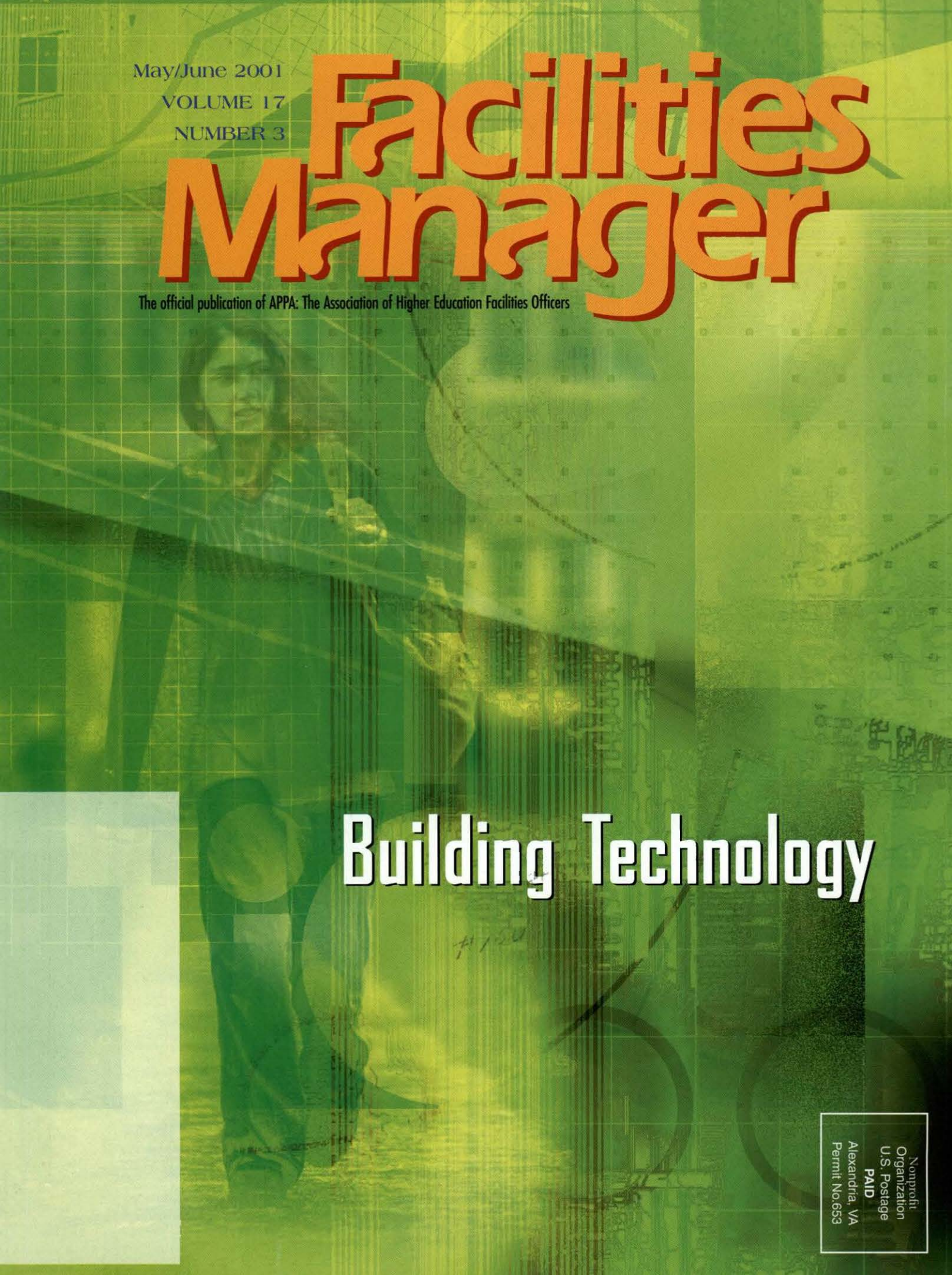
May/June 2001
VOLUME 17
NUMBER 3

Facilities Manager

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



Building Technology

Facility Asset Management Software

We Are GASB 34 Compliant!

Innovative Software For Innovative Campus Facilities Management.

For over a decade, TMA Systems has been recognized as a technology innovator and provider of expert solutions for educational facility management professionals.

At TMA, we pride ourselves on offering total solutions for effective asset management that our clients can measure in lower operating costs and the highest return on investment.

Now, TMA is excited to offer WebTMA®, the market's most comprehensive ASP online CMMS solution.

Find out how TMA can assist you today.

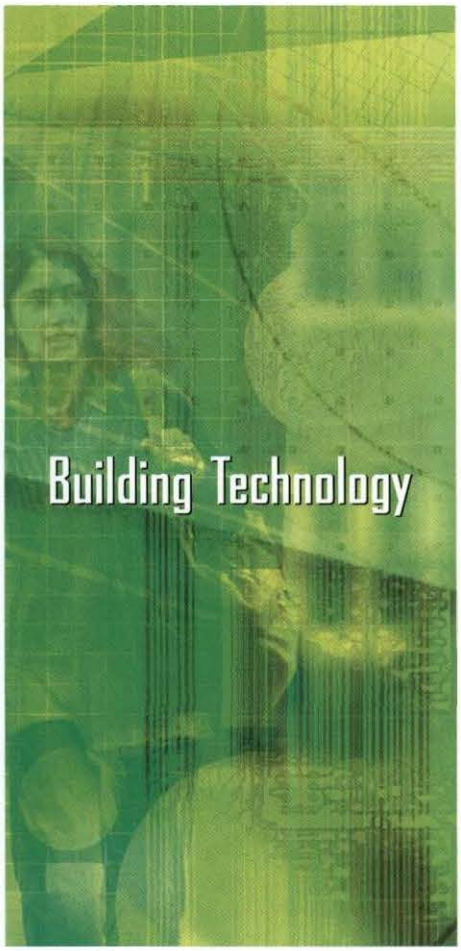
Visit www.tmasystems.com. Or call 1-800-862-1130.

TMASYSTEMS

The Power To Manage.
The Power To Succeed.

Facilities Manager
The Official Publication of APPA: The Association of Higher Education Facilities Officers

Volume 17 Number 3 May/June 2001



Features

19 The Changing Shape of Technology on Campus: From Emergence To Convergence
by Kevin Cunningham and Sylvia Rainey

23 Maximizing Your Investment in Building Automation System Technology
by Charles Darnell

27 Skilling Up the Workforce for New Technologies
by Mark A. King

33 The Benefits of Mixed Flow Technology Roof Exhaust Fans
by Paul A. Tetley

39 Cultural Change and a Balanced Scorecard: Does Your Organization Measure Up?
by Chris K. McAlary

Departments

From the Editor 2

APPA News 3

Executive Summary 7
What the Big "E" Really Means
by E. Lander Medlin

Membership Matters 11
How to Get the Edge in Uncertain Times
by Dina Murray

Perspective 13
Meaning Business
by William Love

Field Notes 15
What Is Leadership Anyway?
by James E. Christenson

Facility Asset Management 45
There's Strength in Numbers: The Facility Asset Management Process
by Matt Adams, P.E.

Listnotes 47
Facilities Management Technology
by Jennifer Graham

The Bookshelf 49
Book Review Editor: Theodore J. Weidner, Ph.D., P.E., AIA

Reviewed in this issue:

- *Technology-Driven Planning: Principles to Practice*
- *Historic Preservation Project Planning & Estimating*
- *Quality in the Constructed Project: A Guide for Owners, Designers, and Constructors*

New Products 51

Coming Events 52

Index of Advertisers 52

Facilities Manager

PRESIDENT: John P. Harrod Jr., University of Wisconsin/Madison
EXECUTIVE VICE PRESIDENT: E. Lander Medlin, Alexandria, Virginia

EDITOR: Steve Glazner
ASSOCIATE EDITOR: Medea Ranck
ASSISTANT EDITOR: Jennifer Graham
SUBSCRIPTIONS: Cotrenia Aytch
CREATIVE DIRECTION: Corporate Design
PRINTING: Corporate Press, Inc.
EDITORIAL OFFICE: 703-684-1446 ext. 236
FAX: 703-549-2772
E-MAIL: steve@appa.org
jgraham@appa.org
medea@appa.org
cotrenia@appa.org
WEB: 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: gvtgvt@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.

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

Global Partner in Learning

by Steve Glazner

Integrating People,

Technology, and Design was the theme of the first-ever Emergent Building Technologies Conference, held last February in Las Vegas, Nevada. It was not an accident that the word "people" comes first in that phrase.

As a founding cosponsor of the EBTC, it was important to APPA that we not lose sight of the purposes of technology in building design and use—to serve the educational, research, or business needs of the people who live and work there.

APPA was fortunate to have been one of the sponsoring organizations of the EBTC. Our cosponsors in this exciting and daunting venture are the Construction Specifications Institute (CSI), an APPA strategic alliance partner based in Alexandria, Virginia, and the National Systems Contractors Association (NSCA), an association of systems integrators based in Cedar Rapids, Iowa. Many staff members from all three associations worked hundreds of hours to create, develop, promote, and implement the Emergent Building Technologies Conference.

The EBTC drew more than 450 people to educational sessions on the latest advances in building technology, as well as to the learning lab demonstration area for attendees to both observe and experience product use. We dispensed with the traditional trade show concept and replaced it with a unique and innovative learning lab environment that included a section sponsored by APPA and Siemens. We wish to thank Sylvia Rainey and all the Siemens companies that came together to develop and staff this important educational event.

We also thank the varied associations that came together as endorsing societies for the first EBTC. They include ACUTA: Association for Telecommunications Professionals in Higher Education, American Consulting Engineers Council, American Institute of Architects, Architectural Woodwork Institute, Building Futures Council, Civil Engineering Research Foundation, Door and Hardware Institute, EDUCAUSE, International Communications Industries Association, National Glass Association, National Institute of Building Sciences, Society for College and University Planning, and Society for Marketing Professional Services.

Corporate sponsorship of the EBTC came from the McGraw-Hill Construction Information Group. In addition to APPA/Siemens, other learning lab sponsors included CSI/Revit Technology Corporation and NSCA's Technology Pavilion.

APPA, CSI, and NSCA are already preparing for the 2002 Emergent Building Technologies Conference, which will be held next February again in Las Vegas. We are completely revising the form of educational delivery for the next conference, including more hands-on, interactive demonstrations in the learning lab area. We will bring you further information as we develop the program and identify our keynote speakers. Please visit www.emergent-buildingtech.com regularly for more information on next year's conference.

In this issue you'll read about several technologies and concepts that were introduced at the EBTC. I also direct you to Lander Medlin's summary of the excellent keynote presentations given by futurists Elliot Masie and Michael Joroff. They truly set the tone for any discussion of building technology and its role in our learning worlds.

In Memoriam:
We recognize and honor the following APPA Emeritus members who have recently passed away.

- **George W. Matters,** Thomas Jefferson University
- **Bob Naugle,** Bucknell University.

Don't Miss These Dates

On July 22-24, 2001 the 2001 Educational Conference and 88th Annual Meeting will take place in Montreal, Canada. You can register on-line at www.appa.org for the conference.

MONTREAL 2001

June 18, 2001 is the cut-off date to reserve a room at the Fairmont Queen Elizabeth hotel in Montreal, where the conference takes place, at designated APPA rates. Keep in mind that hotel reservations are on a first come, first serve basis, and you should make your hotel reservations as soon as possible. You cannot reserve a hotel room via APPA's website. You must contact the hotel directly at 800-441-1414 or 514-861-3511 or by fax at 514-954-2256.

Call For Photos

APPA is building a collection of photographs of member campuses for use as illustrations in our brochures, advertising, magazine, website, and other materials. Are you particularly proud of a specific part of your campus? Got a beautiful new building to show off? Proud of the landscaping around your quad? Is your school known for its historic buildings? This is your chance to show it off! Here are the details:

1. Photos should be 8x10 glossy color

or high resolution image file (TIF or JPEG format).
2. Photos must not be copyrighted and must be the property of person submitting them.
3. Photos should be clearly labeled on back with date taken, subject of photo, institution, and the contributor's name, title, and phone number.
4. All photos submitted will become the property of APPA to use as deemed appropriate in our various promotional/informational materials (print and electronic).
5. Whenever a photo is used, APPA will run a caption beneath or alongside identifying the institution and subject depicted.

Send photos or electronic files to APPA, Attn: Medea Ranck, 1643 Prince Street, Alexandria, VA 22314-2818; e-mail: medea@appa.org.

Education Survey Uncovers Mixed Feelings

A new survey by the American Council on Education (ACE) reported that the public knows very little about distance learning. Seventy-eight percent of respondents said they had never known anyone to take a class over the Internet. Distance learning is certainly not the only topic covered in ACE's new report, *Taking Stock: How Americans Judge Quality, Value, Affordability, and Leadership at U.S. Colleges and Universities.*

The bad news is that the respondents as a whole felt that college and university presidents were more concerned about the school as an institution then about students, or the best interest of the public.

The good news is that people continue to value higher education and they rate the quality of that education highly. Seventeen percent of respondents gave colleges and universities an "excellent" mark, while 57 percent gave a mark of "good." These findings follow with people reporting that they know more about the cost of higher education and obtaining financial aid.

The report was based on a national poll of 850 Americans and was conducted by KRC Research & Consulting. For more information or a copy of the report ($15), contact ACE Fulfillment Services, Department 191, Washington, DC 20055-0191, 301-604-9073.

Energy Star Awards APPA Members

The 2001 Energy Star Awards took place on March 20, 2001 in Washington, DC. Thirty-four different businesses, schools, universities, utilities, and other organizations received the Partner of the Year award from Energy Star for their efforts and achievements to increase energy efficiency. APPA members Johnson Controls, Inc., the University of Missouri at Columbia, and the University of Virginia received the award.

The U.S. Environmental Protection Agency (EPA) and the Department of Energy sponsor Energy Star and the awards ceremony. This year, Christie Todd Whitman, EPA administrator delivered the keynote address. Tina Settecase, vice president and general manager, home appliances, for Sears, Roebuck & Company, was the featured Partner of the Year speaker. For more information on the awards, contact Krista Martin at 202-944-5179 or kmartin@hillandknowlton.com.

Domain Wars

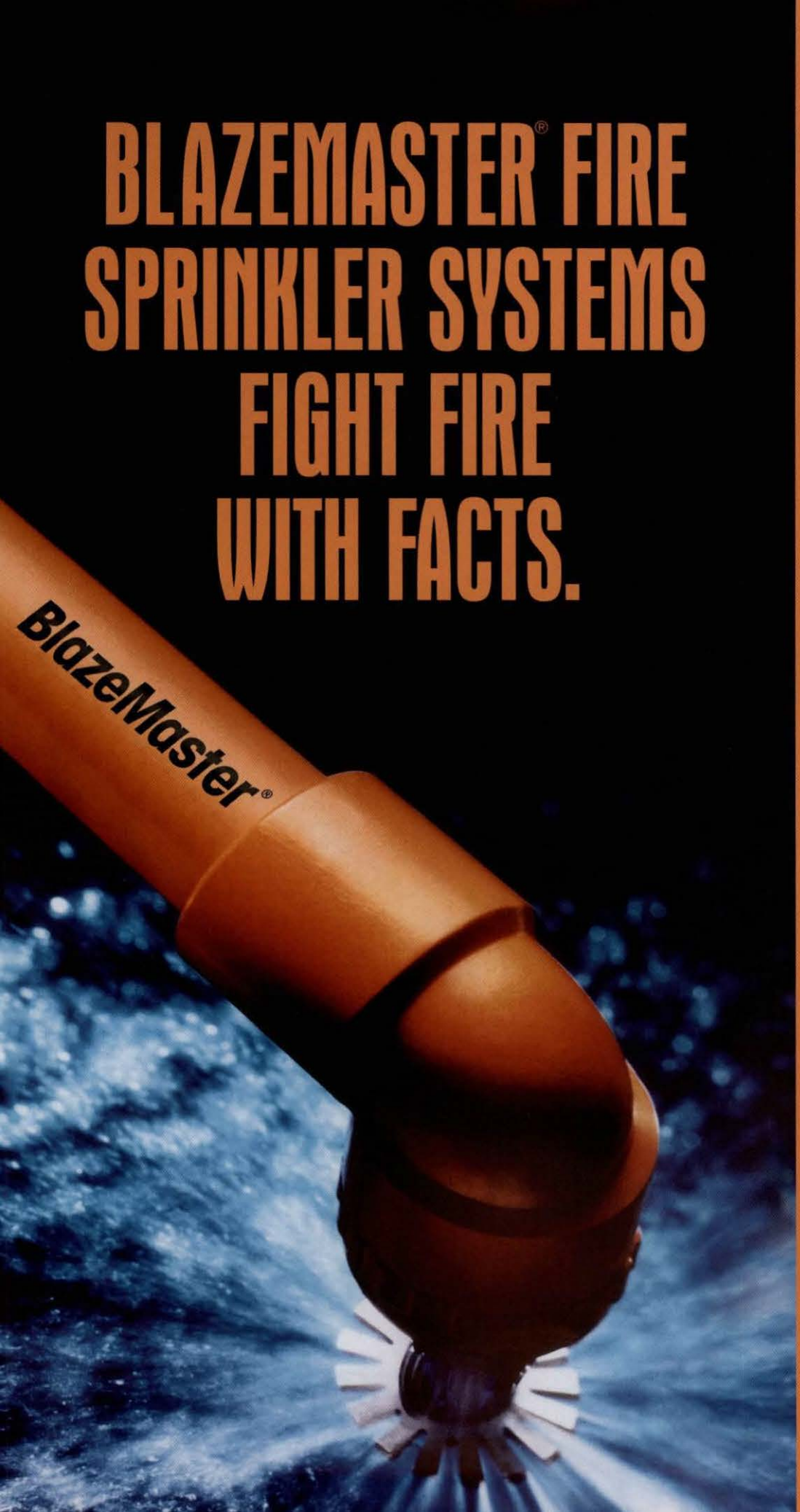
There is an ongoing debate regarding the .edu domain designation, used by 4-year colleges and universities only. Community colleges, as well as K-12 schools, are outraged that they aren't able to use this designation for their schools, leading to lengthy and confusing domain names. For example, Northern Virginia Community College's website address is www.nv.cc.va.us, as opposed to say nvcc.edu.

As of now, a company called Network Solutions handles the registering of .edu domain names, and their contract with the government, who is ultimately responsible for this rule that was created in 1993, doesn't expire until the end of 2001. Will this restriction be overruled by next year?

Schools and community colleges across the country hope that EDUCAUSE, an organization whose goal is to create change and incorporate technology in higher education, will take over the contract from Network Solutions, and with authorization from the Department of Commerce, change the rule.

On April 11, 2001, the Department of Commerce announced that it will in fact enter into an agreement with EDUCAUSE. Under this cooperative contract, EDUCAUSE will be responsible for creating and maintaining the database of campus' .edu Internet addresses. Please see www.educause.edu for more information.

BLAZEMASTER® FIRE SPRINKLER SYSTEMS FIGHT FIRE WITH FACTS.



The facts prove it. You can't choose more reliable fire protection than BlazeMaster® CPVC fire sprinkler systems.

- *NSF approved*
- *UL listed*
- *Factory Mutual approved**
- *Loss Prevention Council approved*
- *Approved for use in air plenums, per NFPA 90A*
- *Meets ASTM standards*
- *Pressure rated for water service by the Plastic Pipe Institute*
- *Quality-made in the U.S.A.*
- *Quality of pipe program*

Our 15-year track record provides proof of our reliability. BlazeMaster CPVC pipe and fittings have outstanding corrosion resistance, low flame spread, low smoke characteristics, and a Hazen-Williams "C" Factor of 150. Quality is so high, BlazeMaster fire sprinkler systems have a 50-year life expectancy with a safety factor of 2. And nothing is quicker, cleaner, quieter or easier to install, helping keep installation costs much lower.

