

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

Facilities Manager

Volume 8 Number 4

Fall 1992

PROFILE
DON MACKEL,
APPA'S NEW
PRESIDENT



"Who's in Charge Here?"

You know what you want, but do you always get it? Are you really in control of your maintenance, repair and minor construction projects, or do contractors and suppliers control your schedule, cost and quality? With Delivery Order Construction, you control a Unit Price database listing real costs for over 30,000 work items. You control our on-site design/build team dedicated to delivering your projects at your prices, on your schedule. No minimum, no maximum, no surprises.

You even control our profit margin. And we guarantee quality, it's our job security. DOC can cut your project costs and acquisition lead time in half, while putting you firmly in control of the entire process. Call us, and we'll send you a free videotape that explains how....after all, knowledge is power.

You're already in charge....take control.

1 800 962 1604

M C C
C O N S T R U C T I O N
C O R P O R A T I O N



Mentoring and Planning: A Visit with Donald L. Mackel

by Pauline O. Hovey

12

FEATURES

18 Educational Leadership: The Role of Facilities in Educational Excellence

by Dr. Samuel H. Smith

22 Power, Influence, and Survival in Difficult Times

by Dr. Mark Pastin



28 Demand Side Management

by Dr. Mohammad H. Qayoumi

34 Productivity-Based Facilities Management: Managing the University Bottom Line

by Thomas C. Hier

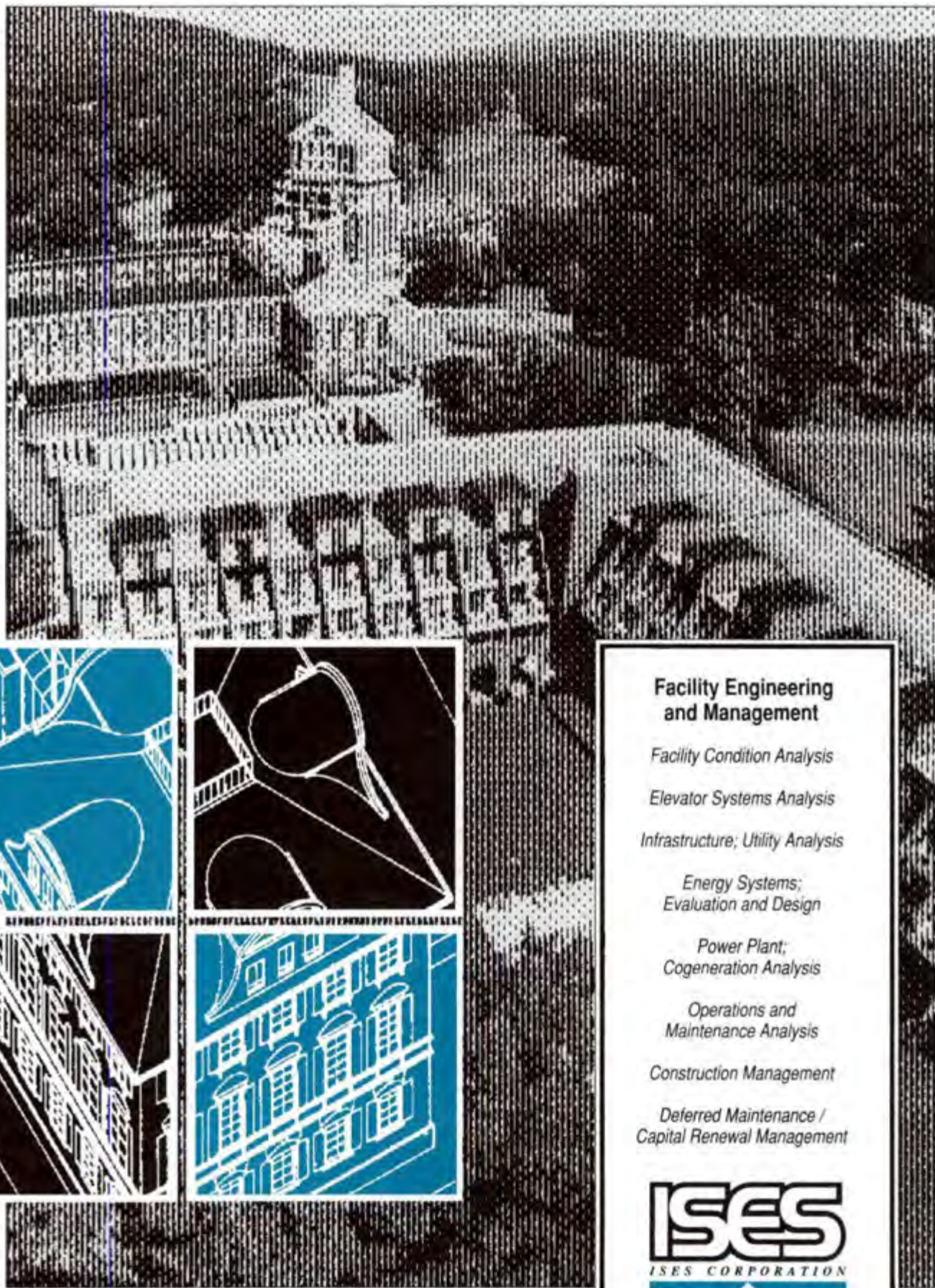
Cover photo by David Tufano

DEPARTMENTS

APPA News	3
• Emeritus Club Update	
• Hands on History	
• Letters to the Editor	
• APPA Committees 1992 - 93	
Capital Notes	7
by Donna Wiesner	
The Environment	8
by Stephanie Gretchen	
Focus on Management	10
by Sigmund G. Ginsburg	
Perspective	11
by Winthrop M. Wassenar, P.E.	

APPA Answers	39
by Maxine Mauldin	
Global Exchange	40
by Marcus Taylor	
Data Base Update	42
by Howard Millman	
The Bookshelf	44
Reviewed in this issue:	
• The Campus as a Work of Art	
• Campus Design	
Job Corner	46
Coming Events	50
Index of Advertisers	50

engineered solutions



Facility Engineering and Management

Facility Condition Analysis

Elevator Systems Analysis

Infrastructure; Utility Analysis

*Energy Systems;
Evaluation and Design*

*Power Plant;
Cogeneration Analysis*

*Operations and
Maintenance Analysis*

Construction Management

*Deferred Maintenance /
Capital Renewal Management*

ISES
ISES CORPORATION

Intelligent Systems &
Engineering Services

Lake Lucerne Office Park / Suite 1A / 4615 Highway 78 / Lilburn, Georgia 30247
Telephone: (404) 985-8651 / Facsimile: (404) 985-6327

APPA News

Emeritus Club Update

by George T. Preston

Emeritus Club Coordinator
Art Institute of Chicago
Chicago, Illinois

The inaugural Emeritus Club meeting went off well during the Indianapolis annual meeting. There were fourteen members present and, after a nice luncheon (compliments of APPA) in a private dining room, we spent almost the entire afternoon discussing the various programs that we hope to implement at the St. Louis annual meeting in 1993. We also discussed the future of the Emeritus Club, which seems to be very bright due to the group's strong interest to keep it going.

I have agreed to act as club coordinator for another year until we meet again in St. Louis, at which time the club president will be elected. A good number of ideas came out of those discussions, and I will do my best to implement them. More on that later.

During the APPA annual awards banquet, the emeritus members, who were all sitting at a reserved table, were recognized from the podium and received an enthusiastic round of applause from all present. One of the old-timers, Harold Babcock, flew all the way from Oregon just to be at our meeting. In general, I feel that the Emeritus Club enjoyed this get-together, as well as seeing each other after a long separation.

As you see, we are off to a good start, and it is my sincere hope that the club will grow and prosper. Please mark your calendars now for our St. Louis meeting, which will take place July 25-28, 1993. Let's hope our attendance doubles.

Hands on History

Since 1989, the University of Virginia's facilities management department has offered a "field laboratory" internship for two to four students to work with various restoration projects in the Jeffersonian precinct of campus.



Interns Nancy Clapp, left, and Tina Papamichael work with specially-skilled work crews in UVA's restoration program.

