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Operational Guidelines
for Educational Facilities

Maintenance

second edition



Operational Guidelines
for Educational Facilities

Grounds

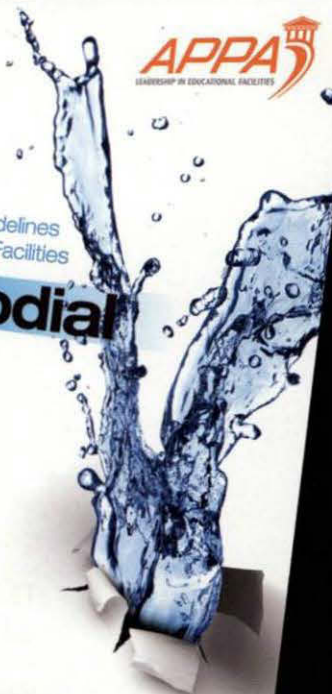
second edition



Operational Guidelines
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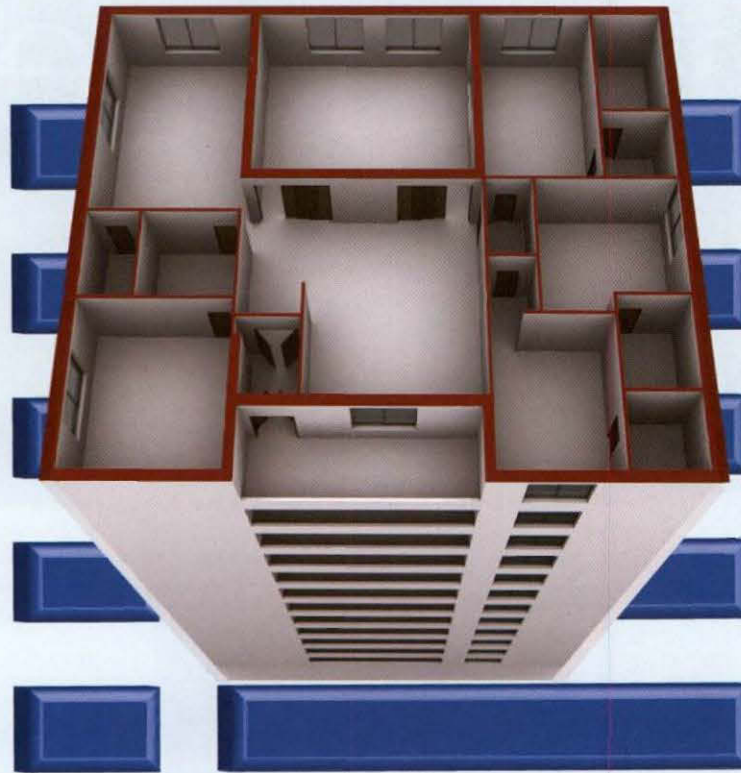
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UPDATING APPA'S
OPERATIONAL
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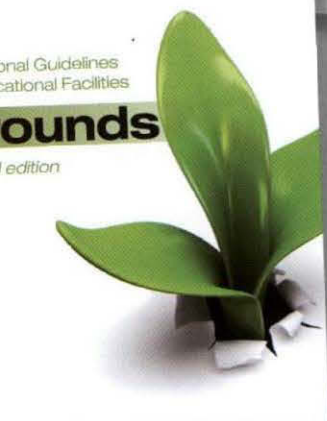
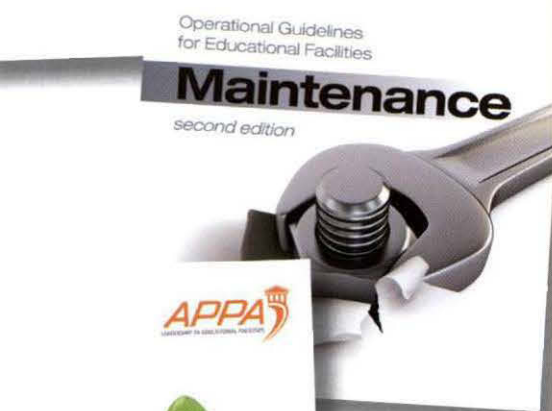
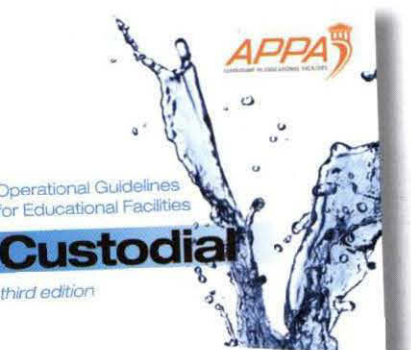
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UPDATING APPA'S OPERATIONAL GUIDELINES

APPA's New Operational Guidelines for Educational Facilities

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By Alan S. Bigger, APPA Fellow

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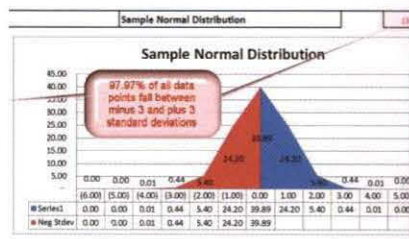
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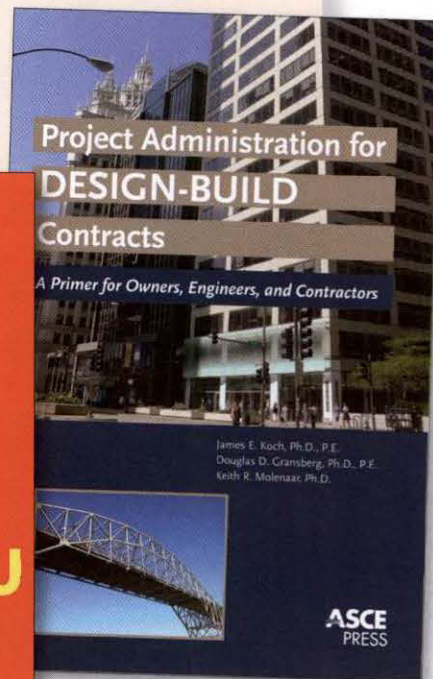
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THE THANK YOU ECONOMY

gary vay•ner•chuk

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LETTER TO THE EDITOR:

I enjoy *Facilities Manager* magazine, the articles are up to date, and even the advertising is a source of what is new or sometimes just new to me. On the cover of the May/June issue I saw the two college students walking across the grass and thought that it was a typical college photo, as the students never seem to walk on the sidewalks. Then I studied the shot. It appears that they have climbed over

one brick wall, a wrought iron fence, through a sunken roadway of some sort, and scaled another wall just to be able to walk on the grass.

When I asked my administrative assistant what was odd about the picture, she replied

that it was obviously a set-up shot because the woman on the right was dressed for fall and the one on the left for summer.

I have learned two things as a facility manager: One is that students will go out of their way to walk on the grass. The second is that I am never amazed at the way students dress. Your magazine cover shot may have not been a set-up after all.

Again, thanks for the excellent and informative publication.

Mark Friedman

Director of Buildings and Grounds
Lincoln University
Jefferson City, Missouri

DAIGNEAU WINS FOURTH REX DILLOW AWARD FOR OUTSTANDING ARTICLE



One of my favorite annual activities is the discovery of the recipient of APPA's Rex Dillow Award for Outstanding Article in

Facilities Manager magazine. Selected by the Information and Research Committee from 19 eligible articles, this year's winner has the unique distinction of being the only APPA member to have won the award an unprecedented four times.

William A. Daigneau, vice president and chief facilities officer at the University of Texas M.D. Anderson Cancer Center, is the 2011 recipient of the Rex Dillow Award for his article, "Portfolio Based Management," published in the October/November 2010 issue. Bill also received the award in 2007, 2000, and 1998.

In addition to his provocative writing in *Facilities Manager*, Bill has served APPA as a Vice President for Educational Programs, faculty member at the Institute for Facilities Management, and content coordinator for the planning, design, and construction section of the current BOK, APPA's Body of Knowledge. Bill was also an inaugural APPA Fellow in 2004.

Congratulations on the award, Bill. 🍷

Coming in Sep/Oct 2011

- Profile of President David Gray
- APPA 2011 Conference Highlights
- Jack Colby, APPA Fellow

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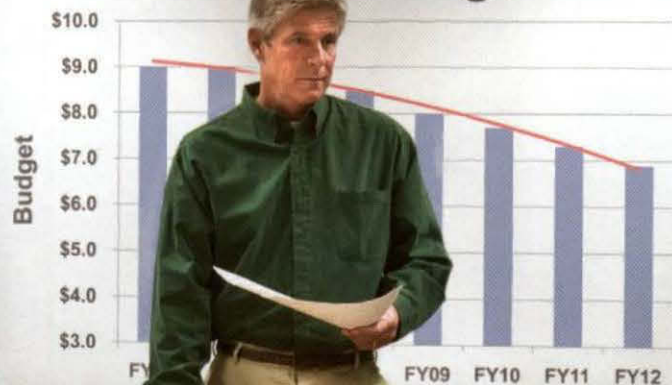
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About APPA

APPA promotes leadership in educational facilities for professionals seeking to build their careers, transform their institutions, and elevate the value and recognition of facilities in education. APPA provides members the opportunity to explore trends, issues, and best practices in educational facilities through research, publications, professional development, and credentialing. Formerly the Association of Physical Plant Administrators, APPA is the association of choice for 5,200 educational facilities professionals at more than 1,500 learning institutions throughout the United States, Canada, and abroad. For more information, visit us at www.appa.org.

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facilities digest

By Anita Dosik

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Contact Steve Glazner at steve@appa.org if you have any questions.

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The Educational Facilities Professional Credential (EFP) and the Certified Educational Facilities Professional (CEFP) Program are now offered online. You can apply, as well as take the test online and receive your test results the same day. All you have to do is choose a test date, time and proctor at your institution.

Find out more about the EFP Credential and CEFP Certification online at <http://credentialing.appa.org> or contact Christina Hills at christina@appa.org.



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Jul 16-18 APPA 2011, Atlanta, GA

Sep 18-23 APPA U - Institute for Facilities Management and Leadership Academy, Ft. Lauderdale, FL

Oct 3-7 ACUHO-I/APPA Housing Facilities Conference, Orlando, FL

REGION/CHAPTER EVENTS

Sep 12-14 RMA 2011 Regional Conference, Regina, SK, Canada

Sep 23-28 CAPP 2011 Regional Conference, Springfield, MO

Oct 2-5 ERAPPA 2011 Regional Conference, Halifax, NS, Canada

Oct 7-13 MAPPA 2011 Regional Conference, Cincinnati, OH

Oct 16-18 PCAPPA 2011 Regional Conference, San Francisco, CA

Oct 16-18 SRAPPA 2011 Regional Conference, Jackson, MS

OTHER EVENTS

Aug 7-9 Big Ten and Friends Trainers Conference, East Lansing, MI

Oct 9-12 2011 AASHE Conference & Expo, Pittsburgh, PA

Oct 26-29 PGMS School of Grounds Management & GIE + Expo, Louisville, KY

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APPA's New Strategic Plan

By E. Lander Medlin

Since its founding in 1914, APPA has become a premier association serving its diverse membership of international educational institutions in all areas of facilities management. APPA's programs, products, and services are designed to equip facilities professionals with the technical knowledge and necessary administrative acumen to fulfill their vital role in both managing educational facilities, and pursuing proper organizational alignment with the institutional vision, mission, and strategy.

International APPA's newly developed strategic plan has taken into account the responses to and recommendations from the most recent member survey; a review of numerous studies; and the APPA/Regional Relationship Task Force outcomes to evaluate the association's performance and give direction for the future. Indeed, this strategic plan is a living, breathing document that will change somewhat over time. However, its purpose and intent is to set the association's direction and allocation of its resources. This involves thinking strategically about actions that are necessary to support International APPA's mission, while maintaining programmatic viability and financial stability. These issues and elements are captured in the new Strategic Plan that is intended to strengthen the overall position of the organization, and most importantly, its members. This plan contains "Objectives" that articulate the desired results, "Five Leading Strategies" that define actions, and "Five Foundational Elements" that are keys to success by further buttressing each of the strategies to achieve the objectives and outcomes over time.

THE FIVE LEADING STRATEGIES ARE:

1. ENGAGE ALL STAKEHOLDERS:
Develop and implement Engagement Plans for all stakeholders both internally and externally. Establish localized delivery systems that touch stakeholders at their time and place of choice.

**THIS STRATEGIC PLAN IS A
LIVING, BREATHING DOCUMENT
THAT WILL CHANGE
SOMEWHAT OVER TIME.**

2. BROADEN THE MEMBERSHIP:
Develop and implement Recruitment and Retention Plans with packaged programs, benefits, and services that effectively target varied market sectors and expand market share.

3. DEVELOP FUTURE LEADERS:
Develop and implement plans to create, engage, and replenish a future generation of leaders. Define appropriate roles and responsibilities for APPA International and its regions and chapters to ensure a consistent, smooth and well-orchestrated delivery system exists. Further assess important generational differences to ensure succession planning is "considered" and effective. Partner with accredited educational institutions with Facilities & Construction Management related degree programs to groom future leaders.

4. ENHANCE PROFESSIONAL DEVELOPMENT OFFERINGS:

Develop and implement training and development offerings in collaboration with the international community, its regions and chapters to ensure content meets the needs of all stakeholders in the educational community. Further clarify and utilize the APPA designed "professional development continuum" to aid in targeted career planning for all stakeholders.

5. EXPAND RESEARCH:
Expand research to build credibility and assure broad dissemination to all stakeholders. Increase collaborative opportunities with external organizations and agencies. Ensure that the Body of Knowledge remains fresh, vibrant, and up-to-date for use by all stakeholders at their time and place of choice.

THE FIVE FOUNDATIONAL ELEMENTS ARE:

1. COMMUNICATION PLAN:
Refine and implement communication systems that are effective throughout all levels of the APPA organization. Clarify relationships, roles, and responsibilities to ensure consistency of brand messages and all communications are well understood. Translate information into useful and meaningful knowledge that is highly accessible.

2. MARKETING PLAN:
Develop and implement an integrated marketing plan by tailoring messages to targeted market sectors and further defining APPA International's

value proposition. Increase awareness of and value for the facilities profession with senior institutional officers.

3. TECHNOLOGY PLAN:

Fully leverage computer/Web-based and other effective technologies. Employ targeted activities that enhance and expand the role of technology in

APPA International's content and delivery systems.

4. METRICS & MEASURES THAT DEFINE SUCCESS:

Develop and utilize metrics to assess reliability and viability of all APPA programs, products, and services. Establish measures that define "success" and

thereby enhance the effectiveness of plan execution.


5. RESOURCE MANAGEMENT:

Identify resource requirements necessary for short- and long-term feasibility of operational planning and implementation. Utilize cost/benefit analyses, ROI, established benchmarks and metrics, and feasibility criteria in making go/no-go decisions of programs and services to ensure continued financial health and stability.

Furthermore, these five foundational elements will be embedded in every strategy. They represent key support actions that will be essential—albeit critical—for program viability, successful delivery, and ultimate achievement of each strategy.

By targeting our actions strategically, and effectively utilizing and leveraging our resources, we should be able to achieve our stated "Objectives"/outcomes of

1. a fully engaged group of stakeholders,
2. across an increasingly diverse membership body,
3. where there is greater alignment and synergy amongst and between international APPA, its regions, chapters, and international alliances,
4. thereby, achieving measurable influence and credibility throughout the entire educational enterprise.

Through this type of targeted focus and direction, APPA will remain the association of choice for educational facilities professionals and their institutions worldwide. 