So fight fire with facts. Think BlazeMaster CPVC fire sprinkler pipe and fittings. For more information contact the BlazeMaster Marketing Department, 9911 Brecksville Road, Cleveland OH 44141-3247, 888-234-2436. www.blazemaster.com

BlazeMaster®
FIRE SPRINKLER SYSTEMS

COLD HARD FACT #1

This Quiet Unassuming Machine

Drains Your Utility Budget

Vending machines use an incredible amount of electricity to keep beverages cold.
VENDINGMISER *can help you save hundreds of dollars a year on <u>each</u> vending machine.*

Money In Your Pocket

VENDINGMISER uses a passive infrared sensor to completely power down a vending machine when the area surrounding it is unoccupied. When someone approaches the machine, VENDINGMISER restores its power.

Product in the vending machines always stays cold because VENDINGMISER automatically restores power to the machine at preset intervals. VENDINGMISER will never power down a vending machine while the compressor is running or cut short a cooling cycle once it repowers the unit.

The VENDINGMISER Advantage

Approved for use by both Coke® and Pepsi®

- Invisible to vending machine users
- Easy to install and requires no service
- Pays for itself in about one year
- Monitors electrical current to protect/prolong compressor life
- Reduces vending machine maintenance costs
- Keeps beverages ice cold...summer or winter
- Much better choice than de-lamping (no sales impact)
- Three year "no-quibble" warranty
- Thousands already in use across the country
- UL Listed

Save More Than Money

Companies and institutions using VENDINGMISER are cutting their energy bills by an average of 47%. VENDINGMISER reduces the usage of electricity, thereby lowering our dependence on fossil fuels, reducing pollution and leading to a cleaner environment.

Easy Installation

VENDINGMISER is a plug-and-play device with no settings or adjustments. Your vending machine is not even touched. VENDINGMISER'S three year warranty is a demonstration of our confidence in your satisfaction.

Call Today!

To learn more about VENDINGMISER call 1-800-770-8539 for the name of a representative in your area, or visit our web site at www.bayviewtech.com and click on PRODUCTS.

VendingMI$ER BAYVIEW TECHNOLOGY™

Bayview Technology Group, Incorporated • 1091 Industrial Rd., Suite 106 • San Carlos, CA 94070 • www.bayviewtech.com

What the Big "E" Really Means

by E. Lander Medlin

The most important force at work today is technology—or is it? Without a doubt, technology is radically transforming the economy, the workplace, and society as a whole. We are rapidly continuing our transition from a goods-and-materials-based economy to an economy built on information and ideas. However, so much can be copied or reproduced that goods and materials, as well as information, becomes cheap or of a lesser value.

So what becomes of value? Human time, attention, and relationships are the rare and valued possessions. This notion is reinforced time and again by writers and speakers alike. Our ability to build and nurture effective interpersonal relationships is and will be the thing of most value. The Web will indeed allow greater opportunities for connectivity and empowerment, in new and different ways that we must continue to learn and relearn.

All of those in attendance at the first Emergent Building Technologies Conference (EBTC), held last February and cosponsored by APPA, had the opportunity to continue that learning process as we were challenged to experience new technology through insightful learning laboratories and engaging speakers. Particularly noteworthy were our opening and closing keynote/general session speakers—Elliot Masie of the Masie Center and Michael Joroff of MIT, respectively. They each spoke eloquently and with great specificity about the culture of technology.

Masie reminded us of how young this e-technology really is. It was a mere five years ago that mostly "techies" or "geeks" had e-mail and Internet access. He reiterated that the hype about "e" this and "e" that brings us to the point that we all feel "e-nough" already! Ignore the hype, and rely on the only sure thing when it comes to the future of technology: it will be more sophisticated.

More importantly, the "e" should stand for "experience." This is what technology really means. It's about the sense of touch, smell, hearing, and emotional elements. It is important to recognize this so that we don't become seduced by the technical elements alone, especially since we are looking at a 36-month life span at best for new technologies. We must focus instead on such questions as: What are we trying to achieve? What is it we want from the technology? Why are we adopting the technology to begin with? And we won't be the only ones asking these questions.

The new client (faculty, staff, or student) will be more assertive, discriminating, critical, connected, and downright demanding. Therefore, how do we leverage technology to form an effective relationship so we can better meet the expectations of our customers and constituencies?

As Masie emphasized, we first need to understand that the new technology is not about computers and computing. The main thing is how we use technology to accomplish these three goals: 1) communication and collaboration, 2) knowledge and learning, and 3) commerce and transactions.

For communication and collaboration, Masie cited his office building construction site and the relationship with his contractor. The contractual relationship called for the full utilization of e-mail, a continuous, fully operational Web camera of the entire site, a technologically equipped two-story elevator, and off-the-record rooms, where no technology whatsoever existed for purposes of "digital evaporation." His view was that the informal communication and the visuals of the work effort are more important and more valuable than the formal efforts. Masie is using technology now and into the future to engage the senses and the emotions, to increase effectiveness, to build effective relationships with his staff and clients, and, ultimately, to achieve an experience.

For knowledge and learning, his focus was on the classroom that allows faculty and students alike to engage and enhance learning in different forms. Again, it's not about technology, or even about teaching—it's about learning. Therefore, anybody who is building buildings should be building with learning in mind, no matter what the space is.

For commerce and transactions, Masie's prediction is that we will all use the Web for some form of commerce or transaction. We must account for this change in the way we conduct business, and add it to the mix of options and opportunities for all stakeholders.

These three components of our "e" world transform the building into another important network for human interaction and connectivity. This network will impart its own form of value, for, ultimately, the next generation will change the way our work environments exist. We will move from privacy to proximity and from hard service to soft service and personalization, where we can have it OUR way, but with all the off-the-

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

shelf manufacturing efficiencies. And soon, very soon, we will be able to work anywhere, anytime, anyplace. Therefore, the cycle time of successful "e" business will be measured in speed and responsiveness, efficiency and effectiveness, and time and effort, as long as each adds value. The new equation will be ROE = ROI (return on effort equals return on investment).

In this new environment, where return on effort is part of the equation, people must ultimately possess the ability to work harmoniously to achieve "digital collaboration" or "digital balance" across the entire supply chain. This will require specifications and standards that are interchangeable and interoperable, requiring a degree of cooperation that is presently unprecedented.

With the technology cleverly hidden from our sight, we must create mental spaces that translate into experiences for enhancing the quality of our communication and collaboration, for freely accessing knowledge and learning, and for allowing commerce and transactions to flourish within that mix.

Michael Joroff reinforced Masie's comments as well. His focus was on the importance of shaping the enterprise, not just responding to it. We have to be entrepreneurs adding value at every turn.

If you were to visualize where you do your work, more often than not you will imagine the physical structures rather than the thoughts in your head. Joroff emphasized the difference between perceiving an office as a physical space versus a mental space, where work is done in a variety of places at any time. The same is true for learning; it doesn't just happen in the classroom.

These new images give rise to different ways in which we will do our building construction work in the future. For example, communication systems will overlay (some are already in use) all the drawings and systems so that more people can work on projects asynchronously, thereby fostering teamwork to a much greater degree. These shifts to cyber space (such as increased sharing of information, networking, creativity, and time suppression and completion) coupled with different physical requirements and changes, will produce a blend of "bricks and clicks," where physical space and cyber space don't compete or diminish each other, but instead are complementary. Ultimately, we will be using each of these spaces differently to create the experiences we want.

Hence, we move to an age of ubiquitous information and ubiquitous computing, or UBICOMP, where intelligence is built into nearly everything (kitchen counters, lights, ceiling tiles, keys, etc.). With "chips" in everything, it becomes more important how you utilize tools and connect various bits of information to create knowledge. So you see, YOU are the most important component amidst all of this technological wonder and evolution. It is your connectivity that matters most. It's about choices, cycles, preferences, and coming together when we want or need to do so. This is a major shift in how we think about physical space and the impact of cyber space.

We may begin with "e-chips" and IP addresses, but we will end with "relationships." So you see, the "e" means much more than electronic. It signifies the emotions, effort, effectiveness, enhancement, engagement, and the overall experience of using technology. We must assess the most effective uses of technology in our built space as well as cyberspace, and utilize it to build stronger, more meaningful relationships.

The 2nd annual EBTC will take place again in Las Vegas, Nevada in February 2002. For more information visit the website at www.emergentbuildingtech.com.

Mailboxes
and Postal Specialties

The Industry Leader in the Educational Marketplace

Products Include:

- *Brass Mailboxes*
- *Brass Door Spare Parts*
- *Aluminum Mailboxes*
- *Apartment Mailboxes*
- *Commercial Mailboxes*
- *Pedestal Mailboxes*
- *Free-Standing Mail Centers*
- *Residential Mailboxes*
- *Parcel Lockers*
- *Name Directories*
- *Key Cabinets*
- *Free-Standing Drop Boxes*
- *Wall Mounting Mail Drops*
- *Specialty Boxes*

CONTACT US FOR A FREE CATALOG!

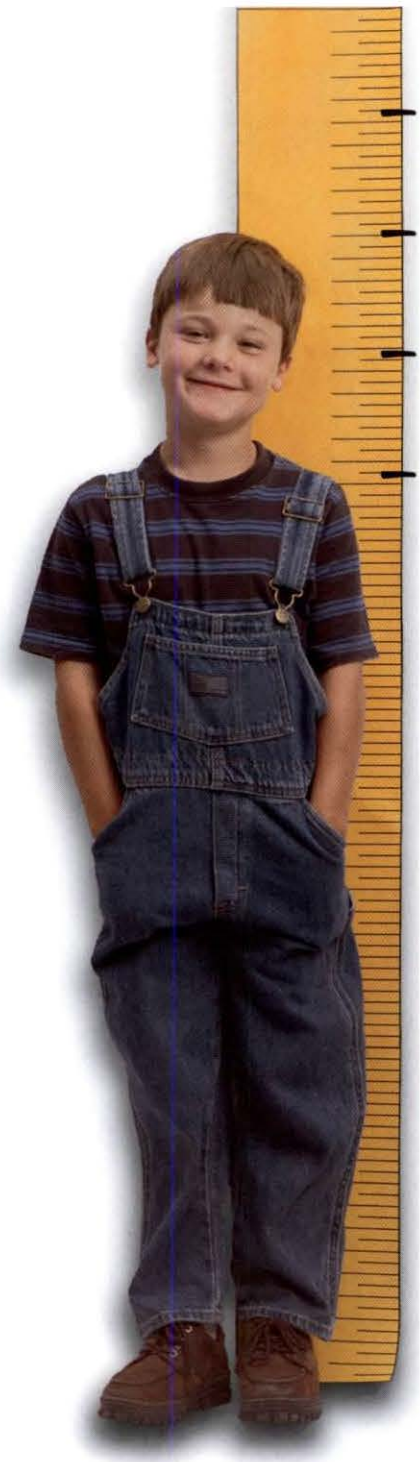
1-800-SALSBURY
www.salsbury.com

SALSBURY INDUSTRIES

People Committed to Quality Since 1936

1010 East 62nd Street, Los Angeles, CA 90001-1598

How does your school measure up?

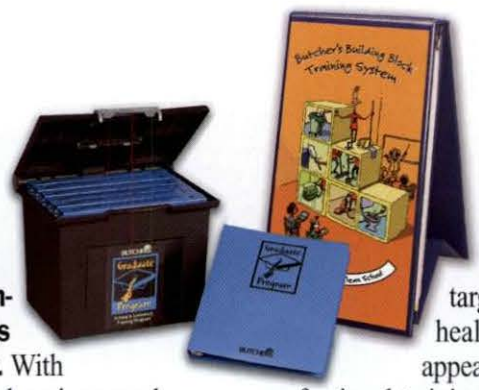


Productivity

Total Costs

Appearance

Environmental Health



Measuring up to school facility cleaning and maintenance standards is not child's play. With challenges today such as increased enrollments, aging buildings and budget constraints, we at Butcher's understand that the cleaning and maintenance of schools is now more difficult than ever. Based on an active collaboration with Schools and Universities, Butcher's has developed **The Graduate Program™**, a comprehensive training program targeted to clean for health, safety and appearance. By providing professional training and support tools, The Graduate Program supplies real-world solutions to your toughest maintenance challenges. For more information on how Butcher's training and quality products can help your school "measure up," call us at **1-800-225-9475.**

The Butcher Company
Marlborough, MA 01752 USA
1-800-225-9475 • www.butchers.com

BUTCHER'S®

How to Get the Edge in Uncertain Times

by Dina Murray

Thomas Jefferson said, "Nothing gives one person so much advantage over another than to remain calm and unruffled in circumstances." Never has this saying had more impact in the workplace than today. All industry is being changed and reinvented due to economic uncertainty, technical innovations, and streamlined budgets. In order to remain in the same position or move vertically, one must present a total package of skills, as well as the fortitude to compete in an ever-changing and unpredictable environment. As an APPA member, your benefits include the tools, services, and support to help ensure your calmness, and to give you the edge at your campus, organization, or company.

As a loyal member, you pay your dues, talk to colleagues about APPA membership, and eagerly await the next issue of the *Facilities Manager* magazine. But did you know there is so much more that APPA has to offer you? You should be taking full advantage of all the benefits awaiting you as an APPA member, especially those that will give you an edge in the educational facilities arena. If you are not, your competitors may be.

How do you get up-to-date information on the industry? It seems like an easy question that could be answered in a split second. For many members the bimonthly magazine *Facilities Manager* would seem like an obvious choice, but there are others as well. As APPA looked for other ways to deliver information, October 2000 saw the creation of *Inside APPA*. Our electronic news source is offered biweekly and provides information on regional and international APPA events, programs, publications, and industry information.

The advantage of *Facilities Manager* and *Inside APPA* over other industry publications and news sources is that the material is filtered and tailored to APPA's specific membership. You do not have to sift through a multitude of sources only to find information of limited value. APPA recognizes that your time is precious; by delivering the e-newsletter, we are able to provide timely information that is also easy to digest and reflect upon. Services delivered via e-mail also provide cost savings to the association, which can then be shared with its members when allotted to other beneficial services.

While your support of APPA is important to the vitality and long-range stability of the association, your participation is equally as important. According to the March 1999 member and non-member survey—tabulated from over 1,500 quantitative surveys mailed to the Board and volunteer members, members at large, and prospects—*education* was the number one reason for joining APPA. Likewise, education was the number one reason why membership was renewed.

The survey also showed that respondents are highly educated and a large number have a postcollege degree. This is no surprise considering the demand and need for expansion of APPA's educational programs, including the Leadership Academy, Institute for Facilities Management, the Educational and Annual Meeting Conference, and the renewed joint effort of APPA and NACUBO to reestablish the Institute for Facilities Finance. In the future, look for other new additions to the educational calendar on focused topics such as the Electric Deregulation Seminar that was held in March.

For many members, APPA's Institute for Facilities Management is one of the more popular educational sources. Started in 1982, the Institute is primarily geared to mid-level facilities managers, although others in executive and senior level management positions have attended. The Institute concentrates on the core areas of facilities management and gives attendees the vision and leadership abilities they need to grow within their campus environment.

I had the opportunity to attend the most recent Institute held in Newport Beach, California, January 28-February 1, 2001. What a great opportunity to become more knowledgeable in the core areas of facilities management, which includes general administration, operations and maintenance, energy and utilities, and planning, design, and construction. Due to the outstanding reputation of the Institute, and a great location in the PCAPPA region, attendance reached a new high of 562.

Registration for the Institute is now handled online to make the signup process more efficient and manageable for both the attendee and the registrar. Due to online, realtime service, all attendees have access only to open available classes. The system also provides notification if all vacancies for the Institute have been filled. Confirmation is instantly sent via e-mail to the registrant upon successful completion of the registration process.

Dina Murray is APPA's director of member services. She can be reached at dina@appa.org.

To ensure that the classes are meeting current needs, attendees are asked to complete a survey on each class. Based on this information, as well as input from members at large and committees, new elective classes are added to each Institute based on ever changing industry demands. New to the Institute in Newport Beach was the addition of the elective Special Facilities: K-12, Small, and Community Colleges, presented by Dave Petersen, assistant director of administration and operations for the Fairfax County Public Schools in Virginia. Surveys completed after Dave's presentation were positive, recognizing all educational facilities share similar needs. It is important to remember that input from our members drives all APPA programs, regardless of the size of the constituency group, as well as consideration of the broad scope of the facilities market.

APPA President John Harrod addressed Institute attendees at a breakfast meeting and urged them to not only take advantage of the educational offerings of the week, but also to meet new peers and expand their networking circles. John asked attendees to look around the room and consider this group of like-minded professionals, who share similar concerns and responsibilities, as an invaluable source of information and opportunity. Attendees were asked to share their business cards with several new people every day of the Institute. At the end of the week new friends and contacts were made that certainly made the Institute experience even more beneficial.

Due to the popularity of our educational programs, the APPA 2001 Educational Conference and 88th Annual Meeting held in Montreal, Canada, will offer a class reunion for Institute, Executive Development, and Leadership Academy graduates on Saturday, July 21 from 4:00 to 5:00 p.m. It will be a wonderful opportunity to renew friendships and meet some new colleagues, who share your commitment to education and personal development.

Will Rogers said, "Even if you're on the right track, you'll get run over if you just sit there." No matter what track you're on, or aspiring to be on, don't get run over. Expand your education and growth horizons today. Beginning June 1, 2001, information and registration for the Scottsdale, Arizona Institute for Facilities Management will be available on the APPA website. Register early and don't miss out on this popular and effective program.

The tools are out there to help you compete in your own environment. APPA's membership benefits can give you the advantage to remain in control of your career, and the information you need to stay abreast of trends in educational facilities management.

Meaning Business

by William Love

The year 2000 is history and the century's curtain has been pulled for the new millennium. WOW! Our industry has survived the past, works in the present, and is keeping a sharp lookout for the future.

Customer satisfaction still reigns supreme in the housekeeping world. We are still a service industry, and we must provide it in a most efficient and courteous manner without sacrificing quality. We must develop mutual respect with our employees and customers, while appreciating their individual differences. On the path to doing this, we must first recognize and accept that we are all human beings. Some will say that this comes naturally; however, it can only come naturally if we are "real," not pretentious, and focus on our primary reason for staying employed at our institution.

Sometimes it takes reorganizing, or as some say reengineering, to stay on focus. This includes meeting customers' schedules and also workers' schedules through a process that is strictly win/win. It also encompasses increasing our individual job knowledge through high-level training and positive creative thinking. We must open our minds to all ideas, no matter how different, without making immediate judgments. Everyone can be creative, but we must provide the space for development. Negative critical judgment must not interfere. Each idea that dies from a negative thought or phrase is a missed opportunity to change things for the better. Nothing worthwhile comes easily.

A lot of things that were good yesterday, even though they worked, are now invalid in today's arena. They can become stumbling blocks to the employees themselves. Forward-thinking managers will continuously search for ways to encourage their employees—aiding self-motivation to increase productivity and creativity. A restimulated professionalism and renewed pride, by everyone, are necessary for the foreseeable future.

Looking over our survival, in the past, probably gives us mixed emotions, especially while reflecting on the goals, objectives, and achievements we attained. We experienced good times and bad times. In the present and into the future we will continue to have challenges, both seen and unseen. These challenges can offer more opportunities that can help us immensely.

A sure way to understand challenges and evaluate your performance is to try to operate your in-house services like a business. Form a Building Services Business Plan. At the University of Cincinnati, we wrote a full business plan for building services. The various processes to do this will help you realize and see things you took for granted.

A Building Services Business Plan is a comprehensive outline of your department's goals and objectives for the year. It begins with your mission statement as it relates to the overall institutional mission statement. Your vision statement, core values, and operating principles normally follow this.

A full business plan will show whether your venture or activities are really working, based on the economy and other factors. It will show how competitive you are in the marketplace. Benchmarks can be checked regularly to see if you are on target.

In today's world, we believe that a viable business plan will be a major deciding factor in whether you progress or stay where you are. A good business plan overcomes planning for mediocrity, and steers you toward success in serving your customers, working as a team, and eliminating the "need to know" syndrome.

We must pleasantly exceed our customer's expectations and make every encounter a memorable one. Real people with purpose/expectancy/results will become the order of the day.