This year, Nancy Clapp and Tina Papamichael, who both recently received their master's degrees from the university's school of architecture, spent about three months with the field crews at Levering Hall and Pavilion V, one of UVA's original early nineteenth century faculty residences that is undergoing major renovation.

The interns' duties included research, making measured drawings of existing conditions, and using physical restoration techniques.

Has your institution or department received special recognition, or have you undertaken new or innovative projects? If so, please send them to us for possible inclusion in the newsletter or magazine. Send all items to Stephanie Gretchen, APPA, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446, fax 703/549-2772.

Call for Safety Papers

The Campus Safety Association is asking people to submit papers for its 40th International Conference, "Safety...Challenging the Summit," to be held July 11-16, 1993. The technical session themes will focus on the management of toxic substances, safety and health programs, and industrial hygiene. Topics of interest include physical plant safety programs, blood-borne pathogens, fine and performing arts safety, low-level radiation, disaster planning and emergency response, indoor air/environmental quality, risk management, sanitation, air and water quality, hazardous materials management, and more. Interested authors should submit a 250 to 300 word summary of their paper by **November 15, 1992**. For more information and a submission form, please contact Jose R. Harrison, Western Washington University, Environmental Health and Safety, Old Main 345, MS 9018, Bellingham, WA 98225-9018; 206/738-6511.

FACILITY MANAGEMENT COMPUTER CONSULTANT

Purchasing or upgrading a computerized maintenance management system? I can help assure that you receive all the timesaving, headache-relieving benefits that a well-designed, practical system will deliver.

Select the per diem services you need: asset cataloging, software assessments, staff sentiment surveys, bid specifications, hardware recommendations, software installation, data base creation, training, or system maintenance.

Please call for details. No obligation, just cost-effective, time-tested solutions that will work for you.

Howard Millman
Data Systems Services
914/271-6883

Facilities Manager

APPA PRESIDENT: Donald L. Mackel
University of New Mexico

EXECUTIVE VICE PRESIDENT:
Walter A. Schaw
Alexandria, Virginia

PUBLICATIONS ADVISORY BOARD:

Steve Glazner, APPA Director of
Communications, *Chair*

John P. Harrod Jr., Vice President for
Educational Programs, University of
Wisconsin/Madison

George T. Preston, Vice President for
Information Services, Art Institute of
Chicago

Thomas F. Vacha, Vice President for
Professional Affairs, University of
Delaware

Term ending July 1993

Brenda N. Albright, Tennessee Higher
Education Commission

James J. Murray III, American Council on
Education

Term ending July 1994

Charles W. Jenkins, Saint Mary's
University

William D. Middleton, University of
Virginia

Term ending July 1995

Mohammad H. Qayoumi, San Jose State
University

Roger E. Rowe, Miami University

EDITOR: Steve Glazner

ASSOCIATE EDITOR: Stephanie Gretchen

ADVERTISING: Diana L. Tringali

SUBSCRIPTIONS: Cotrenia Aytch

ART DIRECTION/TYPOGRAPHY: Chronicle
Type & Design

PRINTING: Good Printers

EDITORIAL OFFICE: 703/684-1446

FAX: 703/549-2772

BITNET: APPA@BITNIC.BITNET

Facilities Manager (ISSN 0882-7249) is published quarterly (Winter, Spring, Summer, Fall) by APPA: The Association of Higher Education Facilities Officers, 1446 Duke Street, Alexandria, Virginia 22314-3492. Editorial contributions are welcome and should be sent to this address.

Of APPA's annual membership dues, \$20 pays for the subscription to *Facilities Manager* and *APPA Newsletter*. Additional annual subscriptions for both periodicals cost \$40 (\$50 for non U.S. addresses). For information on rates and deadlines for display and classified advertising, telephone 703/684-1446.

Copyright © 1992 by APPA: The Association of Higher Education Facilities Officers. Contents may not be reprinted or reproduced in any form without written permission. The opinions expressed are those of the authors and do not necessarily reflect the views of APPA. Editorial mention of companies or products is for informational purposes only and should not be construed as an endorsement, actual or implied, by the Association.

POSTMASTER: Send address changes to *Facilities Manager*, 1446 Duke Street, Alexandria, VA 22314-3492.

Letters

To the Editor:

Your summer 1992 issue has prompted me to write an appreciative note. The quality of the contributions (Ginsburg, Cramer, Reynolds, Sensbach, Hoelting and Cain, Hall, et al.) is a reminder why APPA is the organization we all choose to join. Congratulations to you and your staff, and thanks to the contributors for their willingness to share the fruits of their labors.

—R. McK Dodd

Works Registrar

University of Otago

Dunedin, New Zealand



To The Editor:

The authors of "Residential Facilities Maintenance: A University Housing Perspective" [Summer 1992 *Facilities Manager*] set out "to develop a perspective from a university housing administrator's viewpoint." However, Hoelting and Cain have presented a limited review of literature, opinions reported as facts, a survey instrument of questionable validity, and a limited selection of responses to one question in a survey instrument as a conclusive study.

The literature review draws heavily on an unpublished evaluation report by Charles F. Frederiksen, which, based upon the passages quoted, is little more than an opinion, as are the other limited sources cited.

A reference to the "classic conflict between housing and physical plant" postulates that there is little, if any, control over the maintenance function exercised by the housing officers. The article goes on to state that "maintenance people working out of the physical plant . . . cannot possibly develop a thorough knowledge of all campus buildings or a personal relationship with students and staff in the residence halls." Although this study focuses on state-operated universities, it would be interesting to determine if this global statement could survive scrutiny at private universities. My perspective at Vanderbilt University, is one of constant communication between physical plant and housing administrators in both formal and informal forums. In addition, housing residents communicate directly with physical plant as the need arises.

The article notes that the selection instrument "has not undergone extensive reliability or validity estimates" and that the research findings support the hypothesis that "there is a difference between state-supported universities that have housing maintenance performed by mechanics who work for housing administrators and those universities where housing maintenance is done by mechanics who work for the physical plant department."

These are points well taken; however, it is here that the greatest leap between fact and opinion is made. The conclusion is drawn that the most effective operating method is for housing to have their own maintenance personnel. Is it, as the limited selection of responses would indicate, the most effective, or is it the most desirable from the housing administrator's viewpoint?

This study has shown that among some housing administrators, the authors included, the opinion exists that having direct control over maintenance personnel is a desirable operating method. However, to dismiss facilities departments so completely is to do a great disservice to a viable, desirable, cost-effective operating alternative.

—Jon M. Gullette

Associate Vice Chancellor for

Operations

Vanderbilt University

Nashville, Tennessee

APPA Committees 1992-93

Educational Programs

John P. Harrod Jr., V.P.	Univ of Wisconsin/Madison	Chair	608/263-3077
E. Lander Medlin	Univ of Maryland/College Park	ERAIPPA	301/405-3207
James O. Roberts	Georgetown College	SRAPPA	502/863-8639
Gary L. Reynolds	Iowa State University	MAPPA	515/294-9633
Tom Jones	Southwestern University	CAPPA	512/863-1915
George F. Knell	University of Wyoming	RMAPPA	307/766-2266
Martin E. Holzman	Cal State Univ/Northridge	PCAPPA	818/885-2325

Information Services

George T. Preston, V.P.	Art Institute of Chicago	Chair	312/443-3940
Michael R. League	Smithsonian Institution	ERAIPPA	202/357-2900
C. Gary Pringle	Converse College	SRAPPA	803/596-9744
Michael Gardner	Butler University	MAPPA	317/283-9393
John D. Rulfs	Stephen F. Austin State Univ.	CAPPA	409/568-4341
Dean Wolf	Auraria Higher Ed Center	RMAPPA	303/556-3292
Chris Christofferson	Cal State Poly Univ/Pomona	PCAPPA	714/869-4397

Professional Affairs

Thomas F. Vacha, V.P.	University of Delaware	Chair	302/831-2616
Richard M. Engle	Rutgers University	ERAIPPA	908/932-2600
William L. Columbus	University of Alabama	SRAPPA	205/348-8703
Gary R. Kent	Indiana University/Bloomington	MAPPA	812/855-6169
Patrick J. Apel	Maryville Univ of St. Louis	CAPPA	314/576-9304
Douglas K. Christensen	Brigham Young University	RMAPPA	801/378-5700
Kenneth A. Hall	University of Idaho	PCAPPA	208/885-6246

