

November/December 2002

VOLUME 18

NUMBER 6

# Facilities Manager

The official publication of APFA: The Association of Higher Education Facilities Officers

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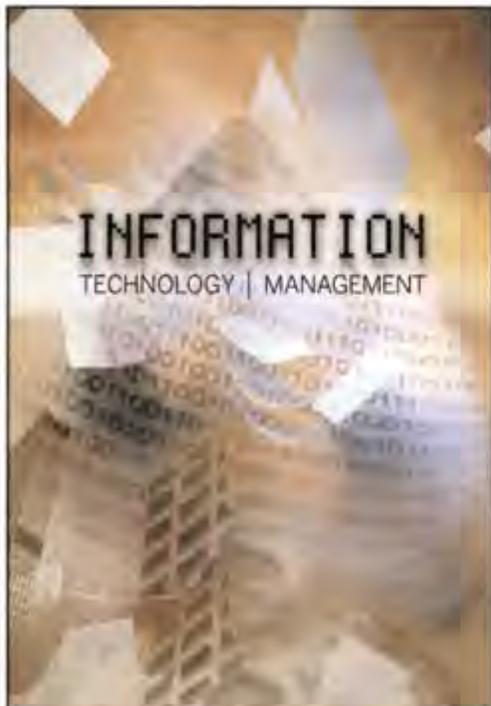


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# Facilities Manager

**PRESIDENT:** Philip L. Cox,  
Cornell University

**EXECUTIVE VICE PRESIDENT:**  
E. Lander Medlin, Alexandria, Virginia

**EDITOR:** Steve Glazner

**ASSOCIATE EDITOR:** Medea Ranck

**ASSISTANT EDITOR:** Betsy Colgan

**SUBSCRIPTIONS:** Cotrenia Aytch

**CREATIVE DIRECTION:**

Creative Media Group

**PRINTING:** Corporate Press, Inc.

**EDITORIAL OFFICE:**

703-684-1446 ext. 236

**FAX:** 703-549-2772

**E-MAIL:** [steve@appa.org](mailto:steve@appa.org)

[betsy@appa.org](mailto:betsy@appa.org)

[medea@appa.org](mailto:medea@appa.org)

[cotrenia@appa.org](mailto:cotrenia@appa.org)

**WEB:** [www.appa.org](http://www.appa.org)

**ADVERTISING:**

Gerry Van Treeck

Achieve Communications

3221 Prestwick Lane

Northbrook, Illinois 60062

Phone: 847-562-8633

Fax: 847-562-8634

E-mail: [gv@gvt@earthlink.net](mailto:gv@gvt@earthlink.net)

**Facilities Manager** (ISSN 0882-7249) is published six times a year (January, March, May, July, September, and November) Editorial contributions are welcome and should be sent to the address below.

Of APPA's annual membership dues, \$53 pays for the subscription to **Facilities Manager**. Additional annual subscriptions cost \$66 for APPA members, \$120 for non-members. For information on rates and deadlines for display advertising, telephone 847-562-8633 or 703-684-1446 ext. 238.

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**POSTMASTER:** Send address changes to Facilities Manager, 1643 Prince Street, Alexandria, VA 22314-2818.

**Published by APPA:  
The Association of Higher  
Education Facilities Officers  
1643 Prince Street  
Alexandria, VA 22314-2818**

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## From the Editor

by Steve Glazner

**Information is a** precious commodity. The current, constantly changing landscape has conditioned our presidents, colleagues, staffs, and customers to expect more information more quickly. We demand and expect it ourselves, both in our professional and personal lives.

We are able to check our personal accounts immediately online now, and many institutions have created websites that allow students, faculty, staff, and alumni to view new construction projects, to check on building closings for renovations, and to review the status of a work order. Some may think there is a danger in giving out too much information—that it can be used against the organization—but the reality is that when stakeholders are better informed, they become stronger collaborators and advocates.

Jerry NeSmith presents a working concept for an FM/IT organization, a facilities management department that is entrepreneurial and incorporates information technology into its very fabric. Richard Rush provides a state-of-the-art look at the classroom of the future, at least as it relates to the technological tools that are being developed and implemented in the learning environment.

Scott Charmack and Randy Walsh describe the successful introduction of hand-held devices to improve productivity and service effectiveness at California State University-Long Beach. You will also read Mike and Ann Ewald's article on some of the technical aspects and uses of modular wiring.

Sarah Banick has summarized in this issue the winning programs from

the 2002 Effective & Innovative Practices Award, APPA's newest awards and recognition program. There is still time to apply for the 2003 Effective & Innovative Practices Award, as well as the Award for Excellence in Facilities Management. The deadline for both award applications is January 31, 2003. You can read more about the awards and apply online at [www.appa.org/membership/awards](http://www.appa.org/membership/awards).

\* \* \*

After ten years with APPA as director of marketing and outreach, Medea Ranck has decided to leave the association following the birth of her second child. She will be greatly missed for her research and writing abilities, which enhanced and focused APPA's strategic planning initiatives over the years. We'll also miss her for her humor and perceptiveness.

During her decade with APPA, Medea edited and coordinated the production on such books as *Building Quality: TQM for Campus Facilities Managers*, *Perspectives on Leadership*, and the first edition of *The Building Commissioning Handbook*. She also served as associate editor of *Facilities Manager* and coordinated our successful advertising sales efforts for the magazine and the membership directory. Medea created and edited the *Inside APPA* e-mail newsletter, increasing our reach to members and keeping them better informed. She was the staff liaison to the Rocky Mountain region, and worked diligently with the Professional Affairs and Awards & Recognition committees.

It was a pleasure working with her, and we wish her well. 🙏

## In Memoriam

We recognize and honor the following APPA members who have recently passed away.

- **John Holman**  
Boise State University  
Member of the Maintenance Staffing Guidelines for Educational Facilities task force
- **Neal Morgenson**  
University of Nebraska, Omaha
- **Peter Welanetz**  
Williams College  
APPA President 1975  
Mentorious Service Award 1974

## Institute Registration

Registration opened November 1, 2002, for the next Institute for Facilities Management. The Institute will be held January 26-30, 2003, in Fort Worth, Texas. Register at [www.appa.org/education/institute](http://www.appa.org/education/institute).

## Congratulations to [www.appa.org](http://www.appa.org)!

APPA has been awarded the Standard of Excellence Web Award in the field of Education and Nonprofits in recognition of our website—[www.appa.org](http://www.appa.org).

The 2002 Web Award Competition awards are presented to websites that meet certain standards set within the

industry of educational and nonprofit businesses. APPA was among a pool of 1300 competitors.

Now in its sixth year, the Web Award Competition for website excellence is conducted by the Web Marketing Association, Inc., an independent volunteer organization founded with the purpose of evaluating, recognizing, and increasing the standard of excellence on the World Wide Web.

## Emory University Wins Brenner Award

In recognition of their work in promoting building commissioning, Emory University and the Facilities Management Team won the first Brenner Award ever presented in

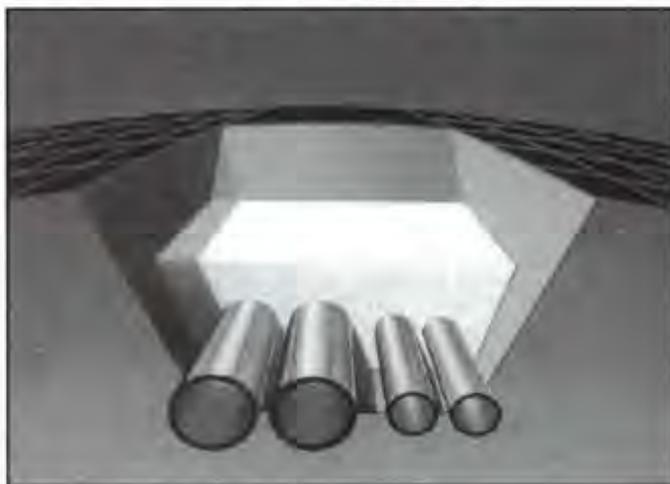
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the organization category. The award was given during the 10th National Conference on Building Commissioning held May 8-10, 2002, in Chicago.

The Brenner Award is given in memory and honor of Nancy Brenner who founded the National Conference on Building Commissioning. The award recognizes individuals, organizations, or firms for outstanding achievement in making building commissioning "business as usual."

Building commissioning became an integral part of the planning, design, and construction of buildings at Emory in 1996 when the president declared that all new construction on campus would be commissioned. Emory has completed commissioning on five major new buildings totaling approximately 645,000 square feet, with 53 more projects in the planning stages.

### Web-Based Software Used in Facilities Management

Assessing the condition of campus buildings will be a little different for facilities managers in Connecticut now that they can turn to a Web-based system. According to an article in *The Chronicle of Higher Education*, September 13, 2002 (pA35), Connecticut officials say that the new technology should help colleges and universities obtain better data for their capital budgets and should help them perform maintenance activities in an organized and prioritized manner.

"It's clearly a new way of doing business, especially for the facilities people—it's bringing them into the 21st century," says Thomas J. Mangiafico, associate director of finance and facilities analysis for the Connecticut Department of Education.

To use the system, engineers enter data on the age and condition of every



aspect of a building—from the foundation to the roof. The Web-based system will calculate the facility condition index for each building. Facilities managers can then use this data to set priorities for maintenance and/or renovation. Using this electronic database will allow a college or university to group similar types of repairs and renovations together for a substantial cost savings.

The investment in this Web-based software system will help colleges and universities collect data for their capital budgets and will help them set priorities for maintenance activities in the future.

### Consumer Updates

#### *Road to Safety, Recognizing the Dangers of 15-Passenger Vans*

This packet of information—an educational campaign for owners of 15-passenger vans—is designed to save lives. GuideOne has proactively shipped this comprehensive educational program to more than 13,000 policyholders who own 15-passenger vans in an attempt to enact state and national legislation to discontinue the use of these vehicles for passenger use. If you would like a packet, visit GuideOne's website at [www.guideone.com](http://www.guideone.com).

#### *Indoor Air Quality Building Education and Assessment Model (I-BEAM)*

Produced by the United States Environmental Protection Agency, I-BEAM is a high-tech software tool that can help you integrate indoor air quality (IAQ), energy efficiency, and building economics. I-BEAM gives you the power to assess the savings and costs that come from following good IAQ practices in your buildings. Preview portions of I-BEAM and download the I-BEAM software from EPA's indoor air quality website—[www.epa.gov/iaq](http://www.epa.gov/iaq) and click on I-BEAM. To obtain a CD-ROM copy, contact the IAQ INFO Clearing-

house at 800-438-4318 or via e-mail at [iaqinfo@aol.com](mailto:iaqinfo@aol.com).

### Books in Brief

*Physical and Biological Hazards of the Workplace*, second edition, Peter H. Wald and Gregg M. Stave. New Jersey: John Wiley & Sons, 2001. 704 pps, cloth.

This practical reference offers basic wwwinformation on the physical type or underlying biology of workplace hazards from an occupational health perspective. All recognized sources of physical hazards are discussed, including ergonomic hazards, dangers associated with shift work, extremes of temperature and atmospheric pressure, energy hazards, magnetic fields, microwave and RF exposure, and ionizing radiation.

*Human and Ecological Risk Assessment: Theory and Practice*, Dennis J. Paustenbach. New Jersey: John Wiley & Sons, 2002. 1556 pps, cloth.

Incorporating two dozen case studies of environmental or human health risk assessments, this resource serves as a complete how-to guide for individuals conducting or interpreting risk assessments. A valuable handbook with more than 4,000 references and citations, the text features numerous examples and problems that enable users to easily understand the methods demonstrated by the various authors.

*Hazardous Chemicals Desk Reference*, fifth edition, Richard J. Lewis Sr. New Jersey: John Wiley & Sons, 2002. 1728 pps, cloth.

This desk reference contains approximately 5,000 chemical entries. Each entry is included based on the importance of the chemical and its hazard potential. Offering a quick reference and summary of the hazards posed by key chemicals, this useful reference includes the safety profile, synonyms, and physical properties of each chemical, as well as government standards and recommendations. 📖

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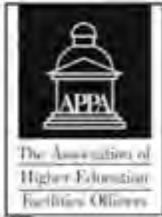


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# 2003 Nomination Form



## *Meritorious Service Award & Pacesetter Award*

APPA's volunteers shape and strengthen both the association and the profession through their contributions of time, energy, and ideas. Each year, APPA recognizes the contributions and achievements of a few of these talented and hardworking individuals through the APPA awards program. But identifying the most deserving from among a large group of active individuals requires input from those who know best: other APPA members like yourself. Help us ensure that APPA volunteers get the credit and appreciation they deserve: Nominate an outstanding APPA member for the Meritorious Service Award or the Pacesetter Award. Purpose and criteria for each award are described below.

To submit your nomination, complete the following nomination form and fax it to your regional Awards & Recognition committee member. The Committee will review jointly all nominations and select the recipients. Awards will be presented July 29, 2003, at APPA's Educational Facilities Leadership Forum in Nashville, Tennessee.

### *Meritorious Service Award*

Each year APPA members bestow the Meritorious Service Award upon the individual member or members who have made significant, life-long contributions to the profession of higher education facilities management. APPA's highest individual honor, the Meritorious Service Award is given to no more than three individuals each year. To be eligible for the Meritorious Service award, nominees must meet all of the following criteria:

1. Active member of APPA for a minimum of five years,
2. Attended and participated in meetings and other functions at the international level, and
3. Demonstrated continued and distinguished service to the association through one or more of the following:
  - Service as an officer of the Board
  - Chair or member of an official APPA education program, special project, or committee
  - Service to an associated professional organization whose principle purpose is related to the betterment of facilities management.

### *Pacesetter Award*

The Pacesetter Award is designed to encourage further participation in APPA among those who have already made significant contributions at their regions or chapters. Up to seven Pacesetter Awards will be given each year. To be eligible for the Pacesetter Award, nominees must meet the following criteria:

1. Active member of APPA for a minimum of three years.
2. Service/contributions/accomplishments to the association through one or more of the following:
  - At the international, regional, or chapter level.
  - As a member of an APPA committee, program, task force, etc.
  - Through participation in an APPA educational program or special APPA project.
  - Authorship of a publication, article, or chapter for APPA or presentation at an APPA annual meeting or educational program.
3. Other voluntary contributions of time, effort, resources, and leadership abilities to promote and enhance APPA and the educational facilities management profession.

# 2003 Nomination Form

Please complete the information below as thoroughly as possible and submit this form to your regional APPA Awards & Recognition Committee representative listed below. Use additional sheets as needed. Attach supporting documentation when available (e.g., letters of commendation, recommendation, newsclips, etc.) All nominations must be received by **January 31, 2003**, in order to be considered for the 2003 awards. This form may be copied for multiple award nominations.

I nominate the individual named below for the following award:

2003 Meritorious Service Award

2003 Pacesetter Award

Name of Nominee \_\_\_\_\_ No. of years in APPA: \_\_\_\_\_

Title \_\_\_\_\_

Name of Institution \_\_\_\_\_

List any positions and/or offices the nominee has held at the international, regional, or chapter level of APPA:

Office	Level (Int'l, Regional, Chapter)
_____	_____
_____	_____
_____	_____

List committee, task forces, or other special projects upon which candidate has served at the international, regional, or chapter level of APPA:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

List and describe other ways your candidate has served APPA (e.g., presenting at the annual meeting, writing for an APPA publication, teaching at the Institute):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What other facilities-related organizations has candidate served?