William Love is the assistant director, facilities management, and director of building services for the University of Cincinnati, Cincinnati, Ohio. He can be reached at william.love@uc.edu.

If you have an opinion you'd like to share, consider writing an article for the Perspective column.

Send your ideas to our editor Steve Glazner at steve@appa.org.

ALL AMERICAN TEAM

Put Design, Performance And Value On Your Team With Sauder Contract Furniture.

The Sauder *DuroPly 3-Position Chair* tilts forward for writing or work activities, sits straight for under table or desk use or lets you lean back for reading and relaxation.

Sauder contract furniture combines traditional American craftsmanship with state-of-the-art manufacturing for winning performance year after year.

Sauder has chairs and tables to meet any need; residence halls, study lounges, libraries, computer labs and student unions. And every player on the Sauder team provides:

- Contemporary design that works in almost any setting.
- Long-life construction and exceptional value.
- Extended-use comfort and support.

DUROPLY 3-POSITION FROM SAUDER.

A Star In 3 Positions.

SAUDER®

For more information on Sauder seating and tables, contact:

1-800-537-1530 (USA and Canada)
419-446-3697 Fax

www.saudermanufacturing.com
sales@saudermanufacturing.com (e-mail)

What Is Leadership Anyway?

by James E. Christenson

"The very essence of leadership is that you have to have a vision..."
– Fr. Theodore Hesburgh, past President of the University of Notre Dame

Consider these questions: What is leadership? Why does our organization need it? What if we don't have it? If we want it, where do we find it? If we can't find it, how can we develop it?

Before you read further, disabuse yourself of the idea that the only leaders are the rare "born leaders." Leader and author Warren Bennis maintains that leadership is not a rare skill. Leaders are made rather than born, they are mostly ordinary people, and leadership can be found (and is necessary) throughout an organization. Finally, Bennis reminds us that leadership is not about control, direction, or manipulation, but instead about alignment of the energies of others behind an attractive goal.

Some of you remember when APPA was actually the acronym for the Association of Physical Plant Administrators. But 20 years ago, we began to refer to our profession as facilities management in lieu of physical plant administration. In the last few years, APPA has been promoting the Leadership Academy, hence preparing facilities managers to take on the role of leadership. What is behind these terms *administration, management,* and *leadership?* And is there anything significant in the migration of titles from passive to active?

The education hierarchy of 50 years ago commonly depended on those who cared for facilities to tend to that business using, literally, tools and physical skills. These officials neither expected nor desired that the facilities staff show initiative or give advice on facilities improvements in support of the institution's mission. Many of us know some facilities pioneers who didn't fit into that restrictive mold, but they were probably the exception.

Management as a process worthy of study and research became more prominent in the 1950s. But the sudden need to deal strongly with energy issues in October 1973 eliminated any lingering doubt that physical plant administrators need management skills. The person at the top of the physical plant organizational chart was being called on to do more than keep business running as usual. That individual had to put programs in place to seriously conserve energy and money. Other challenges loomed. The administrator assumed the role of a manager and became identified as such.

More recently, our society has recognized that enlightened leadership is called for in many areas, and that it sometimes has not been there when needed. In a business environment, changing at the speed of light, education, and the organization that provides its facilities support, are coming to understand the urgent need for leadership and change too.

Moving from management to leadership suggests many transitions for the person heading the traditional facilities organizational chart. These include moving from dealing with things to dealing with people; from techniques to principles; from doing things right (efficiency) to doing the right things (effectiveness); from left brain activity (analytical) to right brain activity (holistic); and from control to empowerment.

Might it be the increasing call for intentional change that creates the need for more and better leadership? I think so. Businesses, institutions, and nearly all of society realize that many of the old ways of doing things are no longer effective. Therefore change from those old ways is essential. Forward-thinking organizations are demanding leadership that can effect the changes.

Leaders have come forward on special occasions from the beginning of humankind. So leadership is not a new skill. But it is axiomatic that, unless someone feels that the direction needs to be changed, there is no need for a leader. In fact, there may not be a need for a manager or an administrator either. There have been periods in the world's history when very little changed from decade to decade, even from one century to another. In times of no change and no perceived need to change, leaders will be redundant.

Jim Christenson retired last year after serving 40 years in university and federal facilities management. He can be reached at jchriste@umich.edu.

But no one living at this moment can truthfully claim that deliberate change is not a near-continuous requirement. If that is accepted as fact, who is it that gets change underway? Answer: a person who has an idea of what should be and also has ideas and thoughts to get to what *should be* from *what is*. Gary Hamel uses this phrase: "Imagine the future that you can create. The 'should be' is, really, a vision for the organization, the 'preferred future'."

Look again at Fr. Theodore Hesburgh's statement on leadership: "The very essence of leadership is that you have to have a vision." Warren Bennis defines leadership similarly: "The capacity to create a compelling vision and translate it into action and sustain it." Robert Greenleaf, author of *The Servant as Leader*, makes it still more challenging by stating that a leader needs to have a sense for the unknowable and to foresee the unforeseeable. Between the three authors, we can see the components of a leader: vision, action, sustainable, prophetic.

Consider a few people history has identified as leaders—Alexander the Great, Joan of Arc, Abraham Lincoln, or Sir Winston Churchill. Each measured up to the definition of a leader. And they met another definition of leader too: a person who is going somewhere, and is able to persuade others to go along.

A leader doesn't just point to the goal. A leader by definition leads others toward the goal. Robert Quinn, author of *Deep Change* puts it this way: "If I say to you, 'Follow me into this land of uncertainty as we try to learn our way to a new level of performance', the first thing you do is look at my feet...the followers trust the leader and the leader holds the trust through integrity and role modeling."

It is interesting to think of the applications of Webster's 10th New Collegiate Dictionary's definition of leader: "**1:** something that leads: as a: a primary or terminal shoot of a plant."

This may unintentionally give some insight into the tasks of a human leader. What does the leader of, say, a spruce tree do? It provides direction, governs the rate of growth, explores new territory, fights for the right to occupy that territory, and is exposed and vulnerable. If it is wounded by disease, insects, or overtopping trees, another replaces it as the new leader. Similarly, a facilities manager must be a leader or someone who can lead the organization through growth and change will replace him or her.

Stephen Covey, author of *Principle-Centered Leadership*, states that the first challenge of a leader is to establish continuing consciousness of the principles foundational to organizational effectiveness and quality—in short, to establish "true north." He tells us that the second challenge is to create conditions enabling the organizational culture to internalize and apply those principles. He is advising that it is not enough to have that great vision of the preferred future. To lead the organization to that *external* shining light on the hill, the leader must also identify and lead toward a preferred future for the *internal* organizational culture. Without that, the most heroic leadership efforts will fail. They will be one-person shows with a lot of talk and no real results.

The people in the ranks, on the front line with the customers, are the only ones who can transform a preferred future into a reality. They must know and accept the preferred future, which demands a work culture where trust is pervasive and true-north principles are shared. Max De Pree, in his book, *Leading Without Power,* reinforces the points that Covey and Quinn make concerning the leader's role in creating an atmosphere of trust. He states, "Building trust in organizations has become a chief responsibility of leaders, an essential duty especially in the eyes of followers."

And, while Alexander the Great led a mighty force to realize most of his vision, he isn't the preferred model for today's leader. Robert Greenleaf suggests this test of a leader: Do those served (by the leader) grow as persons; do they, while being served, become healthier, wiser, freer, more autonomous, and more likely themselves to become servants?

Does this servant-leader business sound strange? Perhaps. New? Not so. Servant leadership focuses on making everyone in the organization successful in fact and perception, while drawing minimal attention to the (leader's) self. And more than 2550 years ago, Lao-tzu is reported to have advised:

> A leader is best when people barely know he exists. Not so good when people obey and acclaim him. Worse when they despise him. But of a good leader who talks little when his work is done, his aim fulfilled, they will say 'We did it ourselves'.

You may be a person who enjoys being at the front of the parade, gathering the glory. But the leader's role is to support the members of the organization being led. The image of servant-leader, while tough for some to swallow, may well produce the most lasting results. If the leader whose vision blazed so clearly in the sky is able to cause that vision to be accepted by the rank and file members of the organization, the vision is, with that acceptance, close to realization. If, after reaching the goal, every member of the organization is proudly on parade and the leader is standing on the sidelines cheering them on, that leader has the best of rewards.

This is not a light.

It's a vital aspect of your students' education — and a source of overhead expense for your operations.

At PSEG Energy Technologies, we understand how your facilities impact the quality of your school's image and your budget. That's why we provide energy management services that deliver efficiencies to the places you need them most.

From energy procurement, mechanical construction and service to facility operation, maintenance and project financing, PSEG Energy Technologies can help you streamline cost. Improve operations. And provide students with a comfortable, enlightening atmosphere for their education.

To learn more, visit www.et.pseg.com or call 1-800-618-7734 today.

PSEG
Energy Technologies

- Analysis and Design Services
- Construction and Mechanical Services
- Energy
- Financing Services
- Building Operation and Maintenance Services
- Distributed Generation Services

LAST CHANCE TO REGISTER!

APPA's 2001 Educational Conference and 88th Annual Meeting

July 22-24, Montreal, Canada

Don't miss out on this rare opportunity to join hundreds of your peers and immerse yourself in networking, renewal, and professional development. We invite you to take a moment and register for APPA's 88th Annual Meeting and Educational Conference. Join us in Montreal July 22-24 where we will welcome such speakers as Marshall Goldsmith, William A. Daigneau, and Dr. Janet Lapp to name only three. And we're excited to announce that the annual banquet will feature music and performers from the world-renowned Cirque du Soleil.

Venture through the exhibit hall where your Business Partners will be displaying the latest in the facilities management arena. Here you can interact with your vendors and suppliers one on one. We are looking forward to a wonderful show and don't want you to miss out. Please visit the APPA website to complete your registration: www.appa.org/education/. If at any time during the process you have any questions, call APPA's Education Department at 703-684-1446 ext. 233.

See you in Montreal!

HOT TOPICS

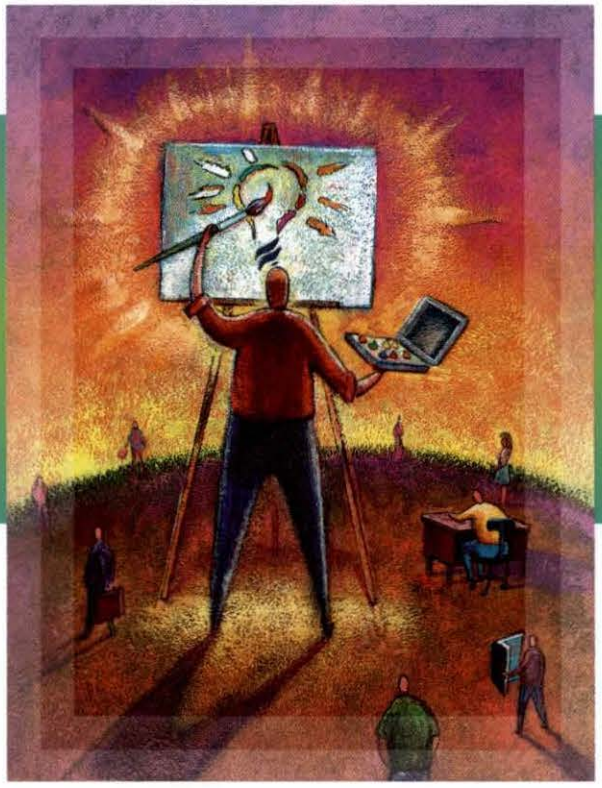
Below is a sample of the exciting presentations lined up for this year's meeting:

Wireless Technology in Higher Education
GASB 34/35
Building a Facility Life-Cycle Knowledge Base
Regulatory Issues, Legal Actions, and Economic Decisions: The Department of Justice and ADA
Operational Guidelines for Grounds Management
Using Facilities Assessment Data to Produce 21st Century Residence Halls
Environmental Management Systems: The What's, Why's, and How's
Facilities Design for Emerging Technologies

THE CHANGING SHAPE OF TECHNOLOGY ON CAMPUS

From Emergence to Convergence

By Kevin Cunningham and Sylvia Rainey



The convergence of disparate technologies on campus, some say, is not only inevitable, but may even be more exciting and challenging than the new technologies themselves. In fact, a few institutions have already discovered that the positive outcomes and benefits of the "intelligent campus"—one that integrates voice/data communication with building automation—can be extraordinary. The keys to success require a basic understanding of the new technologies as well as how the technologies must converge to benefit the institution.

The stream of new tools available to today's campus facilities professionals to help them meet the challenges of education, it seems, is never-ending. Market forces are at work—rising needs for safety, security, and greater choices—driving campus professionals to seek new ways to remain competitive and focused on their institutional missions.

Until recently, convergence of communication technology implied the integration of voice, fax, data, and images over one commonly used infrastructure, such as an Internet protocol (IP). However, this vision will evolve as both the integration of the infrastructure and the integration of applications converge, creating significant opportunities to leverage an institution's assets. Affecting the vision are three major societal trends: the Internet, e-business, and increased mobility. As a result, colleges, universities, and schools are struggling to adapt and respond to a constituent base that can communicate from any place via any network to any device or system in any situation.

On its own, the Internet presents a veritable fountain of opportunities for educational institutions to "mobilize" their services, particularly with regard to distance learning. True e-commerce and e-learning for today's institution can effect business transactions and processes over networks and distributing core activities across time zones and geographical boundaries.

Convergent technologies enable the integration of voice and data solutions that distribute and process information and provide much greater access to learning. This makes possible Web-based, alternative-delivery learning systems and leading-edge service offerings that meet new student-driven demands, such as just-in-time and other distance-learning courses. Campus management itself can be improved markedly via integrated applications that can process both voice and data to enable the institution to optimize workflows and leverage its intellectual capital.

E-commerce and the Internet offer enormous potential for lowering institutional costs while enhancing revenues and the overall quality of educational services. Prime examples include online application for admissions, payment of tuition and student bills, student purchases of educational materials and merchandise, business-to-business procurement, and electronic access to facility information, databases, publications, and other resources.

These trends place greater pressure not only on new technologies themselves, but also on how they can all work together, or converge, for increased value. In essence, when a

Kevin Cunningham is director, integrated solutions, at Siemens Building Technologies, Inc., Buffalo Grove, Illinois. He can be reached at kevin.cunningham @sbt.siemens.com. Sylvia Rainey is senior marketing manager, higher education, for Siemens Building Technologies, Inc. She can be reached at sylvia.rainey@sbt.siemens.com.

building automated system (BAS) converges with seamless voice and data network operations, users have the ability to access over the Web, navigate and manage interoperable systems such as HVAC, power monitoring, lighting control, security, and fire alarm/life safety.

In most cases, the greater the facility-management challenges on campus, the greater the potential return on the technology investment: rapid facility growth, advanced research laboratories, infrastructure improvements and deferred maintenance, and environmental issues can all be addressed more effectively via convergent technologies.

The challenge is not just finding new technologies, but finding new ways to make technologies work together on campus for greater value.

It Takes Two

Two key components are required for effective technology convergence. One is the communications or wide area network (WAN) infrastructure, such as across a large campus, while the other is a facility management infrastructure in the form of a robust BAS. Respectively, these constitute two symbiotic technologies: the communications network as the "nervous system" that provides the universal, high bandwidth connectivity; and the BAS as the "brains" to manage all of the local area network (LAN) functions, such as individual buildings or departments, in an intelligent campus environment.

These WAN and LAN networks are highly complex technical enterprises that, when engineered properly, can meet predictable service standards for data management by network administrators. A network hierarchy consists of precisely defined functional layers that build from the physical infrastructure to network applications, with each layer relying on the layer below it.

Both the simplest LAN and the most advanced WAN use these layers as basic system building blocks. The physical layer is the physical pathway that carries the electronic signals, the network layer comprises the protocols that convert the signals into messages, and the application layer includes the network applications that turn messages into services.

The BAS is a core enabler to achieving higher degrees of automation because it provides the base tool necessary for systems integration. Essentially, a typical BAS architecture is composed of three levels grouped by network: the LAN floor level network, which comprises dedicated controlled devices; the LAN building level network, which comprises principally the global automation system; and the WAN campus or management level network for enterprise information and management.

Systems integration allows different building systems to communicate and "interoperate" as needed. The BAS is responsible for collecting all of the data and delivering the data to whomever needs the information and whenever the information is needed through workstations, or laptops and wireless devices.

Campus Safety and Security

Most of the elements of campus safety—including fire alarm, voice activation and communication, physical access control, video surveillance, intrusion detection, asset control and management, and network access—can be managed more effectively and efficiently when the systems are networked.

One of the most tangible benefits of integrating multiple building systems on campus involves fire safety. As systems become interoperable and capable of sharing and exchanging data, smoke and fire detection schemes are enhanced considerably, as is fire suppression, notification and evacuation, and annunciation. The efficiency of these systems' operator is improved via a single terminal at each monitoring location.

Numerous inter-system operations can also be pre-programmed, such as egress control (unlocking access controlled doors and elevator control), smoke control via fans and dampers, and automated closed circuit TV (CCTV) verification. Locking

and unlocking of buildings on a time schedule can be performed automatically, rather than by roving personnel.

When voice communication, or intercom, is integrated with the call button, the CCTV system and the graphical display software, the user is afforded distinct advantages. Ideally, CCTV control should be interfaced through access control and other security subsystems. A specific camera can be commanded into viewing action while a graphic map of the location's floor plan is displayed at the workstation. Alarm conditions involving security, fire or building management systems can be verified. Events, conversations, and date/time may all be digitally recorded, tagged with the respective alarm and related system, and archived for future use.

Systems integration also reduces operator errors, requires fewer groups and/or individuals to be coordinated, and provides more consistent response activities. Vectored alarms (by alarm type/condition) can be routed immediately to the appropriate terminal with operator password authority. (A single point of responsibility can be assigned, which is a key benefit.) Voice evacuation during an emergency can be monitored both locally and remotely, with automation control contingent on other system alarms.

Global, inter-discipline reports can then be generated to include trend-based analysis and various system conditions. Physical access control itself is improved throughout the campus. As vectored alarms are identified based on type, they can be routed to administrative, security, and maintenance personnel and handled more efficiently as needed.

Related campus disciplines are enhanced, as well. Code compliance, a major issue with modern facilities management, can be more professionally addressed. Testing, inspection, and maintenance of a variety of equipment and components can be automated, managed, and reported with greater ease and accuracy, less paperwork, and in shorter response times. Automatic call-up of the respective CCTV cameras can also be performed as needed for assessment and verification.

Utility Cost Management

As one university CFO proclaimed out of frustration, "I count every pencil and paperclip on campus, but we spend millions of dollars on electricity without knowing where a dime of it goes." This, too, will change as today's campus learns how to prepare for and cope with electric utility deregulation and as its infrastructure adapts to emerging and converging technologies.

For many institutions, for example, the technology already exists for integrating control and management of energy costs while automatically responding to Real Time Pricing (RTP) rates. Facilities professionals can monitor precisely how and when the campus is using energy and what measures can be implemented to reduce waste.

Building metering systems, when integrated into the building automated system, enable the institution to minimize utility costs sensibly while actually increasing "profit-center" performance. These measures can be also be implemented while maintaining the integrity of indoor comfort and safety levels.

When Web access capability is provided by the BAS in an intelligent campus environment, consistent and accurate energy usage measurement throughout a single building or campus wide is made possible. Building metering (or submetering) systems empower facilities professionals with not only the data and access to important operating information, but also the analytical power to determine energy usage by building, by department, by function, by enterprise, or by specific equipment. Users have the ability to define energy usage patterns along with specific areas to control when the price of energy is high.

The effects of specific energy conservation actions can also be measured accurately as they are implemented. This greatly improves the facilities manager's ability to reduce energy loads at peak times and to take full advantage of the cost benefits of RTP rates. In the new era of deregulation, the most effective control strategies are those that can be easily changed as the price signals change. As a result, labor costs can be lowered, energy waste is reduced, and the optimum balance between comfort control and energy usage can be achieved.