Awards and Recognition

William S. Mutch	University of Calgary	Chair	403/220-7555
James McChesney	SUNY College/Cortland	ERAIPPA	607/753-2100
W. Clay Adamson Jr.	Medical College of Georgia	SRAPPA	404/721-3477
William W. Whitman	Iowa State University	MAPPA	515/294-8079
Glenn Gripe	Univ of Arkansas/Fayetteville	CAPPA	501/575-6593
Randy Turpin	University of Utah	RMAPPA	801/581-6510
David Demauro	Cal State Univ/San Bernardino	PCAPPA	714/880-5130

Facilities Administration (NACUBO)

William A. Daigneau	University of Rochester	Chair	716/275-4142
Paul F. Tabolt	University of Colorado	RMAPPA	303/492-7120

Government Relations Task Force

C. Ronald Hicks	University of Cal System	Chair	510/987-9390
Donald Little	Rutgers University/Newark	ERAIPPA	201/648-5713
Kemble Johnson	Western Kentucky University	SRAPPA	502/745-3253
Kenneth P. Burns	Purdue University/Main Campus	MAPPA	317/494-8000
Charles Jenkins	St. Mary's University	CAPPA	512/436-3335
Pieter van der Have	University of Utah	RMAPPA	801/581-5082
Chris Christofferson	Cal State Poly Univ/Pomona	PCAPPA	714/869-4397

International

Ed Naretto	California Polytechnic State	Chair	805/756-2321
Roy Dalebozik	McGill University	ERAIPPA	514/398-4569
Allen Perry	Tulane University	SRAPPA	504/865-5457
James E. Christenson	University of Michigan	MAPPA	313/764-3400
Herb I. Collier	University of Houston	CAPPA	713/743-5674
Dean Reynolds	University of Colorado	RMAPPA	716/645-2236
Maurice R. Pawsey	Member Emeritus	Australia	

Membership

Michael D. Fines	Clemson University	Chair	803/656-4935
Michael J. Sofield	Smithsonian Institution	ERAIPPA	202/357-1665
W. Clay Adamson Jr.	Medical College of Georgia	SRAPPA	404/721-3477
Joseph P. Kish	Northeastern Illinois Univ	MAPPA	312/794-2878
John Greene	Trinity University	CAPPA	512/736-8411
Stanley P. Hobbs	University of Wyoming	RMAPPA	307/766-2266
Nicholas Cimino	Truick Meadows Comm College	PCAPPA	702/673-7100

Research and Health Sciences Committee

Tom Harkenrider	Salk Institute	Chair	619/453-4100 x432
Karl F. Schmid	Cornell University	ERAIPPA	607/255-7311
Ronald D. Carter	University of Virginia/Med. School	SRAPPA	804/924-8595
James L. Hopp	Medical College of Wisconsin	MAPPA	414/257-8633
Thomas H. Atkins	Univ of Texas Health Sc. Ctr.	CAPPA	512/567-2880
Jerry C. Black	University of Arizona	RMAPPA	602/621-1228

Small College Committee

Philip H. Meldrum	Bates College	Chair	207/786-6207
John P. Holmes	Messiah College	ERAIPPA	717/691-6011
Dudley Howe	Stetson University	SRAPPA	904/822-8800
Robert L. Lewis	Augustana College	MAPPA	309/794-7278
Aaron M. Reuck	William Jewell College	CAPPA	816/781-7007
Robert McGregor	Pueblo Community College	RMAPPA	719/549-3291
Larry Klumas	Occidental College	PCAPPA	213/259-2654

**A
77-Year
Tradition
of
Providing
Quality
Architectural,
Engineering,
and
Related
Services**

**Computerized Facilities
Management**

Master Planning

**Advanced Technology
Facilities Design**

**Hazardous Materials Handling
Facilities Design**

Three-Dimensional Modeling

**Utility Systems and
Plant Design**

Plant Rehabilitation

Security Systems Design

**Operation and Maintenance
Manuals**

Value Engineering

Public Facilities Design



BLACK & VEATCH
PROGRESS BY DESIGN

Gerald C. Snyder
(913) 339-8223

Capital Notes

Donna Wiesner

Due to space limitations, I cannot include all the activities of APPA's government relations program; instead, this column focuses on information to assist you, sometimes rather briefly.

OSHA will allow Hepatitis B vaccine to be administered within twenty-four hours of (after) exposure for certain employees giving first aid. Exception is only for employees who administer first aid as a collateral or "good Samaritan" duty. Occupational standards for Hepatitis B Virus (HBV—causes serious liver disease) and the Human Immunodeficiency Virus (HIV—which leads to AIDS) took effect on March 6, 1992. Written Exposure Control Plans identifying job classifications with exposure not considering the personal protective equipment were to be completed by May 5, 1992, and updated annually. Engineering and work practice controls needed to have been implemented by July 6, 1992.

Courts are deciding that leaking underground storage tanks constitute hazardous waste disposal under RCRA, and violate environmental warranties and permitting requirements for hazardous waste. There are numerous sites affected, especially in California, Indiana, and Kentucky. Louisiana's state underground storage proposal has been approved as is.

The Federal Emergency Management Agency (FEMA) has proposed rules to facilitate public elementary and secondary school facility cleanups after a disaster. FEMA, not the Department of Education, would have jurisdiction in the authority to grant assistance (57 FR 29854). The proposal does not so far in-

clude higher education facilities.

Senator Pete Domenici (R-NM) proposed Malcolm Baldrige-type awards to universities that exhibit excellence in total quality management (teaching or internal). Awards would be for \$3 million, \$2 million, and \$1 million for first, second, and third place awards, and \$500,000 for special awards. The Senate Commerce Subcommittee on Science, Space, and Technology is awaiting the White House position.

The House Science Committee held hearings on a bill sponsored by Chairman George Brown (D-CA) to establish NASA, NSF, and Department of Energy money for merit-based competitive awards for instructional equipment and facilities for science and technology education. The agencies oppose the bill.

When I first printed the regional administrator's offices in the Summer 1991 *Facilities Manager*, I got some criticism for two reasons. First, that there was no reason for members to call them. I have since heard back from members that these calls can be very helpful, even when the questions are state permitting questions. Second, several members said that any association they make with EPA constituted an invitation for an inspection, and thus, fines. Several EPA staff have sworn to me that this is not the case, and that questions are not recorded for potentially devious reasons.

In a new development, the assistant administrator for EPA, Herbert H.

Tate, was asked if the increasingly aggressive criminal enforcement might be a disincentive to environmental audits. Tate said voluntary disclosure of audits has not resulted in any federal prosecutions.

Gary Reynolds with Iowa State University forwarded a comprehensive article from the May 1992 issue of *Heating/Piping/Air Conditioning*. The article, "CFC Alternatives and Chiller Retrofits," is not only technically complete, it is practical. The article is long, so we will not reprint it here. You can obtain a free copy by calling or faxing me.

On May 29, 1992, OSHA decided to exclude nonasbestos tremolite, anthophyllite, and actinolite from coverage under asbestos standards. Paint and ceramic manufacturing and construction aggregate user operations are most affected. Contact Susan Hall Fleming at 202/523-8151.

EPA has established guidance procedures for early identification of Superfund sites likely for potential de minimis settlements. Contact Gary Worthman at 202/260-5646.

EPA's new storm water regulations call for annual inspections of facilities rather than annual monitoring. States must submit draft storm water permitting plans to EPA by April 3, 1995.

Printed below is the letter received from The White House and read at APPA's Annual Meeting in Indianapolis. It includes a statement on regulatory reform.



Donna Wiesner is APPA's director of government relations.

The Environment

Stephanie Gretchen

The EPA Indoor Air Division recently published *Current Federal Indoor Air Quality Activities*, which lists the **indoor air quality** activities being taken by federal agencies on a project-by-project basis. For a free copy, contact Public Information Center (PM-211B), U.S. Environmental Protection Agency, 401 M Street, S.W., Washington, DC 20460.

