to establish a better way of reporting on failures and organizing that data to make better decisions on resource use.

#### SOLUTIONS

Using its internal IT staff, the operations staff conducted a review of the CMMS system to determine if it was capable of handling this challenge. The review determined that the CMMS had the built-in capability for failure reporting using a hierarchical Problem–Cause–Remedy (PCR) failure coding system. Each of the shops was consulted to develop the codes. The codes addressed as many failure scenarios as possible. A process was then developed to easily add codes as needed to continually build on the system. The PCR was deployed to the staff using a pull-down menu system for ease of use.

#### RESULTS

The system has streamlined the work order closeout process, because staff are no longer required to type any information and can use drop-down menus instead. The information being captured is now consistent and easily reportable. The new system is easier for the staff to use and much less time consuming than the previous process. The staff can now do their own investigation on prior failure history without needing to consult others or rely on IT to pull reports. Operations is now able to see failure trends by building and to group failures together, and can now decide if certain assets require more preventive work or need to be replaced. The ultimate goal is to become more predictive in addressing problems instead of reactive, thus better utilizing limited staff resources.



#### CASE STUDY: SANTA FE COLLEGE CHALLENGES

Santa Fe College (SFC) has a 1-million square foot campus. The vision of the facilities management department at SFC is to be an environmental leader, with a goal of achieving one of the lowest energy utilization indexes in Florida. This goal had become increas-

ingly difficult, with nearly 75 percent of SFC's entire facilities management staff retiring over a year-and-a-half period. Adding to the complexity was a lack of operational funding. While adding more buildings on campus, SFC has not been able to add staff to support them.

#### SOLUTIONS

Recognizing that they needed special and diverse skill sets to leverage their investment in BAS and CMMS, SFC developed a new position. Before the position was filled, however, immediate funding became unavailable. Instead of letting that position go unfilled, SFC decided to outsource the position to its annual services engineers as an energy engineering service. Instead of one position, SFC got the diverse skill set of multiple team members with expertise in mechanical and electrical engineering, data analytics, BAS and CMMS experience, and energy engineering.

The energy engineering service is a time-bound program that engages SFC staff to carry out its functions and provides hands-on training. The goal is to organically grow the new skill set in SFC's team. The energy engineering team has optimized the BAS and used data analytics strategies to discover and resolve energy and operational anomalies on campus.

#### RESULTS

With continuous energy savings over the past ten years, Santa Fe has reduced its annual energy consumption while also adding facilities, and is smoothly transitioning to a new facilities management team. ☺

#### ENDNOTES

- 1 Tom Willie, "Facility Realities: CFM as an Inevitable Trend," *Facility Management Journal*, May/June, 2014, see: [http://fmj.ifma.org/article/Facility\\_Realities%3A\\_CFM\\_as\\_an\\_Inevitable\\_Trend/1711354/209515/article.html](http://fmj.ifma.org/article/Facility_Realities%3A_CFM_as_an_Inevitable_Trend/1711354/209515/article.html)
- 2 National Institute of Building Sciences, "Construction Operations Building Information Exchange (COBie)," see: [http://www.nibs.org/?page=bsa\\_cobie](http://www.nibs.org/?page=bsa_cobie)

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