Specific applications of building metering for campus facilities include power quality monitoring, load shedding, demand control, and RTP response, as well as individual tenant billing for on-campus housing. Armed with the technology for accurate cost allocation and recovery, a research university would, for example, be able to track energy costs associated with specific research or grant projects.

Optimizing Sophisticated Environments

Research facilities are challenged continually to improve efficiency and reduce operating costs, especially as the institution's size and complexity of operation increases. For these organizations, integrating certain building functions can boost productivity and reduce operating costs while helping to adapt more quickly to regulatory changes.

Operational efficiencies are also maximized as facilities professionals are armed with the capability to handle enormous amounts of data in shorter periods of time, with fewer people needed to collect the data. Equally important, in alarm conditions, response time is shortened considerably to reduce downtime and loss.

Systems that are integrated into a network ensure safer and healthier work conditions within the laboratory facility. Specific operating parameters, such as fume hood ventilation, security alarms, temperature, and humidity can all be tightly controlled and responded to more efficiently, reducing risk and exposure to occupants.

In a facility with convergent technologies, facilities professionals are elevated to a new level of information management. Building automation and systems integration solutions can be tied directly into other key information systems within the organization—document management, inventory tracking, and business management.

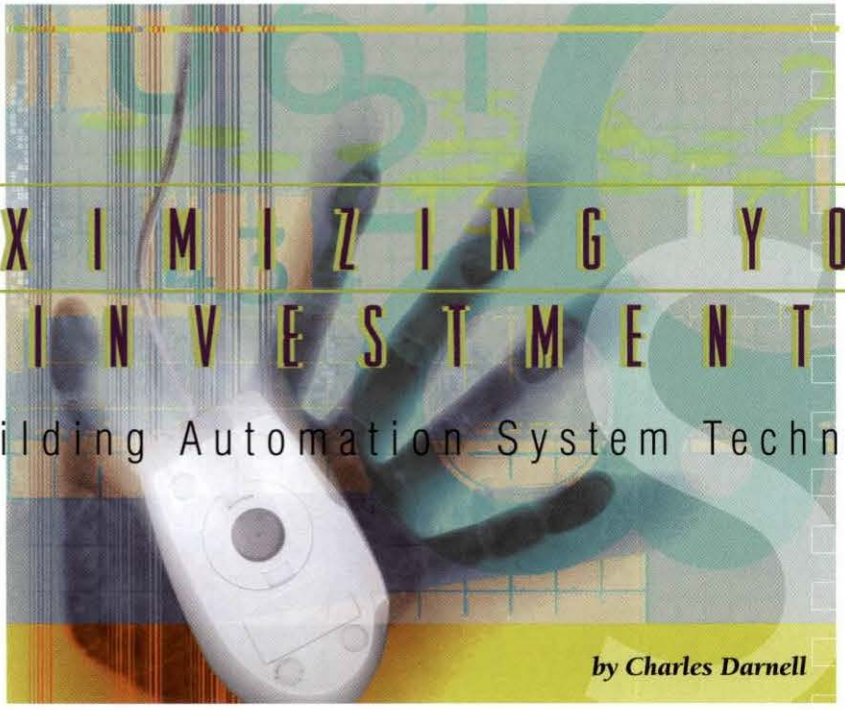
As a result, the institution realizes significant cost reductions via operational efficiencies and productivity gains, automated documentation, decreased liabilities, and labor reductions. Expenditures normally difficult to quantify can be tracked and forecast through charge back systems, cost accounting techniques, usage forecasting, and space planning.

Technology convergence of laboratory operations can help universities operate as an enterprise, attract top-notch researchers and grants, and help secure contract work from the private sector. Industry at large can benefit by streamlining pre-clinical trials, by helping to recoup research and development costs and by increasing competitive strengths. All sectors can benefit from automation by being better equipped to comply with current standards and future changes.

Conclusion

In order for an institution to make measurable gains in expanding its quality of learning environment, existing and emerging campus technologies need to be leveraged in novel ways. This places greater pressure on not only the technologies themselves, but also on how they work together, or converge effectively.

Outcomes can range from lower costs and decreased operating, maintenance, and energy costs to improved productivity via greater availability to operational information and data management. For institutions that get it right, the integration of technologies helps improve the teaching, research, community services, and economic development of education.



MAXIMIZING YOUR INVESTMENT

in Building Automation System Technology

by Charles Darnell

The decade of the 1990s has been described by many as one the most extraordinary periods of technological advance our society has ever experienced. During this time, improvements in building automation systems (BAS) have included more durable electronics, reliable networking capabilities, and best of all, declining prices relative to higher quality and increased computing power. Perhaps the most salient outcome from this period is that these powerful systems can now be placed in the capable hands of professional facilities managers as opposed to computing systems specialists.

Although BAS advances now provide institutions with building automation power nearly unprecedented a decade ago, harnessing that power to fully exploit an investment in this state-of-the-art technology can be challenging. Beyond obligatory training, institutions may be faced with organizational changes, the addition of new higher paid personnel, and the touchy issue of proprietary procurement to accomplish that objective.

At Texas A&M University, we have instituted dramatic changes in the management of the campus BAS in the last five years. While we are not prepared to say that we have reached a pinnacle in maximizing our BAS investment, we believe that we have established solid strategic direction that will serve us and our successors well into the future.

Charles Darnell is the assistant director for utilities (business & energy) at Texas A&M University, College Station, Texas. He can be reached at cdarnell@utilities.tamu.edu. This article is a follow-up piece to his presentation at the first Emergent Building Technologies Conference, held last February and cosponsored by APPA.

This article is presented to complement a presentation given at the first annual Emergent Building Technologies Conference in Las Vegas this past February. This exciting new conference format put the practical uses of contemporary building technology into sharp focus through case studies and informative learning labs. This article will discuss how organizational issues and system standardization can be important factors that determine an institution's ability to fully exploit contemporary building automation technology. This article will also present more management strategy than technical acumen as a basis for maximizing the BAS investment. While systematic planning is used for developing other institutional assets, it may be neglected when dealing with a new and rapidly evolving, little understood technology.

An Organizational Assessment

In lieu of a discrete evaluation and decision making process, responsibility for BAS management at many institutions has likely just evolved with the technology over time. However, an internal organizational assessment could be critical in determining who in an organization should be responsible for managing the system. The assessment should identify a tangible link between personnel that will be responsible for system operations and accountability for organizational objectives that are impacted by the system. Likewise, it is crucial that an appropriate level of authority be vested in these personnel, so that the expectations of the organization can be met. Finally, it is not sufficient to determine that existing personnel may lack necessary skills and therefore require training. The organization must determine which personnel have an appropriate skills aptitude for managing and operating these systems over the long run.

By 1980, responsibility for the building automation system at Texas A&M had shifted from an earlier energy management

function to the building maintenance staff of the physical plant department. After hiring a full-time energy manager in 1991, and more in line with doing the right thing for the wrong reasons, responsibility for the BAS was transferred to that new position. After all, it only made sense that the energy manager be responsible for what was then called the "energy management system."

While it is not easy to decline undue credit for this forward thinking plan, it does prove that sometimes foresight, like hindsight, can be 20/20. Today, we credit much of our success with BAS implementation to this organizational change.

Contemporary building automation systems provide more capability than ever before in meeting indoor air quality standards, while providing occupant comfort and achieving energy efficiency. While these objectives should not be treated as competing priorities, assigning system responsibility to personnel having the highest incentive to correct comfort complaints, can readily lead to sacrificing two of these priorities for the other. The challenge of good facilities management is to achieve occupant safety and comfort as efficiently as possible.

At Texas A&M University's Physical Plant, this task is assigned to the utilities energy office. Because campus energy efficiency is an assigned responsibility of that office, there is a strong link between accountability for an organizational objective and responsibility for one of the primary tools used to achieve that objective.

Since the utilities division is part of the physical plant department at A&M, the decision to extend its more traditional authority beyond the building meter and into the facility HVAC control system, may have been easier than for other institutions. However, for large base-loaded campuses with numerous complex buildings, occupant comfort demands and weather effects may have less to do with energy efficiency than does basic building HVAC operations management. This troubling issue creates the dilemma of who in the organization is best suited to manage the BAS.

Another substantial difficulty to maximizing building automation technology is acquiring the necessary personnel skills to effectively manage the operation of the system while actively planning for future needs. While it may be possible for smaller institutions to successfully contract for these services, mid-sized and larger schools should develop their own internal BAS skills.

Unfortunately, unlike more mature professions, a job description or even an appropriate title for these human beings may be as allusive as these individuals are to locate. Casting a broad recruiting net, offering liberal compensation, and aggressively training appropriate internal personnel may be the only means for improving your chances of employing and retaining these prized personnel.

Has Keeping Pace with Technological Change Become the Objective in Your Organization?

As a manager who either monitors or presides over procurement in an organization, do you secretly harbor doubts about the nearly endless computing system upgrades, expansions, and overhaul requests

that cross your desk weekly? Like others, you may be torn between the fear of displaying some form of fatal ignorance should you dare to ask a discerning question, or that you'll cause irreparable harm should you summarily deny one of these improvement initiatives. While each of these fears are largely unfounded, it is not unusual for the technology itself to become the objective, as opposed to the technology more suitably serving a specific organizational objective.

As with other responsibilities in an organization, it is easier to monitor whether a more broad and measurable strategic objective is being achieved, than it is to understand every micro-issue involved in achieving that objective. Likewise, an investment as substantial as a campus building automation system should be identified as an initiative that serves some larger organizational purpose.

For instance, are indoor air quality and comfort complaints declining? Has the energy utilization index gone down by some percent over some defined period of time? Have there been measurable avoided energy cost savings over some specified time frame? Do billed customers have access to electronic data histories as well as real-time energy consumption and cost?

At Texas A&M, growth and utilization of the campus BAS is specifically defined in our Strategic Energy Management Plan. Because this plan has been accepted by our administrators, system initiatives move forward more easily as a result of fewer approval requirements.

Resistance to creating strategic objectives in an organization usually include management's fear of forfeiting control, an inability to change or delete a strategy once its begun, and that stated goals will not be attained. However, showing trust in a skilled BAS team by decentralizing decision-making is an effective way to begin capitalizing on your BAS investment.

With respect to reconciling missed goals, it is just good management practice to periodically evaluate progress toward stated objectives. In this way, goals can be adjusted, updated, extended, or deleted. Evaluating progress toward achieving strategic objectives should be constructive as opposed to punitive. Understanding why a goal was not attained is an honest way for an organization to learn how to be more effective, and consequently, improve its chances for maximizing any investment, not just its BAS investment.

To Standardize, or Not to Standardize...and Other Systems Integration Questions

An issue often surfaces with respect to the BAS installation: is it better to standardize on one system, or compete several systems through an open bidding process? Because Texas A&M has standardized on a proprietary HVAC building automation system since 1988, we are often asked either of the following two questions—How did you do that? or Why would you do that?

These two extreme positions come from differing schools of thought. There are those who want to standardize because of perceived synergies and cost benefits derived from greater simplicity. And then there are those who perceive greater cost benefits arising from competition, where synergy between multiple systems would be provided through BACNET or some other gateway. There is also a concern that standardization might position your organization in a captive situation, making it potentially difficult to react to declining vendor quality or questionable price increases.

While the concerns of those who advocate competition are not without merit, we believe that for the next five to ten years, standardizing on BAS and plant automation systems will provide the greatest overall cost benefits. The cost of additional servers, workstations, software, training, and inventory, not to mention the confusion of managing multiple systems, each with their own proprietary code, would likely offset any incremental savings derived from competitive procurement.

To the extent that your institution will allow sole source procurement, we recommend that you utilize an RFP process that heavily weighs local service history in its evaluation and

selection criteria. When discussing BAS installations with peer institutions, by far, the most common distinction continually mentioned is how profoundly important high quality local vendor support actually is. Because this attribute varies nationally between vendors, you should not automatically assume that a good relationship in one location is indicative of service that could be expected in your local area from that same vendor.

To best manage cost considerations in a long term sole source arrangement, look for a vendor whose profit motive appears to be based on long-term sales volume and post-sales services, not just a quick profit on project related sales. To manage the relationship once a vendor decision is finalized, you may choose to compare quotes and hourly wages against standardized estimating data and other cost of service benchmarks.

However, as a precautionary note, it may be very difficult, if not impossible, to determine with certainty that you are receiving the absolute best pricing. Just as when buying a new automobile, how can you ever know for sure that you have secured the best possible deal? Also, while conventional government bidding procedures may satisfy rote procurement needs, the process does not alone guarantee lowest possible price. Again, if initial price becomes your only motive, you may avert some scrutiny with respect to documentation of your procurement decisions, but receive little from your substantial BAS investment in return.

An exception to the BAS standardization philosophy might occur for an institution that has already made a significant investment in creating, maintaining, and fully utilizing multiple systems. To the extent that such an institution is fortunate enough to receive excellent vendor support services for each system, continuing this strategy may be appropriate. For these campus installations, BACNET or other gateway may provide a common platform for addressing more basic campus service issues.

However, critical system troubleshooting and more exotic HVAC control algorithms such as temperature reset schedules, outside air control, economizer operations, as well as most continuous commissioning procedures, will require an in-depth knowledge of each system's proprietary programming language. From our discussions with peer institutions, we feel that the risks associated with assuming that you can accommodate the complexities of multiple system management as well as to secure high-quality services for multiple system installations, are prohibitively large.

Texas A&M procurement decisions have evolved over time to standardize on specific families of plant and building automation technology. We have standardized on separate vendors for building HVAC automation, building fire and security equipment, building electrical power monitoring devices, plant electrical distribution relaying, power plant process control automation, and power plant electrical generation control.

While integration between these system families is highly desirable, it need only be accomplished at a superficial level that emphasizes selective data sharing, as opposed to the need for inter-system process control. Accordingly, we have begun to integrate data from a few of these systems into our BAS front-end as well as to establish selective data downloading to an SQL-based management information system currently being developed. Our long-range plan is to organize shared data among these systems to improve the quality and reliability of utility services we provide to the campus.

In summary, we favor standardization within specific plant and building automation system families. In our opinion, current and near future integration technologies—while capable of providing valuable, but basic interoperability—do not allow for detailed professional manipulation through a single platform.

It may be further unlikely that a BAS industry, which markets its products through a differentiation strategy, will ever offer a true industry-wide, fully standardized open protocol. The challenge is to identify which BAS and plant automation families are best to standardize on, then determine what information might be integrated between each system.

Finally, while neither a competition or a standardization strategy is perfect, the decision to move in either direction looms as both large and timely. Unfortunately, neither strategy is easily reversed, and waiting for less rapidly evolving technology before making a commitment, might leave your organization in the new dark ages.

Summary

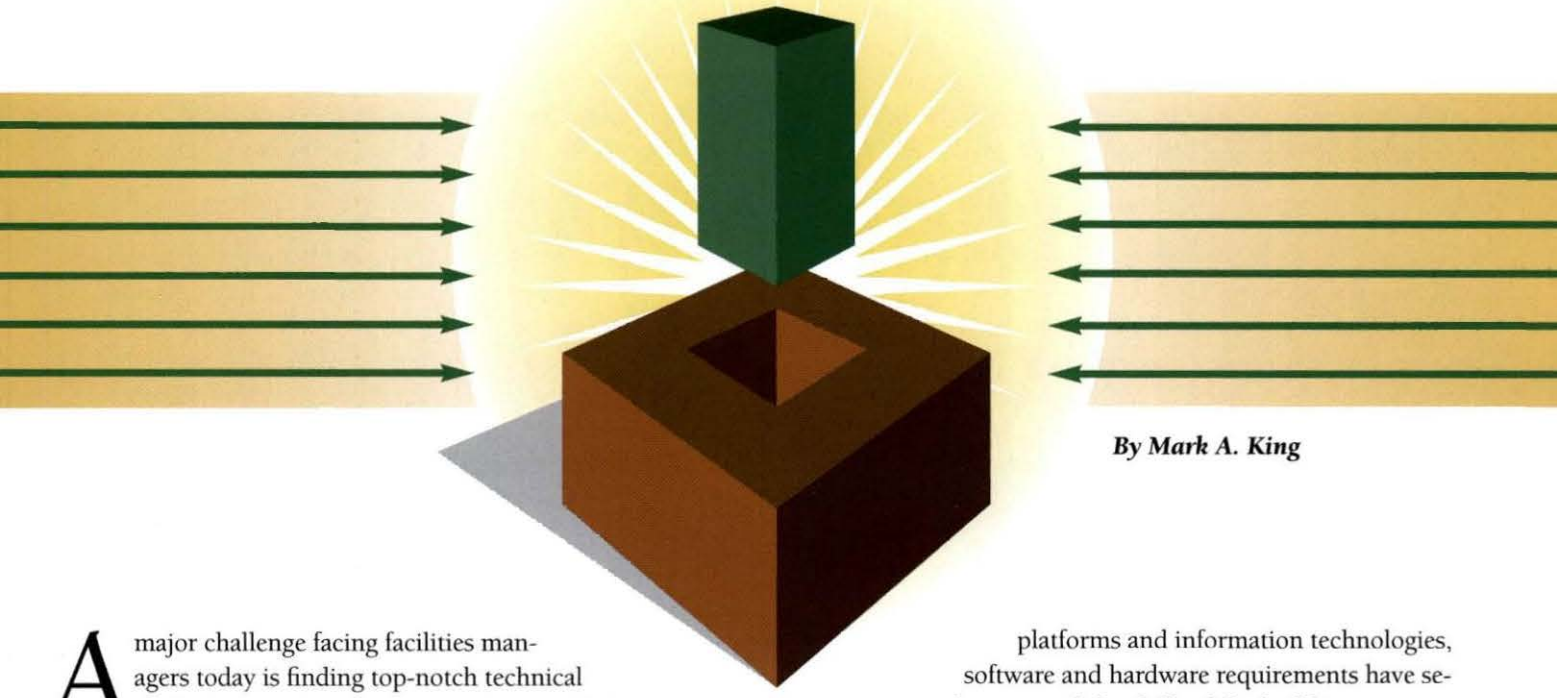
This article has presented a strategic management point of view for maximizing an investment in plant and building automation system technology. Central to this issue was an emphasis on defining specific strategic objectives that are augmented by technology-based initiatives. While acquiring expensive assets and providing training may be a satisfying in-basket task for the facilities manager, these activities alone may result in an organization losing sight of how value is to be created from these new technologies.

Locating and developing necessary internal skills, organizational structure, and decision-making autonomy were discussed as essential to exploiting the BAS investment. While the technological landscape has moved beyond most science fiction of the 1960s, the model for building operations management at some institutions may have changed little since that time. The merits of BAS and other plant automation standardization were discussed in detail. While no proprietary system marketed today is specifically recommended in this article, several key criteria for selecting a BAS vendor and for managing a long-term relationship were offered.

In closing, to maximize your BAS investment, you should be dedicated to the belief that it is going to be exceedingly hard work, moderately expensive, and that true success will come from paying attention to details that may not always be obvious. Conversely, success is rarely if ever achieved by accident.

SKILLING UP

THE WORKFORCE FOR NEW TECHNOLOGIES



By Mark A. King

A major challenge facing facilities managers today is finding top-notch technical professionals who are up on the latest building technologies. For those organizations fortunate enough to have found qualified people, they are equally challenged to keep them qualified. Here are a few hints that may help.

The continuous stream of innovative core technologies into the institutional marketplace presents facility management professionals with as many challenges as it does solutions. In many cases, manufacturers release products and services developed on new technological platforms that cannot be supported by the skill sets of the existing workforce. As a result, the gap in the necessary knowledge and skills widens, making employee training ever more significant. At the same time, most institutions today are less likely to send valuable staff off to two or three-day courses just on new products.

Until recently, a building technologies specialist could get by with elementary knowledge of personal computer systems in setting up and deploying the graphical man-machine interfaces (MMIs)—typically mini or personal computers. For developers to maintain a leading edge with new computing platforms and information technologies, software and hardware requirements have severely outpaced the skills of the building technologies specialist. Compared to the HVAC specialist of the past, today's building technologies specialist more closely resembles an information technology (IT) professional in terms of required skill/knowledge profiles.