Lewis Publishers has published a number of books on **indoor air pollution**, including *Air Toxics and Risk Assessment* (\$79.95), *Indoor Air Pollution: Radon, Bioaerosols, and VOCs* (\$69.95), and *Understanding Indoor Air Quality* (\$55). For more information, contact Lewis Publishers, 2000 Corporate Boulevard, N.W., Boca Raton, FL 33431; 800/272-7737.

Ithaca College started its **recycling program** in fall 1989 with three academic buildings recycling office paper. By spring 1991 the effort added newspaper, cardboard, envelopes, magazines, glass, cans, and plastic in all academic buildings and residence halls. The Ithaca College Resource and Environmental Management Program incorporates student efforts as both volunteers and paid employees. The program is a division of the college's physical plant department, which funds and coordinates it. The program is also affiliated with the school's Dana Student Work Program, which helps students who need financial aid through involvement in educational work experiences. The college's recycling program also includes metal, furniture/equipment, batteries, petroleum products, antifreeze,

Stephanie Gretchen is APPA's communications manager and associate editor of Facilities Manager.

styrofoam, grease, and composting. For more information on the college's program, contact Rick Couture at 953 Danby Road, Ithaca College, Ithaca, NY 14850; 607/274-3225.

Five universities have joined forces to form UNET, the University Network for Environmental Training, which will present two series of **certificate programs**: one for environmental compliance coordinators and one for safety compliance coordinators. The members of UNET are the University of Florida, University of Cincinnati, University of Medicine and Dentistry of New Jersey, University of Kansas, and University of Utah.

The certificate series is a sequence of courses offered at an accredited college or university. The same courses will be offered at each of the UNET campuses. Each course is designed to meet the oc-

ganized by year, month, and day. The calendar comes in a binder or on a 3.5" ASCII diskette. The calendar costs \$325 a year. For more information, contact The Bureau of National Affairs, Inc., Circulation Department, P.O. Box 40947, Washington, DC 20077-4928; 800/372-1033.

In order to comply with the **Hazardous Materials Transportation Uniform Safety Act** of 1990, the Department of Transportation passed a final rule, May 15, that increased the training requirements for people involved in transportation of hazardous materials. The *Federal Register* (57 FR 20944) said these new regulations evolved because the Research and Special Programs Administration found that human error had been the probable cause of most transportation incidents involving a release of hazardous materials. The new rules



Illustration by Ted Benson

cupational, professional, or personal improvement needs of the audience. For more information, contact Connie Crandall, Program Director, Continuing Education for RMCOEH, Department of Family and Preventive Medicine, University of Utah, Building 512, Salt Lake City, UT 84112; 801/581-5710.

BNA is offering the **BNA Plus Environment and Safety Compliance Calendar**, which features summaries for each EPA and OSHA requirement or

were effective on July 1, 1992. For more information, contact Jack Smith, Office of Hazardous Materials Standards, RSPA, Department of Transportation, 400 Seventh Street, S.W., Washington, DC 20590; 202/366-4488.

EPA has made *The Consumer's Handbook for Reducing Solid Waste* available. The book outlines practical steps people can take to lessen the toxicity of their daily trash. For a copy, call the Waste Hotline at 800/424-9346 or 703/920-9801.

According to the EPA *Activities Update* (August 17, 1992), the agency set the first comprehensive federal standards for safe handling of **used oil** on August 11. These standards, in conjunction with existing standards, make it unnecessary to regulate used oil as a hazardous waste. Generators of used oil must maintain tanks and containers in good condition and label them "used oil"; clean up spills or leaks from used oil; and allow only a transporter with an EPA identification number to collect and ship used oil for recycling.

Besides generators and handlers nationwide, other organizations affected by the rule include used oil collectors and transporters and facilities that burn off-spec used oil for energy recovery. For a copy of the rule, contact the Small Business Hotline at 800/368-5888 or the Waste Hotline at 800/424-9346.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE), recently pub-

lished provisions for the safe installation of mechanical refrigerating systems that use **alternative refrigerants** R-123 and R-134a. They are specified in ASHRAE Standard 15-1992, Safety Code for Mechanical Refrigeration. Copies are \$31, or \$21 for ASHRAE members. For more information or to order, contact ASHRAE, 1791 Tullie Circle, N.E., Atlanta, GA 30329; 404/636-8400.

EPA has developed a new records system that would document **complaints to the agency** by agency employees, state, local, and federal officials, and private citizens. The system will be implemented in October and will be used by the Office of Inspector General to maintain information concerning possible violations of law, rules, mismanagement, gross waste of funds, abuse of authority, or a danger to public health or safety. For more information, contact John Jones, Assistant Inspector General for Management, Office of Inspector General (A-109),

EPA, 401 M Street, S.W., Washington, DC 20460; 202/260-4912.

On August 11, a House subcommittee reauthorized the **Indoor Radon Abatement** Act of 1988 without the requirements to test schools for radon nationwide. This bill would protect consumers from fraudulent or inaccurate radon testing by requiring EPA or state certification of radon testing devices and services.

The video *Petroleum Leaks Underground* is available from EPA's Office of Underground Storage Tanks. The thirty-minute video focuses on liquid and gas phases of leaks, shows how leaks spread through different soil types and conditions, and explains how pump-and-treat cleanup processes may smear contaminants through surfaces. The program costs \$75. For more information or a copy, contact Environmental Media Center, Box 30212, Bethesda, MD 20814; 800/522-0362.



Buildings That Look Like Prisons Are Never Popular!

Wyoming, PA—For most professionals, conducting a security survey and spotting problems is the *easy* part of the job. The *tough* part? *Selling* the solutions.

When it comes to protecting vulnerable windows, options have been very limited, and *very* hard to sell.

Products that don't allow safe, reliable emergency egress are easily ruled out. What's left is choosing the lesser evil: stainless steel wire, expanded metal, or wrought iron. All were designed for *detention*, for *keeping people in*, not out, with *no concern for aesthetics*.

All look institutional. Wire cloth is shiny and heavy, cutting down sharply on light and ventilation. Expanded and wrought

iron are still more jail-like, and don't even guard against glass breakage.

CRIME SHIELD® window barriers from Exeter are different. They utilize InvisiPerf™ protective membrane, designed by experts in optics, psychology and physics. For any given strength [a wide performance range is available], InvisiPerf membranes transmit *more light*, *more air*, and look *less obtrusive* than any other protective material.

Complemented by patented framing—finished to match your building trim—it's the 1st window security system *designed as an architectural product!*

Next time you need to "sell" security solutions, make it easy: recommend the system that *looks* as good as it *works*.

- PHYSICAL PROTECTION
- LIFE SAFETY
- ATTRACTIVE
- AFFORDABLE

CRIME SHIELD® WINDOW BARRIERS

Member - National Fire Protection Association
Business - Criminal Violence Prevention Center

U.S. Patents #4,993,187, #5,026,262. (Other foreign patents issued.)
Exeter, Castle logo, Crime Shield and InvisiPerf are trademarks
of Exeter Architectural Products, Inc. © 1992



243 W. Eighth St.
Wyoming, PA 18644
717-693-4220 • Fax 693-2575



Focus on Management

Sigmund G. Ginsburg

Sig Ginsburg is vice president for finance and administration at Barnard College, and lecturer in management systems at Fordham University, both in New York City. He was the 1992 recipient of the Hines Publication Award from the National Association of College and University Business Officers for his contribution to NACUBO publications.

TRUST YOUR GUARDIAN ANGELS—BUT DON'T ASSUME THEY WORK OVERTIME

It is comforting to believe that you have a guardian angel who somehow helps you succeed or, at least, prevents you from making terrible errors in judgment or action. Some call this a sixth sense, intuition, "a feeling in my gut," or "a red, yellow, or green light." Such a belief, valid or invalid, can be helpful to your self-confidence and willingness to take risks.

Through experience and training, many individuals can develop a warning system that can be helpful in reducing the risks in decision-making and actions. Some people do this by

- Making a checklist of what to look for, using various decision-making, prob-

lem-solving, and analytical techniques.