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

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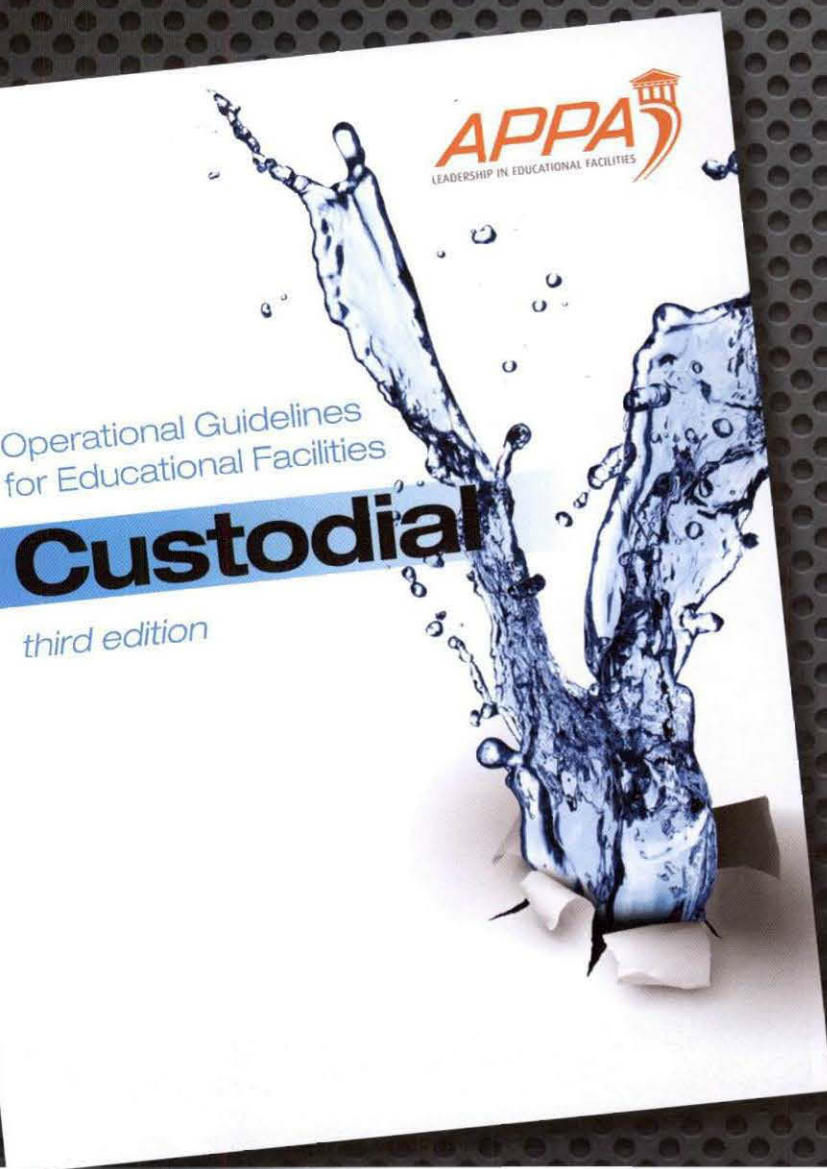
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APPA's NEW OPERATIONAL GUIDELINES FOR EDUCATIONAL FACILITIES

Alan S. Bigger, APPA Fellow

Nearly 25 years ago a group of enlightened APPA members and facilities managers started to discuss an idea and to plant a seed about the need for a document, or series of documents, that would explain the need for staffing facilities operations and the implication of such staffing on levels of service. During the 1980s states and institutions of higher education were facing severe economic issues and the budget axe invariably fell on the facilities management departments of educational institutions. As the demand for increased budget cuts reached seismic proportions, facilities managers scrambled for assistance to validate their staffing requirements and the impact of draconian budget cuts on levels of service. Thus the seed that was planted by the facilities managers in 1987 sprung into a plant, with three leaves, much like a shamrock.

The first leaf of the shamrock was the first edition of APPA's *Custodial Staffing Guidelines for Educational Facilities*

published in 1992, then updated and expanded in a second edition published in 1998. This was followed shortly thereafter by APPA's *Operational Guidelines for Grounds Management* in 2001, and APPA's *Maintenance Staffing Guidelines for Educational Facilities* in 2002. These three leaves of the shamrock have become indispensable source publications for proactive leaders that seek to operate and provide efficient and effective services to our stakeholders on campuses across the world.

One of the unique features about a shamrock is that it has three leaves, distinctive leaves, yet tied to one another by a mutual stem. APPA has been that stem through the decades and has fed and nurtured facilities management professionals with cutting-edge publications. The new and improved *Operational Guidelines for Custodial, Grounds, and Maintenance* are an outgrowth of that support. Not only are these books distinctive, there are themes that flow through each book to include staffing guidelines, sustainability, benchmarking, position descriptions, use of computerized maintenance and management systems, and outsourcing options. The books are

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operational guidelines for your organization that are easy to read, similar in format, and provide invaluable advice to assist you in guiding your organization during the years ahead. Each book provides advice that is flexible and that can be adapted to your specific organizational needs. The three publications will nurture and nourish your organization during “the best of times and the worst of times.”

Each book has chapters about important topics, written by facilities professional that live and breathe operational issues each and every day. A task force was developed for each book headed up by a team leader. For the Maintenance Operational Guidelines, Tom Becker of Philadelphia University headed up the team of authors, and Tom Flood of Elon University guided the Grounds Operational Guidelines project. Casey Wick, formerly of Hamilton College and now at American International Schools, Dhaka, Bangladesh, headed up the Custodial Operational Guidelines group. Without their voluntary hard work, leadership, and dedication these books would not have been published.

As you read and use the books, we trust that the common threads and vernacular will start to resonate with you and your facilities management team. The revisions to these books was based upon an APPA survey and task force member inputs, and chapters were added, deleted, or modified based upon that input. Much as organizations are a living organism, the guidelines cannot stay static so we encourage your feedback to APPA on improvements for the future. We trust that you find these new books to be beneficial to you and your organization, and may the blessings of the Irish shamrock be with you during the years ahead. ☘

Alan Bigger is a Past APPA President and APPA Member Emeritus based in South Bend, IN. He is the editor-in-chief for the update of APPA's *Operational Guidelines* trilogy. E-mail him at frugalperson@comcast.net

Visit the APPA bookstore to pre-order your Guidelines at www.appa.org/bookstore.

WHAT CONSTITUTES MAINTENANCE?

BY J. THOMAS BECKER



Operational Guidelines
for Educational Facilities

Maintenance

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In most cases the facilities inventory of an educational institution is its largest fiscal asset. The physical plant or facilities management department is the steward for keeping that asset from becoming a liability. Our principal charge is to make sure that the building inventory maintains its ability to function as intended, that it is safe and legal, and that its life is perpetuated to the greatest extent possible.

Customers' expectations have accelerated exponentially. The electronic age has become intermingled with everyday life. In response to catastrophic events, security systems and building access systems have quickly become more elaborate. The economic crisis has forced our profession to try to improve efficiency in almost all aspects, from energy management to sustainability to staffing assignment.

Material inventories are tighter and not as easily available. Information about our operations is requested to be more transparent. Benchmarking and performance ratios are now expected management tools. Methodologies for implementing ongoing improvement, and having tools in place to measure that improvement, are now looked for when accrediting bodies visit campus.

To quantify performance criteria, both internal and external definitions and measurements need to be consistent. That is by no means an easy task. In most cases, facilities management departments have evolved uniquely within their institutions. Some schools reside almost independent of their surrounding community; others are more interdependent.

MAINTENANCE TYPES

Let's first look at the kinds of activities that many facilities operations perform. Figure 1 is a Venn diagram showing most of the activities, in general terms, of a typical facilities maintenance operation. The large circle represents all maintenance activities the operations and maintenance (O&M) staff may perform in a year. The next smaller circle, entirely within maintenance, is planned work. This includes preventive or predictive maintenance and some corrective work—that which can be scheduled.

Other circles represent emergencies such as power outages and pipe leaks, which cannot be scheduled but are clearly maintenance, and reactive work—those tasks that customers request that have some time requirements associated with them and are not fully within the facilities operation's control to schedule.

Finally, hanging off to the side and trying to be part

of maintenance, is capital work. Many of us don't want to believe it, but some activities performed by maintenance staff clearly add to the remaining life of a building and thus are capital in nature.

Maintenance is also a continuum of activities that range from predicting or preventing failures to capital improvements or renovations, with repairs and "support maintenance" involving operational activities in the middle. The facilities professional must manage resources to meet the needs of the continuum of activities and service the campus. Figure 2 attempts to describe how a typical facilities operation may manage resources along this continuum of activities.

Figure 2 graphs each of the activities identified in the Venn diagram in Figure 1 as a percentage of total resources. If resources are minimal, it is likely that only emergency work can be accomplished. This is representative of APPA Level 5, wherein there are so few people available to perform maintenance work that they are listed in the graph as able to respond only to things such as pipe leaks, heating or air-conditioning failures, and broken windows or locks.

As a facilities operation has more staff (moving to the right on the axis of the graph), it is able to accomplish a greater variety of maintenance activities: planned (predictive/preventive and corrective), emergency, reactive, support, and capital work. When a larger variety of maintenance is completed, the percentage of emergency or critical activities decreases. This occurs naturally even if the number of emergencies remains the same in absolute terms. However, it is likely that if preventive/predictive maintenance work is being done, it has an immediate effect on some of the emergencies (e.g., pipe leaks).

If maintenance is performed in a timely manner, then there will be no or very few unplanned outages that require an emergency response. Examples of these timely interventions include replacing capital equipment at the end of its useful life and scheduling equipment rebuild during off-season times. As more resources are available, the facilities officer is able to assign staff to accomplish a wider variety of work.

Figure 2 does not mandate that work be done. Every facilities professional works with individual definitions based on operating or historical differences at individual institutions. Therefore, each type of task identified in Figures 1 and 2 requires some additional clarification of the differences and fine points. These differences may have little effect on the

Figure 1: Overlaps and Interrelationships in Types of Maintenance

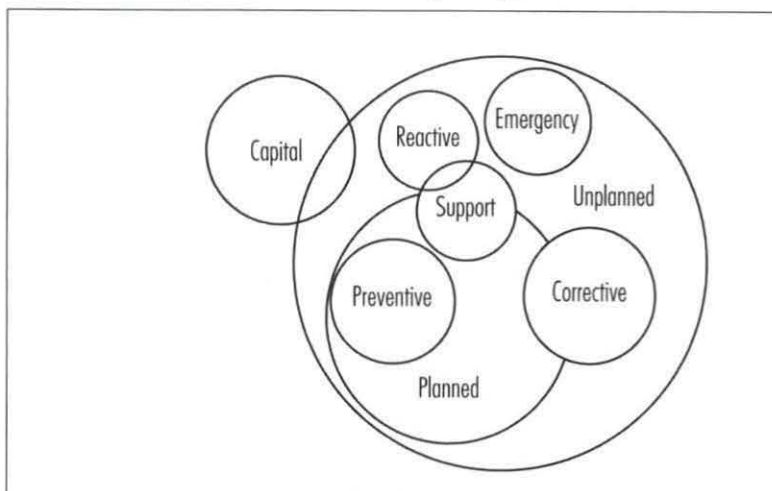
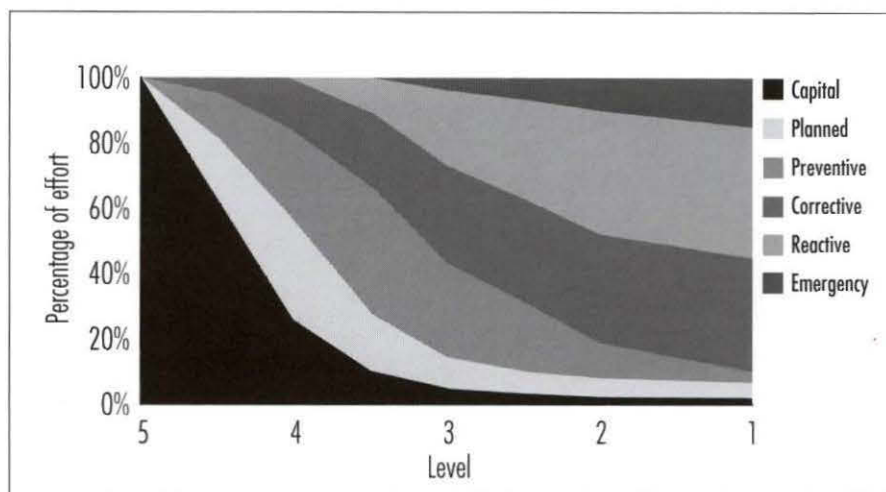


Figure 2: Maintenance Activities as a Percentage of Total Resources



number of people needed to maintain one campus but a major effect on another. The facilities professional needs discretion to interpret and operate.

THE QUESTIONS OF MAINTENANCE

So, what are the fine points? What are the major points? Are there examples of the fine and major points? What are the differences between the standard definition of building maintenance and the definition used on your campus? How do the differences affect maintenance trades staffing? How is the budget affected? How is deferred maintenance affected? How can you use this guide to better fund your maintenance budget? What is and is not included in building maintenance?

First, what is not included in building maintenance? Major replacements of equipment or building components that have

reached the end of the anticipated life cycle are not included. A chiller that is 25 to 30 years old and should be replaced, either because it is old or because the amount of annual service it demands is excessive, is not replaced through a maintenance effort. Similarly, a masonry facade that is exhibiting serious water infiltration or has cracks, particularly at corners or in places where expansion joints should have been located, is not a maintenance effort. Both of these projects are considered capital renewal or improvement; they are not annual maintenance. *They both extend the life of the facility, so from an accounting perspective they are capital improvements.* Likewise, custodial activities—cleaning, waxing, washing, and so on—may be maintenance, but they are not considered as trades maintenance in the Maintenance Guidelines publication. Those maintenance activities are discussed in *Operational Guidelines for Educational Facilities: Custodial*. Maintenance activities to the grounds and other exterior features are discussed in *Operational Guidelines for Educational Facilities: Grounds*.

Another category that falls outside the definition of main-

tenance is improvements (capital), either at the request of a user or because technology has identified a better way of performing a particular function with capital equipment. This category includes the installation of new instructional equipment (movable or fixed) that was not previously present or the installation of energy-efficient light fixtures that have a determinable payback and will assist in financing the project.

A simple description of this category might be, "If it's there and it isn't working correctly, it is maintenance; if it isn't there, it is not maintenance." Individual campuses will differ on these points. One campus participating in our initial data-gathering effort would perform minor improvement work (less than 16 hours and less than \$1,000) under the normal maintenance staff and budget; it considers this work more customer-focused service.


Maintenance is not a major project that will extend the life of the component or assembly—that is, it is not life-cycle replacement. Neither is maintenance a project that solely provides for a technical or economic improvement to a facility.

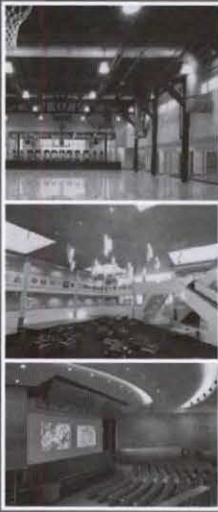
While it is easy to list things that are not maintenance, it is more difficult to list things that are maintenance; it is easier to say "no" than to identify how to say "yes." Because this guide is intended to provide answers to the harder questions, the definition of maintenance must be made in a positive way.


TYPICAL MAINTENANCE TASKS

The following are ten illustrative samples of typical tasks expected of the facilities department, followed by the type of maintenance within which the tasks most likely fall.