One solution that has helped to narrow the ever-widening skills/knowledge gap is the creation of the district automation specialist (DAS). The DAS is selected based on knowledge and experience with IT systems and the building controls industry. As their skills and knowledge bases cover a broad range of technologies, many DAS's are certified by various IT systems manufacturers. They are tasked with staying current on new hardware and software platforms along with new products and services. Furthermore, they coach and mentor other specialists on staying current.

These trends drive the building controls professionals to continually learn new technologies, tools, and methodologies at an ever-increasing rate. While every college and university understands the value of education, a quote from the *International Labour Organization Report* published in April of 2000 reinforces the importance of lifelong learning:

"If knowledge, skills, and learning abilities are not renewed, the capacity of individuals and by extension, of communities or nations—to adopt a new environment will be considerably reduced, if not cut off entirely. Lifelong learning is a survival issue. The importance for persons to continue learning throughout their active working life, and even

Mark King is manager, operations training, for Siemens Building Technologies, Inc., Buffalo Grove, Illinois. He can be reached at mark.king@sbt.siemens.com. ***This article was adapted from King's presentation at the first Emergent Building Technologies Conference, held this past February.***

beyond, will increasingly move to the top of individual, national and international agendas in the future."

The real question is, how does one "skill-up" the workforce to take maximum advantage of both present and future technologies?

In answering this question, it's important to understand a basic assumption about employees: they want to perform. This supports one of the tenets of employee training: when people are appropriately skilled, motivated, given clearly defined job requirements, timely and accurate feedback, performance consequences, appropriate resources, and minimal task interference, they will perform and deliver value consistently.

As noted human performance technologist, Geary Rummler, observed from his experience, approximately 15 percent of performance problems are related to "people" issues while the remaining 85 percent are due to organizational issues or processes that impede their performance. Rummler asserts that only a small percentage of performance problems can be traced to a lack of skill or competency. Simply stated, employees need to know what they should be doing, why they should do it, and should receive feedback on their progress. Institutional processes must enable rather than hinder performance.

Regarding the educational facility management and BAS industries, information technology and computing skills are integral to the total skill set required for interacting with building control systems. During the interview process, look for clues that indicate comfort with technology, such as a cell phone, a palm-top device, a personal digital assistance (PDA), or a laptop. Is there a home computer, and is there comfort using it? Was the interview secured via the Internet, or was the resume e-mailed with an embedded link to a home page? Ask for a few of their favorite Internet sites to gauge familiarity.

Although much of today's training is instructor-led, online or e-learning courses are equally important. This helps to establish technology as a daily part of the work. Leveraging technology decreases the amount of time it takes to train a new employee on job requirements. Many institutions provide e-learning portals that offer a vast array of training programs in both IT and soft-skills.

A key is establishing a clear policy regarding learning/training and work time. When will the training be conducted? If done after normal working hours, how will that time be accommodated? Directing employees to training resources that are accessed anytime and anywhere may pose new challenges, so be sure to have a written policy that is communicated and applied consistently.

One method that helps employees embrace new technologies is participation in Internet-based centers of competency. Chat groups, bulletin boards, online forums that relate to their area of performance help them feel connected to a larger group of peers. Many equipment and technology vendors publish electronic product documentation and knowledge databases/FAQs that can be accessed by the employees via the Internet. It helps the learning process if supervisors set an example of embracing technology, too. Use e-mail as a preferred means to communicate non-critical information.

Experiment with online communities of competence via an intranet platform that facilitates discussion and sharing of knowledge. Experts and exemplary performers should be encouraged to post solutions to tough problems to be accessed and shared throughout the company. Encourage employees to subscribe to industry-relevant listservs (automatic e-mail distribution lists) and electronic newsletters to help them stay on top of new technology.

Some institutions have also experimented with software and hardware tools called Electronic Performance Support Systems (EPSS) to help their employees solve problems in the field. These can be as simple as an embedded help tool within a proprietary operating system, or a standalone program combining a reference and technical documentation library with an expert system for troubleshooting a BAS.

Set specific expectations regarding the employee's involvement in professional development activities. Instructors should belong to professional trade associations that relate to their technical field of expertise and support their current vocation as an educator. In general, employees should be encouraged to take an active role in these groups and seek professional certifications and credentials. They should also attend conferences and seminars regularly that support ongoing professional development. Encouragement is reinforced when the institution provides meeting space for professional association local chapter meetings, or donates equipment and conducts tours. Demonstrating commitment to the im portance of ongoing professional development is valuable.

Spending a minimum of two weeks per year "in the field" performing the actual work for which they are being trained is also helpful and should be clearly stated in the employee's annual goals.

Most important of all, it helps to have a process in place that develops and verifies the specific skills and capabilities required to execute the work within the individual's area of performance. A general process flow should include the following phases:

Six-Phases: The cyclical nature of skills development

See page 30 for a detailed description of the six phases.

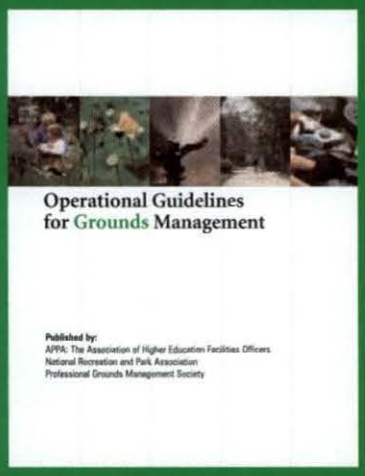
Continued on page 30

Available June 2001

Operational Guidelines for Grounds Management

A comprehensive guide to Grounds Management.

Operational Guidelines for Grounds Management is your comprehensive guide to maintaining and managing your grounds and landscaping operation. Written by professionals with years of grounds and facilities expertise, this book will help you review, organize, and improve your grounds management department.



Included are chapters that discuss the importance of environmental stewardship, explain the benefits and drawbacks to broadcast and zone approaches to organization, and consider the pros and cons of contracting out your landscape operations.

You will also learn how best to staff your department, using our grounds staffing guidelines section, and how to use benchmarking to measure your progress. Plus, there's a chapter on environmental issues and laws to ensure your compliance with current regulations.

Seven appendices give you easy access to references that will help you plan and maintain your grounds operation. These include a selected list of software available for grounds management, sample job descriptions, a bibliography for further reading, and an extensive glossary of terms.

Operational Guidelines for Grounds Management is the result of a unique publishing collaboration between APPA, the National Recreation and Park Association, and the Professional Grounds Management Society.

The price of the book is $75 members/$125 all others.

Table of Content

Order Form

Please send me_____ copies of ***Operational Guidelines for Grounds Management.*** Copies are available from APPA for $75 members/$125 all others, plus delivery ($5.00 orders up to $80; 10% of total purchase for orders greater than $80, with $15 maximum.) Please allow 2–3 weeks for delivery.

Name: _____

Title: _____

Institution: _____

Street: _____

City: _____

State: _____ Zip: _____

Phone: _____

Fax: _____

E-mail: _____

❑ My institution is a member of APPA

_____(quantity) x $75 members/$125 others

_____+(delivery–add $25 for rush delivery.)

For International Orders add 20% of total purchase.

Total: $ _____

Payment Method:

❑ Check enclosed

❑ Purchase order number: _____

❑ Credit card: Please circle one:

VISA MasterCard American Express

Cardholder's name: _____

Card number: _____

Expiration date: _____

Total amount of charge: _____

Authorized Signature

(required): _____

Return this form to **APPA Publications, 1643 Prince Street, Alexandria, VA 22314-2818;** or fax to 703.549.2772.
For more information call APPA at **703.684.1446**
or e-mail **cotrenia@appa.org.**
Visit our online bookstore at
www.appa.org/resources/publications.

Continued from page 28

Phase 1 - Performance Model

The Performance Model represents the key elements of work organized by areas of performance. These include key tasks and outputs, typical metrics or measures, typical performance gaps. The gaps are categorized by deficiency, e.g., individual motivation or inherent limitation, environment/process interference, or knowledge/training required.

In essence, the Performance Model is an accurate picture of the job that becomes the basis for the training and development solutions and qualification measures. The individual, after being trained and having an opportunity to practice the skills covered by the 'work package,' is then asked to qualify or perform the work under typical field conditions. As the task is performed, it is evaluated by a master or exemplary performer against pre-defined performance standards. The Performance Model must reflect real-life (vs. conceptual) work and must be created and kept current using experienced field experts.

Phase 2 - Skill Gap Analysis

The second phase is conducted by the supervisor and the employee to assess the employee's skills and abilities and to identify the gaps needed to fulfill the job requirements. The gaps are prioritized and become primary data for the development of the training plan.

The accuracy of the skill gap analysis is critical: the goals are to avoid wasted time and expenses on unnecessary training while assuring that the employee receives the needed skills training.

Phase 3 - Development Planning

Once the skill gap is identified, the training events to close the gap can be defined. These can be either a series of formal, instructor-led classes or structured on-the-job coaching and mentoring from another qualified individual, or a combination of the two. The training or development solution should remain flexible: the real issue is qualifying the employee to perform the required task.

The development plan must be written, updated, and revisited by both the employee and the supervisor. Development plan updates should be held monthly during the early phases for new employees.

Phase 4 - Development Activities

This phase involves the actual training and development events that are planned and scheduled to close the skill/knowledge gap and enable performance. Ideally, the selection of the most appropriate event should be made jointly by the employee and the supervisor.

Each qualification instrument clearly indicates both negotiable and non-negotiable success criteria. Typically, most non-negotiable criteria comprises issues of safety, quality, elapsed time, or functionality of the work products. Negotiable criteria are often weighed by the exemplary performer or evaluator. The qualification instruments are essentially task performance checks used by the evaluators to ensure task processes are followed appropriately. However, contingencies can and do occur when a work package is completed in the field, so the evaluator must be able to take these into account.

Phase 5 - Structured On-The-Job Skill Practice

Every institution wants all of their new employees who have been to a formal training event to have the opportunity to put their new skills to good use in a productive setting. They also know it's important for the employees to receive coaching and constructive feedback from either their mentor or their supervisor. Once the employee feels they are ready, the qualification event is scheduled with the evaluator.

Phase 6 - Qualification Event

Following a structured, on-the-job practice, the supervisor and the appropriate evaluator should coordinate the scheduling of a qualification event. This may occur when a number of conditions exist, such as when the candidate is trained and feels ready, when an evaluator is available, and when the right job exists that requires the work covered by the qualification event.

Little preparation is needed for the qualification event, so there should be no surprises on the day of the actual event. Depending on the type of work package, the evaluator might observe the entire process or simply evaluate the output. If the event is successful, the evaluator should sign off on the documentation. If unsuccessful, additional training or coaching should be discussed in collaboration with the employee, their supervisor and the evaluator, and the event should be rescheduled. If the employee disagrees with the results of the qualification event, the event needs to be rescheduled and a new evaluator assigned.

Performance Model Revisited

If the Performance Model has changed to indicate new job requirements, then a skill gap analysis should be conducted, development prioritized, training scheduled, etc. The Performance Model is ever changing, and employees must keep learning and demonstrating new skills. Typically, supervisors will update the employee's development plan for new qualifications during annual performance appraisals or whenever critical new qualification requirements surface.

This performance management process is a crucial link in helping employees skill-up for the steady stream of new and exciting technologies. Finding the right people who are committed to lifelong learning, who embrace new technologies with enthusiasm, and who truly desire to perform, is the right place to start. An institution must then communicate expectations clearly for ongoing professional development to assure that employees have and use the technology available to them, to effect a disciplined, formalized development and qualification process based upon a reliable, relevant job model.

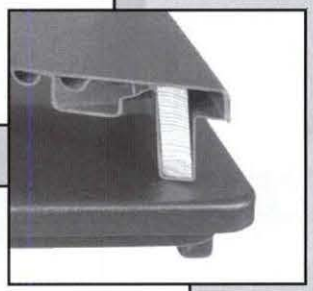
In summary, if appropriately skilled and motivated employees are given clearly defined job requirements, timely and accurate information and feedback, performance consequences, appropriate resources, and minimal task interference, they will perform and deliver value.

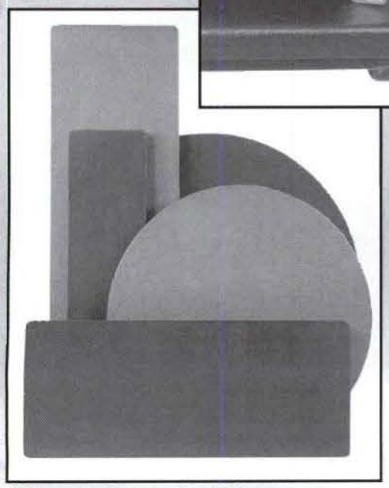
For any Occasion...

Call Today
for your
FREE
Color Brochure
1-800-333-2687

Our
ABS Folding
Tables and Series 5

Folding Chairs provide years of quaranteed service in a multitude of colors and styles. Buy direct and SAVE!





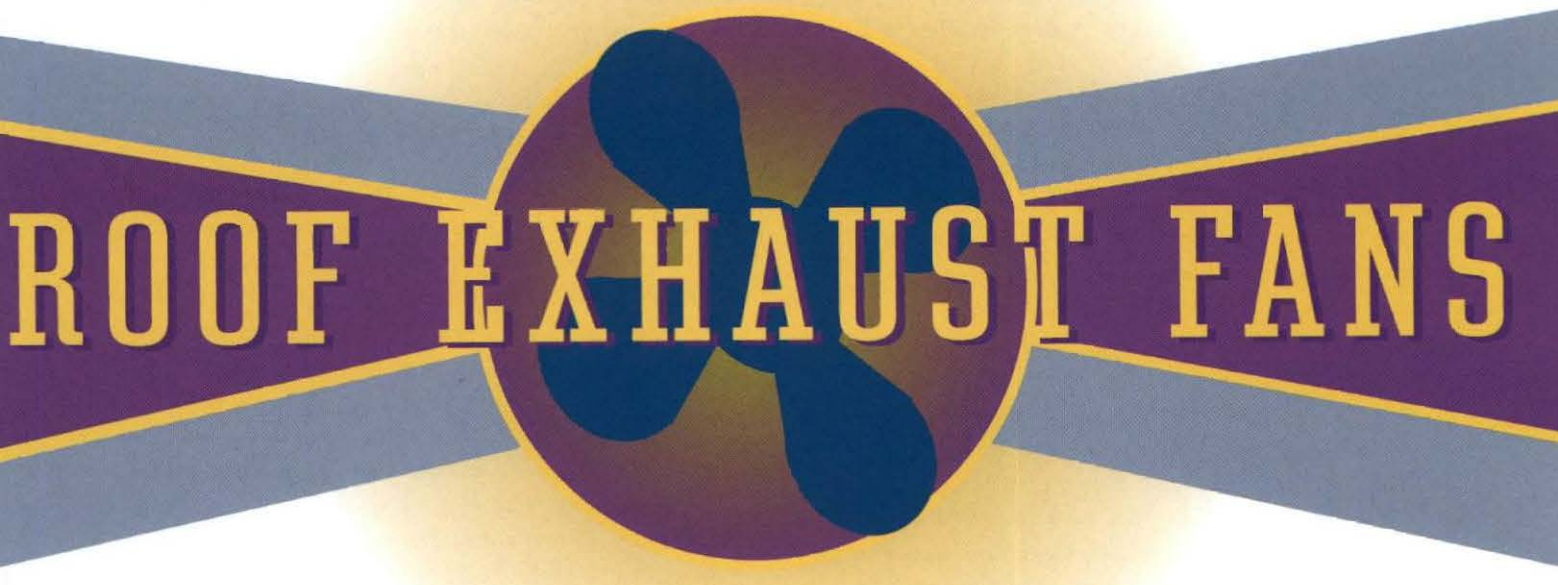
Your Facility Name Here

McCourt Manufacturing

Fort Smith, Arkansas, USA
501.783.2593 Fax: 501.783.7608
Visit Our Web Site at www.mccourtmfg.com

THE BENEFITS OF MIXED FLOW TECHNOLOGY

ROOF EXHAUST FANS



By Paul A. Tetley

Many educational institutions use sophisticated laboratories for teaching and research. Operating laboratory workstations presents problems to facilities managers that typically include issues of indoor air quality (IAQ), pollution abatement, HVAC equipment/system acquisition and operating costs, odor prevention, roofline aesthetics, and other "good neighbor" considerations. Each of these issues is important, of course, more or less prioritized by the severity of the problems they create at a particular campus.

There is a practical and cost-effective way to deal with these issues—that is, through use of mixed flow impeller exhaust fans, a century-old technology that has undergone many evolutionary refinements during the past few decades. This article will discuss the problems associated with laboratory workstation exhaust faced by most colleges and universities. It will explain how selection of a proper fume hood exhaust system can prevent or eliminate these problems and help provide a clean, healthy, safe, and quiet environment for students and instructors, maintenance staff, technicians, and neighbors.

Paul Tetley is vice president and general manager of Strobic Air Corp., a subsidiary of Met-Pro Corp., Harleysville, Pennsylvania. He can be reached at ptetley@strobicair.com.

IAQ and legal implications

The subject of indoor air quality in the laboratory has received widespread publicity over the past few years. There are many reasons for this—perhaps partly because of greater public awareness of pollution issues, and perhaps because of widespread news media coverage of multi-million dollar lawsuits involving workplace pollution issues. No doubt litigation against a well-known university hospital with regard to IAQ and employee health problems helped focus public attention on this issue.

These lawsuits resulted from claims that dangerous laboratory workstation fume hood exhaust either remained in the laboratory work area, and/or roof exhaust gases from the workstation were being re-entrained into this area. In some

of these cases building owners, consulting engineers, contractors, and even architects were named as defendants in lawsuits associated with employee illness allegedly caused by harmful IAQ. Many of these cases have been in the courts for more than a decade, some of them not yet resolved.

Exhaust re-entrainment can be caused by improper or inefficient roof exhaust fans, poor exhaust stack and/or ventilation air intake design and/or location, weather and wind conditions, and other factors. While roof exhaust re-entrainment can be a serious problem, all of its negative implications may not be widely known. In fact, not only can the health of building workers be affected by exhaust re-entering the building through windows, vents, air intakes, and door openings (among other possibilities), but the legal consequences can be troublesome and expensive to say the least.

Roof exhaust re-entrainment takes on many forms. It can be harmless and unperceptible; but more likely it can be toxic, noxious, or odoriferous. Its influence on people covers a full spectrum from innocuous to mildly annoying (but not harmful) to seriously unhealthy. However, if exhaust re-entrainment is not a health concern at a laboratory facility, generating odoriferous emissions can also create problems on the campus. When they are produced—regardless of toxicity—university management will ultimately be confronted, either by neighbors or a regulatory body.

IAQ is only one side of the equation with regard to laboratory workstation roof exhaust systems. There are two distinct terms used to discern differences between roof exhaust that is being "re-entrained" into the facility, and workstation exhaust that is not removed from the building in the first place (containment). Probable causes of "containment" include building ventilation/ ductwork design/configuration, and exhaust equipment/accessories at the laboratory workstation, or some combination. IAQ problems—and lawsuits that might be associated with them—have been caused by both containment and re-entrainment issues.

Mixed flow impeller technology for roof exhaust

For many pollution abatement problems—including prevention of re-entrainment, and odor control—there are two popular exhaust technologies. These include conventional centrifugal roof fans, usually with a belt drive motor and dedicated single exhaust stack, and newer mixed flow impeller exhaust systems mentioned previously.

While many educational institutions have been using conventional centrifugal exhaust fans for their laboratory workstation fume hood exhaust, more and more are switching to mixed flow impeller technology for retrofit as well as new construction. There are many reasons for this. As anti-pollution laws have become more stringent, even the sight of a tall exhaust stack imparts negative connotations in the community. Also, tall exhaust stacks usually require expensive mounting hardware (bases, guy wires, roof curbs, etc.), and often they still do not prevent re-entrainment of exhaust fumes back into the building or adjacent facilities. In addition, the belt driven centrifugal fans associated with these systems generally required periodic (and occasionally hazardous) maintenance, and are sometimes housed on the roof in a "penthouse," another added expense. Penthouses are designed to protect workers from the elements during fan maintenance operations; however, these maintenance people can still be subjected to exposure from unhealthy exhaust fumes.