\_\_\_\_\_  
\_\_\_\_\_

Briefly state how this candidate has contributed to the growth and professionalization of the facilities management profession.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Submitted by \_\_\_\_\_

Institution \_\_\_\_\_

**FAX THIS FORM AND ANY SUPPORTING DOCUMENTATION BY JANUARY 31, 2003, TO YOUR REGIONAL A&R COMMITTEE MEMBER LISTED BELOW.**

**Eastern** ..... Kenneth L. Bollig, Millersville University  
Fax: 717-872-3087; Ph: 717-872-3644

**Southeastern** ..... Daryl Crider, University of Alabama/  
Birmingham  
Fax: 205-934-4990 Ph: 205-934-4427

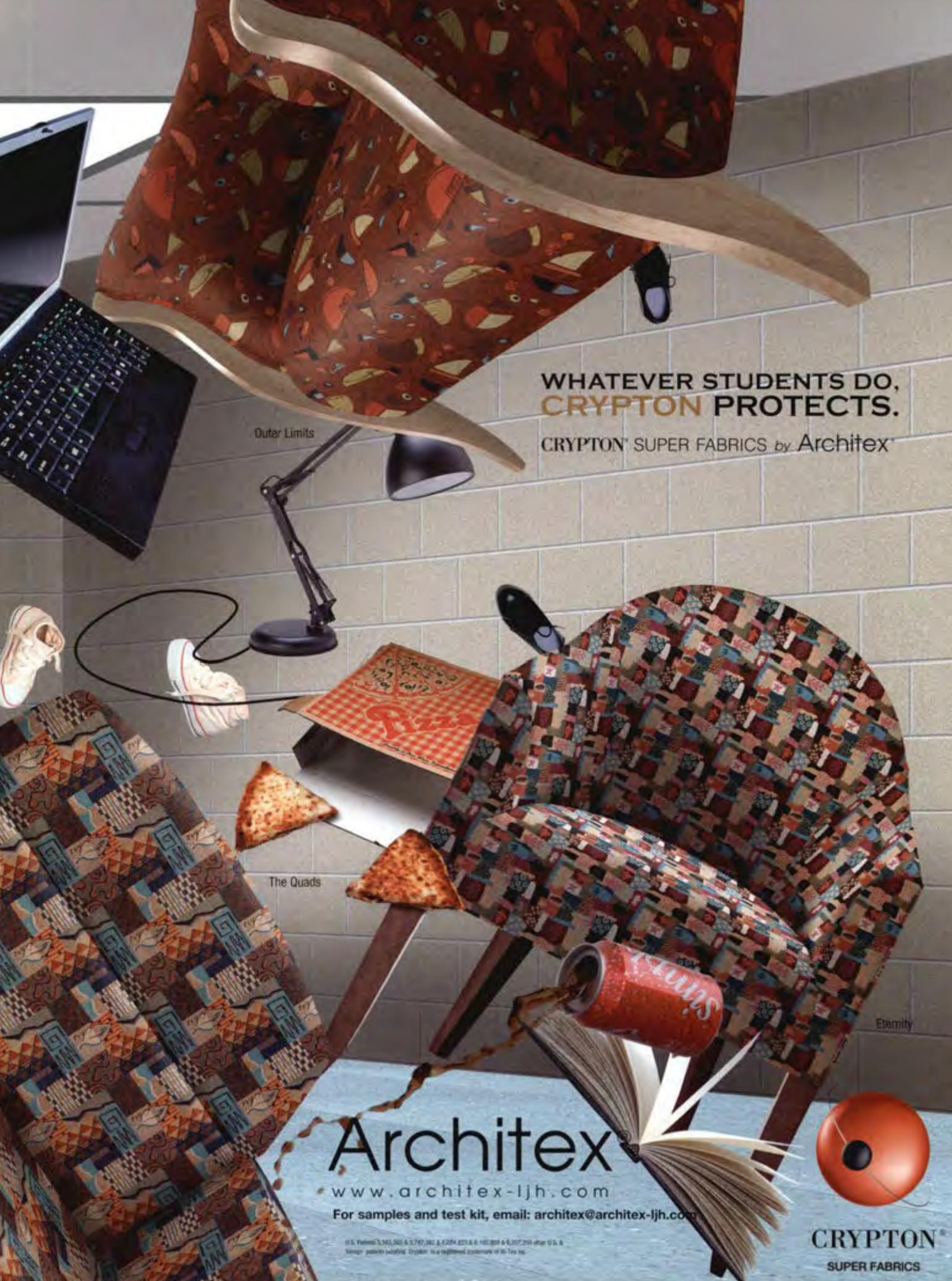
**Midwestern** ..... Alan S. Bigger, University of Notre Dame  
Fax: 219-631-6149 Ph: 219-631-5615

**Rocky Mountain** ..... Greg Wiens, Athabasca University  
Fax: 780-657-6455; Ph: 780-675-6648

**Central** ..... Darrel Meyer, Metropolitan Comm College  
Fax: 816-759-1333; Ph: 816-759-1061

**Pacific** ..... Tony Ielsan, Pomona College  
Fax: 909-612-8656; Ph: 909-621-8136

**Australasia** ..... Andrew Frowd, Queensland Univ of  
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## Who's on First? What's on Second?

by Agatha Armstrong and Ronald N. Smith

In a baseball game everyone can easily visualize the entire playing field. All the players know where the other players are located. The strengths and weaknesses of each player are known. The team has sent scouts out to see what the "other guys" are doing. The coaches know who is a better pitcher and who is a better hitter. It is all about teamwork, and the best part about teamwork is that you can clearly see the results of your efforts rather quickly.

In some ways, a facilities maintenance department is analogous to a baseball team. Facilities staff should be able to see the entire campus. They should know where on campus their employees are working. Individual facilities employees should have a working knowledge and experience in their trade and field. Facilities managers should be aware of the activities of facilities departments on other campuses. They should know what systems work best in their situation and the strengths and weaknesses of each employee. And perhaps the most



important aspect in emulating a baseball team is to instill the concept of teamwork in facilities employees.

Is there a way that a facilities maintenance team could be more like a baseball team? YES! In order to work as a team (whether baseball or facilities management), you need information, education, and access to resources.

### Scouting Reports

Wouldn't it be helpful to know about other "teams" that had the same problem with the same type of "play?" How did they decide to run that "play?" How did they recognize the need for that play and how did that play work for them? The APPA website and the chapter, state, and regional (Eastern, Southeastern, Midwest, Central, Rocky Mountain, Pacific Coast, and Australasia) websites provide information and ideas of how other facilities departments have handled a particular problem. Network with colleagues at APPA chapter, state, regional, and national meetings. Send out a question on the APPAinfo discussion list. The information you receive from these sources

will be some of the most helpful and informative you will find.

### Education and Resources

An excellent way to expand the training, education, and professionalism of your "team" is to take advantage of the programs, publications, books, surveys, and research provided by APPA and its regional associations and the various state chapters.

At the 2002 annual meeting of the Texas Association of Physical Plant Administrators (TAPPA) in Bandera, Texas, several presentations were given by professional microbiologists and industrial hygienists that addressed indoor air quality issues, molds and mildews, and how to recognize and treat them.

At meetings like this, hundreds of examples of sharing resources and information among facility maintenance personnel can be found. Meeting with your peers, telling your "baseball" stories, and listening to their stories are all ways to share and learn. The next time a specific event arises on your campus you will remember a conversation about that very issue at the last conference. Soon you will be exchanging e-mails and calls to members of another "team" and will be on your own road to a successful "play."

For instance, you may have questions such as the following. "It's been 20 years on that same roof—isn't it time for a new one? What are the new roof products on the market? What products perform well on flat roofs or in high winds? What is the best method of replacing a roof?" Check your regional website or the APPA website ([www.appa.org](http://www.appa.org)) for programs to help keep your team current with technology, new products, education, or training. Having this information

---

*Agatha Armstrong is the manager of administrative services, Texas A&M University-Corpus Christi, Corpus Christi, Texas. She is currently the president of TAPPA and can be reached at [aggie.armstrong@mail.tamucc.edu](mailto:aggie.armstrong@mail.tamucc.edu). Ron Smith is the director of physical plant, Texas A&M University-Corpus Christi, Corpus Christi, Texas and is currently the 2nd vice president of CAPP and can be reached at [ronsmith@falcon.tamucc.edu](mailto:ronsmith@falcon.tamucc.edu). This is their first article for Facilities Manager.*

can help make them the best team they can be.

### Competition

Like a baseball team competing with other teams, facilities departments are in competition with each other—for students. The difference is that facilities departments share playbooks, team secrets, plays, and cooperate with each other. However, there is one factor that is a significant hindrance for the “team.” Facilities departments do not actually “play” the other teams in the course of our daily work. Instead of playing a baseball game, facilities departments must demonstrate their teamwork and cooperation by becoming active members of their chapter, state, or regional associations of APPA.

### Trades and Free Agency—Organizing Your Team

How is your facilities department organized? Perhaps you will need to

Like a baseball team competing with other teams, facilities departments are in competition with each other—for students.

reorganize your department, increase your staff, or even add an additional department. It may help to know other facilities departments that have gone through these changes and how they handled them. Just as on a baseball team, you will need to provide statistics on your facilities department and on comparable facilities departments to justify the changes you may want to make. Turn to *Comparative Costs and Staffing Report* published by APPA every two years to ascertain this comprehensive information.

*Are you beginning to see anything in common yet?*

### Perfect Practice Makes Perfect

Yes, you have an excellent facilities team! Really, every institution does! It is very helpful to know that you are not the only one with problems, issues, maintenance nightmares, or complaints. It takes practice, continuing education and training, up-to-date code changes, and investing in new technologies to make a great team. Work with the APPA office or with your chapter, state, or regional association to set up training and/or educational sessions to keep your team players at a high skill level.

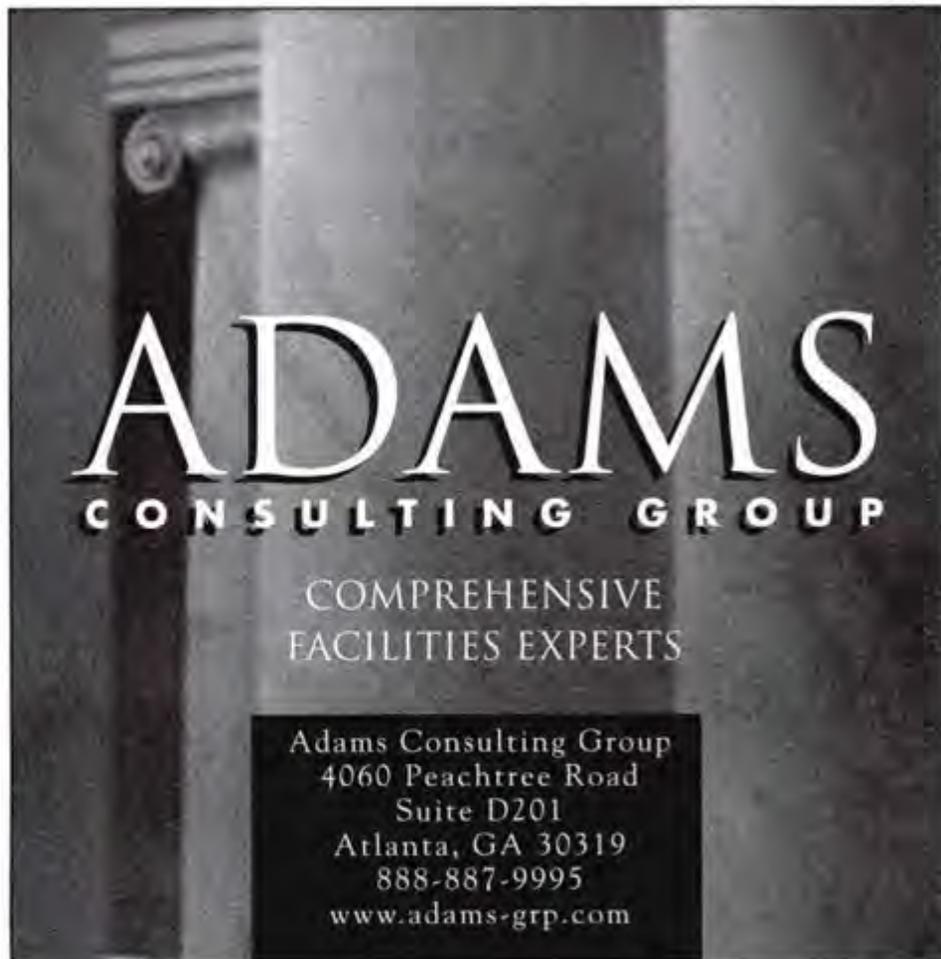
### Away Games

The Central Association of Physical Plant Administrators (CAPPA) is currently setting up a traveling seminar entitled “National Electric Code Update Seminar.” Sending a staff member from each institution to attend would probably not be in the budget of most facilities departments. By taking this seminar on the road to several institutions, it can be offered at a reduced cost. Take advantage of these types of seminars as they allow many team members to attend.

### Directors as Coaches and Mentors

APPA offers many educational and leadership programs for upper level management and administration. These include the APPA Educational Facilities Forum, the Professional Leadership Academy, and the Institute for Facilities Management. It is up to each facilities department to offer the training that is needed for their employees’ benefit. Directors of facilities departments should also be coaches and mentors for employees—guiding them through a career in facilities management along with increasing their skill knowledge.

The real value of a baseball team or a facilities management “team” is found within each individual member of the team. Only by building on the strengths and assets of all facility staff, does a facilities department become stronger. Now, “Play Ball!” 🏆



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## You are the Leadership of APPA!

by Gary L. Reynolds

Any APPA member who has volunteered knows that it is important for the vitality of the association that its members come forward to serve the organization. The ability of an association to remain vital and relevant is dependent upon a continuous convergence of diverse ideas, conviction, and action. It is *people volunteering* that bring the ideas

*Gary Reynolds is director of facilities services, The Colorado College, Colorado Springs, Colorado. He is the Immediate Past President of APPA and can be reached at greynolds@coloradocollege.edu.*

forward, and with conviction, make things happen. It cannot be emphasized enough that the need to continually refine APPA's product and services is vital to our association's future. And it is you and me that make this happen.

But growth and development of an association is not all one way. I can remember, over 20 years ago, when Bill Whitman, mentor and friend, asked me to make a presentation at the APPA annual meeting. This experience gave me the confidence to speak in front of large audiences. Later Bill supported me as a faculty member of the Institute for Facilities Management, then as the director of the Institute, and finally as Vice Presi-

dent for Education. In each case, my continued involvement in APPA, and Bill's support of that involvement, returned many dividends to both me personally and professionally and to the institution.

APPA has many opportunities available for members to become involved. There are many committee assignments, task forces, faculty positions, officer positions, etc., that need the diverse expertise and experience that you can bring. With the launching of the Center for Facilities Research (CFaR) in 2003, there will be many more opportunities to participate in research projects that will truly support the facilities management profession.

Early each year, committee assignments and nominations for office are made. It is an ideal time to either support someone in your organization or to volunteer for one of these positions yourself. As I noted last year, "Leadership is Personal." If you just sit back and wait for someone else to volunteer or to support a staff member, then you, your institution, and our association will be the lesser for it.

Do not think that you or members of your staff have nothing to contribute. Each of us has unique backgrounds and experiences that provide the diverse perspective needed to make our association truly relevant as a Global Partner in Learning. It is imperative that we nurture the vitality of our association through individual commitment and participation. This year consider making that personal commitment. I know you won't regret it! 🏠



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## The Right Stuff

by E. Lander Medlin

**D**o you have the "right stuff?" Does your organization have the "right stuff?"

Recently I had the opportunity to present an educational session titled "Teambuilding Transformed into Creative Collaboration" to a group of business officers. Throughout the research and preparation process, I learned a great deal about the necessary leadership skills and abilities required to build successful teams. Moreover, I found that the philosophies behind teambuilding apply to

*Lander Medlin is APPA's executive vice president. She can be reached at [lander@appa.org](mailto:lander@appa.org).*

everyone in the organization. I also discovered that it takes an enormous amount of time and talent, energy and focus, and skill and commitment to channel the "collective" energies, talents, and skills to transform teamwork for specific tasks or projects to true creative collaboration across the entire organization.

In order to transform teamwork into creative collaboration, you must possess, or more importantly develop, and instill the "right stuff" (ways of thinking about and dealing with people and their delivery of services) into yourself and your organization. With the world changing dramatically and at a phenomenally rapid pace, *now* is the right time to meet these chal-

lenges head on. This is especially true given the shifting focus of higher education from:

- teaching to learning
- faculty to student
- one-way to two-way communication
- passive to interactive
- producer to consumer
- monopoly to competition

The focus of higher education has also shifted because of the following:

- Our environment is no longer bound by time and place.
- We are a market-driven, growth industry.
- We are a business, with all its trials, trappings, and tribulations.

The critical driving forces APPA has identified as significantly impacting society, education, and the facilities profession have caused even a further shift. You will recall these driving forces to be:

- information technology
- resource scarcity
- societal needs (such as public scrutiny, performance accountability, diversity, and other social responsibilities)
- governmental intervention
- environmental deterioration

Russ Moxley spoke about this new environment, the changing needs of the organization, and the changing expectations of today's workforce in his book, *Leadership and Spirit*. "In the fast-paced, white-water world in which organizations now operate, those that are to succeed need employees who offer the best they have within them. The work of organizations must now be done with creativity and passion, with commitment and dedication. Doing this requires that we use all of our energies—mental, physical, emotional,

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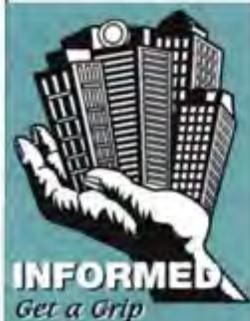
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and spiritual. Organizations need for us to offer our best selves, and we want to and we will, if the situation warrants it, if practices of leadership invite it."