1. Repair leaking roof and associated damage from storm of July 6 — Capital Maintenance
2. Paint Fine Arts room 105 for new department chair — Support Maintenance
3. Replace broken window in Life Science Building, west entry — Corrective Maintenance
4. Perform eddy current test on chiller in the Physical Science Building — Preventive Maintenance
5. Old Main room 125 is hot — Reactive Maintenance







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6. Replace inoperative light fixture in Business College room 2414 — Corrective Maintenance
7. Set up stage and chairs in gymnasium for graduation ceremony, May 6 — Support Maintenance
8. Replace broken exit device at northwest door of Technology Building — Emergency Maintenance
9. Replace door in Education Building; it needs to be a Dutch door now — Support Maintenance
10. Relocate hand-washing sink in food service kitchen to make way for a new oven— Capital Maintenance

Another way of looking at the duties and responsibilities of the maintenance department is to view them within generic operating rules or limitations. These limitations describe the characteristics that make up annual maintenance activities. The characteristics address object, time, and location (what, when, and where). First, maintenance is generally component-nonspecific; it can happen to anything on campus. The maintenance department responds to hundreds of small requests or needs to keep the campus operational. These needs may be the result of vandalism, wear, or general use. For the most part, these requests cannot be planned (other than preventive/predictive maintenance).

Second, the duration of maintenance work (excluding preventive/predictive maintenance) cannot be predicted. Individual maintenance activities may have an identifiable duration that is used to plan where and to what activities workers are to be directed through the day, week, month, and year. However, maintenance does not have an end date or time — it is a continuous activity. Individual tasks will be completed, but the overall effort will go on as long as the campus exists. This is often a difficult concept for different parties to agree on, but it is extremely important to define the scope of maintenance work, particularly if a campus has contracted its maintenance to an outside organization.

Third, maintenance occurs everywhere on campus; it is not limited to a specific site. Individual maintenance tasks may be site-specific, but the overall maintenance activity can occur anywhere. Maintenance personnel are deployed on a 24/7 schedule (depending on priorities and general campus operating rules) to resolve operating issues that affect a wide variety of buildings, equipment, or components.

These three limitations define what constitutes maintenance. The opposite of maintenance is the capital project. A capital project, whether it is a new facility, rehabilitation/renovation, or major repair, is a specific, focused activity. It focuses on a specific piece of equipment or building component, it almost always occurs within a specific time frame that

is usually identified and scheduled in advance with a planned completion date, and it occurs in a specific location.


From an accounting perspective, a capital project either increases the value of the campus (e.g., a new building) or extends the useful life of a facility (e.g., a replacement chiller). Some would argue that replacement of an old, large, centrifugal chiller is part of an annual maintenance plan, but the project is specific, of limited duration, and in a fixed location — which means that it is a capital project, not annual maintenance.

It may also be argued that the planned repainting of a building interior is not maintenance, but rather a capital project. It is entirely possible to describe a single effort that is then contracted, executed, and completed without maintenance employees. This is an operating decision for the facilities professional to make. If it is decided that the campus will perform cyclical repainting of building interiors with maintenance forces, then the staffing levels are easily determined by selecting the repaint cycle length. Similar arguments could be made for maintenance efforts to other continuous components, such as masonry, roofing, or flooring. Replacement cycles should be looked at carefully before the choice is made. A replacement cycle may commit the organization to more maintenance work than it can sustain.

STEWARDSHIP AND CUSTOMER SERVICE

As educational facilities professionals, we have a prime obligation to be stewards of these assets and ensure that they provide long-term value. Customer service is a major factor in customer satisfaction. They are not mutually exclusive and, in reality, cannot exist without one another. Our customers expect service with urgency to maintain satisfaction. Without customer satisfaction, a department loses support and likely funding.

Our facilities departments must lead with highly visible customer service, while tracking performance and still allowing the largest portion of our resources to follow with stewardship functions.

An established, published target level of service expectation—one that the campus community understands and supports—is a facilities manager's best tool for achieving the desired balance. 

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SETTING STANDARDS FOR CUSTODIAL OPERATIONS

BY CASEY J. WICK

Operational Guidelines
for Educational Facilities

Custodial

third edition



In general, standards serve as fixed mile markers on the path to achieving goals and objectives. They create a measurable system by which to determine progress or regression toward or away from predetermined outcomes. In terms of custodial operations, numerous types of recognized standards are used to measure operational parameters. Among those standards are the following:

Training	Social
Production	Management
Staffing	Ethical
Conduct	Productivity
Appearance	Procedural
Association	Process
Equipment	Regulatory
Safety	Product

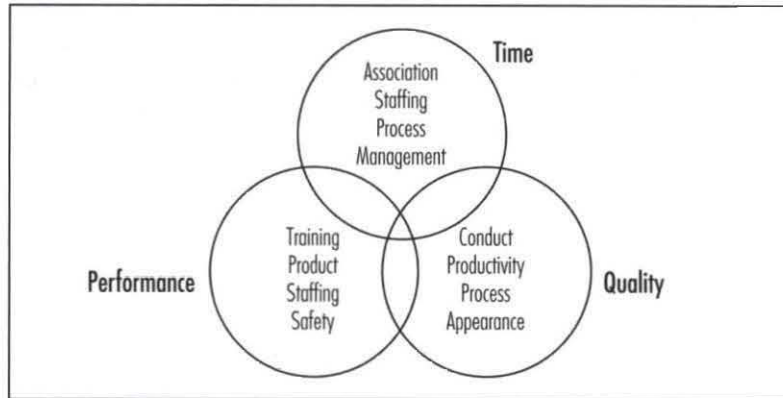
As is evident from the list above, the number and variety of standards associated with custodial work is extensive and can be difficult to comprehend. It is therefore helpful to organize such standards into meaningful groups or categories for the purpose of evaluation and application. Figure 1 illustrates both the overlapping and interdependent nature of standards common to the custodial field. More important, the diagram also illustrates how several standards can be grouped together in broader categories for evaluation and application purposes.

Time Standards include standards based on performance pace and chronological outcomes. In other words, how long will it take to perform one single task or series of tasks? The "Normalized Base Times" identified in the new Custodial Guidelines publication offer custodial managers a powerful tool with which to objectively justify full-time equivalent requests, create reasonable and fair workloads, and facilitate daily and weekly scheduling.

It is important to note that time standards are not related only to task performance. Time standards are also critical factors in circumstances such as chemical dwell time, equipment maintenance schedules, and regulatory compliance matters.

Performance Standards include standards that are designed to objectively define targeted levels of performance or outcomes. Universal examples of performance standards are those relating to safety guidelines and hazard minimization. Such safety and

Figure 2: Maintenance Activities as a Percentage of Total Resources



hazard minimization standards also show how many standards can be categorized into a number of different categories.

For example, while safety standards are certainly performance standards in terms of how a certain task is to be performed and what personal protective equipment is to be used, they also reasonably fit into the category of time standards when consideration is given to time-related occupational exposure limits such as decibel levels. Performance standards related to custodial operations are most frequently thought of in terms of attaining a predetermined and defined level of cleanliness, and therefore establish an understandable and accurate means of evaluating cleaning performance.

In conjunction with such standards, custodial managers are tasked with maintaining an expected level of cleanliness within their respective facilities. The five levels of cleanliness defined in the APPA guidelines describe observable levels of cleanliness that can be used during an inspection to measure performance.

Performance standards not only create a useful means of measuring actual cleaning outcomes, they also facilitate staff training and communication of expectations. Ultimately, they help create a shared understanding of expectations and clear, easily understandable communications.

Quality Standards and performance standards are often viewed as one and the same. However, while performance and quality standards do overlap more than most other types of standards, they should be viewed as distinct and concerned with unique circumstances.

Quality standards are more closely based on a 360-degree perspective on service delivery. For example, a restroom surface that has been cleaned to meet observable cleanliness levels will

likely be judged as meeting both performance and quality standards. Yet, even though the surface appears clean, bright, and shiny and there are no visible signs of soil, it may still harbor contaminants and undesirable pathogens (especially if the product used is a neutral cleaner rather than a disinfectant).

Quality standards are designed to take into account the entire service cycle and address all aspects collectively. Likewise, quality standards are useful tools when one takes a holistic approach to service delivery. Facilitating standards such as customer interactions and service follow-through is a primary concern regarding quality standards. Quality standards within custodial operations are the foundation for developing structured and appropriate quality plans and service quality measurements, designing a feedback cycle, and developing an appropriate and functional continuous improvement plan.

Management Standards. Effective management provides the foundation for success in each of the areas cited above. The bottom line is that achieving effective performance and quality demands the implementation of a professional management structure that ensures that a custodial operation has the necessary pieces in place to operate as efficiently as possible and with a full commitment to customer satisfaction. APPA has various programs available to assist in determining the effectiveness of a facilities management organization, including a standardized self-audit program and the Facilities Management Evaluation Program (FMEP).

In addition, ISSA—The Worldwide Cleaning Industry Association—has outlined the primary characteristics of a quality, customer-focused cleaning organization in its Cleaning Industry Management Standard (CIMS). Developed through a consensus-based process, the CIMS program offers a road map for all cleaning service organizations—including both building service contractors and in-house cleaning service providers—in the development of an effective management structure.

For many years, APPA members have utilized industry best practices such as those afforded by the U.S. Green Building Council, Green Seal, and the Environmental Protection Agency. ISSA's CIMS program offers a set of "environmental preferability" criteria that serve as the basis for a comprehensive green cleaning program. Taken together, CIMS and CIMS-Green Building (CIMS-GB) provide a key tool that an institutional custodial department can use to improve the likelihood of success. Institutions that self-perform service can use the CIMS standard to develop and maintain quality management within

their own organizations, while those that use a third-party contracted service can use CIMS/CIMS-GB as a powerful prequalification tool when selecting an outside provider. More information is available at www.issa.com/cims.

STANDARDIZATION

Once the general concepts of standards are understood, they can be applied within an institution in a process of standardization. Standardization is generally defined as "establishing common rules and procedures that apply uniformly." Standardiza-

tion principles are not a new concept. The birth of standardization is rooted in Fredrick W. Taylor's visionary work from the mid- to late-1800s, which forms the basis for what is described in contemporary management theory as Scientific Management.

Scientific Management is defined as developing performance standards on the basis of systematic observation and experimentation. Working primarily in the steel industry, Taylor studied operations and collected extensive data on peak performance standards. He then analyzed the data and used the results to define procedures that would yield the greatest output while minimizing waste. Taylor's methods caused output and quality to increase dramatically while at the same time lowering costs. These two factors—increased productivity and quality coupled with decreased waste—lie at the heart of a standardization program. It must be noted, though, that Taylor's work is generally viewed as obtuse toward employees and considers individuals as economic objects and not as human beings. Management scholars still debate this belief today. However, the positive impact of introducing standards into a cleaning operation has been proven time and again.

IMPLEMENTING STANDARDS

Custodial managers often find determining which standards are valid, appropriate, and effective to be quite a challenge. A well-thought-out and effective standardization program can range from one that is developed completely in-house to one

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that has been developed by a not-for-profit trade association or other industry expert. Regardless of the source of the program, thoughtful and committed implementation remains crucial to the successful integration of the system. Defining and adopting a set of standards is only the first step. The timing, scope, and control of the program are as vital to success as adopting appropriate standards.

One thing to keep in mind is that the strategies employed during implementation need to be directly related to the operation in which they will be applied. For example, operations that occur in multiple facilities and at multiple locations face unique challenges as managers seek to achieve implementation across several facilities. The following questions need to be asked: How can widespread implementation be achieved? Is it best to take small steps in all facilities at once or fully transition one facility at a time? What is the best method of tracking results? At its core, implementation should be viewed as guiding the transition and making minor adjustments along the way as necessary. Can this be done effectively across several locations, or would the one facility at a time be a better approach? These are just a few of the many considerations managers must address during and after implementation of a standards program.

SUMMARY

The benefits of developing and implementing a standards program are countless, and effective standardization can yield great returns. Professional cleaning operations are a model environment in which to implement standardization principals. The repetitive nature of the industry creates a situation in which consistently desirable results form the foundation for success. Minimizing variations in performance will improve the overall level of services delivered.

Standards also can become the basis for goal development and cohesive performance efforts among employees. Creating an environment in which all members of an operation know and understand what is expected of them will undoubtedly boost morale and improve cooperative team efforts. ⑤

Formerly with Hamilton College in New York, Casey Wick is director of facilities at the American International School, Dhaka, Bangladesh. He can be reached at caseyjwick@gmail.com. He served as task force chair for the new APPA book, *Operational Guidelines for Educational Facilities: Custodial*, from which this article was excerpted and adapted.



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DESIGNING THE SUCCESSFUL GROUNDS ORGANIZATION

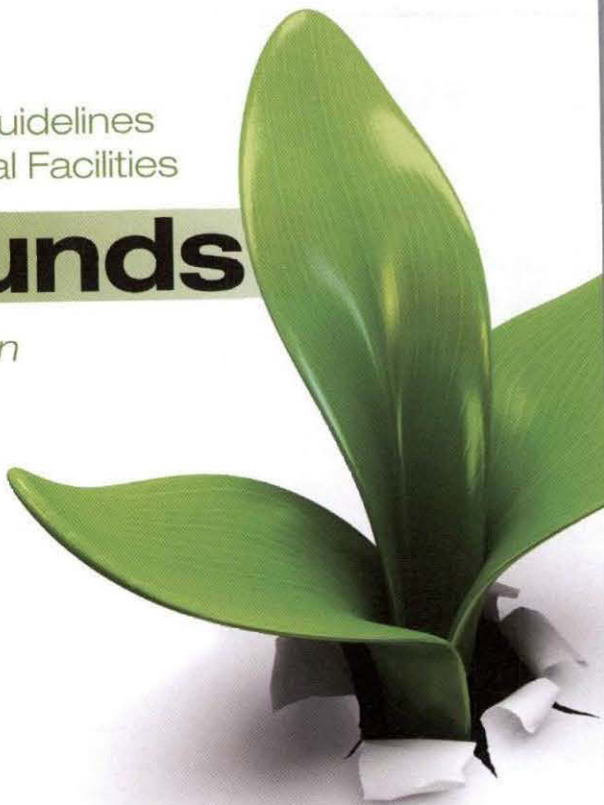
BY FRED GRATTO



Operational Guidelines
for Educational Facilities

Grounds

second edition



Grounds maintenance is conspicuous work. Doing it well requires preparation and organization, whether repairing a road, finishing concrete, scattering salt on icy steps, landscaping a new building, trimming trees, or refurbishing a bus stop. Our jobs are especially difficult because they take place under the watchful eyes of the public, many of whom are weekend gardeners and think they know the best way to do things. Few people, however, have a sustained interest in the art of managing people and directing resources to ensure that a campus is maintained safely and attractively.

But grounds managers do, and they find ways to be helpful and get things accomplished. Effective leaders know and appreciate those who do the work of the organization. "In the world according to great managers, the employee is the star. The manager is the agent," wrote Buckingham & Coffman in *First, Break All the Rules*. Genuine cooperation results when supervisors encourage employees to identify and solve problems. Supervision through cooperation and empowerment requires a fair exchange of responsibilities and benefits so that all can share the fruits of sustained efforts.

There are probably several ways to organize departments and do this, but three are mostly commonly used.

ZONE MAINTENANCE

Most people take care of things better if they own them. For example, people who rent a house may not be too concerned about the impact that pets might have on carpet. Perhaps they move pictures often and are not bothered by all the holes in the walls, because the home is not theirs. Likewise, drivers of rental cars might not be as careful as they are with their own vehicles. Squeezing into a tight parking space is no problem. The ding in the door from the other guy might not be such a big concern.