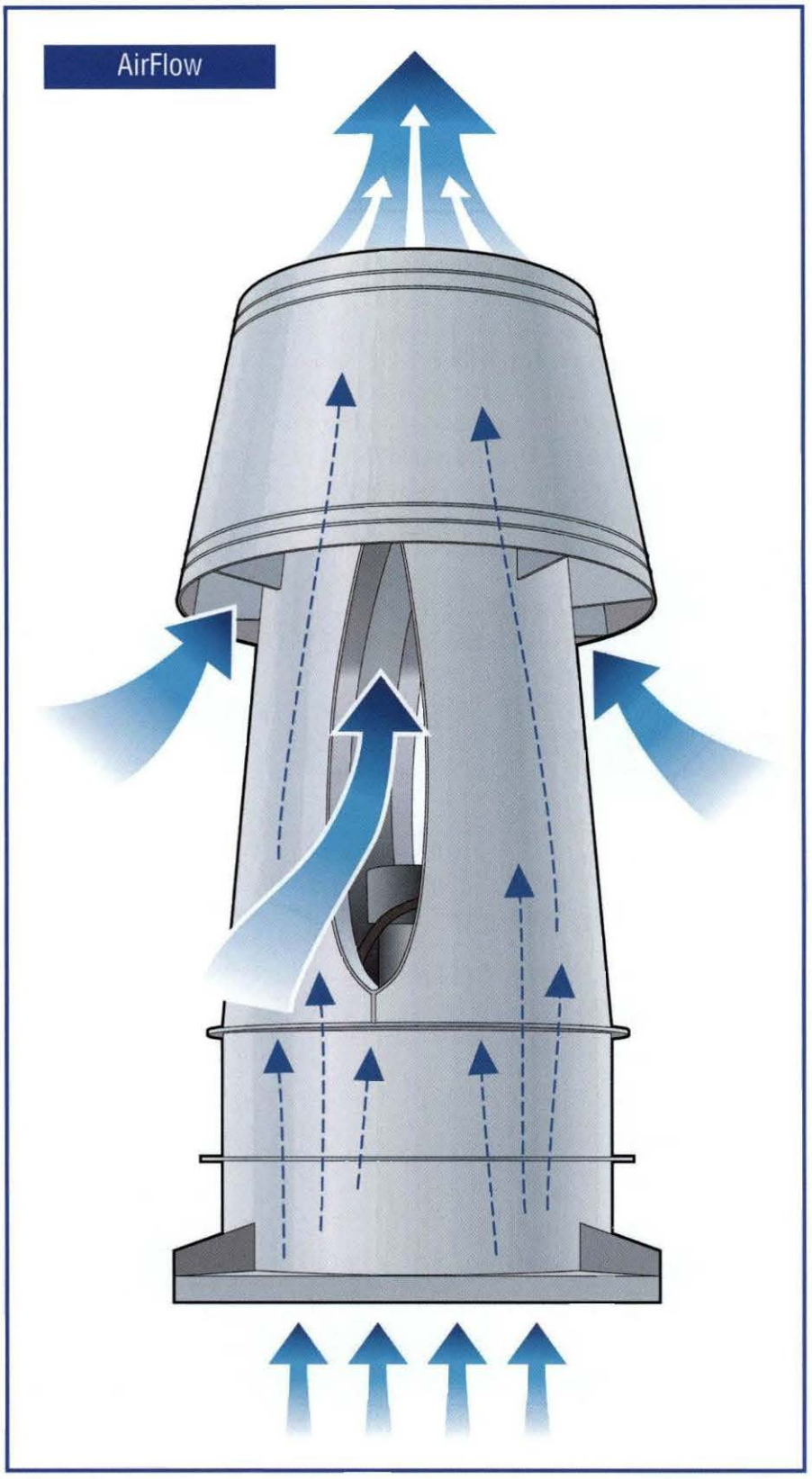
Development of mixed flow impeller technology

Mixed flow impeller technology originated in the late 19th century in France. It is actually a combination of axial, radial, and centrifugal flow technologies that existed for many years prior to that point. Mixed flow impeller technology capitalizes on the outstanding performance characteristics offered by each of these fan types by combining

them into a unique fan blade design that provides constant acceleration ratios through blade passageways of volume, or the pressure to the volume curve. What makes the technology unique is that both sides of the blade are performing equal work for maximum efficiency. As a result, the performance curve is perfectly stable with no stall or unstall sections.

When this technology was developed it provided approximately 70 percent peak efficiency performance which was remarkable for the time; today it is more like 80 percent+. Mixed flow technology was originally designed for low pressure, high flow applications; with today's advances in blade aerodynamics, it provides optimum performance in virtually all combinations of low pressure/high flow, high pressure/low flow, etc.

About 20 years ago, interest was revived in this technology. Over the past decade it has been refined to such a high degree that most of the problems associated with centrifugal type fans have been eliminated, with mixed flow impeller technology fans accomplishing the same purpose, more efficiently, and much more economically.



Exhaust dilution and jet plumes

Mixed flow exhaust fans combine outside (ambient) air with exhaust discharge, sending a nearly vertical "jet plume" of exhaust gases up to 350' high above the building roof line. The exhaust gas/air mixture contains as much as 170 percent free outside air, effectively diluting the exhaust plume into the atmosphere, thus eliminating pollution problems (as defined by appropriate regulatory codes). The powerful vertical plume also eliminates re-entrainment possibilities, solving some—or all—of the IAQ problems that may have been caused by laboratory workstation fume hood exhaust.

Addressing the containment issue

With regard to containment issues (sometimes "the other half" of the IAQ equation), various equipment within the building at the workstation is available to eliminate containment problems. This can include dedicated but simple air moving systems through complex, automated hood or ventilation systems designed to prevent workstation exhaust from remaining in place. In addition, there are many automated laboratory workstation fume hood controllers and other sophisticated instrumentation that prevent containment problems at the fume hood. These devices usually incorporate set point alarm systems to automatically close off the workstation if a pre-set value is exceeded. In this way exhaust containment is eliminated, and the quality of indoor air is not compromised.

Fan noise can also create problems

The subject of noise generation—while not directly associ-

ated with IAQ—has also become popular since many people are increasingly aware of unwanted noise. Centrifugal-type dedicated roof exhaust systems are generally noisier than mixed flow impeller-type systems (on a direct CFM comparison basis) because the mixed flow fans are typically in the mid-to-upper 80 percent efficiency range vs. the mid-to-upper 50 percent efficiency range for centrifugal fans (based on total efficiency [TE]). Since sound is a function of efficiency, mixed flow technology is inherently quieter. In addition, noise generation caused by peripheral blade tip speeds also plays a role in performance sound levels, and mixed flow impellers rotate at substantially slower speeds than centrifugal fans for the same amount of work.

Most campus laboratory buildings contain two different noise sources—the supply fans that provide conditioned air (HVAC) and the workstation fume hood exhaust fans mounted on the roof. Each of these systems is usually independent; and each requires a separate set of standards and criteria with regard to noise generation and/or minimization.

Exhaust acoustics are considered part of a building's aesthetics. Acoustical analysis of exhaust and ventilation systems early on, prior to installation for new or retrofit construction, can minimize the acoustic impact on surrounding areas. Obviously facilities managers don't want the mechanical sound of exhaust fans to be heard within a building or at the property line; and, exhaust fan noise should not be detectable in adjacent buildings as well. To eliminate possible noise problems, many organizations, when building a new facility or refurbishing an existing one, look to independent noise study experts to help make determinations as to exhaust system operating noise levels, usually at the property line.

If mixed flow impeller type fans are employed, and noise is still an issue, there are also accessories available to reduce sound generated at the property line. These typically include acoustical screens and/or louvers, chevron screen walls, and acoustical silencer nozzles that use a combination of sound absorption material as well as special airflow patterns to achieve high attenuation values.

UND and re-entrainment prevention

Eliminating re-entrainment with quiet exhaust were two issues facing the University of Notre Dame (UND) in South Bend, Indiana. The university recently completed a major renovation project at its Galvin laboratory complex—a 30-year old, four-story building with 138,000 sq.ft. of space. One upgrade included the building's laboratory fume hood exhaust system. The need for additional fume hoods in the existing Galvin complex had taxed most of the original systems beyond their performance capabilities, yet eliminating re-entrainment possibilities with quiet exhaust fans were key objectives.

The re-entrainment issue was determined to be a serious problem at the original complex which housed 60 laboratories with 78 workstations and fume hoods along with some biological safety cabinets. A few additions had been made over the years and a fourth addition, the Hank Family Center for Environmental Sciences, was also planned. At the existing facility workstation, exhaust was reaching the ground level of the building and being drawn into the outside ventilation intakes.

To solve these problems, the university conducted a study which included evaluation of the existing building and its systems (building audit), a feasibility study for the renovation of the Galvin HVAC systems, and a computer simulation of the building's laboratory fume hood exhaust systems. Though re-entrainment was not detectable by sight or smell, the building audit and wind model provided compelling data to support a complete overhaul of its exhaust systems. At that point, standard centrifugal workstation fume hood exhaust

fans were ruled out because they were not able to prevent re-entrainment. Consequently, more powerful fans were evaluated which, while solving the re-entrainment issue, would likely create higher noise levels which were also objectionable.

Mixed flow impeller fans eliminated re-entrainment—quietly

After studies were completed, the university purchased mixed flow impeller workstation fume hood exhaust systems that eliminated re-entrainment possibilities. The system also reduced noise—with substantially lower noise levels in the lower octave bands—and cut energy consumption while providing enhanced performance.

Since acoustics were an important issue at UND, the university had acoustical analyses performed to potentially eliminate the mechanical sound of any exhaust fan that might be heard within the building and in its pedestrian and mall areas adjacent to the building.

Sound calculations were performed based on varying distances, both theoretical and practical, by an architectural acoustics firm. Noise characteristics were obtained directly from the fan manufacturer. Ambient noise levels from surrounding areas were analyzed. A decibel meter was positioned at various locations surrounding the Galvin facility to gather noise level information. From these studies—including a review of the fan manufacturer's noise abatement options—total sound values in decibels were determined. As this project evolved, more and better information, such as exact equipment location, building plans, surrounding buildings, wind patterns, and other considerations were also reviewed. While noise codes were not a factor since the university was its own neighbor, the amount of noise generated by the exhaust system is of critical importance on a campus site with proximity to a library and classrooms.

Lowering overall system costs

At the University of Quebec at Montreal (UQAM) the institution's facilities managers and design team evaluated many HVAC products while planning a new 400,000 sq. ft. laboratory building for its science campus. Teaching and research activities there include mathematics, computer sciences, physics, earth sciences, and environmental sciences. By any standards, this was a huge project. The ten-story building accommodates over 4,000 students, and incorporates over 150 individual laboratory workstations for research and education. The building also houses classrooms, teachers' offices, and a library.

One of the many HVAC considerations was managing the workstation/fume hood exhaust for the 150 laboratories. As is typical with many university laboratories, a wide variety of chemicals and materials is used at the workstations; as a

result some fume hood exhaust effluents are highly corrosive, and noxious.

"The issue of laboratory workstation exhaust was a major consideration in planning the entire HVAC system for the building," according to André Couture, an architect at the university. Couture's department was responsible for overseeing the design and development of the technical/mechanical systems of the entire building, and he served as the link between the architects, the engineering consultants, the future occupants, and UQAM's maintenance department.

Cutting energy costs drastically with mixed flow impeller technology

For laboratories that require 100 percent conditioned makeup air, mixed flow impeller systems are also being used in a new and unique manner; that is, adding heat to ventilation intake air to achieve substantial energy reductions.

Heating energy costs are expected to rise by 50 percent or more this year over last. Many universities with laboratory workstations are seeking relief from these high costs, particularly since laboratory facilities account for unusually high energy consumption.

Add 1° F for 3% energy savings

Laboratories that require conditioned 100 percent makeup air experience extraordinarily high costs for heating and cooling. With heat recovery coils as part of the mixed flow impeller system, for every 1° F you add, energy costs are reduced about 3 percent. A 10° F rise in intake air temperature translates into a 30 percent energy saving—quite impressive based on today's high fuel costs.

In addition to lowering costs, users help contribute to a cleaner environment since less fossil fuel is consumed. Systems of this type are practical when outside air temperatures are below 40° F or above 80° F. That's because there must be a sufficiently large temperature difference between outside and inside air temperatures to make it effective. With regard to cooling air in warmer temperatures, if outside air at 90° F is brought back into the building and sent to the heat recovery system, the air temperature drop is typically 4°-5° F—also equating to a 3 percent drop in energy consumption for each 1° F drop in air temperature.

To sum up, in addition to the dramatic fuel savings for heating and cooling (in 100 percent conditioned makeup air facilities) other advantages offered by mixed flow technology fans include lower energy consumption over comparable centrifugal-type exhaust fans, virtual elimination of periodic maintenance, re-entrainment prevention, odor elimination, and quiet operation. Based on current trends this technology will likely be used by more college and university research facilities.

Cultural Change and a Balanced Scorecard

Does Your Organization Measure Up?

By Chris K. McAlary

Are you inundated with marketing brochures and e-mail messages from private vendors proclaiming they can save your school or university thousands of dollars while providing better services than your existing organization? Guess what? Maybe they can. Do you measure the success of your business enterprise? Do you measure *anything* in your business enterprise?

If you don't, you are a prime candidate for outsourcing. You can be sure that a few of the many criteria that private industry promotes in their marketing brochure are customer satisfaction and performance indicators that identify bottom-line savings and increased customer service. Although you may want to dispute the accuracy of their claims, any rebuttal without a plan of action will be labeled defensive, too little too late, myopic, or lacking a long-term vision for your unit.

Are you getting the picture? Well listen up! Have you heard of the balanced scorecard concept (BSC)? The BSC could have answers to some of these woes and will better position you to compete in the areas that make sense for your organization. The balanced scorecard approach reduces the dangers of over-dependence on "lagging" financial results by ensuring that companies take regular measurements of their customer base, internal business processes, and levels of internal learning and growth as strategic objectives are pursued.

Chris McAlary is associate vice president for facilities planning and management at California State Polytechnic University, Pomona, California. He can be reached at ckmcalary@csupomona.edu. This article is based on research the author conducted while enrolled in an Executive MBA program at the University of Southern California.

In addition, you will be able to properly reevaluate your operation to identify those areas that you can't compete.

There is evidence at several large campuses that suggest a balanced scorecard is a winning prescription that has added value to their organization beyond their original expectations. And APPA has adopted the balanced scorecard concept as the structural foundation for its Strategic Assessment Model, an important self-assessment and continuous improvement tool. [*Ed. Note:* The revised second edition of *The Strategic Assessment Model* will be published in July.]

What Services are at Risk?

Have you heard of "Bob from account temps" or "Jane from Collections.com"? Virtually every service provided at an educational institution could be outsourced. We are all aware of the facilities outsourcing in recent years at the University of Pennsylvania and the construction management services at Stanford. The ensuing reorganization at both universities included the loss of many white-collar professional jobs.

The primary driver in the outsourcing equation used to be cost associated with the bottom line. There are now other factors being identified that can be more valuable than just the bottom line. Some of these "other factors" that are considered in today's outsourcing equation include technology, expertise, and quality of service.

A recent survey administered by Cheryl Keown confirmed that the trend to outsource traditionally in-house services continues to grow. Her article in the November/December issue of *Facilities Manager* also notes that universities are not outsourcing as a means to reduce costs, but rather due to the expansion of existing facilities and the need for specialized skills that in-house employees lack as technology continues to advance.

In our complex world of rules, regulations, and laws, the expertise and quality of service provided from a private firm can add value beyond just price. What approach should you take to determine if your department is adding value for your campus stakeholders?

A Balanced Scorecard

The skills and competencies we are trying to master in our fast-paced environment today require a broader set of measures than the traditional financial performance measures that worked well in the past. The balanced scorecard concept of performance management is being recognized by organizations that are seeking a more well-rounded, forward-looking approach to guiding their businesses. According to Robert Kaplan and David Norton, the balanced scorecard "translates an organization's mission and strategy into a comprehensive set of performance measures that provides the framework for a strategic measurement and management system." There is also strong evidence that suggests a successful implementation of the balanced scorecard concept can dramatically change the focus of your organization.

The balanced scorecard complements financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and learning activities. It allows management to look at the organization from four linked perspectives:

1. How do customers view the department?
2. What must the department excel at?
3. Can the department continue to improve and create value?
4. How does the department look to shareholders (financial perspective)?

This approach enables you to "evaluate and balance" the measurement of performance on several business dimensions and avoids the potential of being misled by any single measurement.

The basic concept of the scorecard is to translate your organization's strategic plan to a set of specific, objective requirements (metrics on a scorecard) that are reviewed monthly. To balance the metrics, the scorecard should include both financial and non-financial metrics that reflect the overall business strategy. This ensures that attention is paid to each dimension of the strategy.

Scorecard Design and Implementation

The experiences from the for-profit sector suggest that the entire balanced scorecard design and implementation process can easily take up to two years or more. To avoid getting intimidated by the schedule it is helpful to take a holistic view of the entire process. Kaplan and Norton (1996b) suggested that designing and implementing a balanced scorecard comprises four related stages: (a) translating the vision and gaining consensus; (b) communicating the objectives, setting goals, and linking strategies; (c) setting targets, allocating resources, and establishing milestones; and (d) feedback and learning. These four stages should be representative of the organizations shared vision.

Ultimately, your measures should help to communicate the organization's strategies and goals, motivate actions to these, and provide guidance and feedback to their attainment. Thus, for an organization to reap full potential of the balanced scorecard process, it needs to first define its mission, determine major departmental objectives, and select strategies.

A faculty committee at the University of Southern California's Rossier School of Education recently adapted the BSC model to satisfy the central administration's need to know how the department is doing and how it measures up to other schools of education. One of their conclusions is that the processes through which people must work together in order to develop the scorecard will probably have latent benefits that contribute to organizational well being, like conversations that encourage the development of shared values.

Continued on page 42

Does your campus pass the test?

We have over 29 years experience making sure that signage systems make the grade. We have the expertise to take care of all your way-finding needs, from interior to exterior...from interactive touch screen kiosks to basic safety signage. And we offer a collaborative, comprehensive, planned approach that's made a difference for universities coast to coast.

Getting through college is hard enough.
Getting around it shouldn't be.

For a brochure or video, call 1-800-777-8283.
We'll educate you for free.

The Company That Does Things Right

INNERFACE®

Innerface Sign Systems, Inc.
5320 Webb Parkway
Lilburn, Georgia 30047-5943
1-800-777-8283
www.innerfacesign.com

ADA Interior Signage Exterior Signage Safety Signs
Logos Sign Planning Touch Screen Directories Installation

Continued from page 40

A properly constructed scorecard should tell the story of the business unit's strategy through such sequences of cause-and effect relationships between outcome measures and the performance drivers of those outcomes. All balanced scorecards use certain generic measures, which tend to be core outcome measures. Outcome measures without performance drivers do not communicate how the outcomes are to be achieved. The performance drivers—the lead indicators—are the measures that tend to be unique for a particular business unit. A good balanced scorecard should have a mix of outcome measures and performance drivers.

Success Stories

A wide variety of for-profit organizations have benefited from using the balanced scorecard but only a few applications by educational institutions have been reported to date. A partial list of users includes AT&T, Brown and Root, Intel, 3Com, and Tenneco. In the insurance industry, Allstate Corp. has developed a balanced set of measures and achieved higher levels of customer satisfaction, employee effectiveness, process effectiveness, and innovation, which in turn have significantly improved corporate cash flows (Birchard, 1995). Several other companies (Cigna Insurance and Active Tools) have successfully linked compensation to balanced scorecard results.