- Probing issues and people through penetrating questions.
- Carefully developing and evaluating subordinates.
- Evaluating colleagues.
- Developing and using management information systems.
- Recognizing that the time is not right for making a major decision or that their psychological, physical, or emotional state is not right for making a decision.

Others may not need any of these approaches, but through experience and intuition they just get a sense that something is not quite right. Thus, they may take no action on the problem until they spend more time on it and isolate the reason for their discomfort.

They then can see to it that the issue is studied further, using various techniques or, at least, that a final decision is put off for a while until more thought is given, information and analysis developed, or the heated atmosphere of the moment cools down a bit.

As a manager I believe in rational, analytical approaches, but I also believe in trusting your guardian angel or intuition. If your guardian angel is buzzing, you should hold off for a while, even after analysis says "go." Believe in your angel, but not too much! There is danger in going overboard on this and in believing that your angel is always with you or is always needed. You may end up delaying things dangerously long while waiting for your guardian angel to give you the go-ahead.

On the other hand, if you believe in your angel's protection too deeply and you act upon this too much, you may fall prey to taking bad risks or making decisions too quickly. You may assume that because you're a lucky person protected by your guardian angel, you cannot fail.

If you listen to your angel and things turn out wrong, don't cast aside your feeling of intuition. Be understanding, and assume your angel was on vacation, or tired and was not working overtime. Believe that your angel is still available to be of assistance, if used carefully and moderately. ■

Isn't It Time to Unlock the Door to Better Key and Lock Management?



SecureKey™ is a state-of-the-art computerized key and lock management system that provides instant access to key and lock records. It quickly shows the relationship between key-holders, keys and a facility's doors. It's so simple to use that even a novice computer user can access information with just a few quick keystrokes. On-line help menus make operation a snap. There's also unlimited toll free support.

Thirty Days to Better Key Control.... SecureKey™ Guarantees it!

Try SecureKey™ risk-free for thirty days! If you're not completely satisfied with SecureKey™ for any reason just return it within thirty days and we'll refund the purchase price! Order SecureKey™ today for only \$399.95. To order SecureKey™ call 1-800-441-0641. All major credit cards accepted.

System Requirements:

IBM compatible PC, DOS 3.1 or higher, 640K memory, Hard disk, Monitor, Dot matrix printer.

1-800-441-0641

Management Systems Corporation, 200 Tech Center Dr. - Knoxville, TN 37912 - SecureKey is a registered trademark of MSC. All rights reserved. Copyright 1992

Perspective

Winthrop M. Wassenar, P.E.

Rx: Handicapped Accessibility

There's a saying that goes something like this: "Before making a judgment about someone, you must first walk in that person's shoes."

Have you ever thought about what it would be like to get around an exhibit hall on crutches, especially if that's not your normal mode of travel? I hadn't until I arrived on crutches in San Antonio last December to attend The Athletic Business Conference. I have to admit that I had never thought of having wheelchairs available in an exhibit hall in all of the years that I've been going to APPA annual meetings.

It wasn't fun—my armpits hurt, I was tired, and my leg swelled. Whose fault was it? No one's, really. We rarely think about those things that don't affect us: we need to walk in the other person's shoes (or crutches or wheelchair) sometimes in order to appreciate the challenges that some people have to contend with.

I ruptured my Achilles tendon on November 23, 1991 playing paddle tennis. Welcome to the world of the disabled. On November 24th, I was trying to maneuver on crutches in the sud-

denly shrunken world that was accessible to me. Several weeks before my mishap, I had made plans to attend the APPA/Lilly Endowment press conference on December 3rd in Washington, D.C. I would then travel to San Antonio to attend the Athletic Business Conference, at which the Chandler Athletic Center at Williams College was to receive a Facility of Merit Award. Should I attempt this trip ten days into my new world? On December 2nd, after having the stitches removed and a new cast fastened to my right leg, I decided to give it a go and see what it was like to get around with a disability.

Arriving at Washington National Airport at 7:00 p.m., I was met by the requested wheelchair that would take me to the cab for the ride into town. I settled into the wheelchair, leg up, crutches firmly grasped for the journey up the jetway. Ok, let's go! The attendant was having trouble pushing me up the sloping jetway and finally came to a halt as

we encountered the first metal plate transition-piece that joins one jetway section to another. No problem. The attendant pulled the chair back a few steps so as to allow a running start before encountering the metal plate.

As the small forward wheels of the wheelchair hit the plate I was catapulted out of the chair, leg first into the plate, smashing the heel of my new cast and scaring the daylight out of me. I screamed, not from pain, but from surprise and fear of the unknown, thereby bringing other attendants from all directions. "Ah," said one, "you have to pull with the wheels forward in order to make it up

and over the transition pieces." That was my introduction to getting around airports. From then on I "crutched" up the jetway, getting into the wheelchair for the level ride through the terminal.

The remainder of the trip went quite well, with a few learning experiences along the way. Why would a hotel put all of the handicapped rooms on the

first floor? I'll take my chances with fire egress problems on the fifth floor with the "normal" people. And, no doubt, the taxi business in San Antonio recorded a marked increase during the week of December 2.

The timing of my injury was fortuitous for its coincidence with the growing recognition of the Americans with Disabilities Act (ADA), including APPA's publication of *Removing the Barriers: Accessibility Guidelines and Specifications*.

Williams College is presently having a firm complete an ADA audit on fifteen of the campus' most public buildings. Every school and college should perform a similar audit and then develop a program to meet these requirements. These two steps will go a long way toward keeping the authorities away from your door for ADA violations.

The lessons learned? Get a pair of crutches, a wheelchair, a blind-fold, a pair of ear plugs, and go out on your campus and into your buildings to see how well you can travel about. I guarantee that you'll feel differently about accessibility and ADA. Try opening and closing a bi-parting freight elevator door from a wheelchair or on crutches; try getting up a twenty- or thirty-degree sloped sidewalk with no handrail, especially if it's covered with snow and ice; try walking or wheeling on sidewalks that are full of potholes and frost-heaved; try getting into the building with eight to ten steps up to the entrance, or even three.

One of the more interesting changes occurring in recent years at Williams is the annual increase in the number of physically disabled alumni who return for alumni reunions. Colleges and universities, especially those in less hospitable climates, will likely find that accommodating alumni members with disabilities is of a much greater urgency than preparing for an influx of students with disabilities. One of our summer 1992 capital projects was to make the Old Guard (post-50th) Alumni Reunion headquarters accessible to the physically disabled.

I do not recommend rupturing your Achilles tendon in order to experience the world of the disabled, but I do recommend that you take a closer look at the implications of the new ADA legislation and the accessibility code requirements of your state. It could save your institution a fine while making it a more hospitable and open environment for everyone. ■



Wassenar

Photo by Steve Glazner

Win Wassenar is director of physical plant at Williams College, Williamstown, Massachusetts.

Mentoring
— and —
Planning

A V I S I T W I T H

Donald L. Mackel

by Pauline O. Hovey

Photo by David Tafara



APPA's new president, Donald L. Mackel, may be as unique as the climate of his native New Mexico. Three generations of Mackel's family attended the University of New Mexico (UNM), where he is currently director of physical plant operations. He received both his bachelor's and master's degrees at UNM and has spent his twenty-four professional years at that site.

Fittingly, Myron Fifield, president of APPA in 1958, influenced Mackel's decision to pursue a career in physical plant management. Fifield was the director of physical plant at UNM when Mackel began working for the department in 1968 while studying for his MBA. Mackel described Fifield as "a classic mentor. He was one of those fellows who had an incredible network. No matter what you did, you'd get a little note from him, or be called down to his office and thanked for the work you were doing." Mackel regards his former boss as "an incredible leader; he was doing things twenty-four years ago that the management gurus are writing about today."

During one of their conversations, Fifield said, "Come with me, son, I've got something for you to do." And before he knew it, Mackel, still a graduate student, was speaking at APPA's 1970 annual meeting in Tampa. There he learned firsthand how the members of APPA "care about what they are doing. The more I got into it, the more I found what an interesting, exciting career field this was," said Mackel. "There are no two days alike. There is always a new challenge."