Another observation is that people litter in public spaces, but they probably would not throw trash on the ground in their own yards. People tend to care more about things if they are personally responsible for them. For example, a grounds worker who operates the same mower every day will likely take better care of it. The tires are equally inflated. The blades are changed as needed and the moving parts get greased every day. The condition of a piece of equipment can often reveal the level of attention to detail and tell supervisors a lot about the work habits of the operator. On the other hand, the problem of poorly maintained equipment can develop if mowers or dump trucks, for example, are operated

by different people every day. No one knows who scraped the fender, lost the fire extinguisher, or forgot to check the oil.

As with equipment, a supervisor and crew with responsibility for a specific campus area can nurture a sense of ownership and foster teamwork. Often, people are more interested in their jobs if they have their own areas to take care of. They take pride in improvements made over time and feel good about their contributions. They notice changes from one day to the next, are mindful of unfinished details that must be attended to, and pitch in to help one another. A zone approach to deployment of personnel can also encourage friendly competition.

People like to be the best. They like to win. Certainly, doing as well as or better than peers is important to many of us. Unlike some kinds of work, landscape maintenance is not abstract. Our work is conspicuous, and we can see what has been accomplished at the end of the day. Noticing which landscaped areas look better than others is easy. Peer pressure can be a positive factor if it raises the level of interest and pride that people have in their work. If productivity is increased and the level of grounds maintenance improves, good things are happening.

We are in the service business, and the general public, campus employees, students, and faculty are our customers. It's important for our customers to see us occasionally, and zone maintenance allows this to happen more frequently since the same people are usually in the same areas every day. As a consequence, we can create a favorable impression for our organization when a customer approaches a lead worker or supervisor with a question or request and finds someone who can provide accurate information or make a decision. The level of customer satisfaction increases when an individual's concern is regarded as important enough to be acted on quickly.

Another positive aspect of zone maintenance is that workers often see the same people every day. As people come to campus in the morning or go about their business throughout the day, they often have routines. They usually arrive to work at the same time each day; probably park in the same location; walk, bike, or jog the same routes; and work in the same building. These situations allow grounds maintenance personnel to have occasional contact with people and develop relationships. This is important because the opportunity to establish rapport, show an interest in the needs of others, and provide timely service is a good situation worth nurturing.

A zone approach to maintenance of campus grounds assigns a specific supervisor and a specific crew to a particular area, and they perform all the necessary tasks in it. Therefore, it is important to develop expertise in several skills so that individuals are qualified to do any job on any team, such as the mowing crew, irrigation crew, tree crew, pruning crew, or horticultural team.

When employees have the skills necessary to perform many different tasks, the whole organization benefits because people can solve any problem, meet any challenge, and fill any void—and they know it.

Confidence and can-do attitudes are the logical outcome. This fosters a sense of ownership, ensures continuity, increases job satisfaction, facilitates supervision of jobs, and allows people to demonstrate a sustained commitment toward making the campus a better place. So, providing opportunities and training that increase abilities and create jacks-of-all-trades is good for individuals and the organizations in which they work, especially when zone maintenance is the preferred way to organize the workforce.

The zone approach also offers some potential challenges as well. There may be a tendency for people to create boundaries and the possibility that staff members will reach beyond the beneficial friendly competition and create silos or lose a sense of teamwork with the larger grounds organization. Multiple crews may require additional equipment to accommodate their competing schedules, as weather and horticultural requirements often mean everyone will want to use the same piece of equipment at the same time. New groundskeepers in the zone-based organization may require more training to become proficient in their positions. Consequently, the zone approach is more frequently used on campuses that cover larger geographic areas and have larger staff and more equipment resources.

BROADCAST MAINTENANCE

Having the same crew responsible for the same area of campus every day is also an effective approach to grounds maintenance. The resulting routines and familiarity are good, but so is variety. Doing the same tasks at the same location every day can get physically and mentally tiring. It's refreshing to see and do other things and take on different opportunities and challenges. Too much of the same thing saps energy, dulls attitudes, lowers productivity, and causes a drain on the brain.

Over time we adapt to the sights, sounds, and smells that constantly surround us. Eventually awareness fades, and the constants in our environment become much less noticeable. For example, enter an air-conditioned building on a sultry summer day and a refreshing breeze of cool air greets you. But, within ten seconds or ten strides down the hallway, you probably don't notice it anymore. The same thing happens with beaches, mountains, sunrises, pay raises, fancy cars, life in general, and, unfortunately, with people. We get too used to things. I teach an undergraduate class each semester, and I recently asked one of my students how the university could serve them better. A young lady replied, "Surprise us. We're just in our routines every day and we need something different to get interested in; everybody does."

In the world of facilities management, surprises are generally not something we want. Nonetheless, a change of pace is good, and a broadcast approach to grounds maintenance can provide this somewhat by providing work settings that differ daily or change several times throughout a workweek. For this reason and others, a broadcast approach to campus maintenance works well, because people work in different areas of campus each day. This is helpful because we all like a little difference in our days, whether at work or at home.

A broadcast approach uses teams. For example, the mowing team performs all the mowing in a discrete area and then moves on to another one. The pruning team, irrigation team, and other teams function in this manner also. There is an advantage in having crews of specifically trained people move about campus and do all of a certain type of work. It is common for a mowing team, herbicide crew, or tree crew to handle all needs of these types, rather than have separate crews for each area. This broadcast approach avoids duplication, efficiently uses labor and equipment resources, nurtures

cooperation, and allows personnel to respond to problems in a timely manner. Training time for replacement employees is minimal, and people can become highly specialized and effective in their jobs.

The broadcast approach has its potential challenges as well. Once the task becomes too routine, attention wanders and the quality of work tends to slip. For the same reasons, monotony is a real challenge, and employee job satisfaction can diminish over time. While people may take ownership of their task or individual effort, there is less ownership for the appearance of the whole area and less pride in their job, their institution, and potentially themselves.

A COMBINED APPROACH

Another approach to organizing campus grounds maintenance is a combination of assignments in which crews have responsibility for specific areas, yet their efforts are augmented by crews of specialists that move about campus. This approach allows a unified workforce to handle peak demands, such



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as mowing during the rainy season or snow removal during winter months. The appropriate approach to maintenance for any campus and the best methods to be used will vary from one geographical location to another. Also, amount of rainfall, exposure to the sun, soil condition, topography, climate, intended and unintended uses, expectations, and resources all help determine maintenance priorities and regimens. Matching the best maintenance approach to landscaped sites is the essence of effective grounds management.

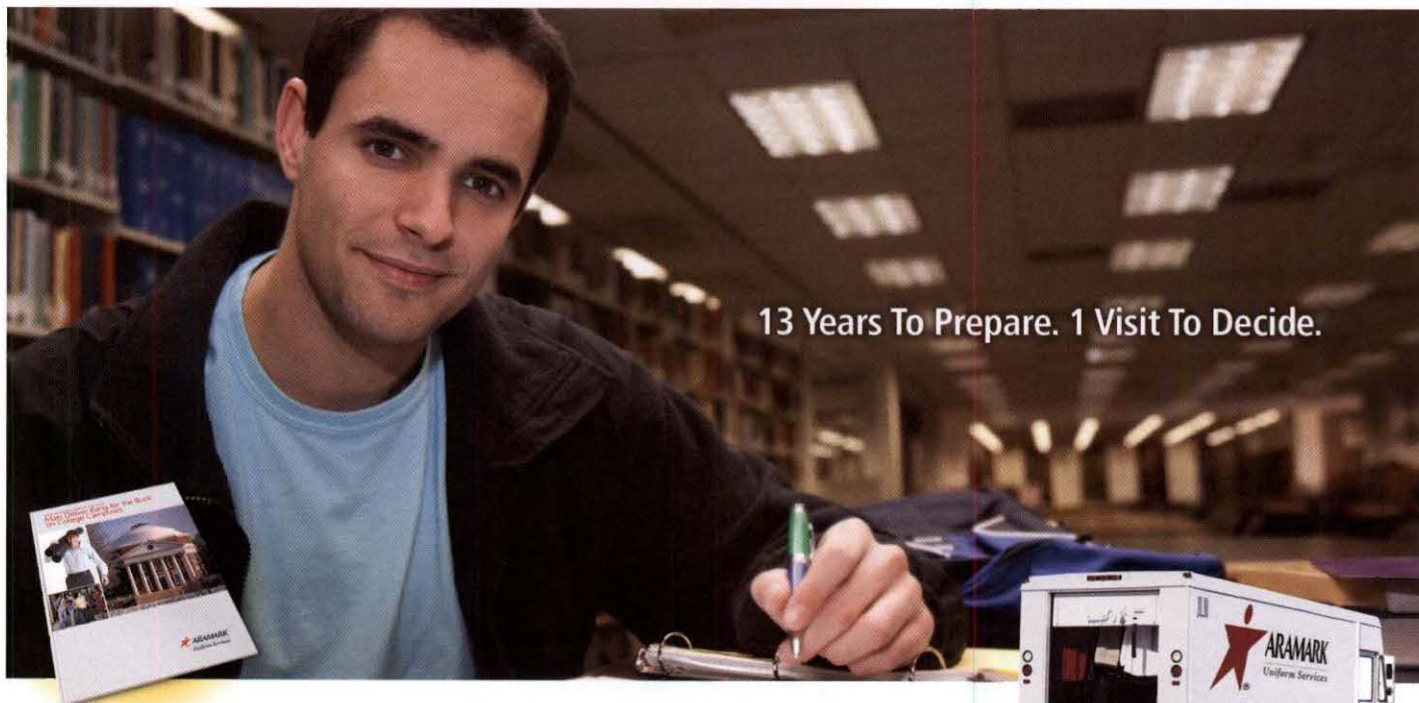
SUMMARY

The most important component of any service organization is people. This is especially true of grounds management, because effective maintenance is dependent on good supervision and knowledgeable people. The grounds management function, therefore, must have personnel who are competent and committed. They must fully understand the scope of their duties and responsibilities and know the mission of the entire

organization. People can do things better when they have opportunities to do the many different and important tasks necessary to maintain campus grounds. We need people who have seen the big picture.

People require less supervision as they become more capable and more self-sufficient, more responsible, more confident, and better able to contribute to the mission. A happy consequence of being more proficient and having more qualifications is that employees are more motivated and qualified for other job opportunities. In the long run, this is good for people and good for the organization, because when there are increased chances for upward mobility, people are more hopeful, more motivated, and more productive. 

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Siemens Strengthens Texas A&M's Tradition of Energy Management

Of the many trends impacting U.S. colleges and universities in the next 10 years, two are converging at a rapid pace. The steady decline in the number of high-school age students, from 21.5 million in 2009 to less than 20 million by 2020, is dove-tailing with the rapidly increasing value 18 and 19 year-olds place on global responsibility. To attract smart, young students, institutions are finding they need to be seen as leaders in energy conservation and other areas of sustainability. Texas A&M University is one institution that has taken this bull by the horns.

As one of the nation's oldest and largest universities, Texas A&M is recognized as a leader in all facets of higher education, from academics to athletics to scientific research. The university has also been a leader in campus energy management, dating back to 1893 when it first began generating a significant portion of its own electricity. Texas A&M continues to look forward, with a new \$15 million performance contract and the help of Siemens Industry, to upgrade the efficiency of over 20 campus buildings.

Decreasing Costs While Increasing Enrollment

Texas A&M's proactive approach to managing energy consumption on campus targets two important goals. It wants to further control energy costs and provide a greener, more energy efficient campus for a more environmentally-conscious student body. This effort, spearheaded by the university's Department of Utilities and Energy Management (UEM) team — led by Jim Riley, Director of Utilities and Energy Management, and Les Williams, Associate Director of Utilities and Energy Management — has been a proven success. Since 2002, Texas A&M has been able to reduce energy consumption by 25% despite the fact the campus' total square footage grew by 18%.

Staying Ahead of the Curve

Today, the campus is embarking on an ambitious upgrade of 24 campus facilities to further improve energy management.

To do this, it is leveraging a \$15 million performance contract made possible through ARRA stimulus funds secured by the Texas State Energy Conservation Office (SECO). The contract allows Texas A&M to fund facility improvements through a low-interest loan paid for by future energy savings.

To implement the performance contract, Texas A&M partnered with the Building Technologies Division of Siemens Industry, Inc. a global leader in building automation and energy efficiency solutions. Siemens was selected in part because of their past successes with Texas A&M energy management initiatives. Additionally, the university felt confident in the ability of Siemens to complete all project work by the end of 2011, a key condition of the funding, according to Riley.

Creating a Better More Efficient Campus

In defining key elements of the building upgrades, Siemens and Texas A&M identified solutions that both reduce energy consumption and create buildings that better meet the needs of its students, according to Williams. The final list of projects calls for improvements to 24 campus buildings. These improvements include:

BAS Building Optimization —

Optimization of the campus' building automation system (BAS) will improve energy efficiency and enable better HVAC control in buildings representing over 1.6 million square feet.

Occupancy Sensors —

Occupancy sensors will be installed in offices, classrooms and common areas to reduce energy consumption and eliminate the wasteful practice of conditioning and lighting spaces when not occupied.

Lighting Retrofits —

Replacing older inefficient lamps will reduce energy consumption dramatically. Texas A&M's 700,000 square foot library will benefit greatly from this upgrade as will campus parking garages, which must remain lit 24/7/365.



Top: Rudder Tower is one of 24 Texas A&M buildings undergoing energy efficiency upgrades.

Bottom, from the left: Jeff Murray, Siemens; Jim Riley, Director Utilities & Energy Management, Texas A&M; Jacob Richardson, Siemens; Les Williams, Associate Director Utilities & Energy Management, Texas A&M

The Impact of Performance Contracting

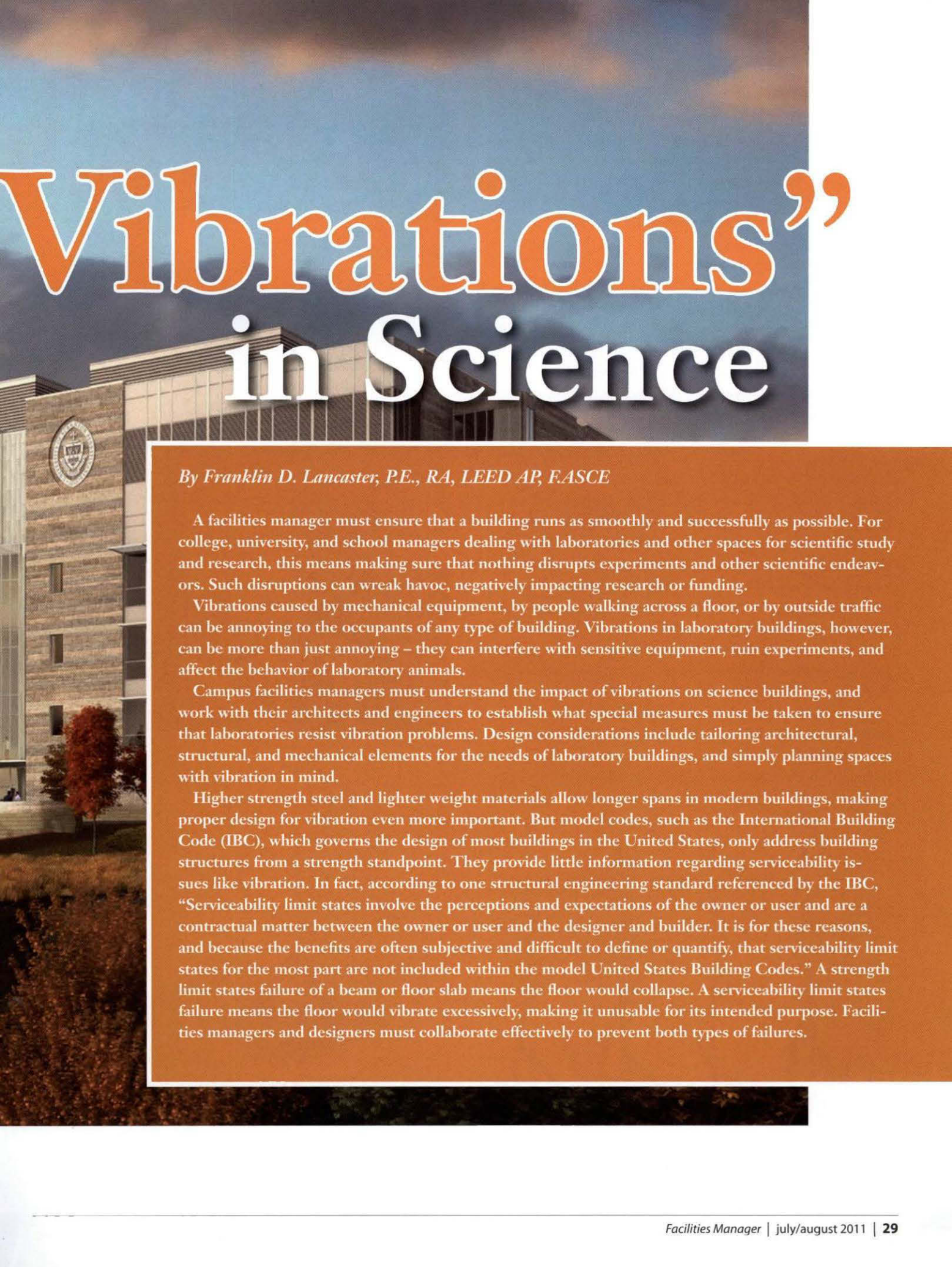
Once the project is completed in 2011, these building improvements are estimated to generate \$1.1 million in annual operations and utility savings. The university and Siemens are working closely with an independent third party assessor, selected by SECO, to ensure performance and savings goals are met. The end result is a more efficient, sustainable campus benefitting the students, budget and the environment.