The Business Affairs division from the University of California at San Diego in 1993 implemented the most notable BSC success story in higher education. Reported benefits and outcomes have included the payroll department reducing errors 80 percent over a three-year period. The time it took to receive travel reimbursement checks was cut from two months to as little as three days. Their dedication to the balanced scorecard program culminated in their winning both the NACUBO 1996 Higher Education Award and the 1999 RIT/USA Today Quality Cup for education. The University of California-Irvine has developed and implemented a similar but much more encompassing system to promote longlasting organizational change and process improvement. In addition there have been recent articles in *Facilities Manager* that identify Soka University of America, Emory University, and the University of Southern California as having recently implemented various combinations of the balanced scorecard concept.

Changing the Culture

The balanced scorecard can be the catalyst for stimulating and sustaining continuous improvement. It is a customer-based planning and process improvement system aimed at focusing and driving the change process. It does this by translating strategy into an integrated set of financial and nonfinancial measures that both communicates the organizational strategy to the employees and provides them with actionable feedback on attainment of objectives.

By clearly delineating the cause from effects, organizations can develop a new focus on what makes a difference, instead of that which consumes time and adds little in terms of value to business results, customer and employee satisfaction, and shareholder value. The organizational scorecard can serve as the starting point for a company-wide performance improvement system that pinpoints each department's key contributions to the overall strategy. Such a scorecard would align all employees with the organization's strategy, focusing employees on critical results that drive the strategy. Richard Quinn, vice president of quality at Sears, said: "You simply can't manage anything you can't measure" (Lingle & Schiemann,1996, p. 56). One recent survey has found that 80% of large American companies are seeking improvements in their performance measurement systems (Birchard, 1995).

Conclusion

A balanced scorecard is certainly not a panacea for all of the issues within your organization. The BSC cannot help an organization that lacks good leadership and good managers to carry out the mission of the organization. However, the BSC can become a very powerful tool enabling your organization to reach new levels.

Essentially, the BSC is a customer-based planning and process improvement system aimed at focusing and driving the change process. The "process" is the key element in the successful implementation of any comprehensive program. A balanced scorecard is no exception to that rule. Remember, the process includes developing your vision, mission, and strategic goals for your organization. More importantly, one might argue that the "process" is the very essence of the BSC. If the process is approached from a comprehensive perspective and is successfully presented to an organization that ultimately embraces the concept, you have begun the process of recasting the culture of your organization. You have also begun the process of identifying the strengths, weaknesses, opportunities, and threats (SWOT) of your organization. An additional outcome of this process is the identification of training needs throughout the organization.

Our facilities are expanding at break neck speed to keep up with tidal wave two. The technology in our new and renovated buildings is changing rapidly. The evidence points to increased outsourcing of our services. What position do you want to be in when you are ultimately asked how your organization measures up? The more important question is: do you want to take the time and properly evaluate your organization or do you want to wait and risk having someone else do it for you?

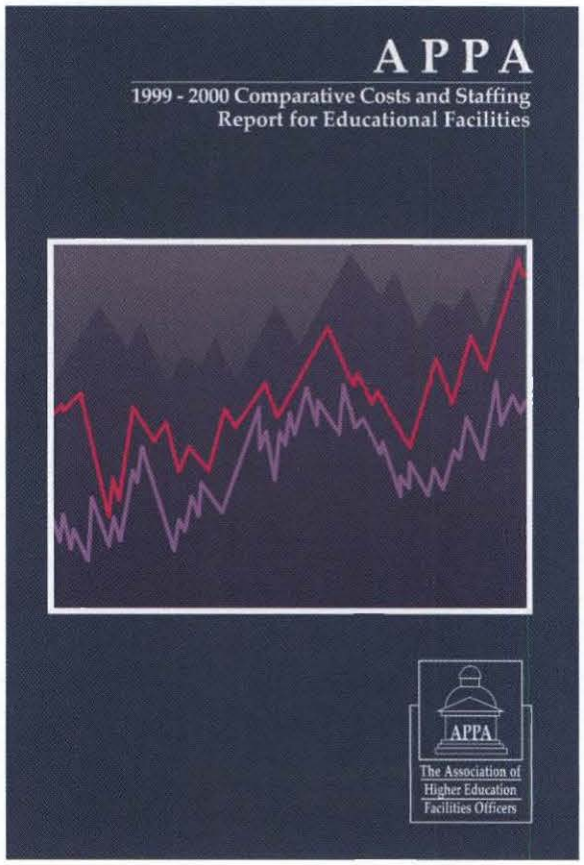
Jack Hug, assistant vice chancellor at the University of California/San Diego put it best when he said, "Today our customers tell us what they want, when they want it, and how much they are willing to pay for it. They also tell us that if we cannot provide what they want, then they will get it from somewhere else." A balanced scorecard will better position you to respond to the challenges of a continuously demanding environment. This isn't about financial performance measures. This is about systematically and fundamentally changing the culture of your organization and the way you do business.

References

1. The balanced scorecard-measures that drive performance. *Harvard Business Review,* 70, 71-79. Kaplan, Robert S., Norton, David P. (1992).
2. Balanced scorecards make teamwork a reality. *The Journal for Quality and Participation,* Cincinnati, 20, 58-59. Abernathy, William. (1997). Continuous improvement in business education: Insights from the for-profit sector and business school deans. *Journal of Education or Business,* 74, 165-180. Bailey, Allan R., Chow, Chee W., Haddad, Kamal M. (1999).
3. Designing and implementing an academic scorecard. *Change,* New Rochelle, 31, 32-40. O'Neil Jr., Harold F., Bensimon, Estela Mara, Diamond, Michael A., Moore, Michael R. (1999).
4. Unlocking the secret behind the balanced business scorecard. *Management Services,* Enfield, 44, 6-10. Atkinson, Phillip, Holden, Malcolm. (2000).
5. Strategic learning and the balanced scorecard. *Strategy and Leadership,* Chicago, 24, 18-24. Kaplan, Robert S., Norton, David P. (1996).
6. Satisfaction in the balance at UC San Diego. *FM Data Monthly,* June. Howard, Lawrence A. (2000).
7. Making the balanced scorecard approach pay off. *American Compensation Association Journal,* Volume 8, Number 2. Manas, Todd CCP (1999).
8. Outsourcing: It's not just about money anymore. *Facilities Manager,* Volume 15, Number 6. Keown, Cheryl (1999).
9. Putting the bam! in sam: recipes for performance excellence. *Facilities Manager,* Volume 16, Number 4. Harkenrider, Tom (2000).
10. Performance measurement: The balanced scorecard approach. *Journal of Cost Management,* 6, 47-52. McWilliams, B. (1996).
11. National Association of College and University Business Officers (1996).
12. Improvement measures up. *USA Today.* Woodyard, Chris (1999).

1999 - 2000 Comparative Costs and Staffing Report for Educational Facilities

Ever wonder if your peers are struggling with the same budgetary and staffing issues as you?



For the past 30 years, the **Comparative Costs and Staffing Report** (CCAS) has provided the most comprehensive data available for facilities management costs and staffing information. And the new 1999-2000 CCAS report continues that tradition. Included are more than 200 pages of statistical analysis and bar graphs of costs per square foot and key comparisons by Carnegie classification (including a category for K-12 schools), student enrollment, APPA region, and more. The CD-ROM includes the entire report, the complete database in MS Access format, and a special peer-to-peer comparative tool.

We know that facilities professionals at colleges, universities, and K-12 schools and districts strive for the continuous improvement of the services they contribute in support of the missions and goals of their institutions. APPA's biennial **Comparative Costs and Staffing Report** continues to be an invaluable resource toward this end.

1999-2000 Comparative Costs and Staffing Report for Educational Facilities

Books: $90 members/$130 nonmembers.
CD-ROM: $130 members/$210 nonmembers.
Members and nonmembers take 10% off when you purchase both the book and CD.

Name: _____

Title: _____

Institution: _____

Street: _____

City: _____

State: _____ Zip: _____

Phone: _____ Fax: _____

E-mail: _____

Return this form to: APPA Publications, 1643 Prince Street, Alexandria, VA 22314-2818; or fax to 703-549-2772; or e-mail cotrenia@appa.org.

Order Form

☐ **Member** ☐ **Not a member**

_____ book(s) x $90/$130= $_____
_____ CD-ROM(s) x $130/$210= $_____
_____ book & CD(s) x $198/$306= $_____
+10% U.S. delivery charge($15 maximum)= $_____
+20% for international deliveries= $_____
$25+10% for overnight delivery= $_____
Total: $_____

Payment Method:
☐ Check Enclosed
☐ Purchase order number: _____
☐ Credit card, please circle one:
VISA MasterCard American Express

Cardholder's name: _____

Card number: _____

Expiration date: _____

Total amount of charge: _____

Signature (required): _____

Visit our online bookstore at www.appa.org/resources/publications

There's Strength in Numbers: The Facility Asset Management Process

by Matt Adams, P.E.

The facility renewal issue has been brewing for years. With good success there was first Walt Schaw, and then Wayne Leroy, and now Lander Medlin educating and promoting the need for greater awareness of this issue, which is now capital renewal and deferred maintenance (CRDM). Institutions have increasingly heard the message, and individuals have championed on their own campuses the beginnings of facility portfolio management. Most have started with facility audits to create the "baseline" condition data. From these audits, facilities managers make a pitch to the business office, board of trustees, or anyone who will listen for that matter, for funding. Typically, this results in at least a short-term increase in the capital budget. This is a success. However, what is next? Is the utility of the initial audit gone? How does the audit process continue while the capital projects keep flowing?

The typical facility audit conducted for the first time is often thought of as strategic, but it is not. In fact, most initial audits are immediate and specific. It's difficult to see this until one comes to the next year or phase of the facility asset management process. As capital projects begin to fill the pipeline, the audit data goes from being highly accurate and useable to seemingly clumsy and inconsistent. At this point, some have perceived that the auditors were sloppy, but they probably were not. Others can't reconcile capital project spending with the audit data and the audit is abandoned. This is a waste. What has happened? This initial audit was a starting point, and the facility asset management process is more holistic and strategic.

First of all, the main focus of the initial audit is one of measurement. What is the condition of our facilities? In a deficiency-based, initial audit, the engineers and architects document deficiencies and calculate an associated cost with each. This is really a model of the facility portfolio. These costs are "sliced and diced" to create reports and power point presentations illustrating the conditions and need for additional renewal funding. If done convincingly, the funds are increased and during the next months additional planning must occur. This is where the initial audit data and the "real world" projects diverge. The fact is that the deficiency-based audit is basically theoretical to the pragmatic and efficient characteristics of facilities asset management. There is a distinctly different approach associated with each activity. For the person attempting to reconcile the two, the accounting process can seem subjective and inaccurate. However, for a long-term portfolio management plan to succeed, both sets of data must exist.

Initial facility audits do not identify every possible element in a capital project. However, they often identify more than just CRDM or the basic condition of the facility. This disconnect hinders the continued success of the assessment and CRDM funding program. To keep the ongoing process of audits and subsequent funding in place, the reconciliation of the facility portfolio model must take place. This is often the hardest challenge, initially. However, once clarified, this reconciliation enhances and encourages the success of long-term facility portfolio management. To illustrate accountability, the facility manager must continue the process of measurement (facility auditing), and recording of the capital funding results (accountability). In other words, we must show the need and show the results of the spending. This requires reconciliation of what was assessed versus what was actually completed each year.

In order to reconcile and continue the audit process, the identification of deficiencies must allow for packaging of those deficiencies into capital projects. This is both a one to one and a one to many relationship. For example, a damaged fire escape may represent a single deferred maintenance deficiency that is identified in the initial audit. This deficiency is likely to have a high priority and get funded. It becomes a project and stands alone in the facility asset management process. On the other hand, the inspectors may have recommended installation of new, high efficiency lighting in the hallways of a facility. This deficiency (is it really a deficiency or an upgrade) initiates the situation of audit data reconciling with capital project reality.

Here's what happens. New lighting can be a "capital renewal" or an "upgrade adaptation" project. These two categories are really different colors of

Matt Adams is president of The Adams Consulting Group, a management/engineering consulting firm located in Atlanta, Georgia, specializing in facility maintenance and management for higher education, school districts, and other institutions. He is co-chair of APPA's Trades Staffing Guidelines Task Force and can be reached at matt@adams-grp.com.

money. Nevertheless, once approved, other considerations like sprinkler retrofit, ceiling and wall finish replacement, electrical distribution upgrades, VAT replacement, etc., become candidates for project planning. At this point, the planning process follows the path "deferred maintenance leads to capital renewal upgrades, then deferred obsolescence, regulatory threshold triggers, and finally deferred renovations." This slippery slope often (and rightfully so) grows from deficiency retirement to renovation programming. In terms of stretching capital dollars, this scope creep is really a good thing. However, this new packaged project has far more colors of money contained in it than the original audit implied.

After this experience, it should be clear to the facilities manager that two major tasks must occur to allow for the continual utilization of the facility audit database. First of all, include the facility audit deficiencies in with capital considerations. Individual deficiencies are drawn from the audit data and included into the capital project, even if the scope and price are altered. The point is that the original deficiencies are really measurements of the overall facility condition. As such, they must be included in the capital packaging process in order to reflect facility improvement. It's fine that other improvements from different funding sources are included as well. After completed, the real costs of a particular deficiency can be recorded, or it is simply removed from the model.

Second is the need to more clearly identify deficiencies in both the assessment and in the planning process. The various types of deficiencies must be clearly defined and agreed upon before auditing and facility asset management activities. Also, subsequent audits must be clear in scope of assessment. The separation of normal capital renewal from system upgrades is more easily accounted for in the assessment process. Most funding bodies now understand that deferred maintenance is only a portion of the renewal need. This presents an opportunity to create an assessment or audit process and a facility asset management process, that are more holistic in scope.

While measuring the condition of facilities remains critical, the pooling of various capital renewal and improvement projects expands the potential supply of capital to the entrepreneurial facilities manager.

Facilities Management Technology

by Jennifer Graham

Scanning the recent activity on the APPAinfo list, with the theme of this issue in mind, it came to me that the meaning of the word technology has taken on such a singular meaning these days.

When one thinks of technology, the image of the titanium iMac, or the new Palm Pilot VII, or your favorite movie on DVD comes to mind. While these are all different products, one can sensibly argue that they fall under the category of new technology, thus reducing the word to only mean innovations that involve computers. Being a self-proclaimed technophobe (which was tellingly first used in 1965 when computers were coming of age to describe people with the same fear as mine), I began thinking: am I scared of technology, for its own sake, or am I scared of computer technology?

The word technology derives from the Greek word technologia, which means the systematic treatment of an art form. The oldest modern definition I found, in Merriam Webster's Collegiate Dictionary, tenth edition, is from 1859: "the practical application of knowledge esp. in a particular area."

So my goal for this column is to focus on those systems and procedures that each of you advanced—through discussions with each other, research, and being a member of an association related to your field—thus inventing and continuously improving the technology of facilities management.

Question: ***Ok, someone out there must have an answer to this. It is my understanding that plants will grow mold, especially if they are not properly cared for. Any comments would be appreciated.***

- We've been through a little of this and I can say what we learned. We had several folks in one area of our administration building complain about mystery respiratory symptoms. After investigating the condition of the air-handler that served that area and finding nothing in anyway remarkable, we called in an IAQ consultant for some help. The consultant took a variety of air samples within and outside the building, and finally found that we had a fairly high number for the range of molds, which combine into what we call leaf mold in Minnesota, on the roof near the fresh air intake. He found very good numbers at the discharge and at diffusers in the affected spaces. The AHU and its filtration were working perfectly. I asked the consultant about plants as we have a number of large plants in the public spaces in the building. He responded that while they may produce molds of various kinds in the soils, in his experience he had not found them to generate airborne molds. I continued to question his observation because there are occasionally noticeable odors when these plant materials are watered. Finally, we had an opportunity to dig a little deeper when our president resigned and we had a gap before the interim president moved into the office. There was a large plant in the office that had been there for at least 13 years, spanning two presidents, and no one knew its history. I stuck my face almost right in the soil and just about gagged, as the mold smell was so strong. There was a summary judgement and the plant went in the dumpster that evening. After a couple of days most symptoms in the area started to clear up. So, this was decidedly unscientific, we have no real documentation, but folks are happy.
- Congratulations on a job well done. This story just goes to show me how open minded one must always be in search of solutions that may be outside the technical realm, i.e., plain good ol' common sense always seems to work. Kudos.
- We had a similar issue with indoor air quality from an office plant. We discovered the cause, by happenstance, when our HVAC technician observed an occupant pouring out left over coffee into the plant. In the coffee was cream that soured in the soil and this was determined the source of the numerous IAQ complaints. The plant was repotted, unused coffee was redirected to a sink, and IAQ complaints ceased to be.

Jennifer Graham is the assistant editor of* Facilities Manager *and APPA's publications manager. She can be reached at jgraham@appa.org. To subscribe to the APPAinfo discussion list, go to www.appa.org/resources/internet/appainfo.html.

Question: ***Looking for some insight...Our board has authorized the construction of a $9 million science/ethics facility. The architect has been selected; however, there are many debates on the use of consultants in the design of the science labs. Our architect has experience in the construction/design of science labs, but that is in elementary and secondary education facilities. As such the science staff thinks that this experience is not sufficient and is convinced that outside assistance is needed. My dilemma is keeping the cost of consultants down in order to minimize the impact on other important areas (i.e., the selection of mechanical equipment).***

- If you stand in the way of the users seeking specialized design consultation, they will associate every post occupancy problem with that decision. It's not worth it.
- Your science staff could visit some other colleges with recently renovated science areas to see what they like.
- You mention the architect, but lab experience is equally if not more important with the MEP consultants. Do not expect the mechanical engineer, who has been doing comfort HVAC for office buildings, to have a clue what the issues are in a college science lab. This can be a significant safety issue.
- We just finished a science building. You have gotten some good advise so far. Most importantly not involving users is a mistake. You will be blamed for every beaker that falls on the floor.
- I worked on a program for a $42m life sciences building which will serve biology and psychology. (Project is currently under construction.) I worked with a biologist on the program and was amazed at the intricacies of determining room needs and attributes to serve advanced research labs in biology. I also discovered that most of the users we were working with did not have a clue about power or utility requirements to run the sophisticated equipment they were using, nor did they know the relative amounts of lab bench space they would need to perform their research. You need to get someone in that can guide the users through the planning and programming part of this project and then translate the information so the architect can do his job.

Question: ***We have about 160 soda machines on campus. Due to the energy crunch, we are trying to calculate what we should be charging for electricity on a monthly basis. Another issue we are dealing with is calculating the savings if we didn't run the compressor for 8 hours per day on midnight hours. If anybody completed a project like this, did the benefits outweigh the initial cost and grief?***

- In a previous job, I did some investigation for the local K-12 school district because they had some of your same concerns. Turns out most soda machines are real energy pigs. The suppliers have no motivation to make them energy efficient because they rarely pay for the electricity. The machines we measured used 2-3 times the electricity of a large refrigerator. The ones that are designed to go outside are even worse because they have electric heaters so the pop doesn't freeze on cold nights. As a result of this investigation, the school district instituted a policy of having the janitors unplug the machines on any extended school holiday and over summer break. They never invested in timers (although it was discussed). The key to figuring out a payback is determining what your off-peak electrical rate is (turning off at night will not likely help your peak demand costs). Here in this part of the country off-peak energy costs a few pennies per kWh. At those rates, it takes a lot of hours to add up to real savings.

Question: ***We are going to be forming safety committees in our K-12 schools and would like a little direction so we don't have to reinvent the wheel. Any help from someone who has "been there done that" would be greatly appreciated.***

- With faculty focused on the classroom I've found it necessary to lead the Safety Committee from within Physical Plant. We recruit committee members from each school division as well as maintenance, custodial, and grounds. The process works well but would die if not sustained through facilities. Depending on the size of your district, a district safety department might be able to take the lead on this.

The Bookshelf

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

Technology is with us in many ways. The lead review maintains this theme with a focus on planning. Also in planning are two manuals/handbooks. The first book is new while the second book is a new edition of an industry standard. Together, these three books are valuable additions to any facilities management library.

* * *

Technology-Driven Planning: Principles to Practice, edited by Judith V. Boettcher, Mary M. Doyle, and Richard W. Jensen. Ann Arbor, Michigan: Society for College & University Planning. 187 pp, softcover.