Mackel moved from his native New Mexico only once, in 1960—a four-year tour with the U.S. Navy that proved fateful. While stationed in Jacksonville, Florida, Mackel met his future wife, Sharon. He later attended Daytona Beach Junior College for one year before deciding to return to school full time at UNM. But moving his young wife, who was then eight months pregnant, from Daytona Beach to the unusual climate and surroundings of the Southwest was not as easy as he might have thought. Mackel explained that New Mexico architecture is regionalized; it's in harmony with the colors of the natural landscape, and the buildings are all varying shades of earthtones. "For someone coming from a very green part of the country, it was a tremendous shock." It took about six months, he said, for Sharon to acclimatize. "Now, I couldn't move her out of New Mexico with dynamite. She just absolutely loves it. The desert has that kind of appeal."

Mackel described New Mexico as a distinctive and sparsely populated state with a limited economy. Most of the students attending UNM have lived in the state for some time. "We have a multicultural element here that is very rich, a treasure, and it's very exciting, but it takes some understanding. I think I certainly bring that understanding to my position as director."

Because New Mexico is a high desert area, its climate affects different aspects of the physical plant. For instance, the temperature swings 30 to 35 degrees every day, winter and summer. It could be 100 degrees during the day and drop to 70 degrees at night. In the winter months this temperature flux causes freezes and thaws in the same day, which, affects systems such as roofs, pavements, and land-

scape. Mackel said that he gained "cumulative knowledge" on how to deal with temperature-related problems and freeze/thaw cycles as he went along, but he is still learning.

"We have to fight for every blade of grass that we have," he explained. "Over the years we have been able to integrate automatic irrigation systems, and it's made a tremendous difference in the appearance of the campus. It's really becoming a very nice place." When Mackel first attended UNM as a student in 1964, mostly rocks and dirt covered the campus. During his employment at UNM, the campus has grown from less than 1.5 million square feet to nearly 6 million square feet.

Challenges Ahead

One may wonder how a person can spend twenty-four years of his profession at the same facility, but Mackel still speaks with passion and enthusiasm about the challenges ahead at UNM. The university completed a strategic plan eighteen months ago, and, when he was awarded the job as director, Mackel said he was given a "wonderful opportunity to step back and take a look at the organization and to answer two questions: Are we structured organizationally to accomplish our mission? And are we structured financially to accomplish our mission?"

The biggest part of his effort now is pulling together the planning group to devise a strategic plan for the physical plant department. Through his association with APPA, Mackel has acquired assistance from a number of people at other institutions, including Jack Hug, Dorsey Jacobs, Wayne Leroy, John Harrod, Ken Hall—all part of the team to help him evaluate and get through the planning session. Finding and developing this kind of network of talented people is one of the things Mackel finds especially exciting about APPA.

"We have a multicultural element here that is very rich, a treasure, and it's very exciting, but it takes some understanding. I think I certainly bring that understanding to my position as director."

A major part of his current interest at UNM is to consider and assess the university's physical plant organization and "see if we are really ready to do our job. Hopefully, out of that will come a better way to do what we need to be doing. We will be organized more efficiently and financed perhaps a little better than we are now, or at least in a different fashion." This plan excites Mackel because it is the first time during his tenure at UNM that the physical plant department has been given such an opportunity.

Benefits of APPA

During his twenty-two year association with APPA, Mackel served on various committees and learned firsthand of the organization's benefits. He quickly made contacts, valued the network he was establishing, and learned how to handle problems and situations unique to his profession.



Photo by David Talaya

Mackel reviews plans with Michael Gallegos, manager of medical center maintenance. The Family Practice and Emergency Medical Building is in the background.

Building a network enabled Mackel to combine the talents of other professionals when he needed help with his strategic plan at UNM. "As I looked at the idea of developing a shared vision, a strategic plan for my own department at the University of New Mexico," he said, "one of the things that was very clear to me was that the people on my staff haven't had a lot of exposure to other physical plants. Most of them are pretty much home grown. They went to school here and came to work at the university, and we still have them. So they haven't had much experience outside this particular university environment. I went to this year's annual meeting with the idea of recruiting some people to come help me with this strategic plan for my department. I didn't have one person turn me down. They were all very excited about the idea. And that's what I mean about the networking. It's amazing what this network of professionals is all about."

People in APPA willingly share their knowledge with one another, according to Mackel. Not so in the private sector, he said, where business people are afraid to give away trade secrets. "In our business, I find it surprising that people are so willing to share what they've learned. It's a very professional kind of attitude."

Mackel believes other members agree. "In general, I think sharing is looked at as a positive and beneficial aspect of our careers," he said.

Mentoring is another aspect of APPA membership that Mackel values, especially since he himself was taught by a "classical mentor." Mackel stressed the need to assist people in the facilities management field by mentoring and taking a hand in their development, as well as by taking positive and affirmative steps to bring more women and minorities into APPA. "I see the health of this association being maintained by our bringing people along," Mackel explained. He believes facilities management is an excellent career field for both men and women, which is evidenced by the increase in women members within APPA.

Continuing education is extremely important in facilities management, and APPA provides this as well. In fact, this year, Mackel set up a task force so that the entire association can learn from the successes and failures of others. The plan

is to develop a listing of strategies that have worked and those that have not, relative to the consequences of downsizing or cutting back.

Educational sessions provided at the annual meeting are also extremely important to Mackel. "The premier part of APPA is the education process—workshops, institutes, annual meetings," he said. Besides the educational sessions, which Mackel sees as "the major draw," the suppliers attending the annual meeting give members a chance to view new products and state-of-the-art technology.

Mission as President

During his term as APPA President, Mackel will continue to focus outreach efforts on smaller schools. "If we analyze the marketplace," he said, "that's with the greater number of nonmembers. It's also the largest segment of our current membership; 68 percent of our membership comes from schools with less than 5,000 FTE [full-time enrollment]." He believes that APPA provides many benefits to small institutions.

"I take it as a personal mission to bring those smaller schools into this association, because we have so much to offer them. We can do so much more together than we can individually."

Recruitment has become an important part of Mackel's 1992-93 Operating Plan. A structural change that occurred this year eliminated the elected office of Vice President Membership. As a result, the new membership chairperson, Michael Faires of Clemson University, and APPA staff will provide the focus and direction of the Membership Committee's work. They have set up the Member-Get-A-Member campaign as their top priority this year, and they will award prizes for efforts in recruitment.

As President-Elect last year, Mackel worked with the Planning Committee to develop the 1992-93 Operating Plan, which he says "comes from the grassroots of regional representation." As each committee reviews the issues, they also screen their priorities for alignment with the Long-Range Plan. "That's an important concept to understand," Mackel said, "because it continues to force us to keep our action and

our eye on that plan. We keep working through those comprehensive issues that the members of this association decided were the most important ones facing them. We're just doing what the members said they wanted us to do, and we don't really deviate from that."

In fact, at this year's annual convention in Indianapolis, Dr. Mark Pastin of Arizona State University remarked on the plan's success in his closing keynote address. [Ed. Note: Dr. Pastin's remarks have been reprinted in this issue.] Pastin had been an invited outside member of the Planning Committee when it devised the Long-Range Plan three years ago, and he was surprised at how many of the goals had already been accomplished. Mackel said Pastin "couldn't believe what he was seeing; he was astounded because we had worked on the plan religiously and were accomplishing almost everything we said we wanted to do."

But the work is not finished yet, and Mackel said, "We're still focused on this plan." He has asked the current President-Elect, Diane Kerby of Berea College, "to go back and begin the process of updating and renewing the Long-Range Plan so we can keep it as our guideline as to where we're going. The Long-Range Plan has been very important to APPA's recent success. This association knows precisely where it's going; there's no question about that. We know exactly what we're about, and everybody on the Board of Directors seems to recognize that, and we're not going to stray." Mackel believes this clear sense of direction is unusual for associations and that "it speaks very highly of the commitment of the people serving on our committees and at the board level."

Said Mackel, "We have an absolutely terrific team in place. These folks have all been tested," referring to the fact that members at the board level have "done their time" on committees and in other major volunteer efforts. He finds the APPA staff very supportive of the board, and "as a team, there's no reason why I can't have a successful year as president of APPA. I'm very excited about it." "As long as we continue to revisit the Long-Range Plan with every initiative that we take, update it, and make sure that we continue to focus on what we know is needed by the membership, then we're right on target."