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No Such Thing as “Good





Vibrations” in Science

By Franklin D. Lancaster, P.E., RA, LEED AP, FASCE

A facilities manager must ensure that a building runs as smoothly and successfully as possible. For college, university, and school managers dealing with laboratories and other spaces for scientific study and research, this means making sure that nothing disrupts experiments and other scientific endeavors. Such disruptions can wreak havoc, negatively impacting research or funding.

Vibrations caused by mechanical equipment, by people walking across a floor, or by outside traffic can be annoying to the occupants of any type of building. Vibrations in laboratory buildings, however, can be more than just annoying – they can interfere with sensitive equipment, ruin experiments, and affect the behavior of laboratory animals.

Campus facilities managers must understand the impact of vibrations on science buildings, and work with their architects and engineers to establish what special measures must be taken to ensure that laboratories resist vibration problems. Design considerations include tailoring architectural, structural, and mechanical elements for the needs of laboratory buildings, and simply planning spaces with vibration in mind.

Higher strength steel and lighter weight materials allow longer spans in modern buildings, making proper design for vibration even more important. But model codes, such as the International Building Code (IBC), which governs the design of most buildings in the United States, only address building structures from a strength standpoint. They provide little information regarding serviceability issues like vibration. In fact, according to one structural engineering standard referenced by the IBC, “Serviceability limit states involve the perceptions and expectations of the owner or user and are a contractual matter between the owner or user and the designer and builder. It is for these reasons, and because the benefits are often subjective and difficult to define or quantify, that serviceability limit states for the most part are not included within the model United States Building Codes.” A strength limit states failure of a beam or floor slab means the floor would collapse. A serviceability limit states failure means the floor would vibrate excessively, making it unusable for its intended purpose. Facilities managers and designers must collaborate effectively to prevent both types of failures.

VIBRATION FACTORS

The three primary factors involved in assessing a vibration problem are the vibration source, transmission path, and the receiver. Vibration comes from a wide variety of sources, including mechanical equipment operating within the building; ground-borne vibrations from cars, trains, and subways; airborne noise from airplanes, speech, or music; and footfall traffic on supported floors. The transmission path represents all of the elements that vibrations must travel through, and may include soil supporting a building, the building foundations, columns, walls, and floor slabs. The receiver is what is ultimately affected by vibrations, and could consist of building occupants (human or animal) and instruments such as microscopes or sensitive scales. The key to mitigating vibration problems begins with understanding these factors, and knowing how to adjust design practices and construction methods for specific science building uses.

Sometimes, solving a vibration problem is as simple as increasing the distance between a vibration source and receiver. However, this is not always possible. For example, at the unified science center at the University of Scranton, a Jesuit university in Scranton, Pennsylvania, the available site placed the new building less than 100 feet from active railroad tracks. To assess the impact of the passing trains on the proposed building, consultants took vibration measurements at various places on site over a period of time. This testing helped the design team consider several mitigation factors, such as the effect of a mat foundation, use of a concrete structure for the second floor, and detailing sound-deadening exterior walls.

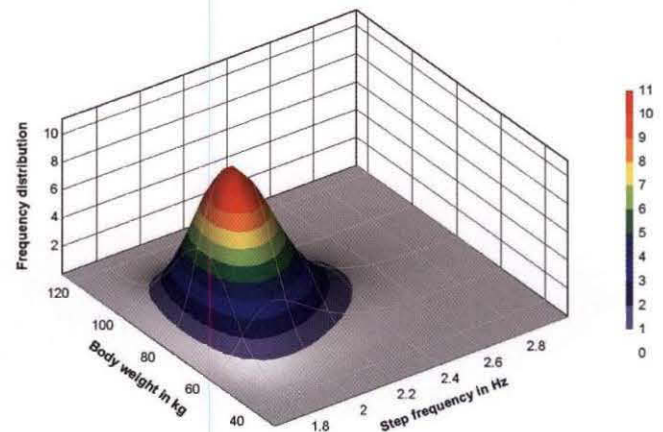
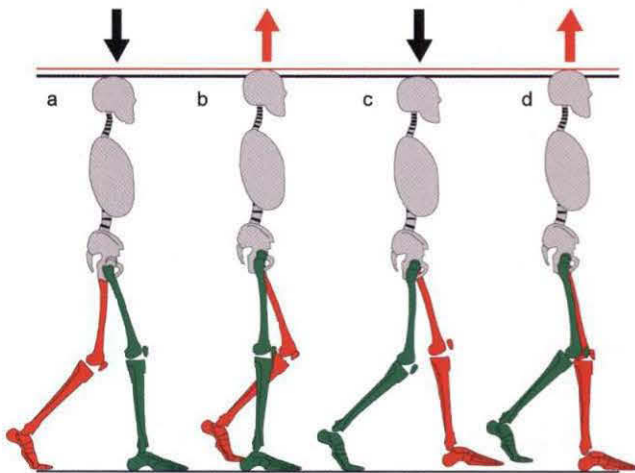
Although all sources of vibration must be considered, by far the most significant cause of problems in laboratory buildings stems from foot traffic. An early method of assessing the response of a floor to walking was the Heel



HEAVY FOUNDATION NEAR TRAIN TRACKS, UNIVERSITY OF SCRANTON



MICROSCOPE LAB, PHOTO CREDIT: MICHAEL MORAN





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MECHANICAL EQUIPMENT PENTHOUSE, THE COLLEGE OF NEW JERSEY; PHOTO CREDIT: MATT WARGO

Drop Test. In this test, a person stands in the middle of a room, rises up on his toes, and drops his weight through his heels to the floor. The floor response can be felt and classified on a scale from “not perceptible” through “distinctly perceptible.” More current study stems from the European Commission Joint Research Centre’s “Design of Floor Structures for Human Induced Vibrations,” which presents a more refined probabilistic method considering body weight and step frequency. Such publications illustrate that a great deal of research has been conducted around the world to deal with designing floors to support a walking person.

FLOOR VIBRATION

In 1828, English engineer Thomas Tredgold wrote, “Girders for long bearings should always be made as deep as they can be got; an inch or two taken from the height of a room is of little consequence compared with a ceiling disfigured with cracks, besides the inconvenience of not being able to move on the floor without shaking every thing in the room.” In general, the same principles apply today.

Many laboratory buildings consist of steel frame construction with floors of steel beams supporting concrete slabs on

metal deck. Floor beams in such an assembly vibrate at a natural frequency when an impact force is applied. This frequency depends upon the beam span, spacing between beams, and depth – properties that affect the stiffness of the beams. Methods to calculate the frequency of floor framing systems are presented in publications such as the American Institute of Steel Construction (AISC) Steel Design Guide 11, “Floor Vibrations Due to Human Activity,” and can serve as a starting point when discussing target floor vibration criteria.

Vibration perceived by building occupants is mitigated by damping, which acts to reduce the energy in a vibrating system. Damping in floor systems is provided by the self-weight of the floor as well as superimposed loads such as partitions and millwork. Understanding the concepts of stiffness and damping allows designers to incorporate low-cost vibration mitigation elements into the building during the early planning phase.

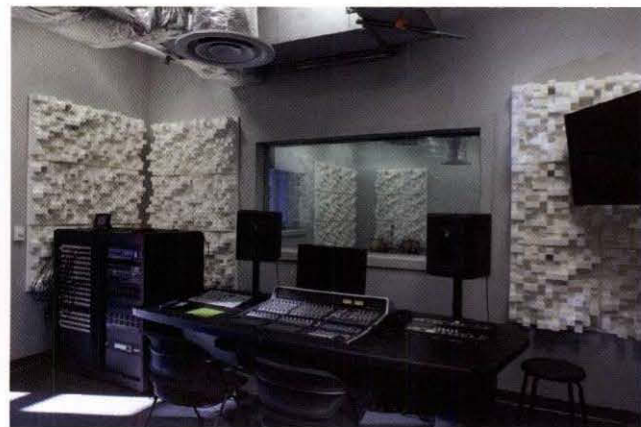
LAYOUT AND PLANNING

Corridors:

The simple act of walking can produce troublesome vibrations within a bay of floor framing. In a typical building with a central corridor and rooms on both sides, it is structurally efficient to place columns along only one side of the corridor. This results in a long span from the corridor line of columns to the farthest exterior wall. The long span supports both the rooms and the corridor, and vibrations caused by footfall traffic in the corridor directly transmit into the rooms sharing the corridor support beams.

In order to mitigate this problem, place columns along both sides of the corridor. Although this requires additional columns and foundations, isolating corridor traffic with separate framing prevents vibrations from propagating into adjacent spaces. Furthermore, the shallower members that span the short corridor provide extra depth for utilities that compete for limited space above corridor ceilings.

Another consideration for corridor design is the speed at which people walk. A fast-walking person generates vibration velocities 15 times greater than that of a person walking slowly. Therefore, try to arrange corridors in ways that discourage fast walking, such as making them shorter or interrupting them with turns. If this is not feasible, incorporate visual breaks in floor patterns and lighting, and emphasize aesthetically pleasing interior design in corridors. People tend not to rush through pleasant spaces as fast as they would through unpleasant ones, which calms traffic.



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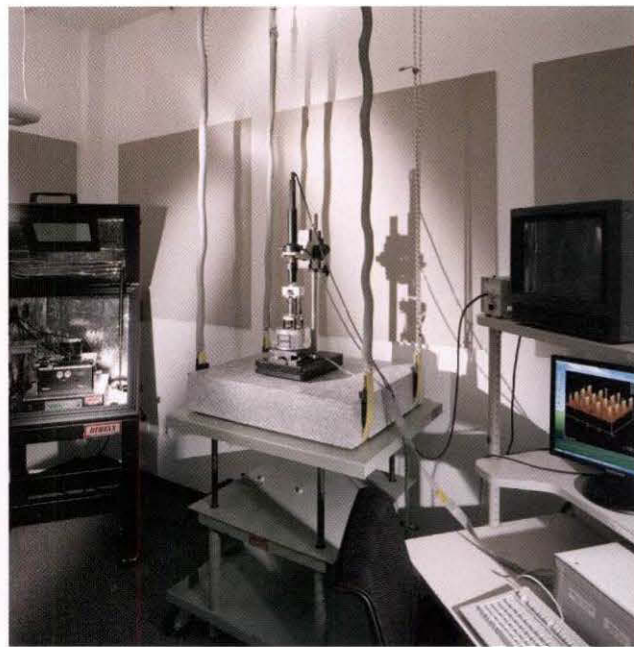
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Span:

Bay size plays a critical factor in the vibration characteristics of a floor system. Since the stiffness of a beam varies as its length raised to the third power, shortening the span is an effective way to improve its vibration behavior. Even though we have the technology to span long distances with high-strength members, laboratory buildings benefit from closer column spacing.

Note that not all spans in a building must be short. Designating sensitive equipment zones can provide vibration-safe areas that maintain a certain amount of flexibility for moving equipment within the zones, without penalizing the entire structure with closer column spacing everywhere. Similarly, not all floor framing systems must satisfy the most stringent equipment requirements. Criteria is available that categorizes sensitivity to vibration based upon type of equipment, such as magnification power of microscopes, and can help the structural engineer finetune spaces for known uses.



INERTIA BASE SUSPENDED WITH ELASTIC STRAPS

Mass:

The mass of floor slabs affects the vibration characteristics of a space. High-rise office building floors often consist of lightweight concrete supported by metal deck and steel framing. Lightweight concrete is made with stone expanded in a kiln, and weighs only 115 pounds per cubic foot (pcf). By comparison, normal-weight concrete weighs 150 pcf. Using lightweight concrete allows the use of lighter beams, and can reduce the size of foundations. However, laboratory buildings benefit from the enhanced damping effect provided by normal-weight concrete; and the thicker the slab, the better vibration properties of the floor system.

The College of New Jersey Art and Interactive Multimedia Building, Ewing, New Jersey, provides an example of successful

manipulation of slab thicknesses to achieve vibration performance goals. After mapping the locations of noisy mechanical equipment above quiet spaces, varying slab thicknesses were used to provide appropriate acoustical separation.

Layout:

A footfall impact at a beam's midspan produces greater vibration than the same impact near a column. Furthermore, vibrations dissipate as they cross column lines, walls, and framing. Consequently, sensitive equipment placed close to columns and far away from corridors will perform better than equipment placed near bay centers and close to sources of excitation. From an overall planning perspective, hold early discussions to identify critical equipment or functions, and decide their appropriate locations within the building. For example, particularly sensitive equipment should occupy isolated slab-on-grade space rather than an elevated slab level.

Floor Isolation:

One method of isolating a portion of a floor is constructing a room within a room. A secondary slab floating on neoprene pads above the base structural slab provides effective isolation of discrete areas. Combined with properly detailed walls and an independent ceiling structure, this type of construction creates a well-protected shell. However, the base structural slab must still meet basic deflection limits, and the frequencies of the intended isolation must be determined. This type of construction typically involves an acoustical consultant.

Mechanical Equipment Isolation:

Modern installations of mechanical equipment include vibration isolators, flexible couplings, and resilient hangers designed to prevent transmission of equipment vibration into the structure. These are typically designed by the equipment manufacturer, and not the project engineer. However, those reviewing these elements during construction should be able to recognize improperly installed or overloaded isolators. Spring isolators should not be fully compressed, elements on either side of flexible couplings should be independently supported, and rigid connectors should not bridge between isolated elements.

Sensitive Equipment Isolation:

Some laboratory equipment comes with its own isolation system designed to prevent transmission of structure-borne vibrations into the equipment. Many of these systems include some type of inertia damper, and the structure must be designed for the additional weight.