Therefore, we cannot deal with these challenges individually. We must collectively band together and face them head on. This will require different skills, a different focus, a different approach; hence, "team-work transformed into creative collaboration."

The foundation for this collaboration is "right thinking" or first exercising choice of attitude. You must choose to embrace this staggering pace of change and reinvent yourself and your organization into a team for the future. The team should represent all members of your organization if you expect to achieve a better—more productive, more efficient, more effective—place to work. Believe it or not, life is a series of choices and, as such, you control your own destiny. As positional leaders in

the organization, your choices have influence over others. How will you choose to exercise that influence?

There is an old saying, "If you always do what you have always done, you will always get what you have always gotten" And, my favorite saying is the definition of organizational insanity, "Continue to do what you are doing, but expect different results."

Even though we have, in many instances over time, downsized, right-sized, maybe even undersized, and otherwise flattened our organizational structures, we have not eliminated top-down authoritarian structures and decision making. These structures do not align with the pace of change we face nor do these structures align with a more productive and motivating environment.

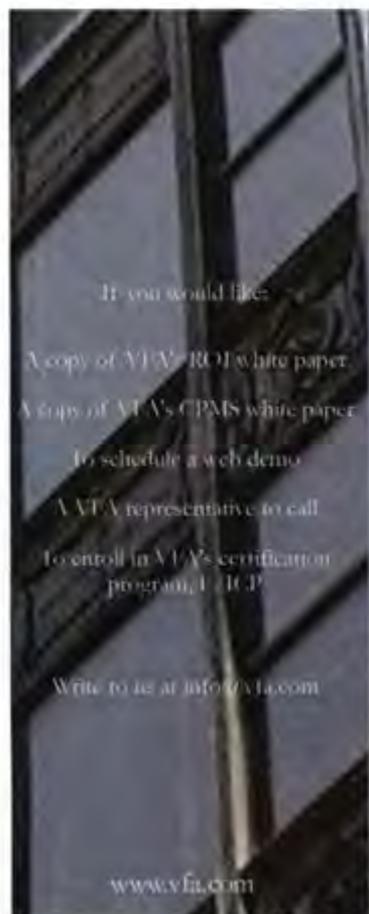
If we are going to be effective "change agents" (and that is a must in today's ever-changing environment), we must change our management philosophy, work behaviors, and

workplace structures. Ultimately, the leadership role then changes to that of coordinator, resource, coach, mentor, visionary, expert, and role model. The benefits of moving in this direction are enormous:

- high productivity
- high energy
- increased creativity and innovation
- increased job competency
- improved morale, and
- enhanced responsibility

However, one must choose this direction genuinely and sincerely, otherwise the necessary organizational climate of openness, fairness, and trust are compromised and respect, acceptance, and buy-in are all but lost. Remember, you have a choice in the environment you create and frankly "work made fun gets done!"

The model used to foster this type of collaborative environment focuses on three key elements—the "right work" done the "right way" for the "right rewards." This approach was

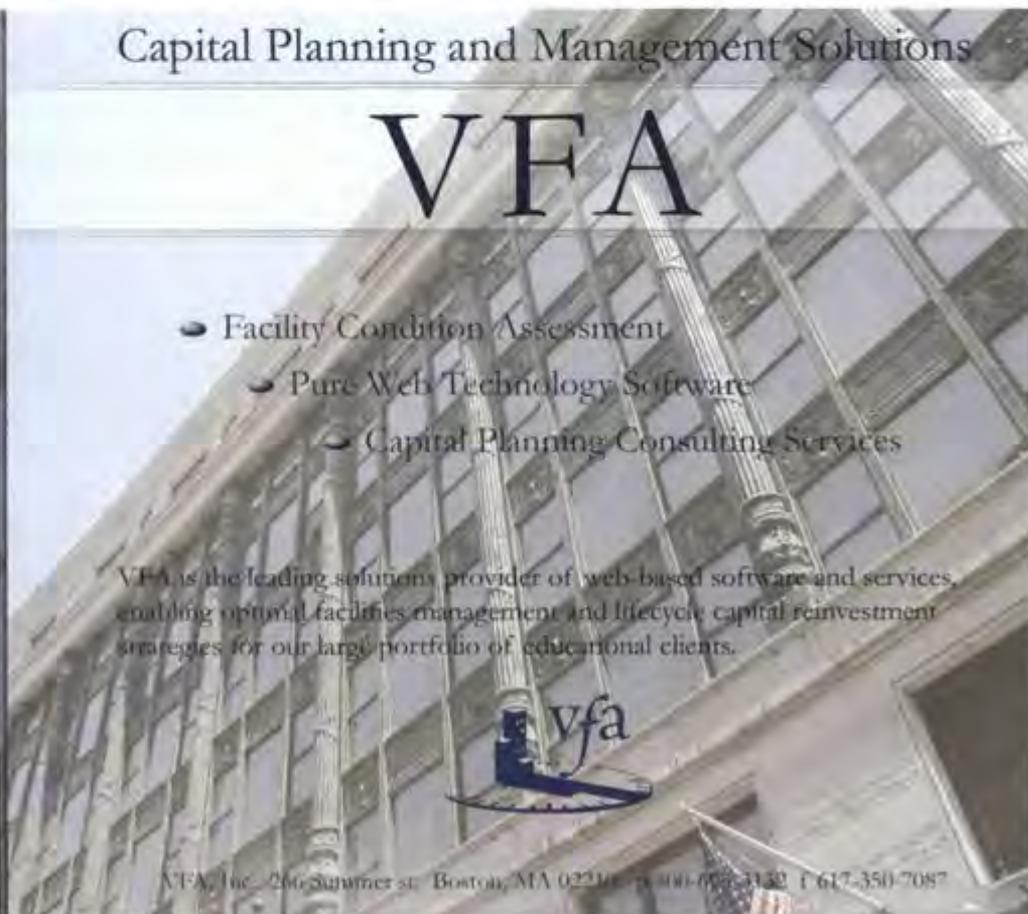


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outlined in the book, *Gung-Ho*, which has been sweeping the private sector for the past couple of years. The principles and approach of *Gung-Ho* serve as a model to put the heart and soul back into our work and our organizations. It gives renewed meaning and purpose to our work.

The first element, "right work," is defined as work that has purpose and value; is based on a shared vision and shared understanding of the goals and direction of the organization; is meaningful and connected to a larger context or cause; and finally, allows work to be fun, invigorating, and motivating. Everybody's job is important no matter what the job duties, otherwise the job would be eliminated. How you translate that fact throughout the organization is a key factor in ensuring that everyone's work effort is connected to the overall vision, mission, and strategy of the institution. Studs Terkel, in his book *Working*, captured this thought with an inter-

esting twist. "Work is about the search for daily meaning as well as daily bread, for recognition as well as for cash, for astonishment rather than torpor; in short, for a sort of life rather than a Monday through Friday sort of dying."

The second element is doing the work the "right way," meaning the way in which work is carried out on a daily basis. In this work environment job ownership and autonomy are valued; an individual's talents are valued; an individual's talents are matched with their role and/or function; staff are considered competent, trained professionals; individual learning and organizational development are essential; and, responsibility is appropriately coupled with the authority to make decisions.

Increased productivity, competency, and creativity are obvious outcomes. If you don't think this is important, take the statistics from a survey of U.S. workers (identified in John Maxwell's book, *Developing the Leader*

*Within You*). In this survey, 85 percent of the respondents said they could work harder and, over 50 percent said they could double their effectiveness!

Finally, the third element of a collaborative environment is work done for the "right rewards," highlighting the importance of constant encouragement all along the way, consistent recognition for a job well done, and an intense focus on a person's strengths and not their weaknesses. Frankly, we do not motivate others per se. That is a matter of individual choice, but we can create a motivating environment. Interestingly enough, in a *USA Today* survey, the top five reasons people stay at their place of work were ranked as:

1. Recognition
2. Participation
3. Opportunity
4. Security
5. Fair Pay

What are you doing to create a recognition-rich and rewarding workplace experience?

Ralph Peters said in his book, *Fight for the Future*, "The great paradox of the 21st century is in this age of powerful technology the biggest problems we face are problems of the human soul." We can do something about this in our own organizations. Remember, you have a choice in the environment you create, and "work made fun gets done!"

As a leader in your organization, you must first exercise "right thinking" through your choice of attitude—one that truly believes in and fosters creative collaboration. Then you can ensure a collaborative environment using these elements, "the right work" done the "right way" for the "right rewards."

In other words, you must focus on ways to ensure that the work has purpose and value; you must establish that job ownership and commitment are supported throughout the organization; and, you must provide constant recognition and encouragement. I would suggest that this is indeed the "right stuff!" 🏆

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# APPA's Institute for Facilities Management Concludes in Norfolk

APPA recently concluded the September session of the Institute for Facilities Management where 85 first-time attendees were welcomed. During the week of September 8-12, attendees spent their time engaged in sessions covering the four core areas: general administration, operations and maintenance, energies and utilities, and planning, design, and construction. But it was not all work; throughout the week the 355 attendees also took the opportunity to enjoy the local flavor of the Norfolk area. Old Dominion University volunteered its campus for a tour. Institute attendees had the opportunity to tour the Maglev Project (the first commercial magnetic levitation transportation system in the world), the Ted Constant Convocation Center (a new sports and general events facility), and University Village (a 75-acre site featuring shops, restaurants, office buildings, and residential facilities). Other attendees toured Colonial Williamsburg and were able to step back in time and experience the ideas and dreams of both great and everyday people on the eve of the American Revolution.

During our week in Norfolk, we also took time to remember the victims of September 11. On Sunday, September 8, Emma Espino Macari, vice chancellor of facilities planning, construction, & manage-

ment at CUNY, explained how the university assisted the New York community in the immediate aftermath of the disaster, the steps taken to relocate its 5,000 displaced students, and what the experience has taught City University administrators about emergency response in the future.

The successful week culminated with graduation ceremonies and the closing banquet. President-Elect Brooks Baker reminded everyone of the importance of striving to be the best and setting goals. He reinforced the idea that the goal of striving to be the best in the field of facilities management was what brought everyone together in Norfolk and that never to forget that goal. Once again, congratulations to all the graduates of the Institute. We wish them well along with Charlie Jenkins who has retired as the dean of the general administration core. His replacement, beginning with the Institute in Fort Worth in January 2003, will be Mary Vosevich of the University of New Mexico.

Look for information on the January Institute taking place in Fort Worth, Texas on the APPA website—[www.appa.org](http://www.appa.org).

## Facilities Institute Raves!

The APPA Institute for Facilities Management held September 8-12, 2002, in Norfolk, Virginia, was an excellent learning experience. As a first-time attendee, I enjoyed the various course offerings including empowerment, managing resources, staff relationships, communications, and more. These courses provided an excellent opportunity for new facility managers to learn from proven leaders in the field and interact with seasoned managers from across the country.

The opportunity to network with other facility managers during class time as well as meal time was an excellent chance to share common problems and solutions. I learned that problems tend to be universal while solutions can be shared to the mutual advantage of the universities.

I strongly encourage facility managers who have not attended, as well as those progressing through the Institute training, to continue to support and participate in this very worthwhile educational session. This is an excellent opportunity to get hands-on experience from the best and brightest!

*Ms. Jeffie Wiggins-McMullen, MBA, MPA  
Manager, Facility Support Services and Business Operations  
University of Nebraska  
Kearney, Nebraska*

## Among the New Faces

Mine was among the new faces at the APPA Institute in Norfolk, September 8-12. I attended because I had heard that the training was exceptional and that having the APPA Institute certification would probably help me get promotions in the facilities field. I didn't know much about APPA, but I learned that, indeed, the training was exceptional.

I came to the Institute feeling like an old warhorse about training. I was very pleasantly surprised that I learned so much and that I began to see facilities issues from a different perspective. Based on my past experiences, I judged these sessions to be of a very high quality. I also found in almost every case that the content was pertinent to my particular work context. I look forward with great anticipation to my next track.

The efforts and attitudes of the APPA staff and faculty added considerable value to the quality of the Institute. Their cheerful assistance kept us all moving in the right direction; ready to sit back and absorb information. Thanks to you all for your kind assistance and your obvious desire to make the week pleasant for us all.

Of course, the icing on the cake came from the networking opportunities with other facilities staff members attending the Institute. Did you know that in addition to the District of Columbia and two foreign countries, 45 states were represented? Did you know that only 18.6 percent of attendees were women? Ask me how I know these statistics the next time you see me. The relationships I made and the acquaintances I met will carry on into the future and are as important to me as the learning process. I feel I have over 350 new phone numbers I can call if I need advice!

Thanks APPA. It was enlightening, stimulating, and refreshing. See you in Fort Worth!

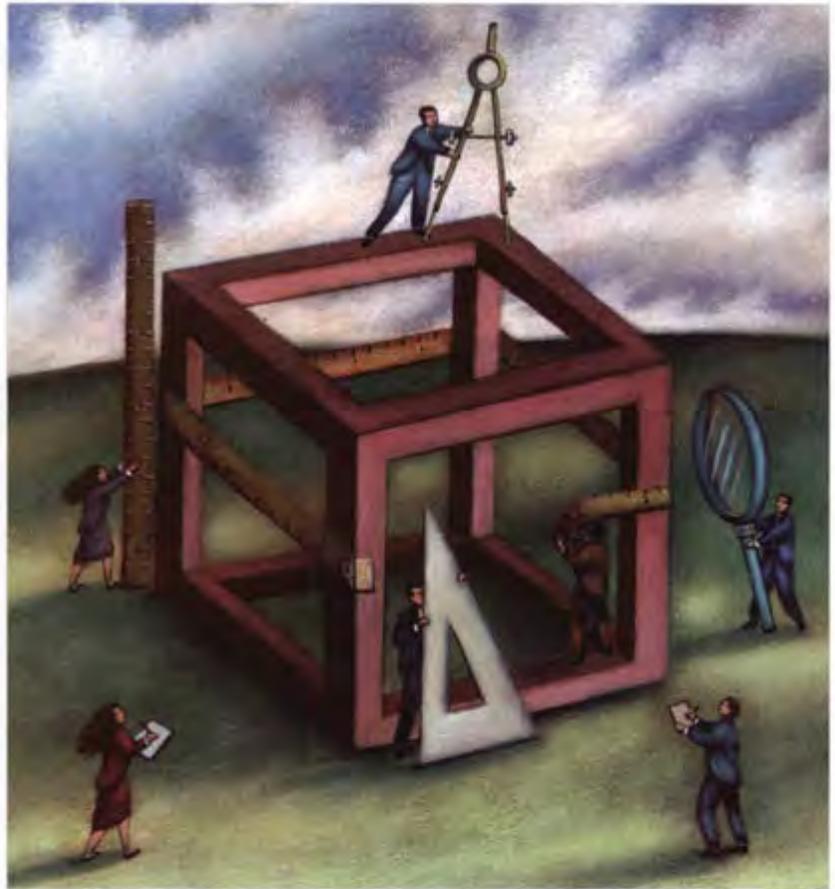
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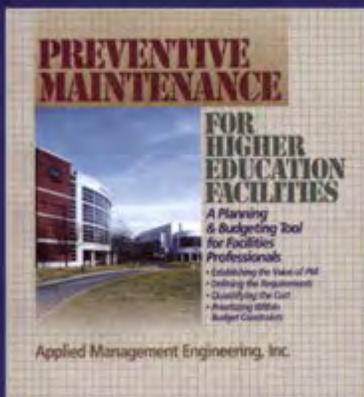
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# THE IT VISION IN FM

by Jerry NeSmith

Over the next few years the most effective facilities management organizations will recognize the need for focused, or even dedicated information technology (IT) resources. How those IT resources are organized will determine how effectively IT helps FM fulfill its evolving role in the public or private sector enterprise. Is IT organized under the FM organization or borrowed on a project-by-project basis from other organizations? Do the IT experts understand the business of FM? Will those experts be around to take IT projects to their successful completion?

As far back as 1995 Edmond Rondeau noted that "[t]he rapid growth and implementation of business information systems will continue to challenge facility management.... Workplace systems and facilities must be able to accommodate the rapid growth of business technology." Today, it is more apparent that IT is becoming as important to the mission of FM as the disciplines of architecture, business administration, and engineering.

The IT disciplines and solution sets required for FM are a unique blend of IT and FM knowledge and experience. Like human resources (HR) and financial data, FM data has value to the entire enterprise. Characteristics of space, occupancy of

space, locations of buildings, repair and renovation history are a few examples of the data maintained by FM that has value to many other departments in the enterprise. This information is essential to such things as customer service, the development of an interactive web-based map, planning for organizational growth, financial planning, and, even, the delivery of mail.