Seven years ago I attended a weeklong program at the University of Notre Dame. The classes were taught in a fine new facility that had the latest in distance learning equipment. There were case-study classrooms with cameras in every corner, microphones at every station, computer hook-ups, and monitors to see images and views of everyone in the room. However, aside from a couple creative instructors, much of the instructional material was still delivered in a traditional way. This exposure to technology in the classroom convinced me that we were approaching an important time in higher education, one where some universities would succeed with a traditional, on-campus method of instruction, and others would succeed by implementing new instructional technologies.

But what would the "campus of tomorrow" look like and how would one plan its physical structure? Would the high-tech campus really be a production facility with several production studios, T-100 lines, and satellite dishes? What about the classrooms, laboratories, and lecture halls, would they disappear? What would the campus infrastructure look like? Would we replace steam lines with glass fiber? Would we need as many buildings? Would we need residential facilities?

Technology-Driven Planning does not answer all these questions. Most of the text is focused on administrative and academic issues, i.e., organizational structures, costs, and teaching methods. However, there are several chapters that focus on what the campus must physically have in order to respond to the needs of technology-delivered instruction. There are spatial studies, arrangements of classrooms, and schedules of equipment or service needs. These are valuable tools that will assist the facilities officer in jump starting either new construction or renovation/remodeling work to respond to academic needs. There are some details lacking, but it is understandable. Technology is changing so quickly, if a handbook were printed today that provided cooling demand information it would probably be out of date by the time the architect completed the bid documents.

While this text doesn't focus solely on facility officers, there is clearly a value in obtaining a copy of the book if one is planning a major technology initiative. It will be interesting to see, probably shortly before this article is available, how a nation-wide interactive discussion on this subject goes, and how rapidly our campuses are preparing to implement the changes suggested by this book.

* * *

Historic Preservation Project Planning & Estimating, by Swanke Hayden Connell Architects. Kingston, Massuchusetts: R.S. Means Co., 2000. 672 pp, hardcover.

There is something unique, sometimes troublesome, about a historic structure. Many campuses in the United States have what might be affectionately referred to as "Old Main." Sometimes, within the physical plant, it is sneered at. Why? It is probably because the campus has not had the use of a decent reference on historic preservation.

I'm not a huge fan of declaring a building to be "historic" more particularly getting it listed on a historic register. It is not because I don't admire the fine old buildings on the campuses where I worked. I have loved those buildings, often more than the new ones I helped create. But the historic connotation carries a lot of excess baggage and requirements that might not be necessary if one had a good tool to use to preserve Old Main.

Historic preservation rules are a legal artifice to accomplish good architecture or engineering when one does not have a good architectural or engineering reference such as *Historic*

Ted Weidner is the associate vice chancellor for facilities and campus services at the University of Massachusetts/Amherst. He is also the co-chair of APPA's Trades Staffing Guidelines Task Force and can be reached at tweidner@admin.umass.edu.

Preservation Project Planning and Estimating. This book is organized in a logical way, provides information to inspect, manage code compliance, restore archaic materials, protect what is to be preserved and upgrade what isn't, estimate, and administer the work. This book is typical of the important reference material published by R. S. Means: it has been needed for a long time.

The book is organized in five parts with 25 chapters. The first part describes what constitutes a historic structure and the many various governmental organizations that may become involved in declaring a facility historic. There is also information about hazardous materials that are found in older facilities and some of the agencies that affect how the materials are handled. There is also a chapter on building codes and where to find solutions rather than problems. This includes some interesting examples on how to make an old facility more accessible.

The second part discusses building assessment and repair. These nine chapters provide the reader with a general understanding of the capabilities of historic materials and lead the reader to more detailed references. Part three addresses the first part of project administration including recommendations for project elements that will lead to a better final product such as mock-ups and contractor prequalification.

Part four covers costs as well as maintenance costs. This one chapter provides an outline of how to develop a long-term maintenance budget. Every campus financial officer should be informed of this important step in building preservation before beginning a restoration project. Failure to do so will require another major restoration project in the near future.

The appendices provide references to statutes, professional organizations, governmental organizations, and funding organizations. There is also an extensive bibliography, listing more detailed resources as well as a glossary. In general, there is a great deal of information packed into a moderately sized volume.

But does a reference book deserve so much praise? It does have some missing elements, but not many. I would have liked a reference to historic structural shapes, such as can be found in *Historic Tables* by S. H. Steinberg. This information is valuable in understanding the structural capabilities of the facility, either for renovation or maintenance. Also missing are examples of the hazards of incorporating new materials with old. There are different kinds of moisture, thermal, or load related movement that can occur in a masonry wall which would lead to its destruction if not appropriately detailed. Experts will have access to this information, but there are a lot of novices masquerading as experts, and this reference would do well to ferret them out.

My concern about these omissions comes from first-hand experience. While it was a great instructor, I would have preferred to learn about these problems from a book, in advance, rather than spend my time and university resources to teach another consultant.

The 14 authors and six reviewers have created a needed reference, sprinkled with examples of historic restoration problems and solutions. They have organized the text in a logical way that will help both the consultant and the owner/facility operator. They have also provided the reader with a valuable tool to estimate future maintenance costs and activities so, in the long run, historic facilities do not become an albatross for the campus or the facilities budget.

* * *

Quality in the Constructed Project: A Guide for Owners, Designers, and Constructors, second edition, (Manuals and Reports on Engineering Practice No. 73). Reston, Virginia: American Society of Civil Engineers, 2000. 266 pp, softcover.

It has been 13 years since I got my first review copy of this manual, and 12 years since its publication. During that time I have learned from and taken advantage of the *ASCE Quality Manual.* It was controversial when first published because there were fears that by setting the bar on quality, the manual would be used as a weapon by those who disagreed with design professionals. While I have no evidence one way or the other on that issue, publication of a second edition indicates it has been a success for those for whom it was intended.

The second edition improves on organization, providing a chronological timeline to guide one through the life of a project. It also provides side notes that reference either other chapters in the book, which provide more information, or external documents. In this Internet world, the website references are particularly valuable and assist in reducing the size of one's printed library. Each chapter ends with a quick reference table noting specific tasks discussed in the chapter, as well as who is typically responsible for the task: owner, design professional, constructor, or design-builder.

New chapters that address computers, partnering, and value engineering are valuable additions. They can provide the facilities officer with important information on how to deal with design professionals.

Over 12 years ago, the American Society of Civil Engineering broke new ground with the publication of this manual. The have reached new heights with this updated edition. It will be a valued resource for all facilities officers.

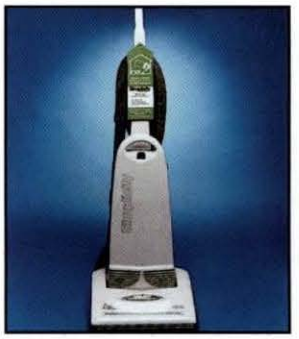
New Products

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 Prestwick Lane, Northbrook, IL 60062; phone 847-562-8633; e-mail gvtgvt@earthlink.net.

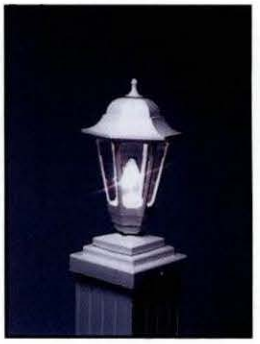
Bird-X Inc. proudly introduces the new BirdXPeller PRO, a sonic repeller that you program to repel whatever birds are infesting your area. Using actual species-specific distress cries, pest birds perceive danger to their own species. Sounds can be customized by varying the volume and timing, making it impossible for birds to get used to any one pattern. Ideal for large outdoor areas including parks, rooftops, and open parking lots. For additional information call Bird-X Inc. at 800-662-5021.

Eurotex introduces Lanai, a new wall carpet that conveys a sense of tranquility. The compact, articulated texture is understated but holds the eye—ideal for auditoriums, conference centers as well as busy areas such as language labs and galleries. Lanai absorbs sound and helps control operating costs by protecting walls. It is woven of 100 percent wool. Warp and weft are polypropylene. The unitary back is flameproof and Lanai is rated Class A for flame resistance. For specifications, literature, and samples contact Eurotex at 800-523-0731.

Ryerson Tull Inc. launches Industrial eBuy, an e-commerce website offering discounted pricing on brand name industrial and MRO products. The site www.industrialebuy.com offers a 10 percent discount on all first-time purchases and 3 percent discount on all subsequent purchases (based on prices listed in Ryerson Tull's Industrial Products catalog). Industrial eBuy offers a wide range of product lines, including maintenance and repair items, racks and shelving, carts and trucks, plant and office equipment and furniture, and numerous other items. For more information go to www.industrialebuy.com.



Tacony Corporation announces the Simplicity 6000 and 7000 series upright vacuum cleaners "Green Label" certification from the Carpet and Rug Institute (CRI). The certification means all Simplicity uprights offer superior soil removal, dust containment, and carpet appearance retention. The CRI certification adds yet another assurance of quality. Additional information can be found by calling the Tacony Corporation at 888-974-6759.



L.B. Plastics Inc. adds two new functional and decorative PVC Lamp Kits to their product offerings. Available in a Colonial Coach or a more modern contemporary Globe style, the durable lamps provide an elegant option for a variety of applications. Ideal for 4-inch by 4-inch and 6-inch by 6-inch posts, and other structures. For complete specs and information call L.B. Plastics Inc. at 800-752-7739.

Nupla Corporation, maker of industrial tools since 1938, offers its complete line of quality replacement handles for its diverse line of tools. All handles are made of genuine *Nupla-glas,* manufactured in a patented "pultrusion" process utilizing only premium and proprietary raw materials. For more information about replacement handles, or the entire Nupla line of industrial tools, contact Nupla Corporation at 800-872-7661.

Coming Events

APPA Events

For more information on APPA seminars and programs, visit our website's interactive calendar of events at www.appa.org.

Jun 17-21—*Leadership Academy.* Fort Lauderdale, FL.

Jul 22-24—*Moving Beyond Boundaries: APPA 2001 Educational Conference & 88th Annual Meeting.* Montreal, Quebec, Canada.

Sep 17-21—*Institute for Facilities Management.* Scottsdale, AZ.

Jan 13-19, 2002—*Institute for Facilities Management.* Tampa, FL.

Jun 10-14—*Leadership Academy.* Scottsdale, AZ

Jul 21-23—*APPA 2002 Educational Conference & 89th Annual Meeting.* Phoenix, AZ.

Sep 8-12—*Institute for Facilities Management.* Norfolk, VA.

Jan 26-30, 2003—*Institute for Facilities Management.* Ft. Worth, TX.

APPA Regional Meetings

Sep 13-15, 2001—*RMA Regional Meeting.* Tucson, AZ. Contact Paul Smith, 520-206-4758 or psmith@pima.edu.

Sep 29-October 3—*ERAPPA Regional Meeting.* Hershey, PA. Contact Ford Stryker, 814-865-4402 or hfs2@psu.edu.

Sep 30-Oct 3—*PCAPPA Regional Meeting.* Vancouver, BC, Canada. Contact John Wong, 604-432-8299 or jwong@bcit.ca.

Oct 7-10—*AAPPA Regional Meeting.* Australia. Contact Amanda Hart, amanda.hart @anu.edu.au.

Oct 10-14—*CAPPA Regional Meeting.* Cape Girardeau, MO. Contact Alvin Stoverink, 573-651-2214 or amstoverink@semovm.semo.edu.

Oct 20-23—*SRAPPA Regional Meeting.* Roanoke, VA. Contact Bill Elvey, 540-231-4397 or wmelvey@vt.edu.

Oct 28-31—*MAPPA Regional Meeting.* Madison, WI. Contact Kris Ackerbauer, 608-265-2758 or orkackerbauer@fpm.wisc.edu.

Other Events

May 20-26, 2001—*National Public Works Week.* Throughout the U.S. Contact American Public Works Association, 816-472-6100 or www.apwa.net.

Jun 11–15—*Comprehensive Five-Day Training Program for Energy Managers.* Anaheim, CA. Contact Association of Energy Engineers, or www.aeecenter.org.

Jun 12–14—*Vertical Transportation Conference for Colleges and Universities.* Ann Arbor, MI. Contact Terri Emmons, 734-647-5720 or temmons@umich.edu or www.vtccu.org.

Jun 19–20—*21st Annual Buildings NY Show.* New York, NY. Contact Reed Exhibition Companies, 888-334-8702 or www.buildsny.com.

Jun 23-27—*ASHRAE 2001 Annual Meeting.* Cincinnati, OH. Contact Meetings, 404-636-8400 or www.ashrae.org.

Jul 21-25—*2001: A Planning Odyssey (SCUP's 36th Annual Conference).* Boston, MA. Contact SCUP, 734-998-7832 or www.scup.org/36.

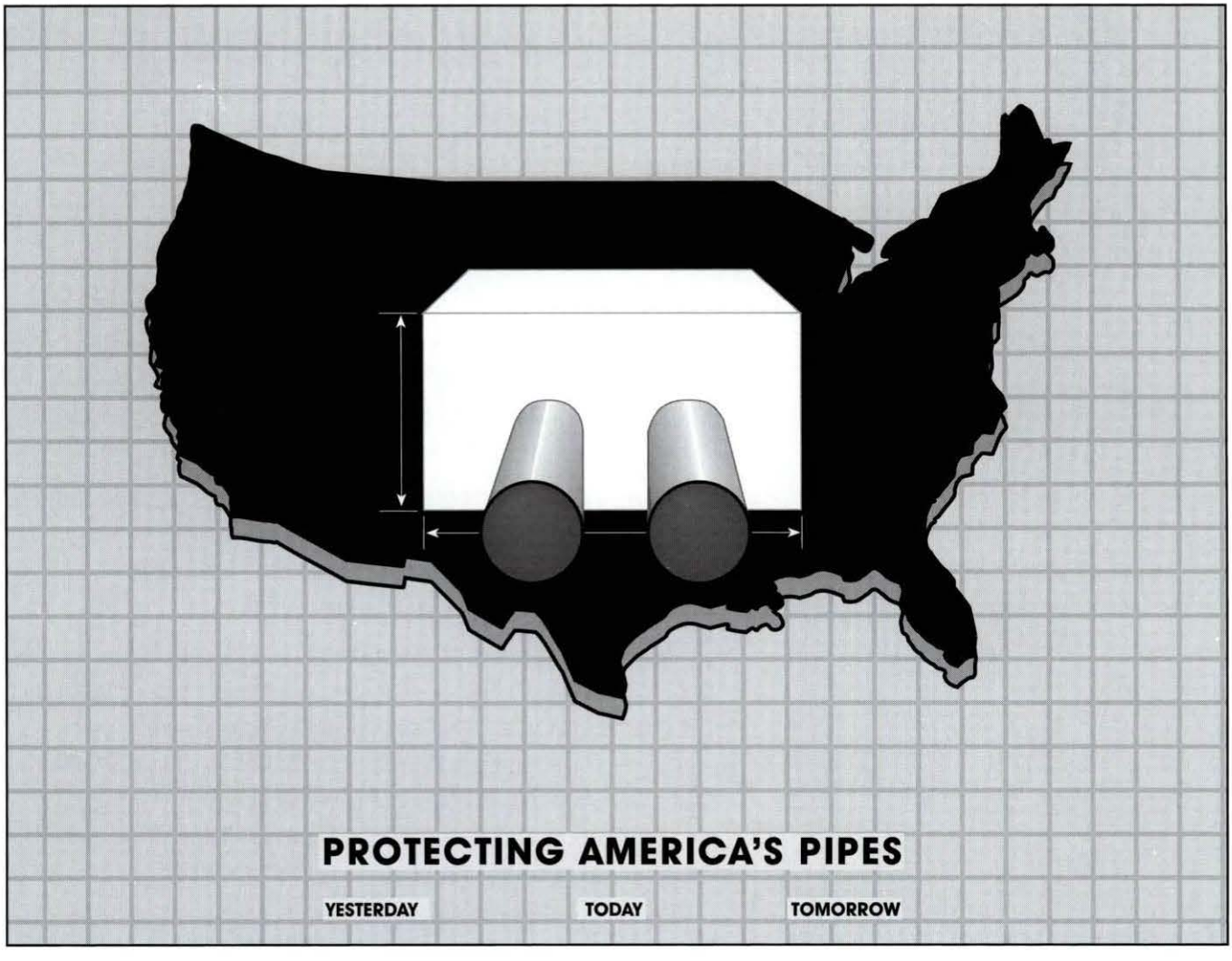
Jul 28–31—*NACUBO 2001 Annual Meeting.* New York, NY. Contact National Association of College and University Business Officers, 425-636-1640 or 202-861-2500 or www.nacubo.org.

Index of Advertisers

Adams Consulting Group 21
American Thermal Products 3
APPA Annual Meeting 18
APPA Publications 29, 44
Bayview Technology 6
BlazeMaster 5
Butchers 10
Delran Builders 42
Dominion Evantage 38
Dorlen Products 20
DriTherm . . . . . Cover 3
Estimating Systems 25
G. Reale Enterprises Inc. 34
Informed Software 40
Innerface Sign Systems, Inc. 41
MADVAC 37
McCourt Manufacturing 32
Munters Corporation 43
Natare Corporation 24
Prism Computer Corporation . . . . . Cover 4
PSEG 17
R.C. Associates 8
R.S. Means Company Inc. 12
RenoSys 22
Salsbury Industries 9
Sauder 14
Sebesta Blomberg 30
Signum Group LLC 46
Stanley Consultants Inc. 36
Strobic Air Corp 31
TMA Systems, Inc. . . . . Cover 2

Dri Therm®

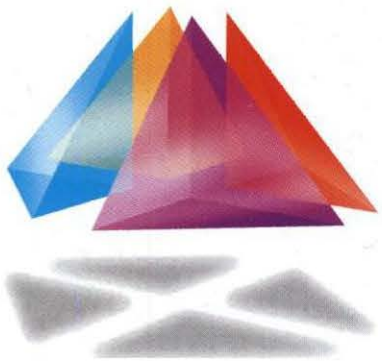
Underground Pipe Insulation / Corrosion Protection



- Continuously Manufactured Using Same Formula Since 1967
- Closed Cell - 100% Hydrophobic Design
- Temperature Range: -273°F (Cryogenic) to +480°F (250°C)
- Ideal for New Piping Systems / Repairs / Tanks
- Approved by Department of Defense for New Construction

DRITHERM INCORPORATED
P.O. Box 5296
Parsippany, New Jersey 07054
(800)343-4188 ***FAX (973) 428-3391***

THE FAMIS ASSET ENTERPRISE



Maintenance Management

Space Management

Calibration Management

Inventory Control

Tool Control

Key Control

Event Management

AutoCAD Interface

Web Site

ON ORACLE

TRADEMARKS:
ORACLE of Oracle Corporation.
FAMIS of Prism Computer Corporation.
BANNER is a registered trademark of System & Computer Technology Corporation.

What Do You Want In A Facility Management System?

How about everything?

You could buy a maintenance management system from vendor X and a space management system from vendor Y and try to force the two to talk to each other. Or you can take a look at Prism Computer Corporation.

Prism's FAMIS Asset Enterprise is a suite of integrated software modules for managing facilities. Since each module is designed to work together, you can easily create the ideal facility management solution for your organization.

And with our advanced technology, you can also easily expand the FAMIS Asset Enterprise to people outside of your organization to create a true enterprise-wide system. For example, you can electronically communicate with your customers using the World Wide Web. You can also integrate it with Oracle Financials, SCT BANNER and just about any other financial system using our FAMIS Open Financial Interface.

The FAMIS Asset Enterprise is based on pure Oracle technology and supports Windows, Windows95/NT, Macintosh and Power Macintosh.

To find out a better way to manage your facilities, call us today at 800-774-7622 or visit our web site at www.prismcc.com.

PRISM

PRISM COMPUTER CORPORATION
TELEPHONE 800-774-7622 / FAX 949-553-6559
E-MAIL: famis@prismcc.com http://www.prismcc.com