Commissioning:

More and more building owners realize the many benefits of commissioning, particularly with the demand for achiev-




SPRING ISOLATOR SHORT CIRCUIT

ing LEED™ certification. The intent of commissioning is to verify and ensure that fundamental building elements and systems are designed, installed, and calibrated to operate as intended. Discovering improperly installed or short-circuited isolation devices during the commissioning process can avoid complaints from users and potential equipment damage. In one instance, a check of a spring-isolated equipment pad revealed

that concrete was accidentally placed between the pad and the supporting floor slab, rendering the springs useless. If not corrected, vibrations from the motor mounted on the pad would have been directly transmitted into the structure.

CONCLUSION

Vibrations in undergraduate science buildings deserve serious attention from the building owner and design team. This article points out many mitigation measures, such as properly locating vibration-sensitive equipment away from sources of excitation, adjusting column spacing and floor slab thicknesses, and isolating mechanical equipment.

However, the most critical factor to ensure the design of a building that successfully addresses vibration issues is a strong relationship among the facilities manager, architect, and engineers, where everyone understands vibration concepts, building uses, and performance goals. 

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Management Span of Control

Matt Adams, P.E.

For some topics in organizational design, there are no hard-and-fast rules. Nevertheless, the topic can still be of considerable importance. Span of control is one of those topics. As always, cost reduction is paramount in the facilities industry, and expanding spans of control offer—at least on paper—a potential reduction in cost. The actual organizational dynamic of span and its impact on the effectiveness of an organization, department, or service unit is equally important. Most of our peers have proven that the old, dated, organizational principles of facilities management have become less effective, and we must consider any and all new best practices. Given that within our peer group there are from one to five levels of management, the span of control parameter is a key variable. In fact, it is per se an indicator of sorts. That is to say that an effective and wide span of control is an indicator that other systems, organizational designs, processes, and training are in place that are also working.

Within our industry the dated general heuristic used to design span of control is a manager to subordinate ratio of from 1-5 up to 1-7. Quick research indicates that this heuristic predates much of the technological and management theory revolutions of the last 50 years. In fact, this rule was developed when nearly everyone prescribed to the Theory X management style, although it was not called that until recently. Theory X and Theory Y represent two sets of assumptions about employee nature and behavior that are relevant to the practice of management. Theory X represents a negative view of employee nature that assumes individuals generally dislike work, are irresponsible, and require close supervision to do their jobs. Theory Y denotes a positive view of

employee nature and assumes individuals are generally industrious, creative, and able to assume responsibility and exercise reasonable self-control in their jobs. Clearly, an organization design based on the old Theory X mentality would vary greatly in its multiple occurrences of spans of control than one based on Theory Y.

DETERMINING THE SPAN OF CONTROL

In a typical facilities management department, there are a wide variety of professionals, trades, and clerical staff. The determination of span of control has a unique consideration for each, but all are based on modern best practices and the revolutions we have experienced. Generally, if workers are involved in work of a repetitive or routine nature, the supervisor will tend to require less application of control than if they perform work of greater significance or complexity.

In addition, spans may be limited by where people are located and by the problems of control and communication over distance. Also, a supervisor can exercise more effective control over a broader span in a stable situation than under dynamic conditions. Specifically, there was a study completed by A.T. Kearny in 1993 that concluded the following factors were most important in determining span of control.

1. The diversity and complexity of the work performed by the organization.
 - The more diverse and complex, the narrower the span of control.
2. The experience and quality level of the workforce
 - Experienced people, who were well selected and have been developed effectively, need less day-to-day supervision.
3. The extent to which coordination or

interdependence is important between employees and groups.

- The more important coordination/interdependence is, the narrower the span of control.
4. Amount of change taking place in the work environment.
 - A lot of change requires more attention to supervision and, therefore, narrower spans of control.
 5. The extent to which coordinating mechanisms exist and are effective.
 - Effective mechanisms allow for increases in span of control.
 6. Geographic dispersion.
 - The greater the geographic dispersion, the more time is needed to coordinate — thus requiring smaller spans of control.
 7. The extent to which job design and tools allow direct performance feedback to the employee.
 - The more direct feedback from tools, the less reliant the employee is on the supervisor — thus allowing for larger spans of control.

For the sake of this discussion, we can discuss the trades and the span of control associated with the shops. From the previous list there are clearly factors that can expand the span of control from the previous standard ratios. However, some of these are actually tests of our organizations to gauge our utilization of all best practice tools at our disposal. One of the most important is item V. Included in this factor are many of the possible tools we can or should incorporate into our organization. Some of those include: formal work planning/loading processes, standardized quality control and continuous improvement systems, computerized maintenance management systems, dynamic work control centers, and zone deployment strategies.

For most of us, there is still much to be improved upon in the latter examples. So if the current ratio of supervisors to trade staff is 1 to 6 what could (or should) it be once these measures are implemented? Clearly the span of control can be widened considerably. In fact, it is our ubiquitous goal to increase planned work—versus unplanned work—and planned work requires less supervision. If an organization has improved on this metric, it has room to expand the span of control, as an example.

These tools will allow trades staff to work far more independently than 50 years ago. There is a high likelihood that many of our peers are already utilizing many of these tools effectively without having made the change of expanding spans of control. There is every reason for the span to trend “wider” within our industry.


SPEED OF TRUST

With respect to item II from the A.T. Ke-

arny list, this is one area where our industry is still not progressing sufficiently. Still, using the trades staff example, many other maintenance industries (particularly in the private sector) benefit from significantly wider spans of control. This divergence starts from the beginning of the employment process in each industry. In other industries, trade staff are trained both technically and managerially to quickly become self-sufficient and operate independently. However, within our industry the opposite is true, and the negative—or the lack of “speed of trust” as Stephen M.R. Covey would say—costs the organization year after year.

Bringing all of this back full circle, one can ask how to make actual changes to the span of control ratios within the organization based on improvements achieved in the Kearny list (and other best practices). One simple method is to create two points of measure; best and worst. For worst, find the most narrow spans for

each department over the last 25 years of your organization. If you are more aggressive, start with the current ratio.

Next, identify a best-of-class peer—not necessarily specifically in the public sector—and use those ratios as a target. Array all available organizational improvements that fall into the Kearny factor list, and give them the simple empirical measurement for each: 3 = target, 2 = threshold, and 1 = unacceptable. Apply a score to each now, and total up the score for each department. Plot the gap of current score to the ideal score over a similar plot of the increasing span of control and start to work on it year after year. 

SOURCES

1. American Management Institute
2. A.T. Kearny

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



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With the campus restored, Tulane looked to renew and improve its facilities. Partnering with Johnson Controls, Tulane expanded and upgraded its central plant, and implemented energy management strategies across the campus. The result? Natural gas consumption has been reduced by 43 percent and carbon dioxide emissions decreased by 37 percent, annually. Better still, these upgrades are projected to save \$71 million over 12 years—guaranteed. At the same time, Tulane has an enhanced learning and working environment for students, faculty and staff.

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The Innovation Mindset

By Joe Whitefield

How much of your facilities management business could be described as innovative?

Innovative organizations are constantly engaged in a continuous improvement process that produces beneficial changes to their business practices. Innovation in the form of best practices can be found in work practices, accounting and billing services, customer service, communications, employee relations, etc. When I come across the innovative practices of others, I often want to adopt the same practices for my organization. More than the best practices themselves, the organizational mindset for innovation is what should be adopted.

In addition to leading to organizational improvements, an innovation-oriented environment engages employees in creative thinking activities that can open avenues of communication and foster teamwork and cooperation. The creative environment is more fun, less mundane, and just better than the alternative. So let's break it down a little.

Innovation occurs when an idea is discovered and essentially forged into an executable practice that effectively meets a need or provides a new opportunity for the organization. Innovative organizations typically display a strong commitment to some form of the innovative process. The innovative process has three key components:

SELF AWARENESS

Self awareness is a deep, realistic understanding of your present condition. This would include expectations of your organization, the capabilities (strengths and weaknesses) of your systems and people, the constraints that are present,

important history, and relevant cultural and political issues. It also encompasses an element of vision where you forecast where you could be or would like to be.

Self-awareness is often an overlooked component of innovation. This is important in that it requires organizations to identify their needs and their opportunities for improvement so they can, first, know what types of innovations to explore, and second, recognize a good idea/practice when they see one.

Keep in mind there are a lot of good ideas and best practices – still, one size does not fit all. It is incumbent upon the facilities manager to identify and incorporate those that are feasible and best for his or her organization. Self-awareness provides the template.

IDEA MINING

Most innovation begins with a really good or interesting idea. Ideas are the raw materials of innovation. They exist in abundance – especially with the technology of today. Idea mining is a *process* (as informal as it may be) of searching for ideas and identifying those that have the best application opportunities and chances for success.

Where should you look for ideas? The simple answer is practically everywhere. The chances of finding a good or great idea increase with the number of ideas reviewed. The trade-off is the need to quickly and efficiently sort and filter the ideas leaving only the best ones for consideration. This calls for broadening the search but narrowing the focus.

Look within our industry. Reviewing the best practices of other institutions similar to ours reveals instant ideas to improve our operations. The caution is that

C Completion
O Organization
I Innovation
N Being Nice

if we benchmark only those institutions most similar to ours we could miss out on some of the best ideas and innovative practices. Consider the other institutions that have a different profile than ours but perhaps have a more developed program in your area of interest. Also, look to institutions that have a similar (or deeper) motivation for the area of interest. An institution that has more at stake (deeper need) is more likely to have good ideas and well thought-out practices.

Look outside our industry. The different perspectives from other forms of business can yield surprising results for educational facilities. Hospitals, manufacturing, volunteer-oriented organizations, retail, hospitality--they all run operations and serve customers. Again organizational motivation and experiences lead to new thinking and innovation.

When do you look for ideas? The simple answer always and before is before it is too late. Need and opportunity are great motivators – desperation is not. Keeping your eyes and ears open continuously for ideas will allow you to recognize opportunities for improvement in incremental ways. Waiting too late paints an organization into a corner leading to reactionary decision making and too much reliance on breakthrough performance and super-accelerated results.

FORGING BEST PRACTICE

Ideas must be converted into an executable initiative, project, or practice. This process takes the raw idea, evaluates and builds a process or practice around it that allows it work effectively for the organization. This is the part that organizations often pay too little attention to. It is easy to adopt an entire best practice from another organization and implement it without adapting it to the constraints/requirements of the new environment. This is particularly true when benchmarking similar institutions within education. Differences in motivations, resources, personnel, culture, etc., can greatly impact the effectiveness of any initiative. Good ideas become poor practices when this occurs.


To combat this, ideas must be evaluated against the systems and cultures of the self-aware organization. To have a

AN INNOVATION-ORIENTED ENVIRONMENT ENGAGES EMPLOYEES IN CREATIVE THINKING ACTIVITIES THAT CAN OPEN AVENUES OF COMMUNICATION AND FOSTER TEAMWORK AND COOPERATION.

reasonable chance for success, practices must be developed around the ideas that specifically address need and align with the specific organization systems, structures, and ability to execute. One example is a financially strapped organizations desire to convert an innovative practice into a "poor man's" version yielding most of the benefits at a fraction of the cost.

In summary, innovation and best practices are essential for organizational adaptation and success. Innovation begins with a mindset whereby a self-aware organization actively

searches for and discovers ideas that can be converted into best practices. Facilities organizations have as many needs and opportunities as ever. Technology makes ideas more available than ever. These factors should combine to make for a great time of innovation.

Get engaged by reading, networking, reading, attending conferences (in person or online), and most of all—reading. 

Joe Whitefield is executive director of facilities services at Middle Tennessee State University, Murfreesboro, TN. He can be reached at jwhitefi@mtsu.edu.



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Data Integrity and APPA's 2010 FPI

By Ernest Hunter and Maggie Kinnaman

Every year, APPA's Facilities Performance Indicators (FPI) Survey and Report increases in the number of participants, and in the quality of data gathered. For FY2010 we continued our emphasis on the number of participants, but also implemented a significant enhancement that vastly improved quality and integrity of the data being collected.

In August 2010 a team of four started the process of creating a design that would support a data scrubbing team and end users throughout the survey cycle. The team included:

- Christina Hills, APPA FPI Administrator
- Maggie Kinnaman, APPA Fellow and Past APPA President
- Ernest Hunter, Hunter Consulting and Training
- Heather Lukes, Digital Wise, Inc.

Previously, all data scrubbing occurred after the survey cycle closed. At

that point, many participants had completed their survey and had moved onto other initiatives. This made it difficult to address data integrity concerns in January/February. Our data scrubbing team believed that the time to create a participant safety net – and to ensure data integrity was in the moment – was as participants completed a module, not after the entire survey was closed. We wanted to create a design that helped to ensure participants were completing their survey as part of a team, all focused on achieving maximum data integrity, and the most accurate picture of their campus reality.

Scrubbing team members each brought to the table their particular area of expertise. Ernest was focused on statistical analysis of the data, and automating the process of detecting data anomaly based on standard deviation triggers. Maggie was focused on survey participant interaction including mentoring new participants.

Heather was focused on creating the supporting technological platform and tools to support the design. And, Christina provided overall leadership for the project. The goal was to help participants by identifying data that fell outside of upper and lower trigger limits and then working with participant to either validate the correctness of the data, or helping them correct the data. The scrubbing team asked targeted questions to ensure that the participant understood both the definitions for the data points but also how to apply the definition to their institution. This scrubbing process was divided into three phases.

PHASE ONE

The first phase focused on actual data input module by module. The new data scrubbing survey design created a survey home page that enabled the participant to request a data review once they had completed a module. This review team

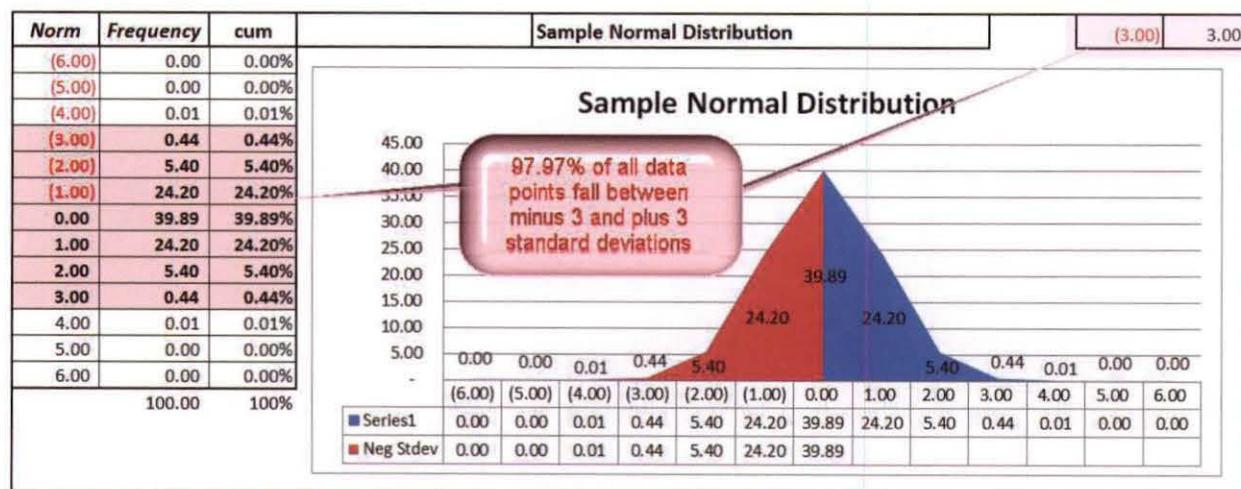


Figure 1 Normal Distribution

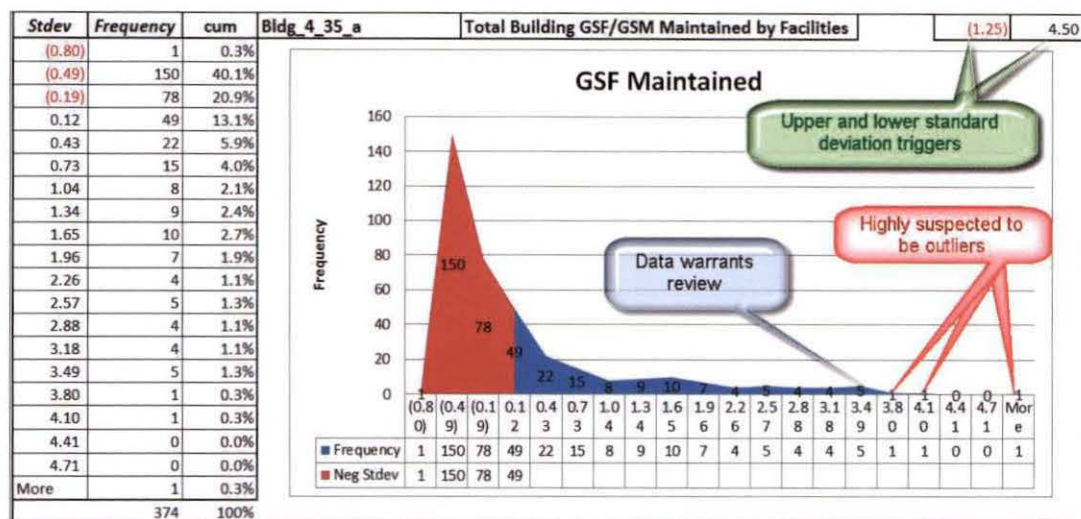


Figure 2 Data Distribution for GSF Maintained

ran two sets of statistics for every data point. They first looked at the data in relation to the prior year input and if there was a variance of more than 20 percent, the data point was flagged as a potential outlier. A second filter was also applied that looked at where the data fell in respect to our upper and lower standard deviation triggers. If no outliers were identified, the participant received a green light on their survey page. If outliers were identified, the home page showed a red light for that module, indicating that future communication would be needed.