The current national economic situation is causing a decrease in the funds for future capital projects, such as constructing new buildings. The expectation of building new space to house new projects or organizations is being replaced by the need to utilize existing space more effectively. Identifying underutilized space, measuring the productivity of existing space, and predicting the cost of building operations are already critical metrics. The ability to manage plans for space utilization, availability, and occupancy is becoming a critical part of financial and organizational planning.

Thus the need for Facilities Management/Information Technology (FM/IT) systems to be used effectively is becoming more acute. Unfortunately, space and work management information resides in what is often perceived as a "data silo" in FM. It is rarely available to those outside the FM organization who need it. Its format and presentation may be difficult to understand outside of the architectural or plant operations world. The effort or expense required to access that informa-

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*Jerry NeSmith is president of TMCI, an IT technical consulting firm specializing in facilities management. He is based in Bogart, Georgia and can be reached at [jnesmith@earthlink.net](mailto:jnesmith@earthlink.net). This is his first feature for Facilities Manager.*

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<sup>1</sup>Edmond Rondeau, Robert Kevin Brown, and Paul D. Lapidés. *Facility Management*, (New York: John Wiley & Sons, Inc., 1995), 384.

tion might prevent other organizations from using it. In fact, those who need it may not know that the information is available at all.

The need for FM organizations to fulfill the facility information needs of the enterprise requires support from the top layers of FM management in defining and supporting the role of an FM/IT organization. (FM management may need to create an FM/IT organization, or, for smaller institutions, designate a person with IT and FM expertise as a proponent of FM's vision and needs.) The purpose of this article is to provide a forward-looking vision of the IT organization in FM. This vision includes the evolution of the FM/IT organization from an *operational role* to a *strategic role*—from an FM *divisional role* to an *enterprise role*. (The word "enterprise" is used in this article to describe the entire institution or for-profit corporation.)

### Primary Goal of FM/IT

The primary goal of FM/IT is to help solve business problems for the enterprise. The fundamental objective in meeting that goal is *servicing the needs of the FM organization*.

Solutions that FM/IT provides come in three forms. The first is *indirect support* of the enterprise by improving the quality, accuracy, and effectiveness of core FM functions. The second is *direct support* of the enterprise by providing facilities information for non-FM purposes. The third is the *integration* of FM business systems and practices with those of the enterprise.

### Objectives of FM/IT

Any IT project relates to the FM/IT primary goal in four objective ways:

1. Optimize productivity of facilities resources in the enterprise;
2. Increase the availability of facilities-related information;
3. Increase the utilization of facilities data in the enterprise; and
4. Leverage and complement the effectiveness of enterprise resource planning (ERP) systems.

#### **Optimize productivity of facilities resources in the enterprise**

Optimizing productivity of facilities resources in the enterprise involves increasing the efficiency of physical plant, labor force, and materials management. The core mission of any FM organization is to build and maintain the physical plant of the enterprise, including buildings, roads, grounds, and, usually, utility infrastructure. Thus the *core mission* of FM/IT is to support plant operations, customer service, planning and construction, and resource management organizations within FM.

The information that IT systems are processing, managing, and presenting are primarily related to four areas:

1. **Physical Plant.** FM/IT provides the means to collect and maintain information about buildings, space within the buildings, and equipment, which is located near or in the buildings and is maintained and/or operated by FM.
2. **The FM labor force.** Usually FM/IT provides the means for employees to clock in and out, to receive work assignments for remedial and preventive maintenance tasks, to report on the time used in the performance of those tasks, and other cost accounting information.
3. **Materials.** FM often provides systems for the management of materiel warehouses, material ordering and receiving, and capital items owned and operated by FM, such as grounds equipment, service vehicles, and HVAC systems.

#### **4. Chargeback or billing.**

The confluence of financial transactions from physical plant maintenance, including labor, and materials often must be processed by direct and indirect cost accounting used to distribute and/or recover these costs to FM's clients. IT systems in FM must support this important accounting process.

The author is *not* advocating any change in the priority of this critically important day-to-day role. In fact, the information that is created, used, refined and maintained by the users of FM/IT systems in the daily stewardship of physical plant has value to

The author is *not* advocating any change in the priority of this critically important day-to-day role. In fact, the information that is created, used, refined and maintained by the users of FM/IT systems in the daily stewardship of physical plant has value to other major organizations in the enterprise.

other major organizations in the enterprise. Its *completeness and accuracy* are improved through sound business practices by all of FM, which is the first to benefit from the stewardship of complete and accurate information.

#### **Increase the availability of facilities-related information**

Increasing the availability of facilities-related information means making FM data more accessible to the enterprise. The value of this information is increased as it becomes more available and more useful to FM's customers. As FM and its customers access this information and rely upon it, accuracy improves through effective feedback and update mechanisms. Examples include online customer billing, facilities (campus) map, space utilization and occupancy, and mail services location.

The most enabling strategy that is being advocated is making the facilities information available to the entire enterprise. We are not advocating the opening of FM/IT systems to everyone. We are advocating the sharing of the information needed by other enterprise organizations, constituents, and customers so that they can be more effective in achieving their goals.

The FM/IT group is the focal point for maintaining the integrity of this information.<sup>2</sup>

### **Increase the utilization of facilities data in the enterprise**

Increasing the utilization of facilities data in the enterprise embraces breaking down inter-organizational barriers and communicating the availability, character, and utility of facilities data. Means and methods for accessing the data with appropriate security must be provided. The means (software/hardware) to access the data must be inexpensive and extremely easy to maintain. It must be deployable to hundreds of computer workstations. Today's Web-based technologies, if implemented carefully, can provide the solution.

### **Leverage and complement the effectiveness of enterprise resource planning (ERP) systems**

The systems that FM/IT maintains are the authoritative source of building, space, infrastructure, and work management data. FM data is almost always required by HR, Finance, and other enterprise resource planning (ERP) systems. FM/IT must use information from ERP systems where appropriate, provide authoritative FM data to them, and integrate with them wherever feasible. The purpose is to optimize accuracy, improve efficiency, and eliminate redundancy.

### **Principles**

An FM/IT manager and staff need to follow six principles for FM/IT projects to be properly defined, prioritized, and designed:

1. Collaboration, Collaboration, Collaboration;
2. Understand the business of FM and the processes that support that business;
3. View the enterprise business processes that supply information from FM and provide information to FM;
4. Create a vision and communicate it;
5. Define and execute islands of success; and
6. Breakdown barriers, internally and externally.

### **Collaboration, Collaboration, Collaboration**

In real estate the slogan is "Location, Location, Location"; in FM it is "Collaboration, Collaboration, Collaboration." The nature and use of FM data is not yet understood by other organizations in the enterprise, so its value is misunderstood. At the same time, FM organizations may not understand how FM information relates to other enterprise data.

By aggressively collaborating with other departments, FM/IT is able to understand and

characterize the value of FM information, make that information available to other organizations, and become an important member of collaborative teams of cross-disciplinary, cross-departmental problem solvers.

### **Understand the business of FM and the processes that support that business**

FM/IT needs to learn and understand the business of FM. FM disciplines include work management, materials management, space management, project management and construction, campus planning, accounting, and energy management/HVAC.

Because FM/IT's core mission is to support FM operations, the business processes of FM must be understood, just as an IT organization in HR must understand the processes of hiring, firing, benefits, and training. In a cross-departmental collaborative effort, FM/IT is representing FM's business interests. FM/IT must be able to maximize the benefits to the enterprise and minimize the negative impacts to FM's operation.

### **View the enterprise business processes that supply information from FM and provide information to FM**

In addition to knowing FM-specific business processes, FM/IT also needs to learn the business processes of the enterprise. For example, FM in a large organization will employ a significant number of people. Understanding the HR data sys-

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<sup>2</sup>Ibid, 120. The FM/IT "staff are now the 'keeper' and manager of accurate data that you can place at management's fingertips."

tems may be important. Also, most projects deal with the tracking of dollars. In such cases understanding the workings of the financial and accounting systems is necessary. Materials management may involve working with the enterprise procurement system. FM/IT may need to work with publications and community relations departments in order to deliver information to the enterprise and the public.

#### **Create a vision and communicate it**

The FM/IT manager must create a vision and communicate it. The process of defining the vision is in itself valuable. It is often the first collaborative step that FM/IT takes with all of the organizations that will work together in achieving the goals of the vision.

It is important for the constituents involved in the work of fulfilling the vision to work together on its definition. A new common language often results from the process. That language not only creates bonds between the people and organizations involved, but also serves as shorthand to make communications easier, more effective, and more fun as the projects around the vision are defined and executed.

Of course, the creation of the vision gives all involved the opportunity to contribute what they think is important and to have a sense of ownership and commitment to the success of that vision. Their ideas and insights can be captured and communicated by defining and creating a symbolic or a graphic representation of the vision.

Presentation of the vision to upper management and to front-line staff is important. (The symbol of the vision can become a useful tool for communicating the vision to others.) In communicating the vision, it is important to clearly state the problems to be solved and the benefits to FM and to the enterprise as a whole. Important, measurable milestones in achieving the vision should be defined as "islands of success," so that everyone can see the progressive steps that will be achieved toward fulfilling the goals of the vision.

#### **Define and execute islands of success**

After a vision is created, FM/IT leadership should define and execute islands of success. They should be tangible, publishable, and celebrated upon completion.

Fulfillment of the vision is likely to take a great deal of time and effort. The steps required to reach the vision should be defined as projects—each project providing important benefits to the enterprise. Each project can be broken down into important milestones that can be celebrated and communicated to all. This will help to keep the vision fresh, the IT staff motivated, and the constituents enthusiastic.

Of course, these islands of success can also be important for project planning, budgeting and staffing.

#### **Breakdown barriers, internally and externally**

For a project to succeed, FM/IT leadership may have to breakdown barriers, internally and externally. Creation of an IT focus internal to FM results in consolidation and simplification of internal processes. To create this focus, the structure

and definition of the role of IT in FM must be examined and modified. There should be one organization with the responsibility and resources required to manage and improve information processing and the means to access and affect that information. The fact that the FM/IT organization can gather and analyze the information processing priorities of FM means that FM management can make more informed, objective decisions about the use of IT resources. Of course, this requires mature, independent, credible FM/IT leadership capable of surveying the issues and goals of FM and analyzing the costs and benefits of solving these problems and achieving those goals. (FM/IT leadership must be able to present these facts and opinions to facilities management.)

FM must support FM/IT in breaking down internal barriers. There is likely to be some political resistance to the changes caused by the creation of an IT organization. FM must help articulate to the entire organization the role of FM/IT, its mission, and its benefit to all of FM. Facilities management should guide FM/IT's leadership in articulating a shared vision and support that vision.

The work that FM/IT leadership does in defining a vision will be instrumental in breaking down internal barriers. The support of FM's operations, customer service, planning, accounting, and construction processes must be a high priority for the FM/IT vision and its day-to-day activities. Success in these areas is essential to the success of FM/IT's efforts to serve the enterprise outside of FM.

Furthermore, FM/IT's success in supporting FM internally can lead to the break down of external barriers.

#### **Conclusion**

The value of accurate FM operational and facilities information is increasing rapidly. The need to manage the collection, processing, and delivery of FM information in effective, efficient, and secure ways calls for the creation of an IT organization in FM.

FM/IT leadership must focus first on its support of FM operations. It must understand the processes that support those operations to make them more effective. Then collaborative interdepartmental efforts can make information under the stewardship of FM valuable and available to other departments.

With the support of FM, a subtle but powerful shift in the perspective of FM/IT and its mission can occur. The role of FM/IT can change from one with an FM *operational perspective* to one with an *enterprise perspective*. That is, to provide the entire enterprise (and its community) with important facilities information, as well as providing the means to gather feedback and updates of that information for the good of all. 🏠

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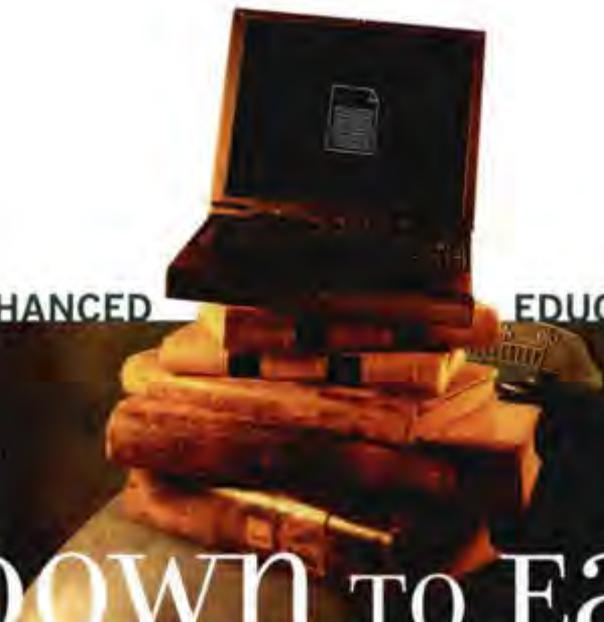


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THE ELECTRONICALLY ENHANCED EDUCATIONAL EXPERIENCE

# BACK DOWN TO EARTH

by Richard D. Rush, AIA, CSI

Campus administrators, facility managers, faculty, and facility designers have a single central design focus: the well being of students during the course of their education. When the computer formally entered into the campus educational experience in the 1960s, few people in higher education really grasped the impact the computer would eventually have. No one thought of it as an educational liability. The physical insertion of the computer was often considered an equipment problem, not a facility design problem.

From the beginning, the computer seemed to be a contradiction. It had a viewing screen, but could not be used to actively draw pictures. The only sound and touch associated with it was the sound of tapping fingers touching a keyboard—not unlike the sound of an electric typewriter. The full computerized sound, visual effects, and touch experience occurred by manipulating the joystick in the cacophony of a computer game. Students who graduated from college in the last decade are the first group of people to grow up with com-

puters. They played computer games; actually they were mesmerized by the games. Accordingly, early computer software developers were confident that if they could channel the energy that these same children put into games into educational projects, something really revolutionary could take place in education.

Microsoft led the research in the understanding the relationship of the full sensory experience to the computer-enhanced learning environment. One oblique spin-off of this important research occurred in museum exhibition design. Armed with a structured conceptual understanding of how the educational experience of a museum visit could be enriched, museum exhibit designers quickly began to include computers in their exhibits. No less prestigious museum than the Smithsonian Institution in Washington, "America's Treasure House of Learning," pioneered such new exhibit designs. These new designs helped transform the museum exhibits into hands-on interactive experiences with three-dimensional multicolored movement, voice-overs and music—the more bells and whistles, the better. The lesson was pretty simple—learning can be a series of overlapping multimedia experiences. Perhaps it wasn't the first example of "infotainment," but it was a very significant early application of it.

In addition to the imaginative game environment, there were three separate paths of expression being pursued on the "business" computer: words, numbers, and graphics. Com-

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*Richard D. Rush, AIA, CSI, is a principal in the Office of Michael Rosenfeld, Inc., Architects, West Acton, Massachusetts. He can be reached at [rrush@omr-architects.com](mailto:rrush@omr-architects.com). This is his first article for Facilities Manager.*



The Office of Michael Rasmussen, the Architect

*No campus function has been more transformed by the computer than the library. The new library shown above is at the Salisbury School, Salisbury, Connecticut.*

puters have made electric typewriters and adding machines obsolete. Soon, film photography will join the ranks of these dinosaurs. The “mouse” was added to the keyboard and “integrated” software was born. Hip educators could perform mathematical equations, write a textbook, and animate the illustrations.

Fast forward in time to the contemporary laptop-equipped classroom. The wireless laptop is on the desk in front of the student. It has a microphone, speakers, a mouse, and a keyboard. Students can listen to long-distance audio or read visual messages via the Internet. It will light up and even function if necessary in very low light. Earphones will make the listening totally private. It can be, and often is, a flat screen, student environment of its own—a classroom within a classroom or a library in your dorm room. In this scenario, the student sitting in the next chair may not exist. Both the class and the teacher may be inside the laptop. The learning experience is self-contained—not all that different from reading an old-fashioned paperback book, especially in this private, isolated, educational context.

Few educational professionals would argue that this self-contained environmental and educational experience is really self-sufficient. It is not an accident that the government-sponsored inspiration for the microchip was space travel—the race to the moon. The space program has proven that we can exist in an environment without gravity, although NASA still relies upon simple gravity to return the shuttle to earth.

The “gravity” of the traditional campus environment is human-to-human real-time communication. College administrators, facility managers, faculty, students, and designers are all dependent upon social interaction. All these groups, collectively and individually, have a personality. The spatial

counterpart of these personalities is expressed by brick and mortar—not pixels. Extremes of heat, cold, moisture, sound, and light all detract from the optimal computer-centered environment. Computers require reduced light, quiet, cleanliness, humidity control, and increased security. The traditional interaction of the built and natural environment has often been diminished by the addition of the computer in the classroom.