Mackel credits members on the committees with volunteering to help get things done. "There aren't any reluctant people

here," he said enthusiastically. "They're here because they want to be. The direction is set. So it's just a matter for me to turn them loose." Mackel speculates that this type of teamwork exists because APPA members enjoy what they do; they have a desire to share a career they value highly, and they take great pride in their work.

Previous Role With APPA

Prior to his term as President-Elect, Mackel served on the Membership Committee. After his sixth year as a committee member, he was elected to Vice President for Membership and reelected for three terms. "That was a major growth opportunity for me," said Mackel. "It was my first opportunity to serve on the Board of Directors. One of the things I learned about the association from that perspective was that there were so few personal agendas. No



Mackel displays the President's gavel he will use throughout his year as APPA President.

Photo by Rob Barayotte



Mackel, right, prepares for a management retreat with Bob Dobell Jr., associate director of athletics, standing left, and Ned Ross, assistant director of maintenance and operations, seated.

Photo by David Tabors

matter what the issue, how thorny, or how divisive, when it came down to it, the people at the board level were working in the best interest of the association. That is one of the most reassuring things I've learned—that this is a group of caring professionals committed to the success of this association. That surprised me, and I feel very, very good about that."

During his term as Vice President in 1988, the association added the Australasia section of international members from Australia and New Zealand. "We've had some great successes. We took membership to more than 1,500 institutions and became a truly international association during that term, and I'm real pleased about that," he commented. In addition to the Membership Committee, Mackel has served on the Planning Committee, the Finance Committee, and the International Committee. In 1991, he received APPA's highest individual honor, the Meritorious Service Award.

Issues Affecting Facilities Managers

Through the staggering growth period of the 1960s through the 1980s, economic changes, and periods of inflation, what has been most difficult for facilities managers, Mackel said, is the issue of deferred maintenance. This has been "devastating to most campuses." Not only college campuses, but K-12 as well. The national estimate for deferred maintenance in K-12 schools is \$1.157 trillion, according to Mackel. "APPA identified \$70 billion in deferred maintenance in higher

education and \$20 billion of that was of an emergency nature. When cities look at deferred maintenance, they probably don't have a clue of what the total national deferred maintenance backlog is in terms of the infrastructure, particularly the things we don't see. That's been the most difficult thing for us to deal with through the years. We have gone through

an unprecedented period of growth on our campuses, and the money has been directed toward programs and salary increases that came with several years of double-digit inflation. Funding for maintenance couldn't keep up with that." While some areas of the economy experienced increases, Mackel said that the salary growth "never was seen at the level of a tradesperson on our campuses."

In addition, Mackel said, when universities did not receive additional funding, the inflation that did occur during those years equated to a spending cut. "We have lived in a wonderful, prosperous period of time," he said, "but it's going to be time to pay the fiddler on a number of these issues." He expects that colleges and universities must pay the cost of having deferred decisions to maintain their infrastructures. He foresees having to do more with less and coping with a different work ethic. "If we're using the work ethic correctly and cleverly," said Mackel, "we have lots of people who care about their work and are doing very good work. It's up to us to lead the way."

"Twenty-five years ago, we were often thought of as the guys who came in and lit the fire in the boilers, warmed the place up, ... we still do the same kinds of things, but we're doing it with high technology."

Changes in the Field

During his career, Mackel has found that technology has changed tremendously. "Twenty-five years ago, we were often thought of as the guys who came in and lit the fire in the boilers, warmed the place up, and took the trash out at night," he said. "We still do the same kinds of things, but we're doing it with high technology. Many of our campus activities can be accomplished electronically today."

Besides the technical side, facilities managers are also addressing people-related issues. Mackel said, "We are learning much more about how to work with people and teams than ever before. This has resulted in more effective managers and team leaders."

Then there is the environment. Issues such as clean air and drinking water, as well as the use of chlorofluorocarbons (CFCs), asbestos, and other materials harmful to the environment, are causing problems that are not easily resolved. The intent is clear and, Mackel said, although we should do something about the problems, the result of uninformed environmental regulation is costly. Mackel hopes "that some of the national brain trust that has been working in the weapons business can be redirected to help us solve

these kinds of problems, as well as the other environmental issues that are becoming so difficult for the campuses to deal with."

He would also like to see state and federal legislators become more proactive in determining the impact of legislation under consideration by "coming to APPA and asking, 'What kind of an impact would it have if we passed this legislation?' and 'How could we mediate? How could we make it easier for you to deal with these problems?'" But Mackel also realizes that some of the constituencies aren't willing to wait any longer.

He cited the Americans With Disabilities Act as an example. "It is going to cost a lot of money to make everything accessible. None of us argues about the rationale for making our campuses accessible; buildings and programs should be accessible to everybody, no question—period. But getting there is a different thing; it requires lots of resources."

To Mackel, patience, tenacity, and persistence are important when dealing with these issues. "We know we've got some tough goals to meet, and we just keep working at them." His words sound a lot like those of the APPA membership. ■

SCANNING SERVICES

A FEW EXPERT OPINIONS ABOUT SCAN

"We would like to congratulate SCAN CONVERSION SERVICES INC. for a fine and prompt job... by producing the work on schedule you have helped us keep our schedule... the quality of scanned work was excellent and will impact minimizing the cost of the CIR project. Should additional scanning need be done, we will certainly ask you to bid on the work."

Washington State University
Ted Krebs, Director, CIR Project

"I have found this company to be very efficient. The work they provide is done in a confident and competitive manner, with the turn around time being excellent."

University of Alberta
Rudy Jakubec, Records Supervisor
Planning & Development

SCAN

CONVERSION
SERVICES INC.

"We have been very pleased with the accuracy and quality of the data we received. The early completion of the project was quite remarkable. I was impressed with your ability to deliver a product the first time that met our technical specifications."

ITT Rayonier Inc., Florida
Brent J. Keefer, GIS Coordinator

"We consider this service to be important in the conversion of manual drawings to CAD format, saving us both time and money while still providing high quality... We have recommended this service to other departments within Transport Canada, and to other Technical Data Centres across Canada."

Transport Canada
David J. Palmer, Sup. Tech. Data Centre

4228 Manor St., Burnaby, B.C. V5G 1B2
TEL: (604) 439-0054 FAX: (604) 439-1459

The Leader in Automated Scanning Conversion to CAD & GIS

Educational

LEADERSHIP:

The Role of Facilities
in Educational Excellence

by Dr. Samuel H. Smith

Dr. Samuel Smith is president of Washington State University, Pullman, Washington. He has held academic positions at the University of California/Berkeley and Pennsylvania State University. This article is taken from Smith's keynote address to APPA's membership at the 79th Annual Meeting, held July 1992 in Indianapolis, Indiana.

Photo by Steve Glazner



I would like to talk about change, because dramatic change is occurring in higher education. You can describe this change several ways. I think it's appropriate in a presidential campaign year to quote John F. Kennedy. Some thirty years ago he made the statement, "Change is the law of life. And those who look only to the past or the present are certain to miss the future." That was a very positive way of phrasing it, a very delicate way, and also a very important way. Colleges and universities are now immersed in a period of tremendous change, but it is not delicate.

Perhaps some of you are old movie buffs. How many of you have ever seen the movie *Shane*? A little boy stands with his father on the edge of their farmstead; they're looking out across an open area, and they see somebody approaching. The little boy says, "Someone's coming. Pa. Someone's coming." They don't know who's coming, they don't know what the person's going to do, but they do know that their lives are going to be changed by the very fact that that person is approaching.

In many ways that's what happening today in higher education. Change is coming. We are not exactly sure if it's threatening or not, but it's on the way. And its very presence will alter our lives and the way we do business.

I'll use another image, one perhaps a little closer to home. All of you have been involved in commencements. A few years ago I was in a commencement line at Washington State University. Two lines of graduates were coming up either side of the floor. They would receive their diplomas and come back down the center of the floor. I stood in the center and shook hands with each graduate. Two long lines of graduates are coming through and I am shaking hands about once every four seconds.