Once an outlier was identified, institutions were contacted via e-mail, advised of the possible outlier, and asked to review their data. If the scrubber suspected possible misinterpretation of definitions, then that was pointed out in the e-mail. Participants were asked to change data where necessary and to let us know if they felt that, even after their review, the data point was valid. In most cases data issues were resolved by e-mail.

However, Maggie also spent many hours on the phone with participants resolving data integrity issues and providing one-on-one survey training. Once communication from the end user was completed, the data point was either released as a valid point, or con-

tinued to be flagged as a data point or possible outlier. Once all data points for an institution were resolved, the radio button on the institution's survey home page changed from red to green. With

As an example, a data point such as *Annual Facilities Operating Expenditure* and *Gross Institutional Expenditures*, could fall within normal limits as a stand-alone data points, but once used

388 participants in the 2009-2010 survey, over 10,000 data points were scrubbed using this approach.

PHASE TWO

The second phase of data scrubbing occurred once the survey closed in December 2010. As most of our members are aware, the FPI program takes data input and produces reports of the actual data, as well as using that data to create ratios and measures. These ratios and measures were the focus of phase two data scrubbing.

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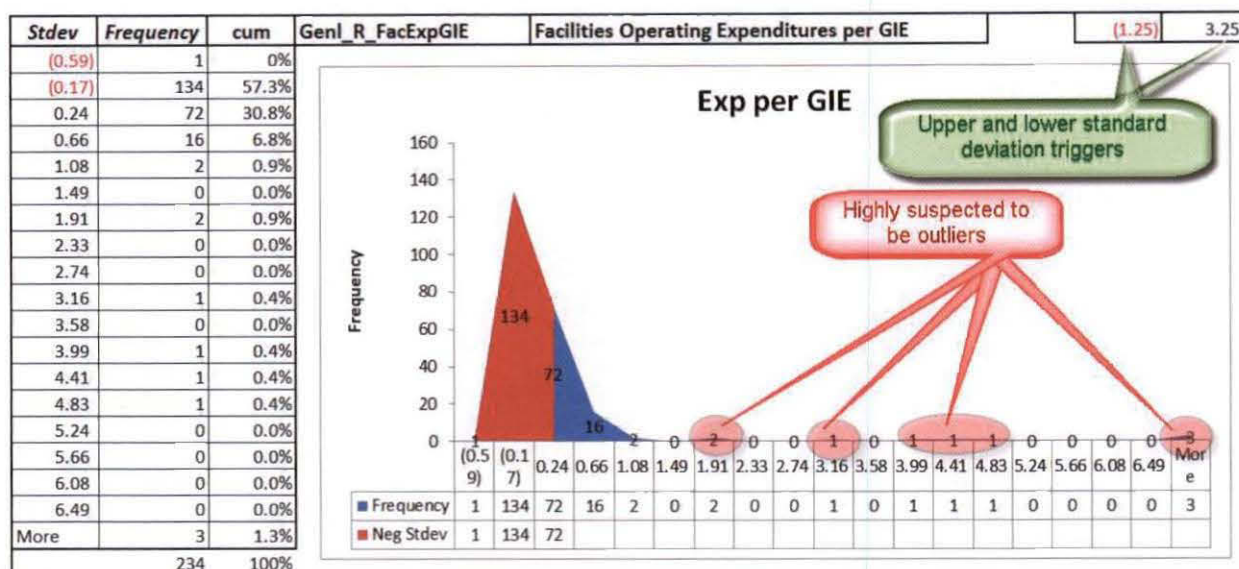


Figure 3 Data Distribution for GIE Index

in a ratio like the GIE index (*Annual Facilities Operating Expenditure* divided by *Gross Institutional Expenditures*), the GIE index might be well outside of our upper and lower standard deviation triggers.

The team developed tools to automate detection of ratios and measures that fell outside of our standard deviation triggers, and focused on them during the second phase. End users were again contacted about the potential outliers and asked to review their data and to let the data scrubber know if a data point used in an outlying ratio required a

change. Often it was necessary to set up a telephone call to resolve the issue as one of two numbers could be the culprit in causing the ratio to be identified as an outlier. At this stage of the data scrubbing process, the participant could not change data themselves, but had to communicate clearly to the data scrubber so that they could make the appropriate changes to the data input.

The new survey design allowed participants to view their survey data and also the reports that were being generated. This helped to facilitate communication with the data scrubber and also helped to achieve a better understanding of how their data input would be used in the published report. In phase two, over 3,000 outlier ratios were resolved ending the cycle, with only five suspect ratios remaining redlined in the published report. This redlined data, although shown in the report, was not utilized in creating any of the overall averages.

In the second phase it was important for the data scrubbing team to understand the natural data distribution profile for the FPI data. They began their pursuit of this understanding by a review of Statistics101, which teaches that the normal distribution is considered the most prominent probability distribution in statistics for sets of data. As can be seen in Figure 1, 97.97 percent of all data points

fall between -3 and +3 standard deviations for a normal distribution.

While the data scrubbing team realized that the FPI data is not a random data set, and that it would not come close to approaching a normal distribution profile, distribution profile analysis with visual presentation such as Figure 2 and Figure 3 would serve as a good tool for systematically identifying potential data outliers.

It turns out that the data distribution for GSF Maintained as shown in Figure 2 is fairly typical for many of the FPI data elements and ratios and measures. Figure 2 is an example of how the scrubbing team reviewed 60 of the most prominent data fields and ratios and measures, and thus easily identified three highly suspected data entries and five data points that warranted review. The participants were contacted and the concerns resolved. With this picture of the distribution profile, the scrubbing team was able to set the upper and lower standard deviation triggers to help them identify other potential data outliers.

Lastly, in further explanation of the second phase and the use of data distribution profile analysis, Figure 3 illustrates the use of data distribution profile analysis to identify ratio and measure outliers – even in instances where the individual stand-alone data fields that make up the ratio and measures were in expected

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ranges. As can be seen from Figure 3, the scrubbing team identified nine potential outliers. For some of these potential outliers one or both of their companion raw data fields (*Annual Facilities Operating Expenditure* and *Gross Institutional Expenditures*) were also out of range, but for some others, the raw data fields were perfectly in an acceptable range, but mismatched to each other causing the ratio to become an outlier.

PHASE THREE


Finally, phase three of the data scrubbing occurred during the Beta report review period. This phase continued to resolve outlying ratios but also focused on ensuring that data collected in one module of the report was consistent with data collected in other modules. During this phase of scrubbing, hundreds of inconsistencies between modules were resolved, and participants were better educated about the survey and

how each data point is an integral piece in telling an important story.

Feedback from survey participants regarding the data scrubbing initiative was overall very favorable. They indicated that it was comforting to know that someone, other than them, was looking at the data and asking questions to help ascertain the accuracy of the information. Additionally they seemed to appreciate the ongoing nature of the review as they completed each section. They truly felt that they had a partner in helping to ensure that their data was the most accurate representation of their campus facilities realities.

Reflecting on the data scrubbing process for the 2009-2010 FPI survey, the data scrubbing team can safely say that the newly designed process was effective in enhancing the quality of our data. The new process created an environment of enhanced communication and teamwork with our participants. It also resulted in a better

understanding of how future survey design enhancements can reduce the number of data integrity issues.

With new automated statistical data integrity tools now in place, next year's data scrubbing team will be able to further improve data integrity and carve out additional time to better assist our first time FPI participants. Lastly, APPA and the data scrubbing team is well positioned for the future to help the facilities management profession better understand the FPI survey, and how to use the survey report to educate a campus community about their facilities realities. 

Ernest Hunter is president of Hunter Consulting and Training in Austin, TX. He can be reached at ernesthunter@gmail.com. Maggie Kinnaman is past APPA President and can be reached at maggiekinnaman@comcast.net.



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The ASHRAE 90.1 Version 2010 Energy Code, and Beyond

By David L. Handwork

Facilities managers should all take notice of deliberate movement regarding the ASHRAE 90.1 energy code. In January of 2011, the 2010 version was published with minor publicity outside of ASHRAE and the Department of Energy (DOE). The most notable accomplishment of the latest publication is achieving approximately 27 percent more code

prescribed energy efficiency relative to the 2004 version, as per DOE software modeling data.

Based on my experience, an average U.S. building energy use index (EUI, in thousands of British Thermal Units per gross square foot per year) constructed under 90.1-2004 would be around 90 kBtu/GSF/yr, according to best available survey results. Applying the

90.1-2010 version modeled energy savings, the average building EUI should result around 66 kBtu/GSF/yr. In raw cost, based upon national average utility rates, this energy savings returns an annual operational cost reduction of \$0.39 per square foot, or \$39,000 per 100,000 square feet.

Presenting all of these figures should not be overwhelming. The bottom line, 90.1 is advancing in energy efficiency stringency. That should be great news for facilities managers, right? But, that depends upon the U.S. location, which results in variability in construction and utility cost. There is no easily obtainable data that provides the average construction cost differential between the 2004 and 2010 energy code versions. Anecdotally, a range of \$2 to \$10 per square foot has been presented in various forums. ASHRAE's own policy is to propose 90.1 enhancements that provide a reasonable return on investment, or ROI (generally three years simple return).

Considering the lower end of the cost differential at \$2 per square foot, the simple ROI is 5.1 years. For institutions with lower than national average utility cost and equal to higher than average construction cost, the simple ROI's can arguably exceed 10 to 15 years. With many education institutions programming buildings for 50+ years of useful life, a 15-year simple ROI may or may not be acceptable. The real issue is that the actual ROI's do not exist, and computer models may

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not be validated for several years when actual building stock is completed under the 2010 version. Most jurisdictions do not adopt the most current version until three to five years post release. Therefore, it could be eight years before a statistical pool is available to validate the current models and

assumptions. Although not likely, it is completely plausible real ROIs could approach or exceed 20 years.


Stating the original premise, facilities managers should take notice. Potentially faulty economics will have unwanted consequences. The perceived success of the 2010 version energy reduction goal 'raised the bar' for the 90.1 committee. When establishing the work plan for the 2013 version, limited discussion resulted in an aggressive goal of 50 percent more code prescribed energy efficiency, again relative to the 2004 version. If achieved, this proposed reduction will place an average building in the current category of high performance building, which is generally considered with EUI less than 45 kBtu/GSF/yr.

The primary concern is affordability for building owners. Even for progressive institutions with strong commitment to sustainable construction standards and best practices, pressing demands on limited available capital funding could create compromises in order to meet energy codes. The most expedient compromise is reduced building square footage that may not meet functional and operational expectations. Can institutions truly afford more complex, higher construction-cost buildings?

Another 90.1 point for facilities managers to take note of is the potential scope change for the code. The APPA Code Advocacy Task Force prior

**THE NEW TITLE
PURPOSE AND SCOPE
OF STANDARD 100
APPLIES EXPLICITLY
TO ENERGY EFFICIENT
MAINTENANCE
AND OPERATIONS
OF ANY EXISTING
BUILDING.**

reported successfully amending a proposed change to the 90.1 title purpose and scope that would have made the code applicable to operation of a building. Simply put, the change would have provided a local jurisdiction of authority the right to inspect compliance to the 90.1 code post occupancy. Even with this success, it is the view of the CATF movement of

the code into post-occupancy application has not ceded. ASHRAE Standard 100 is titled "Energy Efficiency in Existing Buildings." Standard 100 is currently undergoing a total rewording to code friendly language. The new title purpose and scope of Standard 100 applies explicitly to energy efficient maintenance and operations of any existing building. The standard alone does not raise any concern, as it contains sound best operational practices. However, the fact that approximately one-third of the Standard 100 committee members are current 90.1 committee members should raise a red flag. The significant requirement of Standard 100 is meeting or exceeding a prescribed EUI. The consequence of not achieving an EUI threshold for a particular building type will require investment grade energy audit to identify AND implement energy conservation measures. It is the concern of the CATF Standard 100 could be reference in 90.1, which make the standard de facto code. 

The CATF will actively inform the APPA membership if this concern becomes an ASHRAE proposal.

David Handwork is director of engineering services at Arkansas State University and a member of APPA's Code Advocacy Task Force. He can be reached at dhandwork@astate.edu.

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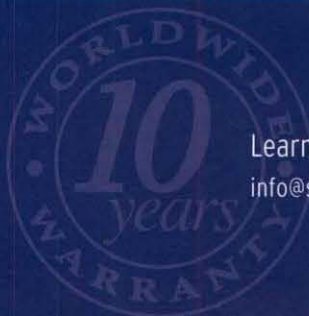
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Book Review Editor: Theodore J. Weidner, Ph.D., P.E., AIA

There are two books reviewed this time. While both are about management, they are very different; nuts and bolts vs. inspirational. You decide which is which.

—TW

PROJECT ADMINISTRATION FOR DESIGN-BUILD CONTRACTS: A PRIMER FOR OWNERS, ENGINEERS, AND CONTRACTORS

James E. Koch, et al., ASCE Press, Reston, VA, 2010, 279 pages, softcover, \$64.00.

Not many universities can use the design-build delivery method yet, but for those who can, it is a great tool. Other states and universities are realizing the power of the design-build method and are considering changes in laws or policies to use it. I recently read that the State of Ohio, which has a cumbersome system, is also considering design-build (DB). By the time this article is published, the Ohio schools may have a new tool to use.