In the last ten years, inserting computers onto the college campus has taken on the quality of a race—a mad dash from chalk to the microchip. There have been pioneers, mainstream participants, and laggards. In some ways, the large and more famous universities have chosen the more conservative path, while community colleges have actively pioneered distance learning. Research universities, heavily dependent upon research funding, have been forced to invest heavily in computers and install them in the existing buildings on campus.

In the urgency of this atmosphere, thousands of computers have been installed on campus in places that were ill prepared to receive them. This urgency has caused the following problems.

1. **It's too hot!** Spaces designed and equipped to handle a high external thermal load were turned into spaces with a high human body and equipment heat load. The hotter they get, the more ventilation was needed.
2. **It's too noisy!** Noise from ventilation fans and equipment fans has raised the noise level of the classroom. Microphones and speakers became a necessity.
3. **Too much light!** A traditional classroom is often dependent upon artificial lighting supplemented by natural lighting. New lighting and controls are now needed to provide a lighting level that is appropriate and free of distracting reflections.
4. **My back is killing me!** The lack of ergonomic design coupled with the rapid upgrading of computer consoles has often produced stiffness in the neck and cramps in the back. Even the resilience of youth has a tough time responding to these changes.
5. **I have a headache!** The eyestrain of gazing at the same place for long periods of time simply fries the neural synapses as they attempt to irrigate the brain with fresh ideas.

None of these adverse conditions reinforce learning. On the contrary, they all detract from the relationship of the sensory experience to the computer-enhanced learning environment documented by Microsoft early in the development of the computer. Rather than overlapping layers of sensory experiences that reinforce learning, campus personnel have created just the opposite—distractions. In all fairness, the traditional classroom has evolved over many years of trial and error. The speed with which the computer has been added to the campus environment has not permitted ample time for the



The Office of Michael Rosenfeld, Inc. Architecture

**The general idea for most classroom computer applications is to maintain a traditional teaching capability while including the new technological capabilities. The lecture space shown above is the Library/Science Building at Burr & Burton Seminary, Manchester, Vermont.**

perfecting of many critical design inter/relationships.

Perhaps even more troublesome amidst the recent proliferation of computers on campus is that the full magical quality of the computer to entertain while it educates is still largely unrealized. Students burdened by environmental design failure seek out an alternative environment that they can control. They plug in the laptop in a place where they can see, hear, and learn in peace. They often resort to a "gravity-free" environment. They seek solitude.

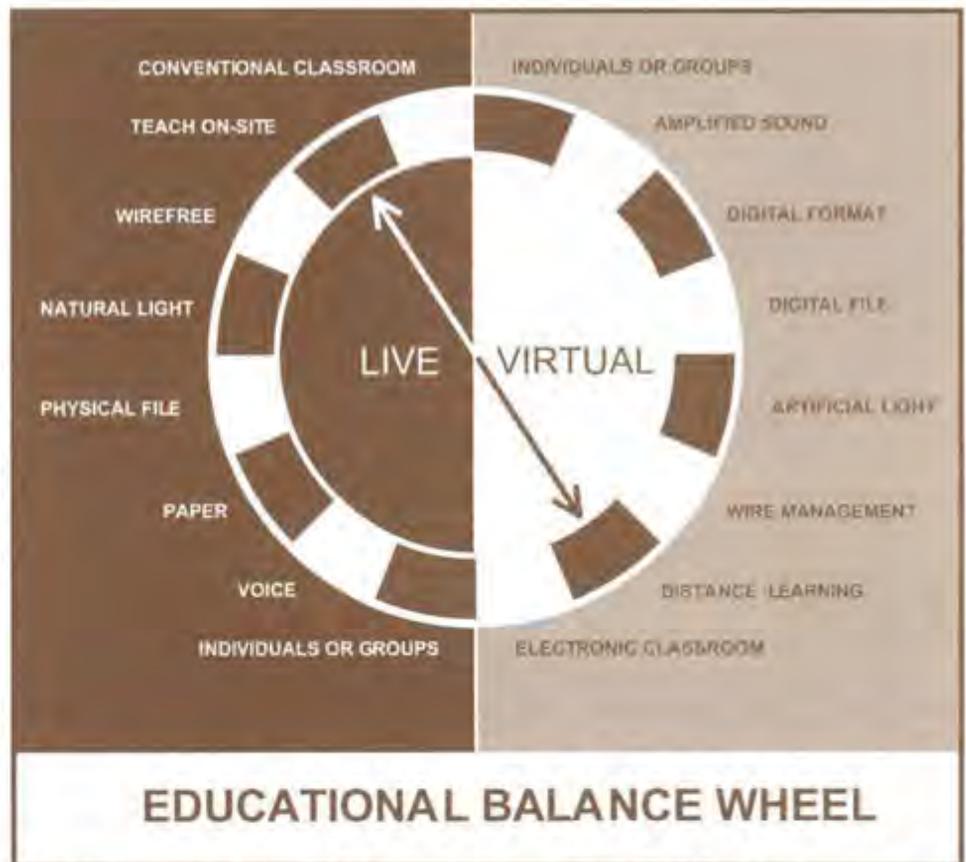
### Research

Now that the first wave of computer installations have occurred at the majority of higher education institutions, there is an enormous body of environmental experience to review—both positive and negative. There is very little excuse for those responsible for designing new computer-assisted learning environments to remain ignorant of what has been done before. A representative generic online information resource is "Classroom Design Forum" at [www.classroomdesignforum.org](http://www.classroomdesignforum.org). This site claims 40 years of experience managing the construction and renovation of hundreds of classrooms at a major mid-western university. The technology departments of many schools often have websites describing their programs down to the age and reliability of the equipment they use.

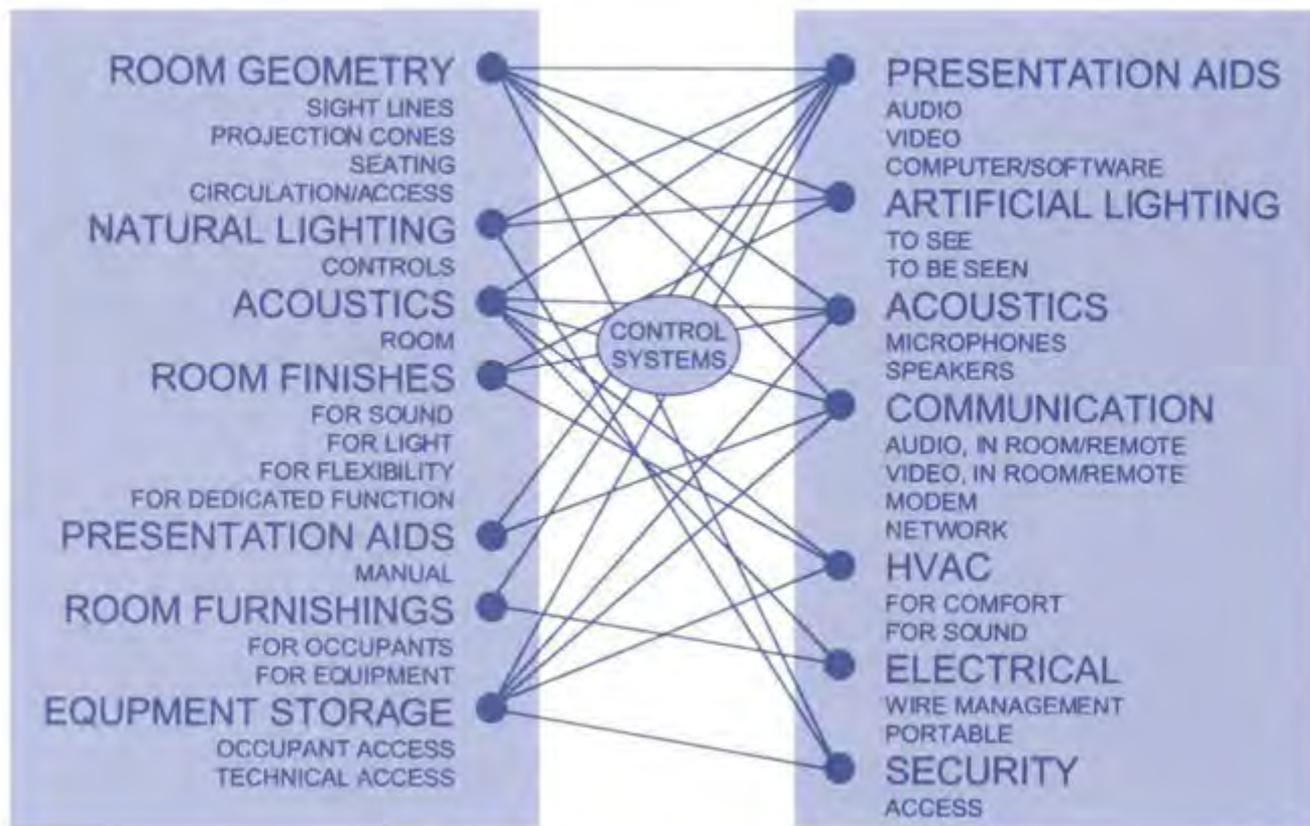
### Mock-ups

Just as classroom teaching requires experience, designing a learning environment is not for novices. It is a complex interaction of dynamic relationships that must balance acoustics, thermodynamics, lighting, geometry, electronics, wire management, maintenance, security concerns, and ergonomics. It must accommodate the diversity of the present and the imagination of the future. The task requires a team of design professionals coupled with articulate equipment and furnishing producers. If done correctly, the administrators, facility staff, faculty, and students should be part of the team. Using this approach every time a classroom adds a computer can be expensive in professional design time. One good solution is to construct a prototypical classroom or mock-up designing a learning environment.

Most schools have a multitude of classrooms but only a few basic types. The mock-up idea is to use professional design assistance to create a series of typical classroom environments and test them in real time with real teachers and students with actual courses. Often, new furniture designs are a result of such experimentation. Connecticut College is one such school that recently initiated their own innovative lecture hall



**The Educational Balance Wheel is similar in principle to a color wheel. It attempts to represent the forces present in the mind of the administrator and educator when designing an educational approach for a course or an entire curriculum. Both the traditional and virtual learning environments clearly have their benefits.**



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## PROFESSIONAL DESIGN TEAM COLLABORATION

*In order to be successful, a classroom design must be a conscious collaboration between technology and the design profession. Even with professional assistance, an institution that hopes to provide effective student/computer interfaces should consider both research and mock-ups to test new concepts.*

design. Over a period of several months the designers and the users formed an interactive team to produce innovative viewing and seating possibilities for the lecture hall. At the University of Rhode Island, a similar emphasis produced two classroom prototypes that are serving several remote campuses.

### Seamlessness and Flexibility

Many times the effort is made to insert computer technology into a classroom but not at the expense of the advantages of the traditional classroom. In other words, when the computers are turned off, the classroom can function "seamlessly" as a conventional classroom. The important distinction is function. The computer-integrated podium, ceiling mounted projector, speakers, smartboards, document cameras, black-out window shades, and card swipe locks on the doors are

difficult to conceal. A student desk large enough to hold a computer, even a small laptop is bigger than one intended to hold a paper tablet. Such hybrids are quite common. The goal is flexibility.

Flexibility in the college environment has many meanings today. One meaning is to take a course at another campus while remaining on your own. In the last two years, Five Colleges, Inc., including Hampshire College, Mount Holyoke College, Amherst College, Simmons College, and the University of Massachusetts at Amherst, have initiated in-house videoconference capabilities. The result has been a general increase in collaborative teaching and a simplification of the general capability that students at these schools are able to take courses at any one of the five schools.

A similar notion of flexibility exists at Bentley College, in Wellesley, Massachusetts. Students may attend class or alter-

natively log on to the class through the Internet (IP). The voice-over-IP class meetings and website course content enable a student to choose between the traditional class setting or sitting at a computer "in class" at a remote station.

### Classes Without Teachers

The computer has also spawned a new kind of learning environment—the small group teacherless classroom. This room may be formally or informally located in the library, the student center, a dormitory, or even a lounge at the end of a corridor anywhere. The key ingredient of such a classroom is that it be a place where a small group of students, usually less than ten, can actively share thoughts and information while simultaneously using computers. While the classroom functions without a teacher, the students still have the choice to invite a teacher to physically attend or to participate online.

### The Future

Another trend easy to identify is that the computers and products that coordinate with them are shrinking. The Media Laboratory at MIT continues to experiment with miniature cameras, microphones, and computer technology in order to invent "Things that Think." The object of this research is to transfer the intelligence of the computer from the desktop to wearing apparel and other familiar objects. With this in place, the computer will be even more pervasive. These ideas are



The Office of Virtual Research, The University of Michigan

*The computer lab was historically the first on-campus evidence that computers were going to present a significant challenge to the normal educational environment. Early examples were commonly overheated and under-designed. The lab shown above makes use of new flat screen monitor technology.*

present in a somewhat less esoteric way more and more in our daily lives.

### See What You Say

New developments in cellular phones now enable a cellular phone to "point and shoot" a photograph. The new "mMode Pix" service allows customers to attach a miniature digital

camera to a cellular phone. The display screen of the phone then becomes a viewfinder. The digital photo is a standard jpeg format and can be sent by e-mail. Other new phone services include voice-activated dialing with picture capability and a product that attaches to a phone jack and makes any two remote phones into real-time videophones. The idea of using the telephone as a teaching tool is an intriguing one since most students already carry them.

When the full spectrum of human interchange is enhanced by the microchip, the education that takes place on campus can be deeper, wider, and richer. The campus has always served to strike a balance between the personal education of the individual and the collective extension of knowledge itself. A cool computer gee gaw should always have an intentionally warm place in a well-designed campus. 🏛️

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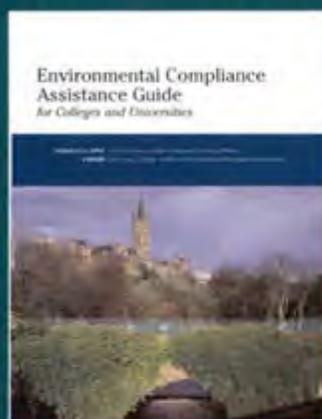
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# Environmental Compliance Assistance Guide

## for Colleges and Universities



A Joint Publication from APPA:  
The Association of Higher Education  
Facilities Officers (APPA) and  
The Campus Safety, Health and  
Environmental Management Association



The idea behind the partnership of APPA and CSHEMA was to produce a guide that would assist colleges and universities in meeting the basic requirements of the environmental regulations. The *Environmental Compliance Guide* accomplishes this and much more!

The *Environmental Compliance Guide* will provide you with a basic understanding of the various obligations that the body of environmental law imposes on campuses and help you develop compliance plans for your campus.

In today's environment, colleges and universities seeking to meet the legal requirements from EPA must realize that the body of environmental laws is much broader than simply the disposal of chemicals or running an asbestos abatement program. Schools that meet the requirements set by the EPA or by state regulators are not simply doing one or two things right—they're doing everything right! Environmental compliance is constantly changing—with new laws, rules, and initiatives passed frequently and innovations being developed as everyone seeks more efficient methods for compliance. Institutions must constantly remake, expand, and improve their environmental programs. This guide will show you the way.

*Environmental Compliance Guide for Colleges and Universities* contains:

- A narrative chapter explaining the effective elements of an environmental management program and how implementing these elements may reduce the potential of an EPA inspection on your campus.
- Abstracts of programs derived from eight environmental statutes that were recently the focus of EPA inspections on campuses.
- An easy-to-read matrix highlighting areas of potential regulatory concern on your campus, in the areas of Academics, Student Activities, Operations, Maintenance, or Utilities.
- The Inclusive Resources section gives key links to EPA documents that describe regulatory standards and provide assistance with them, as well as Web addresses for everything you ever need to know about compliance.

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# Wireless Time Tracking Improves Productivity at CSU Long Beach

by Scott Charmack and Randy Walsh

California State University (CSU) Long Beach estimates a 10-percent increase in productivity through the implementation of new maintenance management software that allows technicians to enter their time through handheld wireless devices for more accurate time accounting. The university originally used separate mainframe-based systems for maintenance, inventory control, and key control that required data to be entered separately in each and were only able to capture about 30 percent of the available hours.

To address these issues, the university made the decision to switch to new software that integrates the maintenance management, inventory control, space management, and key control functions and supports wireless data entry by technicians. The new software makes it possible for the maintenance staff to enter their time from Web-enabled mobile phones or from personal digital assistants (PDAs) that have a wireless connection to the Internet, making it possible to enter virtually 100 percent of their time.

*Scott Charmack is associate vice president, physical planning & facilities management, at California State University-Long Beach. He can be reached at [scharmack@csulb.edu](mailto:scharmack@csulb.edu). Randy Walsh is the division information services manager at CSU Long Beach and can be reached at [rwalsh@csulb.edu](mailto:rwalsh@csulb.edu). This is their first article for Facilities Manager.*

While the university hasn't had time to definitively calculate the productivity improvement, we estimate that it will be on the order of 10 percent, making it possible to reduce the university's overhead rate by a similar amount. Administrative staff also has achieved significant time savings through the elimination of the need to enter information in multiple systems and managers now have the ability to obtain real-time reporting on any of the information that is now tracked by the software.

CSU Long Beach has about 31,000 students from 54 counties in California, 46 other states, and 106 foreign countries. The university was established in 1949 as the Los Angeles-Orange County State College and became part of the CSU system in 1961. The CSU system is now the largest senior system of higher education in the United States, with 370,000 students and more than 40,000 faculty and staff members on 23 campuses. The university currently offers 77 baccalaureate degrees in 203 programs, 62 masters degrees in 89 programs, and one joint doctoral degree. The campus occupies 323 acres with 84 permanent buildings.

## Previous Software Became Outdated

The facilities management organization previously used several different mainframe software packages that had become outdated over the years. The biggest problem was the lack of integration between the different software packages handling maintenance, inventory, and key management that

had been separately developed over the years. Information had to be continually reentered between these different systems, putting a considerable burden on the administrative staff. Maintenance technicians entered their hours worked on time sheets that were entered into the computer by administrative staff. Users continually complained about the software's unfriendly user interface, while managers were unhappy about the difficulty in obtaining information from the system. Only a few standard reports were available, and viewing the data in any other format required expensive custom programming jobs.

The authors led the team from four California State Universities that was in charge of seeking replacement software.

Because of the difficulties experienced in the past with programs that didn't talk to each other, the team decided that the number one requirement for the new software would be to provide the five key functions of maintenance management, inventory control, space management, key control, and event management within a single integrated system using a common database. This single requirement proved to be a major challenge for facilities management software vendors. Most of the companies proved to have strengths in only one or two of the four functions, and those that could offer all four required the integration of multiple products from multiple companies.

The selected company already had tightly integrated maintenance management, inventory control, key control, and space management software modules and was in the midst of developing integrated event management software. We worked with them in the development of the event management software and the finished product has undergone even further enhancements with their help and continues to do so. A component that was not part of their core requirements but has become essential to their options is their software portal. This package allows users throughout the university to submit and review their work orders, as well as space management data through a dynamic Web interface. The software also provides the most open and flexible architecture of the systems that we viewed. Their strong database technology enables it to easily integrate with financial accounting and building operations systems and other software applications, as well as industry standard custom reporting tools, that have allowed us to generate a vast library of tailored reports.



## Enhancing Automated Preventive Maintenance

With the new software now implemented, the university has seen major improvements. One of the biggest is the preventive maintenance capabilities that define requirements for both equipment and locations and automatically generate work orders at appropriate intervals. In the past we used a paper process to track preventive maintenance requirements. With the previous approach it was difficult to keep track of whether machines were actually being serviced at the

required intervals. Now we have a formal process that determines exactly when equipment needs to be maintained and provides records that help us prove that we have done what we were supposed to, in order to exercise our warranties, for example. Another advantage of computerizing our preventive maintenance is that we can easily generate reports that determine our maintenance requirements in order to measure our staffing requirements.

A groundbreaking improvement is the use of handheld wireless devices to reduce time recording and materials usage. Technicians use the wireless devices to view their work schedule, view open work orders for a particular facility, access a particular work

order by number, request materials from the warehouse, enter hours against a work order, and close a work order. In the past, supervisors had to check paper time cards and then go into the system and close work orders. Now the technicians enter the information directly into the system as they do the jobs, and the supervisor can easily check the status at any time. Upper management is continually asking supervisors, "Has this been done?" and now they can answer any question in seconds. This new approach has dramatically increased the amount of time that is captured by the system. We generated statistical analysis that showed that in the past we were only capturing 30 percent of available hours while we are capturing 99.8 percent now.

## Reducing Nonproductive Time

Now that we are recording where nearly all of our time is being spent, we can easily identify areas that are nonproductive such as shop time, break time, and station checks, and then develop a strategy to reduce them. We are marking up labor by 83 percent and we have a mandate from upper management to reduce that figure. Having complete information

on where we are spending time is making it possible to accomplish that goal.

We have already been able to significantly reduce travel time because with the wireless devices technicians no longer need to make return trips to the yard to get information on which job is next, where it is located, or what exactly needs to be done. We are estimating that we will be able to achieve approximately a 10-percent increase in productivity by reducing nonproductive time, making it possible to reduce our markup to as low as 73 percent.

The new software has also made it possible to implement a completely paperless inventory control system. Technicians can now request materials directly from their handheld PDAs. They drill down through logical layers of part classifications to zero in on the right part. The simplicity of the system means that workers can complete the ordering process and inform the storeroom that they are coming for the part or they can inform purchasing to order it. The parts that are requested appear on a computer in the warehouse so they can be pulled without even having to print a pick ticket. Every item is tracked by the system and automatically charged to the proper facility. The material can be pulled while the technician is driving back, avoiding the need for waiting at the warehouse. The material is immediately available in the maintenance module for the charge summary.

### Integration with Space Management

The space management system tracks the way that rooms are being used throughout the university's facilities. The event management module handles scheduling of concert halls, athletic stadiums, theaters, and other spaces. The integration of these modules with maintenance means that work orders can automatically be charged to the department that is occupying the space. If space is reallocated from one department to another or the name of a building changes, it is immediately shared with maintenance. Another advantage is that we can produce graphical reports in which maintenance statistics are reported based on space usage. Key control is a recent implementation its integration with space management means that



any changes in the space are automatically reflected in the key control database.

Our primary reason for implementing the new software was to obtain a fully integrated system that we could input data once and have it available anywhere. Having the space information flow through into our maintenance, inventory, and key control systems has provided substantial time savings. The fact that all of the modules have a common Web-based interface that looks and feels the same dramatically reduces our training effort. We have been able to easily expand access to the system to about 300 regular users and 1,000 occasional users. This project is a resounding success. 🏆

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# MODULAR WIRING

## Offers Cost Savings and Future Flexibility

by Mike Ewald, Ph.D., and Ann O'Connor Ewald, MBA

Buildings designed in the 1960s and 1970s utilized simple three-wire 120-volt systems of ground, neutral, and hot wire on 20 amp circuits. Future expansion would require new electrical service and many upgrades in the wiring system such as 30 amp branch systems and wires to carry energy and control information around the building. Modular wiring systems are going to replace many of the current pipe and wire components, such as the junction box, with phase splitting and management devices because they offer multiple advantages.

### Initial Cost Advantage

Modular wiring is a prefabricated wiring system that replaces branch circuits in buildings. These wiring systems are built in factory-controlled environments to meet UL 163 and NEC 604 requirements for modular wiring. The cost of modular wiring systems is much less than pipe and wire systems due to the volume cost savings of factories on materials and because labor rates are much lower in modular wire factories than labor rates for electricians.

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*Mike Ewald is the director of Electro/Connect and international business for Day-Brite Lighting in Tupelo, Mississippi, and department chair of business and health administration at Columbia Southern University in Orange Beach, Alabama. He can be reached at [mewald@genlytethomas.com](mailto:mewald@genlytethomas.com). Ann Ewald is president of MAE Company, Tupelo, Mississippi, and professor of business administration at Columbia Southern University. This is their first article for Facilities Manager.*



Many modular wiring companies will take your electrical plans and create an initial bill of materials for you at no charge. This bill of materials gives you a good idea of what products will be going into the building and the cost of the materials. If the bill of materials looks satisfactory for an order, the company will develop plans for your building. This is done on a room-by-room basis showing how the product is installed on a piece-by-piece basis. These plans usually are in an AutoCAD format, with a complete bill of materials and in some cases photos of the actual modular wiring parts that are going to be used in the building.

You can expect to see the cost of materials double from pipe and wire systems because you are paying for the prefabrication of the system and shipment to your site of construction. But as most project managers know, the highly variable cost of labor is reduced with modular wiring by up to 80 percent. Why? Many of the labor-intensive jobs are completed at the factory with the lower labor rates, which results in fewer units of labor being needed for the project.

Most jobs that take one hour with pipe and wire become 12-minute jobs with modular wiring. Additionally, high paid journeymen electricians are needed less since this modular wiring is a plug-and-play type of system. In some locations on the East Coast, the cost of journeyman labor runs \$84 per hour while the cost of apprentice labor runs \$22 per hour. As a result of lower numbers of labor units and lower cost per labor unit, there are substantial savings on many projects.

Typically, the electrical contractor will bid a job as pipe and wire and once they have secured the job the contractor will come back and ask for permission to substitute the pipe and wiring on the job with modular or flexible wiring. At this

point the savvy project manager or facilities director needs to know what they are agreeing to and ask for rebates or a portion of the cost savings on the project.

The difference between the bid and cost is profit for the contractor, and these profits can be substantial. Of course not all jobs go smoothly and not all jobs are easy. However, if you know the potential savings with modular wiring, the project manager and facilities director should ask for a share of the savings when the contractor is requesting an alternate bid for modular wiring. More importantly specifiers, engineers, architects, and facilities managers should be specifying modular wiring from the inception of the project to keep wiring costs down and bring other benefits to the project.

### Day-to-Day and Renovation Cost Advantage

Modular wiring is safer for maintenance staff to use. The systems are designed to simply unplug and plug back together again taking out the guesswork or uncertainty about which wires go where. Quality modular wiring systems are keyed or indexed to prevent dissimilar voltages, amperages or uses from plugging together. Maintenance tasks can be accomplished by lower skilled personnel so direct labor costs are reduced.

Modular junction boxes in some systems allow for quick and fast splices for new branch circuits especially in areas with modular or movable walls. The modular wire system can be plugged and replugged in infinite configurations. Additional pieces are available to add on to your existing system or re-configure what you already have. Entire systems can be moved from one building to another, if necessary. Modular wiring is a green, ecologically friendly product. If taxes are a consideration for your facility modular wiring and the fixtures can sometimes be depreciated as a leasehold expense or business expense. Check with your accountant to see if modular wiring has any tax advantages for you.

### Future Technology Cost Advantages

What is the ampere rating of the system? The trend is going toward 30 amp 10-gauge systems where practical. These systems normally carry 4 to 10 wires depending upon the manufacturer of the system. While you may not use all of the wires now, having them in the hall or wall and ready for use is often insurance for tomorrows expansion. Savings you have with modular wiring may be used for more wires in the system.

Are there extra wires in the system for building communication and fixture com-

munication? Yes, we are beginning to see talking ballasts and fixtures that tell you if they are not performing up to par. At the end of a period, these fixtures send a report to a designated office asking for help or repair. Most likely your building automation system would like to chat with these fixtures about their energy use during the day.

### Modular Wiring Manufacturing

Quality modular wiring has the Underwriters Laboratory seal on it. This means the system complies with the National Electrical Code requirements; it has been tested and built to quality standards established by an independent testing lab. Make sure the modular wiring products you buy have this listing.

One test UL approved modular wiring must pass is plugging and unplugging continuously 250 times under 150 percent of normal ampere loads to make sure the product will not short out under normal use and applications. You also want to ask additional questions about the manufacturer:

#### **Are they ISO 9000 approved to ensure consistent quality?**

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Modular wiring is a green ecologically friendly product. If taxes are a consideration for your facility, modular wiring and the fixtures can sometimes be depreciated as a leasehold expense or business expense.

**What testing is done on the wiring before it leaves the factory?**

Normal tests are continuity, function, ground performance, and for shorts. Modular switch drops and power drop tests may include polarity, function, and grounding. Modular wiring offers consistency from one piece to the next. When you are buying prefabricated devices, make sure the device is listed with UL and not just the components.

**Will the modular wiring company ship floor-by-floor, wing-by-wing, etc., to cut down on job loss and lunch box theft?**

If you can get a manufacturer to work with you on a "just in time" delivery system as you need it, this will present cost savings for all parties. The savings include less sorting time, smaller more manageable deliveries, and better control over any problems that might occur. If there is a problem, it is much better to find out about it with only 10 percent of a building delivered as opposed to 100 percent of it delivered.

**What is the warranty is on the system?**

Most companies will offer one year on parts and labor. Oth-

ers will offer considerably longer and these can normally be negotiated. With pipe and wire systems the warranties are shorter and the quality is highly variable based on which electricians did the work and the degree of inspection completed on the project. Pipe and wire quality is a real variable from one job to the next.

**What kind of field support and help can you expect from the modular wiring company?**

Many companies offer a qualified wiring and engineering staff to help answer your questions as you work through a project of any size. This can be important in management of your inevitable project changes. You want a staff you feel comfortable working with. It would be good to fly to the vendor's factory to see the manufacturing process and meet these support staffs.

**Conclusion**

Modular wiring provides substantial cost savings to commercial and industrial projects. It should be a specification from the start of the project, negotiated as a cost savings once a contract is awarded to the contractor. 🏢

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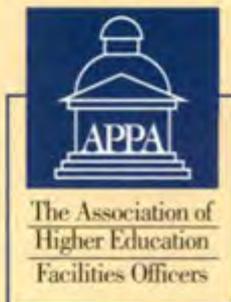
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# Effective and Innovative Practices for Stronger

# Facilities Management



by Sarah Banick

New technology offers the facilities arena a wealth of opportunities, and APPA's member schools are responding in exciting and inventive ways. Nearly every facilities department can sympathize with the challenges addressed by the winners of **APPA's 2002 Effective & Innovative Practices Award**. In this, the award's first year, we recognized five institutions. Each received a cash award of \$4,000, sponsored by the Sodexo Corporation.

The Effective & Innovative Practices award recognizes programs and processes that enhance service delivery, lower costs, increase productivity, improve customer service, generate revenue, or otherwise benefit the educational institution. Entries may highlight either a new program or significant restructuring of an existing program or process. The criteria for winning entries are based on the institutional benefit of the program; its innovation and creativity; portability and sustainability; management commitment and employee

involvement; and documentation, analysis, and customer feedback within the program. Text of the winning 2002 submissions is available on APPA's website at [www.appa.org/membership/awards/effectinnovate.html](http://www.appa.org/membership/awards/effectinnovate.html).

## **FSU: Facilities Maintenance Storefront Partnership**

At Florida State University, Assistant Vice President Mike Faires was fed up with the challenges of the university's MRO supply needs. It took 11 staff members to handle 2,300 items, an inventory worth about \$200,000. Despite that effort, analysis showed that FSU could only satisfy customer needs about 50 percent of the time. Obsolete or duplicate items made up a considerable percentage of the inventory, and customers often had to go off-campus to make "spot buys" to meet emergencies.

FSU officials decided what the university really needed was its own store—one with a large inventory, constantly updated to reflect new trends, and in synch with its customer's needs. They approached Grainger, a leading provider of MRO supplies, in search of a solution. In January 2001, Grainger opened a fully operational storefront branch on the FSU campus. It is staffed, equipped, stocked, and operated by Grainger, and dedicated solely to fulfilling the university's

*Sarah Banick is a freelance writer and editor based in Atlanta, Georgia; she can be reached at [sbanick@mindspring.com](mailto:sbanick@mindspring.com). This is her first feature for Facilities Manager.*

MRO supply needs. Grainger's inventory management system is tailored to the FSU "market." Using a multi-channel approach, Grainger offers its clients fast and convenient service. Facilities personnel can place orders by phone, fax, website, and in person. The website offers 24/7 access to supplies, with next-day availability.

In the first year of operation, FSU took a 35-percent reduction in budget and head count. The university realized a 69-percent reduction in time and cost associated with procurement. The inventory has doubled in value, to \$500,000, with a wider range of up-to-date products. FSU is no longer responsible for keeping the inventory on its books, and most importantly, the customers are happier. Mike Faires is very happy with the results. "We had some struggles at first, being new, but the system is doing really well," he said. "There are still a few things Grainger can't supply for us, but we're working with local vendors to add these to the list of offerings. Then Grainger will handle all of those, as well."

### CSU-Long Beach: Mobile/Integrated Facility Information System

At California State University-Long Beach (CSULB), Director of Facilities Management Rob Quirk, with the help of supervisor Randy Walsh, was looking for a more effective way to capture work order cost data, labor, and material costs. The answer: IFIS Mobile (Integrated Facility Information System), a Web-enabled Nextel digital phone/radio with wireless interface to CSULB's asset management program. The program relies on a rugged device that is a cell phone, digital two-way radio, two-way pager, and a live, real-time interface to the asset database.