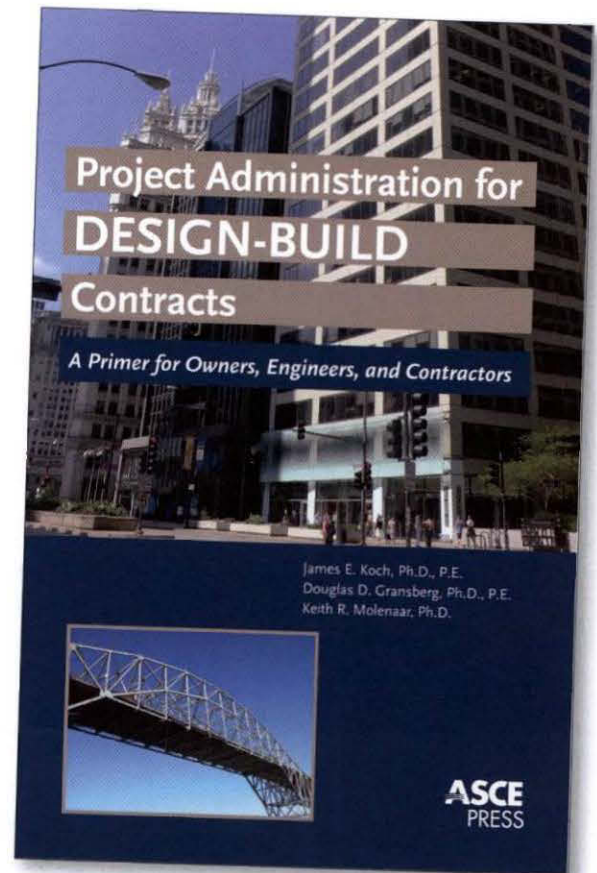
But what is this tool and where is the power? *Project Administration for Design-Build Contracts* is a dense discussion of the pros and cons of every step along the way. Because the authors go over the pre-award steps quickly but thoroughly; the reader doesn't have to have read the earlier publication, *Preparing for Design-Build Projects*. In addition, the authors do a good job of describing all elements of any construction delivery method, not just DB.

If you're unfamiliar with the DB method because you've been using the traditional method (Design-Bid-Build, or DBB), Design-Build is a way of selecting both the design and construction team as one, providing them with a detailed list of your needs, budget, and schedule, and then awarding them the

entire project, start to finish. The owner's involvement in the project is limited by their ability to understand the process and to develop milestones, check-points, and options early on. It's entirely possible to deliver a DB project without all the forethought and preparation, but that is true of DBB projects also. You get what you put into the project up front.

Details about how to manage the construction after the design is essentially complete, and how to keep the project on schedule — and within budget — are presented with clarity. While the DB method leaves a lot of decisions to the DB contractor, the owner's involvement is necessary to ensure a successful project. And in the case of public owners, the DB process helps the owner keep coordinated with the public. The book ends with several case studies of successful and unsuccessful applications of the DB method.

Project Administration for DB is dense. There's a lot to be said, and there's a lot one can learn about DB even if you've been using DB for years. I found it informative on non-DB delivery methods, too. Recognizing that the greatest ability to save costs on a project occur at the very beginning—before much design is done—the planning and organizational discussion presented in this book make it a worthy investment for any owner involved in significant capital construction.



THE THANK YOU ECONOMY

Gary Vaynerchuk, Harper Collins, New York, NY, 2011, 126 pages, hardcover, \$24.99; softcover \$14.99; Kindle, \$11.99.

We learn how to make customers happy every day, and what the consequences are if we don't. The trouble is, we don't understand the structure required in order to deliver the happiness frequently, and without consequence. I can't say that I know all the conditions either, but I do know several organizational steps I have taken, or encouraged in my organization to take, that have helped improve our ability to behave as Gary 'V' recommends.

If you haven't seen the *Daily Grape* on the Internet, you've missed a lot about what Gary is referring to. This Inter-

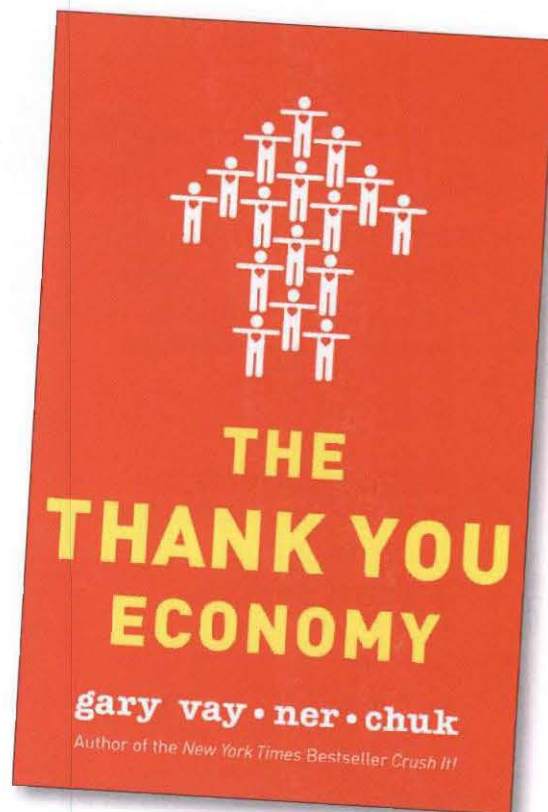
net celebrity is more than just a wine connoisseur; he's a savvy businessman who understands what keeps customers happy. He also understands the risks of new technologies and the potential rewards.

The Thank You Economy is loaded with examples, as you might expect. These examples focus on the immediate connectivity we're all experiencing with social networking: LinkedIn, Facebook, Twitter, etc. These systems are making inroads to business quickly — but is business taking advantage of them? No, because there is risk in doing something too new or using a technology that seems focused elsewhere. Of course, there are the risks because the numbers aren't right; the big competitors aren't using the new technology so there's no clear track record or payoff.


However, some businesses are, just look at *The Daily Grape*. That's what

Thank You is pushing: connections. Not just connections for connections sake, but meaningful communication and interrelationship between the company and the consumer. Twittering as a substitute for traditional ads is not what the thank you economy is about. Gary V provides numerous examples of failures, from his perspective, despite perceived successes by those stuck in the traditional economy.

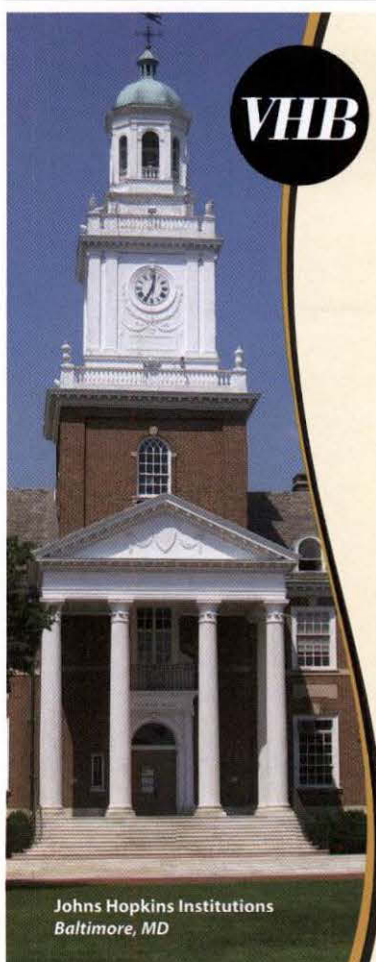
This forward looking book may not be for everyone. It introduces new perspectives and ways to deal with clients. These new ways are not trivial, and they do not rely on many traditional, passive solutions. They draw large and small corporations back to the traditional community store methods; helping the customer beyond the simple transaction.



The goal is to increase transactions through this increase personal attention. In higher education one can find this played out among the elite, high tuition colleges. But how does one institute this at a large campus? More importantly, how does one implement this in an internal service organization?

The Thank You Economy is not a silver bullet for facilities organizations but it is a new way of looking at how to interact with customers. As most businesses gradually move to the thank you economy we will be pushed, too. It's better to be ahead of the wave than consumed by it. Consider this book as an opportunity to get ahead. 

Ted Weidner is assistant vice chancellor of facilities management & planning at the University of Nebraska-Lincoln; he can be reached at tweedner2@unlnotes.unl.edu.



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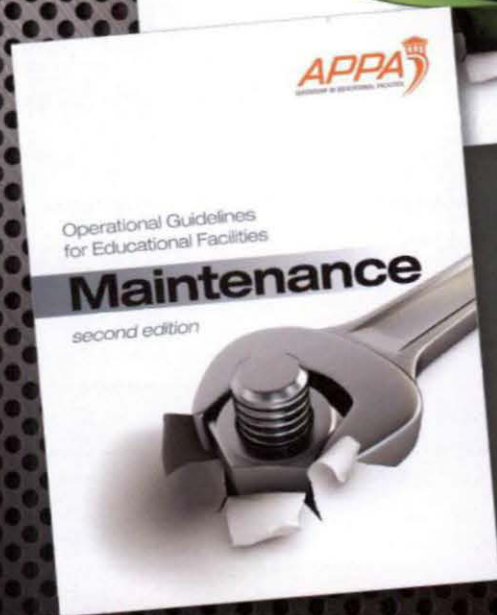
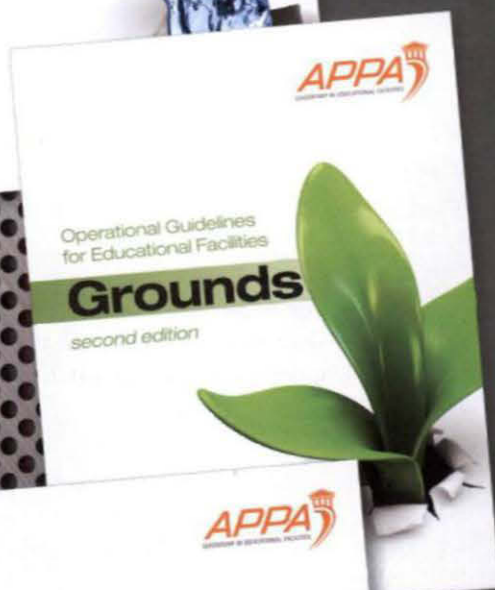
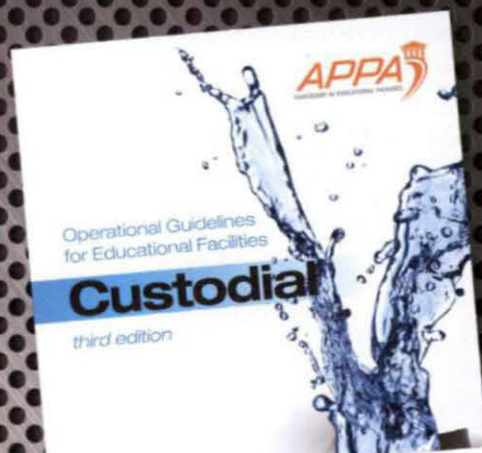
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Grounds:

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Maintenance:

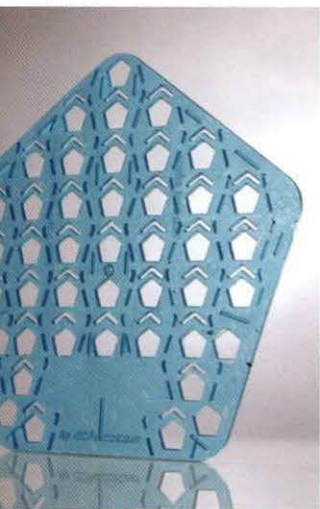
Newly updated guide for maintenance in facilities. Subjects include maintenance of buildings; levels of maintenance and benchmarking; case studies; compliance, safety and sustainability; zero-based staffing buildup; and much more.



Compiled by Gerry Van Treeck

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E.Coli, Klebsiella, and Staph on the surface of the urinal screen along with reducing offensive odor in the urinal. The ëkcono-screen is an ideal solution for facilities that are concerned with cost but still seeking a quality product. The screens are rated to last up to 30 days and are available in four translucent colors and a choice of four fragrances: purpleberry, spiced green apple, ice mint, and tropical fruit. For more information visit ëkcos innovations at www.ekcos.com.

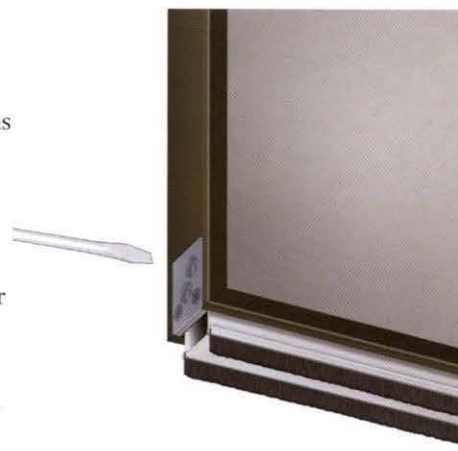


TRACO displays a new double hung window system that is ideal for historical applications. The new 4" aluminum architectural double-hung window system is ideal for applications with historical sightlines and replication requirements. The new double-hung window system has been life-cycle tested to the latest AAMA architectural standard and carries a designation of AW-PG50-H classification. The window system features 1" insulating glass and NEXGEN Warm Edge Energy Spacer™ system that is a non-metallic air spacer that provides high performance heat insulation. The TRACO TR-9800 offers spring load tilt latches for automatic jamb engagement, AAMA Class 5 heavy duty spring balances, stainless steel pivot bars, and meeting rail sweep locks. The window system carries a standard 10psf water performance with an optional 12psf, < 0.3cfm/sq.ft at 6.24psf air performance and 0.46 U-value with Soft Coat Low-E Argon Gas fill. Options include sill automatic locks, oriel sash, flange frame, finger pull rail, and



exterior and interior muntins. The architectural window system sash tilts in for easy cleaning and maintenance. For greater detail visit TRACO at www.traco.com.

Special-Lite, Inc. has added the new SL-301 Adjustable Bottom Brush to their selection of hardware options for their full line of monumental and flush doors—including their aluminum, FRP, and AMP models—to help reduce light and vermin infiltration under door bottoms and prevent air leaks that can compromise HVAC system efficiency and waste energy. The Special-Lite® Adjustable Bottom Brush compensates for floor condition irregularities in new construction such as out-of-level or out-of-position final floors to provide a good weather-tight fit at door bottoms. For existing doors, the Adjustable Bottom Brush can easily be retrofit into the door to address issues arising from normal settling of older buildings. For additional details visit Special-Lite, Inc. at www.special-lite.com.



Arbortech introduces a new Head Joint blades and Heritage blades offering more controlled cuts and exceptional precision for mortar removal on vertical joints and narrow mortar joints. The blades are available as aftermarket accessories for its AS170 Brick and Mortar saw. The new Head Joint Blades are ideal for cleaning out vertical mortar joints. While the use of conventional diamond blades can easily result in over-cutting and damage to the surrounding brick work, the Arbortech Head Joint blades clean out the complete joint without any damage to surrounding bricks. A shortened blade offers exceptional precision and is extremely easy to control, even when the user starts cuts in hard mortar. The cutting depth is 3 1/8-inch deep and the cutting width is 1/4-inch wide. For more information, visit Arbortech at www.arbortechusa.com.



EnergyCAP.

EnergyCAP releases its new fully online energy management software. The software, called EnergyCAP Express, enables small to mid-size organizations such as colleges, universities, and multi-site properties to perform energy and greenhouse gas analysis, auditing, tracking, benchmarking, and reporting, completely online. Thanks to convenient dashboards and embedded Help videos, users can get started quickly and easily without the need for in-house IT or engineering resources. Large organizations with more sophisticated energy information needs can use EnergyCAP Enterprise. A free trial of EnergyCAP Express is available at www.EnergyCAP.com.

Shark Pressure Washers introduces their most user-friendly gas-powered cold-water series to date; the new Aluminum Series. Du-

rable and easy to handle, these pressure washers are ideal for commercial facilities. Featuring an innovative frame shape, lightweight design, and ideal weight distribution that make them incredibly easy to push or pull, even through grass, gravel, and mud. Three models make up Shark's new Aluminum Series, ranging from 2.5 GPM at 2700 PSI to 3.8 GPM at 3500 PSI. For further information, visit Shark Pressure Washers at www.sharkpw.com.

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



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