It allows field workers to access their current work schedule, view the work order details, view equipment details, sort/search work orders by facility identification, enter time against jobs, enter cost-tracking time, and enter truck/bench material. The technology is open platform, thus widely available. Those less-populated areas not supported by wireless technology can work with their cellular provider to specify services.

Management made a \$30,000 commitment to purchase the devices and the results are overwhelming. "There was a learning curve," said Quirk, "but everyone knows how to use a telephone." Most importantly, the staff like using the device, and ask for new features

and information. Employees with the devices now account for 99 percent of available hours. Supervisors like the fact that they can keep better track of employees, based on real-time work logs. Customers have access as well, so they can review work orders and get real-time costs for budgeting. The solution has empowered workers, increased productivity, reduced overhead, and lowered markups, at the same time eliminating time cards, work order tickets, part request tickets, and material issue tickets. Quirk said that CSULB is already expanding the program, adding functions to utilize inventory and order parts.



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— Dan Pena, Assistant Chief of Police, UT, San Antonio

Supervisors like the fact that they can keep better track of employees, based on real-time work logs. Customers have access as well, so they can review work orders and get real-time costs for budgeting.

### **Miami: Using a Formal Facilities Asset Management Program to Maximize the Value of Renovation and Improvement Projects**

The University of Miami, with nearly \$800 million in physical assets, was searching for a "best practice" to emulate, when Associate Vice President Victor Atherton and Physical Plant Director Michael White decided there was not a suitable model. They set out to create their own, requiring three criteria:

- 1) a thorough and up-to-date knowledge of building conditions;
- 2) a spending plan based upon most-urgent needs; and
- 3) a comprehensive facilities maintenance program, developed in-house and tailored to each individual building and its components.

The first step required a thorough assessment of every university building, inside and out, to be performed by university staff (utilizing specialists when needed). "When outsiders come in, you get a report," said Atherton. "We use our own managers to assess on an annual basis. These are their buildings. It took three years, but when we got the data, it was phenomenal." The campus is now divided into four zones, with approximately one million square feet in each zone; the data collected were the basis for a five-year plan to eliminate high priority needs. The assessment and annual reviews make it simple to prioritize limited funds to the most urgent needs. Finally, each campus building and component has its own Facilities Coordination Committee. Facilities staff meets on a regular schedule with deans and other administrators, and information is distributed to the Board of Trustees, deans, vice president, and various other campus stakeholders. Academic staff review impending maintenance and renovations and offer feedback regarding their own expectations and needs. The system helps avoid unnecessary projects and the enhanced communication builds a bridge between academic departments and facilities planning and construction.

The savings from this program fund a large amount of deferred maintenance—\$57.2 million in 12 years. Operating and maintenance costs are more efficient, and have increased by less than one percent each year for the last decade. "It's incredible," said Atherton, "We pinch ourselves sometimes.

Through attrition we've gone from more than 100 to 58 people. We've got better quality with half the people."

### **Mizzou: Volume Purchases of Bid Document Reproductions and Distributions**

The paperwork was getting to Donald Guckert, director of facilities management at the University of Missouri-Columbia. Specifically, the cost of producing and distributing the documents necessary to support the traditional bid process. Like many universities and colleges, Mizzou's bid materials were produced by a number of design firms across the state. Each design firm utilized its own printers, submitting receipts for reimbursement. Once completed, the documents were then shipped to Columbia from St. Louis, Kansas City, or wherever they originated—often a two-hour trip. Then Mizzou staff assembled and mailed the final package. Over the years, bidder interest and the number of drawings per project grew, until one project crossed the line. Strong interest in the new business school building drove budget figures significantly higher than expected. The Facilities' department of Planning, Design, and Construction (PD&C) challenged itself to find a better way. The average 5-year square-foot-cost was approximately 15 cents, rapidly moving toward 20 cents.

"We recognized that there was emerging technology we could take advantage of to centralize all bid document reproductions," said Guckert. State-of-the-art printing equipment, not the norm at most print shops, permits high-speed, electronic reproduction of electronic files. Thus the issue became: "Could PD&C utilize this technology, consolidate bid-document reproduction orders, and funnel them to a single source under university direction—and still cut costs?" The task force discovered the answer was yes, at substantial savings of 10 cents per square-foot (roughly \$500,000 in a two-year period). The changes are seamless in Columbia, and through electronic file transfer, the bid sets are actually available quicker in St. Louis and the other sites. As fewer personnel are needed for package assembly, these employees now staff a center for archiving and managing project documents.

Mizzou still works with more than 30 statewide design firms, but with a fixed, competitive rate for reproduction, project design managers are better able to estimate reproduction costs for budgeting purposes. The audit trail is clearer. It's so successful, in fact, that Guckert says the State of the Mis-

souri has joined the university on its contract. The task force is now examining new ways digital technology can make the process even easier, including website or CD distribution.

### Oklahoma: Physical Plant Evaluation System

At the University of Oklahoma's Norman campus, Physical Plant Director Gary Ward found himself facing multiple issues related to performance evaluation. Although the university had a six-point evaluation system, it left much to be desired. Manager's rankings could be subjective (what separates a loyal, very good worker from an exceptional one?). "We needed a fair and systematic way to attach meaning to the evaluations," said Ward. In addition, job descriptions and hiring criteria offered no consistency, making it impossible to assure equitable salaries for equal work. Employees had limited access to outside training, and managers had no way of actively monitoring employees' proficiencies and progress.

Ward designed EVAL 2000, a Microsoft Access-based application that answered all these of these challenges in one fell swoop. He used business interns from the university to put his plan in place. Now, supervisors perform evaluations by scoring each employee on weighted categories with a standard measure of performance. The software computes overall numerical ratings based upon the competency ratings and their assigned weights. Merit-based pay raises are based upon employees' numerical scores, relative to other scores given by the same supervisor. Built-in decision support allows administrators to change a variety of parameters. There is support for both annual and interim evaluations, and supervisors can view a history of employees' previous evaluations. By keeping track of performance data, it is easy to see where staff needs to seek professional development.

"It's data driven, and we also produce a Top 5 list, which allows employees to know exactly which steps to take to improve their performance and salary," said Ward. Now in its third year, Oklahoma's employees have all but quit griping about salary inequities, and supervisors feel that training and hiring are much easier to document. It is simple to add new competencies, and employees seeking promotions have solid data for their cause, including specific steps toward improvement. The actual evaluation takes less time. Ward says turnover has decreased, "because good hiring criteria allows you to make better hiring decisions."

"Eval 2000 is data driven, and we also produce a Top 5 list, which allows employees to know exactly which steps to take to improve their performance and salary." Now in its third year, Oklahoma's employees have all but quit griping about salary inequities, and supervisors feel that training and hiring are much easier to document.

Has technology, or any other process, enhanced your facilities department for the better this year? If so, you may qualify for the 2003 Effective & Innovative Practices Award. **Applications are due January 31, 2003.** See <http://www.appa.org/membership/awards/effectinnovate.cfm> for full rules and submission information. Awards will be presented at the APPA Educational Facilities Forum in Nashville, Tennessee, July 27-29, 2003. 🏰

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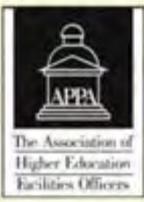


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## **Benefits of Onsite Training**

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- **Retention**—your staff will learn more effectively if they learn together
- **Economical**—no travel, hotel, or meal expenses; the ability to train your entire staff for less
- **Convenience**—schedule the training around your peak work times

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**Track 2** develops organizational leadership skills with the use of a 360-degree leadership profile and a Myers-Briggs survey. This track teaches the skills necessary to ensure the long-term effectiveness of an organization. Particular attention is paid to the concept of teamwork within an organization.

**Track 3** gives participants hands-on opportunities to apply the leadership skills and strategies discussed through a practicum/case study and other exercises. These skills will help participants to understand and appreciate the constraints, requirements, and goals of their institution.

"Since the Leadership Skills training, I see our staff using the skills that they learned. On many occasions I have heard, 'seek first to understand, then to be understood,' 'begin with the end in mind,' or 'think win-win.' Across divisions of our department, I see more interaction and greater corporation which I attribute to their participation as a group in this program."

*Mary Vosevich, Director of Physical Plant, University of New Mexico*

"The Leadership Skills training has created a more aware and cohesive facilities management team while helping to strengthen our partnership with the academic side of the house. Basically we believe that this program will create more competent employees, develop collaborative relationships with our academicians, and result in enhanced levels of credibility when bringing our expertise to the decision-making table of higher education."

*Maggie Kinnaman, Director of Business Administration, Facilities Management  
University of Maryland, Baltimore, Past President, APPA*

"The principles taught in the Leadership Skills workshop have always been critical to the work of Planning, Design & Construction personnel. We depend on forging quality relationships with people with whom we work, whether they're clients, stakeholders, contractors, architects, or coworkers. We are a lot like other departments of campus facilities in that regard. We recognized the importance of relationship building when we were working on our strategic plan. The information from the workshop will help us reach those goals."

*Donald Guckert, Director of Planning, Design, and Construction  
University of Missouri-Columbia, Editor, From Concept to Commissioning*

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## Creating a Responsive Work Environment

by James E. Christenson

"...shared values about our work hold the key to our greatest job satisfaction."

—From *A Journey into the Heroic Environment* by Rob Lebow

Does the leader of a facilities management organization have any influence over the work environment? Can he or she create a better workplace? I hope you all said "yes," "you bet ya," or something to that effect. Legislatures may hem in leaders with administrative and legal fences. The administration can be expected to add another wire to those fences. And labor agreements may padlock all the gates. But there is still much that the chief facilities officer can do within the boundaries to make it a pleasure to come to work and a delight to be a customer of the facilities organization.

A Facilities Management Evaluation Program (FMEP) Certification Task Force from APPA has recently completed documenting recommendations for relatively minor revisions to the program. This work will be reviewed by the Professional Affairs Committee and it is likely that you will see updated criteria soon.

As most institutional members know, the first of the seven evaluation categories is **leadership**. One of the criteria within that category is new. In this column, I will explain why it was added and what scoring high on that criterion might mean to your organization. In the draft, this criterion is numbered 1.9. It reads as follows: *Senior leaders establish and reinforce an environment where shared values sup-*



*port self-direction, innovation, and decentralized decision making.* I make no guarantee that this will stay in the FMEP criteria, or that it will read as above. But I think it is an issue that merits your attention.

What would it be like if the important values of your organization were also the values of each individual in the organization? If these values were aligned with "true north" principles, as Stephen Covey calls them (absolute trustworthiness, fairness, etc.), this might be the utopian facilities department. So what prevents us from getting there? Might it just be our perception that we are powerless to make the necessary changes or to counter the negative, bureaucratic forces arrayed against us?

Rob Lebow, the author of the book *A Journey into the Heroic Environment*, believes the work environment of any organization can be transformed by its own members. Although any person can initiate change within her or his circle of influence, the leader is in the best position to make the change ubiquitous and permanent. Lebow has his own set of principles that he feels should guide this change and should underlie the values of a good organization. They are as follows:

1. Treat others with uncompromising truth.
2. Lavish trust on your associates.
3. Mentor unselfishly.
4. Be receptive to new ideas, regardless of their origin.
5. Take personal risks for the organization's sake.
6. Give credit where it's due.
7. Do not touch dishonest dollars.
8. Put the interests of others before your own.

As you look through the list, I challenge you to find one principle that you cannot practice, no matter how tightly you are controlled from outside your department. I grant you that number 5 will test your integrity if your supervisor is autocratic and conservative. That one may require some serious choices on your part. But if you can get over that hurdle, you can certainly do the rest.

By way of explanation, the eight principles might be amplified and applied, in part, in these ways:

1. **Telling people the truth**—No secrets. No one is to be left in the dark.
2. **Lavishing trust**—Trust people to the point where they really feel trusted.
3. **Mentoring**—A mentor does more than show how to do something. He or she is an advisor, teacher, and friend. Under this principle, everyone is mentored since the team depends on the success of each member.
4. **Being open to ideas**—Welcome ideas from customers, business partners, magazines and books, and from every member of the department.
5. **Taking personal risk**—Each person's growth depends on that person taking a risk and trying new approaches and/or new ideas. This principle also determines the growth and success of the

*Jim Christenson is an APPA member emeritus and can be reached at [jchrste@jackelec.com](mailto:jchrste@jackelec.com).*

department in the eyes of the customer. Excellence is not nurtured by the "this is the way we've always done it" mentality.

6. **Giving credit where due**—People want to understand the reward system and they expect a logical basis for rewards. Fairness is essential. This comes easier if there is full trust and trustworthiness within the organization.
7. **Honesty**—If workers feel the leadership of the organization is dishonest in anything at all, they can rationalize their own poor work, such as loafing or outright theft. The integrity of the leadership must be solid enough so that in perception as well as in fact, there is absolutely no occasion for doubt. All transactions must be completely legal and ethical.
8. **Putting others first**—Myopic self interest must yield to the good of the whole organization.

Converting these principles into shared values does not happen

overnight. The leader must personally live the principles, must consistently "walk the talk." Eventually, by a variety of teaching/learning techniques, one or more of the principles will resonate with each member of the team. These principles need to be fully understood, appreciated, and adopted throughout the organization. Once that is done, leadership becomes much easier. If "people values" are universally shared, desirable business values—such as top quality service and products, ethical practices, and outstanding customer service—follow quite naturally. If employees are treated well and treat each other with respect, they will treat their customer well. The "Field Notes" column in the July/August 2001 issue of *Facilities Manager* contains some suggestions for making the transition.

In the old-style hierarchical organization, every move of every worker is prescribed. Written procedures abound. Supervisors must continu-

ously lay out the details of the work for each subordinate. So the overhead cost is high. Yet productivity is low because individual workers do not have a chance to use their brain. They have been, in effect, ordered to leave it in the parking lot, where they can pick it up and resuscitate it when the workday is over. As a result, morale is low—and the evidence of that is seen and heard throughout the institution.

When positive people values and business values are universally shared in the department, and where appropriate training and development accompany the transition, each individual becomes self-directed. There is little need to "check it with the boss" since each person shares the value system and has the knowledge and skill to make the decisions. Fewer supervisors and managers are needed and those who remain become coaches and mentors more than bosses. The money saved in salaries by leaving managerial and supervisory positions unfilled can go toward eliminating some of the adverse effects that everyone has been experiencing with budget cuts.

In the shared-values work environment, every person is encouraged to seek innovations and to improve services and products. All brains need to be engaged in order to serve the customer in new, better, and more cost-effective ways. This effect is enhanced as the work force becomes more diverse, adding a wider array of backgrounds, experiences, and ways of thinking. A shared-work environment can unleash a vast resource of wisdom to help solve problems and spot opportunities. The organization is responsive to the value added by all of its members.

The challenge of the leader, then, as stated in the draft FMEP criterion first quoted, is to create the conditions for this to happen. That is not easily done. But it is foundational to an effective organization and is well worth the effort. 🏠

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## Maximum Capital Project Management

by Matt Adams, PE.

Depending on the size of an institution, the make-up of the capital project planning and execution arm of the facility management function varies considerably. In smaller institutions, the top one or two senior administrators work with consultants and perhaps a board member to make the decisions. At larger institutions, a fully constructed facility planning and development unit executes this function. While the look and feel of the planning and development units vary, the purpose does not. Their goal is to make cohesive and informed decisions on proposed capital projects. This is only done effectively with an acute understanding of the institutional mission, priorities, contingent impacts, and opportunities for economies of scale.

### Stage 1—Individual Capital Project Submission

- *Interdepartment proposal format/template and prioritization process.*

The first step in the capital project planning process is the introduction of projects into the "queue." Many institutions do not manage this first step well and the results are chaotic. The basic information required for a capital project proposal is easy to delineate. Some of the planning work should occur within departments prior to a proposal reaching the institutional planning process. A basic

*Matt Adams is president of The Adams Consulting Group, Atlanta, Georgia. He is a coauthor of APPA's new book, Maintenance Staffing Guidelines for Educational Facilities, and can be reached at matt@adams-grp.com.*



In order to use capital projects to further the institutional mission, there must be such a mission in place. Ideally, this includes the academic mission, the campus master plan, and any other long-term initiatives affected by facilities.

template that describes the information required for a proposal should be put on the web for department planners to download. This template should require the department to prioritize its own interdepartmental capital project needs. At specified intervals, capital projects—properly compiled and published in standard form—are received by the institution's capital project planning function.

### Stage 2—Capital Project Proposal Assessment

- *Review of proposal in the context of mission statements and goals of the institution.*
- *Clear and specific "due-diligence" reviews of forwarded proposals from EHS, Space Planning and Management, Facility Planning and Design, Academic Affairs, Physical Plant, and others.*

- *Add "Impact" fees for each consideration review. Compile all fees into a holistic "pro forma" financial statement for each proposal.*
- *Pre-score each proposal based on standing Capital Project Performance Metrics which are developed directly from the mission statements, master plan, and other goals of the institution.*

In any process where there are many variables and competing priorities for limited resources, a "triage" process must be used. To accomplish this, the project planning process must start with a prioritization of priorities. That may sound confusing, but it is more clear when in place. Another way to look at this prioritization is to try and rank competing priorities as planning filters. There are some filters (Tier 1) that are "show-stoppers." An example of a Tier 1 filter is that no capital project can be at conflict with a stated mission of the institution. The more clearly the mission is defined, the easier it is to execute this filter. The next set of priorities or filters (Tier 2) provide plan refinement and accuracy. For example, technology and landscape may both be priorities at this time, but technology has a higher priority. Defining priority relationships adds intelligence to the capital planning process.

In order to use capital projects to further the institutional mission, there must be such a mission in place. Ideally, this includes the academic mission, the campus master plan, and any other long-term initiatives affected by facilities. Unfortunately, the mission statements are not always well thought-out or formally published documents. Nevertheless, even if the information is stored within the collective "gray-

matter" of the senior administration, capital project planning must speak to it. In the simplest of terms, the mission is the goal and the priorities are the critical outcomes that most clearly move the collective institution toward achieving its mission.

As project proposals are processed by the planning and development unit, intelligence is added to them. To do this, a 360-degree review of each

proposal is made to fully identify the financial and operational impact created by each proposed project. Actual representatives from functional areas of the institution with contingent impacts or liabilities must scrutinize each proposal in a standard format. For example, in order to fully load the pro forma financial statement for each proposal, at least the following contingencies must be considered:

- infrastructure costs
- moving costs and back-fill costs for relocations
- code compliance costs
- technology costs
- operations and maintenance costs
- contingent deferred maintenance or adaptation costs
- possible economies of scale from combination of multiple projects

Once a true financial and functional pro forma is compiled, the composite score of the proposal with respect to institutional critical outcomes is applied. This score directly links the proposals to the impact on institutional missions and priorities.

### Stage 3—Executive Committee

- Review and approve proposals, direct further study, or refuse with comment.

Once the proposal packages are forwarded to the executive body for approval, they should be fully intelligent. That is to say, that each of the proposals should be fully ranked, scored, and assessed in the full context of those priorities and impacts that are of consideration to the approval body. The hard and difficult decision of go and no-go for proposed projects is as streamlined and practical as possible at this point. The senior administration must have confidence that the processing of projects has resulted in a prioritization and impact modeling that allows for highly efficacious decisions with limited dollars.

### Stage 4—Capital Project Execution

- Standard finance package compilation, Space Plan, Repeated Related or Contingent Project Review, Schedule, Hand-off to Facilities Planning and Design.

At this point, these well thought-out projects are ready for execution. The integrity of the whole process is very high. The limited capital dollars are being invested where they will best further the mission of the institution. 📌

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

This month brings two technical manuals that deal with difficult issues. They may have limited appeal but they both do a good job putting very complex information into a readable form.

\*\*\*

**Preventive Maintenance for Higher Education Facilities**, by Applied Management Engineering, Inc. Kingston, Massachusetts: R.S. Means Company, Inc., 200 pages, 3-ring leaf binder with downloadable files.

We keep hearing about the importance of preventive maintenance (PM) and we know what it is, but few of us can articulate, with significant specificity, what it is, until now. *Preventive Maintenance* provides the educational facilities officer with examples of preventive maintenance activities that can be performed on typical building components, chillers, heat exchanges, fume hoods, elevators, etc., and provides the rationale to do the work rather than avoid it.

I will admit up front that I'm biased. I have worked on campuses that have a history of not performing preventive maintenance, and because of this, the equipment was driven into

*Ted Weidner is associate vice chancellor, facilities and campus services, at the University of Massachusetts/Amherst. He is a coauthor of APPA's new book Maintenance Staffing Guidelines for Educational Facilities, and can be reached at [tweidner@charter.net](mailto:tweidner@charter.net).*



the ground. As a result, the campus developed a deferred maintenance backlog faster than it should have. And of course, we are now paying the price. The temptation to do the same thing to new facilities and equipment is there because of financial and other pressures. A quick read of this book and I am now convinced that PM is the right thing to do.

The book is divided into four parts. There is an introductory narrative (with some quick numbers) that shows why PM is important. Part Two talks about 13 typical buildings that demonstrate how little time is really needed for a good PM program on a campus. Part Three presents 50 checklists of typical equipment used in maintenance. The Appendix presents a simple return-on-investment example to seal the deal. The beauty of the book is that it contains downloadable spreadsheets that allow the user to customize tasks for a particular campus and to make appropriate adjustments for campus equipment. In other words, most of the work has been done.

My added bias is as an author of *Maintenance Staffing Guidelines for Educational Facilities*, published this past summer by APPA. This book

recommends staffing levels addressing both preventive maintenance activities as well as the other customer service activities that are typical on a campus. I am comforted to see that the PM tasks described in *Preventive Maintenance* are consistent with staffing levels in *Maintenance Staffing Guidelines* and that the text provides further proof and justification for the staffing recommendations.

If you can stand a biased opinion, based on experience and research, you will add this book to your reference library and reap the benefits of the vast knowledge and experience of AME. It will make your job easier and the campus environment better for the future.

\*\*\*

**Designing with Structural Steel, A Guide for Architects**, 2nd edition. Chicago, Illinois: American Institute of Steel Construction, 2002. 416 pages, 3-ring looseleaf binder.

Facility officers regularly deal with architectural and structural designers whenever a new building, addition, or renovation is planned. We pay close attention to how the components of campus buildings go together because we know from experience that when buildings are well thought-out and detailed, they are easier to maintain than ones that are not. *Designing with Structural Steel* is a manual that will help facility officers understand why buildings are designed with particular features and will help them become more aware of features they want in a building.

The manual is divided into five sections. The first section, labeled

"Ideas," is a collection of creatively designed steel buildings. This collection of buildings could be used as a marketing brochure but it also demonstrates creative and attractive uses of steel. The meat of the manual begins with the second section, "Systems." Here basic structural engineering concepts are presented. This is not a shortcut to a structural engineering license but it does provide a

good understanding of what the structural engineer will do when using cross-bracing or beam sizing to make a building withstand the vertical and horizontal loads it will experience. This section also includes important information about painting steel, fireproofing, and the preparation of the steel. If you are a construction observer, this section will help you do your job better.

The "Details" section includes a small sample of standard items and highlights important considerations for different applications. Additional references appear in section five, which includes a nice listing of construction organizations with addresses and websites.

Sections three and four address "Materials" and "Details" and discuss the important dimensional information that architects need. Dimensional information is provided, similar to the standard AISC design manual, but little mechanical information is included. This makes sense based on the intended audience of the manual. Structural engineers will not find as much value in this book as will architects. The "Details" section includes a small sample of standard items and highlights important considerations for different applications. Additional references appear in section five, which includes a nice listing of construction organizations with addresses and websites. Several international organizations are also included.

While this manual is not for everyone, it is a very good summary of what construction with structural steel requires. It provides an excellent value on the subject matter and would be a welcome addition to any facilities library where steel construction is the primary structural system. 🏗️

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# New Products

New Products listings are provided by the manufacturers and suppliers and are selected by the editors for variety and innovation. For more information or to submit a New Products listing, contact Gerry Van Treeck, Achieve Communications, 3221 Prestwich Lane, Northbrook, IL 60062; phone 847-562-8633; e-mail [gytgv@earthlink.net](mailto:gytgv@earthlink.net).

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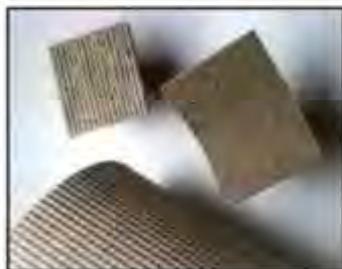


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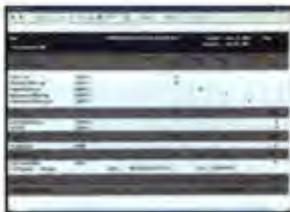
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# Coming Events

## APPA Events

For more information on APPA seminars and programs, visit our website's interactive calendar of events at [www.appa.org/education](http://www.appa.org/education).

### Nov 17-20, 2002—ACUHO-I/APPA 2002 Facilities Workshop.

Nashville, TN. Contact Gary Thompson, 919-515-3040 or [gary\\_thompson@ncsu.edu](mailto:gary_thompson@ncsu.edu)

### Jan 26-30, 2003—Institute for Facilities Management.

Fort Worth, TX.

### Jun 8-12, 2003—Professional Leadership Academy.

Rancho Mirage, CA.

### Jul 27-29, 2003—Educational Facilities Forum.

Nashville, TN; co-located with Nacubo.

### Sep 14-18, 2003—Institute for Facilities Management.

Indian Wells, CA.

## APPA Regional Meetings

### Sep 17-20, 2003—RMA Regional Meeting.

Sedona, AZ. Contact Polly Pinney, 480-965-6106 or [polly.pinney@asu.edu](mailto:polly.pinney@asu.edu).

### Sep 27-Oct 3, 2003—ERAPPA

**Regional Meeting.** Philadelphia, PA. Contact Fred Long, 215-951-1315 or [long@lasalle.edu](mailto:long@lasalle.edu).

### Sep 27-Oct 1, 2003—MAPPA

**Regional Meeting.** St. Louis, MO. Contact Robert Washburn, 618-650-8560 or [rwashbu@siue.edu](mailto:rwashbu@siue.edu).

### Sep 27-Oct 1, 2003—PCAPPA

**Regional Meeting.** Portland, OR. Contact Townsend Angell, 503-777-7763 or [townsend.angell@reed.edu](mailto:townsend.angell@reed.edu).

### Oct 10-14, 2003—CAPPA Regional Meeting.

Corpus Christi, TX. Contact Ron Smith, 361-825-2422 or [ronsmith@falcon.tamucc.edu](mailto:ronsmith@falcon.tamucc.edu).

### Oct 11-14, 2003—SRAPPA

**Regional Meeting.** West Virginia University. Contact Lee Comer, 304-293-2330 or [lcomer2@wvu.edu](mailto:lcomer2@wvu.edu).

## Other Events

### Nov 18-19—Capitalizing on Digital Construction.

Phoenix, AZ. Contact Stacie Gladden, 480-965-9282 or [stacie.gladden@asu.edu](mailto:stacie.gladden@asu.edu).

### Nov 20-22—Facilities/Infrastructure Certification Program.

Boston, MA. Contact Peter Cholakakis, 617-451-5100 or [pcholakakis@vfa.com](mailto:pcholakis@vfa.com) or [www.vfa.com](http://www.vfa.com).

### Nov 20-22—Physical Security: Advanced Applications & Technology.

Miami, FL. Contact American Society for Industrial Security, 703-519-6200 or [asis@asisonline.org](mailto:asis@asisonline.org) or [www.asisonline.org/calendar2002.html](http://www.asisonline.org/calendar2002.html).

### Dec 10-11—Maintenance & Repair of Parking Facilities.

Madison, WI. Contact Raymond Matulionis 608-262-4468 or [matulionis@epd.engr.wisc.net](mailto:matulionis@epd.engr.wisc.net).

### Dec 12-13—The "Contractors" Construction Superconference.

San Francisco, CA. Contact Customer Service 866-587-7280 or [www.andrewsconferences.com/glance/12-12-02.html](http://www.andrewsconferences.com/glance/12-12-02.html).

### Feb 2-4, 2003—Annual Conference of the Association of Applied IPM Ecologists.

"The Urban-Ag Interface and the Future of Agriculture." San Luis Obispo, CA. Contact Jill Klein 707-265-9349 or visit [www.aaie.net](http://www.aaie.net).

### Feb 26-27, 2003—Waterproofing & Moisture Control.

Madison, WI. Contact Nora Kaufman 608-262-8219, [kaufman@edp.engr.wisc.edu](mailto:kaufman@edp.engr.wisc.edu).

### Mar 2-5, 2003—ACUI Annual Conference.

Chicago, IL. Contact [www.acuiweb.org](http://www.acuiweb.org) or 812-855-8550.

### March 18-20, 2003—National Facilities Management and Technology Conference/ Exposition (NFM&T).

Baltimore, MD. Contact Tim Rowe 414-228-7701, [tim.rowe@tradeppress.com](mailto:tim.rowe@tradeppress.com), or [www.nfimt.com](http://www.nfimt.com).

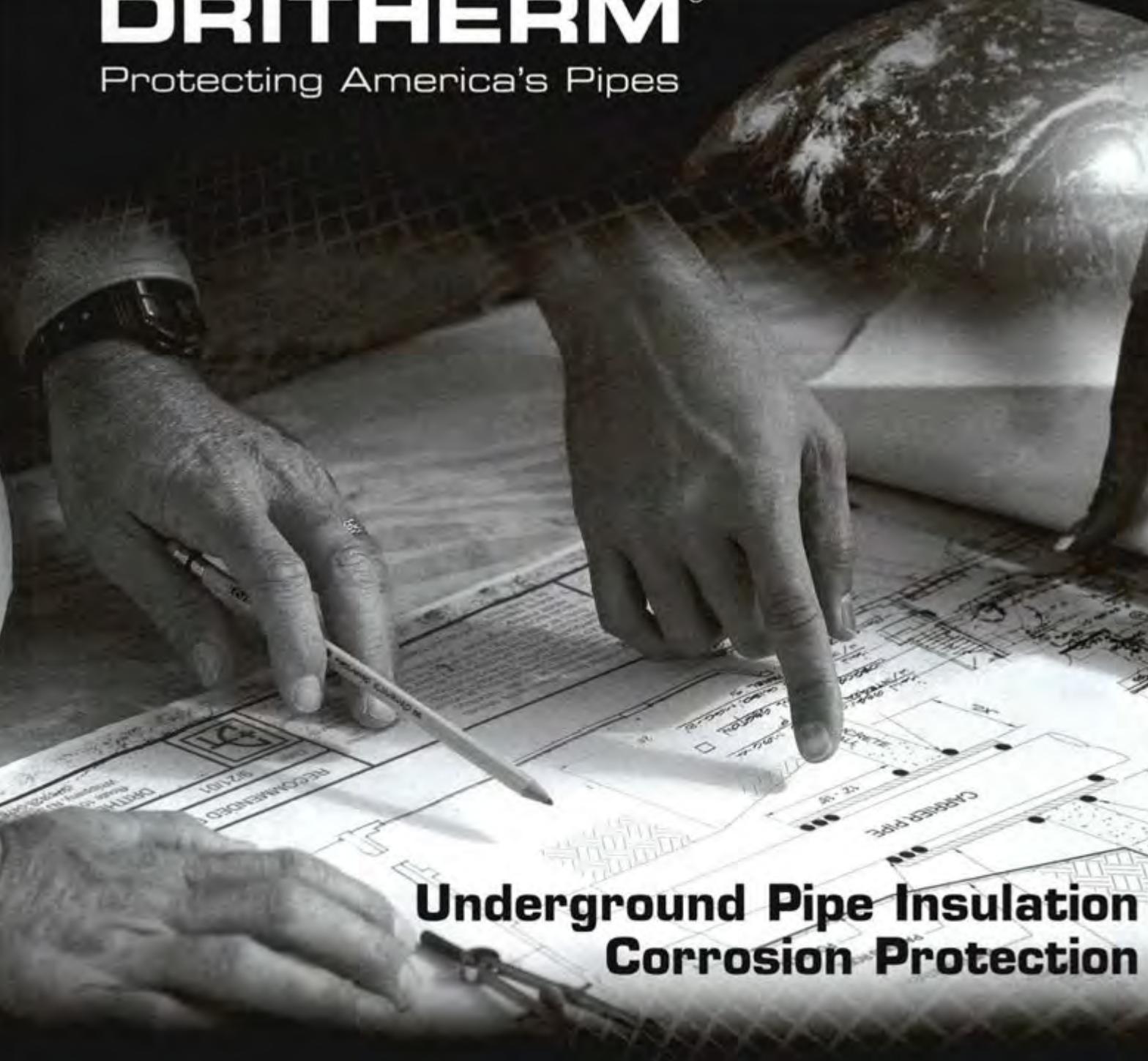
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<i>FIS</i>	<i>Primavera</i>	<i>MAXIMUS</i>	<i>Key-Z</i>
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