One graduate came through and he stared at me. In my business when a graduate or student stares at you, you notice. He came through, got his diploma, shook my hand, and then said, "Mind if I stand here for a moment with you?" Ten to fifteen thousand people are in the audience watching. I'm still shaking hands every four seconds. I said, "All right for just a moment, but don't stay too long." Pretty soon a female graduate comes up. She appears nervous. Well, she approaches, gets her diploma, and comes back down to the center. This fellow steps in front of me, kneels down, whips out a ring, slips it on her finger, and says, "Will you marry me?" True story. She's standing there, he's hugging her, and she is in shock. People are backing up because they're still approaching at one every four seconds. The audience was on its feet and applauding. What do you do? I wished them well and they were on their way together. By the very fact that she was asked the question, by the very situation, her life was changed. It does not matter whether she said "yes" or "no." Her life was changed whether she wanted it to be or not.

What we're seeing right now in higher education is similar. We're seeing changes occur—some positive, some negative, and some we're not so sure about. Twenty years ago, the

American dream was to start children off on the path of life, have them go through a kindergarten-12 system, study hard, do well, get into college, graduate, and enter a profession and be successful. Universities and colleges were looked upon as important developmental phases in the lives of young people. They were looked upon as part of a seamless education from kindergarten through college.

Those days are largely gone. Higher education is now seen as an "extra"—something that is nice to have available, but not essential. We keep hearing higher education described more as a fringe benefit than as a necessity. We keep hearing it described as something we *might* afford to do.

Is this all bad? Is everything gloomy? I say no. We have a series of opportunities within higher education that have never been there before. But we've got to change our operating patterns and operate in a more forthright manner.

What's required today in our changing environment is a university community with leadership from all parts of the community capable of adjusting its own pattern of business and explaining what it's doing and why it is important to the general public. The public that used to tolerate us—which paid for us because they thought we must be good—has started noticing that higher education is big business.

I've been in higher education for many years, yet I'm amazed by the dollar figures that we use when we describe our institutions. Unless your college or university spends a significant number of millions of dollars, you're considered small. Unless you have an operating budget of half a billion dollars, you're considered mid-sized. When you start talking about millions and, indeed, billions of dollars, the general public wants to know what we're doing with their money.

We are asked: "What's your product? What does your university produce? How do you measure it?" Can you imagine a major company responding, "Well, I don't know what I produce."? Can you imagine a breakfast food corporation saying, "Well, we put things out in boxes; I think they're good."? We don't explain what we do because in many cases we don't really know how to describe our product.

Change is being exacerbated by a tough economic environment. A number of years ago we counted on the federal government to supply a base level of support for universities and colleges, but the federal government started reducing its continuing support. What happened then was that the individual states entered into a marvelous competition. Each state was largely on its own. How well they supported higher education determined how well their economy performed in the future. Some states did well. Some states did not realize there was a competition.

You can't pick up *The Chronicle of Higher Education* without reading about budget cuts. From the June 17, 1992 issue: California state's public colleges are bracing for cuts of from 17 to 33 percent in the 1992-93 academic year. These are numbers that none of us would ever have thought possible, numbers that would only have occurred in some of our worst nightmares. We're talking about increased costs and decreased

budgets, and we're talking about it at a time when the public is not sympathetic to higher education.

To those of you in private institutions, we have further complicated your lives. Public colleges and universities are now raising significant amounts of private funds. So, in addition to having all of the normal problems you have as far as rising costs and tight economies, public institutions are now competing with you in fund raising.

To meet these challenges I'd like to suggest a change in an internal approach, and then suggest an external approach that we might take. Finally, I will use my own institution, Washington State University, as an example of some things that higher education is attempting. As I start to describe an internal approach, I will use some broad generalizations. When you look within institutions of higher education, often you see three significant populations. First, of course, are the students, a population that has been well documented and discussed. However, I will discuss the other two populations because they are germane to our discussion.

The second group is what I call the academic population. These are primarily faculty, researchers, administrators, and an increasing number of what we call administrative or support staff. Many are in categories or areas that did not exist ten or fifteen years ago. This academic population is usually considered to be transient or temporary. The number of years of service for the academic are usually ten, fifteen, or twenty. The academic population is seen as bringing in the dollars. We count their grants, gifts, contracts, and awards. You read about individuals in the academic population in the newspaper. There is a national or international market or frame of reference.

The next population is usually the dominant one in numbers of employees at any university. It is what I call the permanent population. This is usually the staff involved with facilities, operations, maintenance, dining halls, residence halls, grounds, motor pool, and a host of other categories. These individuals work for twenty, thirty, and forty years. This permanent population is seen as costing dollars. Also, you don't often read about these individuals in the newspapers. You read about the new building that went up late, or you read about the hazardous waste site that someone should have cleaned up. The permanent staff market is often from a local or statewide market rather than national or international. I'd like to compliment APPA for giving your profession a national perspective.

Please keep these populations in mind—students, academic, and permanent—when you consider that many colleges and universities claim to have planned for the future. Frankly, if business planned like universities, we'd all be out of business. When planning occurs within universities, we talk about what we're going to do and we assume growth. We assume that the world is a positive place, and we continue to add programs and people, never dropping anything. When the budget periods of the last ten or fifteen years started turning against us and many universities went through what I call a surface reorganization, they were not confident

of where to take the necessary budget cuts. Keep in mind the primary decision makers in universities are the academics.

Remember those populations? If the primary decision makers are the academics and someone is going to have to take a cut—and you don't want to cut the number of students—it wasn't really surprising that the majority of the cuts were taken in the nonacademic, permanent population.

Very few academic employees were affected by the first round or two of budget cuts. As the cuts have continued, and operating costs continue to escalate, cuts are starting to be more frequent in academic areas. But, the funding for the nonacademic or permanent areas have not been restored and continue to be restricted.

I agree with the president of the Carnegie Foundation for the Advancement of Teaching when he suggested that a university's priorities are dramatically revealed by the way facilities are maintained and the importance that is assigned to the physical plant itself. Our recent budget cutting process has revealed that very strongly. A cut of deferred maintenance funding, for example, is more easily made by the academic population because the long-term benefits or problems are probably not going to be theirs.

From a business management viewpoint, one of the expected and logical changes that has occurred is in how a university or college makes a decision. If we receive new funds, I am very pleased to make the decision and tell you what you will receive.

In bad financial times, however, the pronoun shifts from "I" to "we." We develop a process because we don't want to tell you that you can't have something you need or want. Academic administrators want someone to share the blame. Higher education institutions have usually developed a reconfiguration process or retrenchment process or a shared decision-making process on how to handle their budget deficit.

We have a series of opportunities within higher education that have never been there before. But we've got to change our operating patterns and operate in a more forthright manner.

They are trying to get everyone, by consensus, to take ownership. I am talking about participation in institutional decision making. In many instances, we arrived at a positive outgrowth of our very negative budget environment. The economic woes we are going through have made a process available to many that were not included before.

In the past, students were often included in decision making, but usually not the permanent employees. Now our budget environment creates the opportunity for all three populations to be included within the decision-making process. This should be viewed as probably the single greatest opportunity for those involved in the permanent population that

has occurred in the last few decades. There is now a greater opportunity to actually be involved.

From a financial viewpoint, the true analogy to what many of our institutions are undergoing would be a family crisis. Higher education is experiencing a family crisis. For example, let's imagine there's been a death in the family, or things are really tight financially. The family pulls together and says, "We have to figure out how to work together to handle this crisis." It's usually one or two people who are senior within the family who lead the way. Within most families there is often one person who doesn't want to go along, one person who doesn't think he or she ought to chip in to help cover the bills. No matter what happens over the next twenty years, everybody in the family is going to remember the person who wasn't helpful. During the crisis we have in higher education, we have to make sure nobody ends up like this disfavored relative.

Many involved in facilities management are on the edge of being the disfavored relative. They were first into the cuts, and in many cases the cuts perhaps were considered and, indeed, *were* unfair. We have to make sure those involved in facilities management who experienced early cuts can get back on the team where they can talk and be part of the decision-making process.

If you look at what's occurring and want to become more involved in decision making, what can you do? Let's go back to John Kennedy's comment, "Change is the law of life. And those who only look to the past and present are certain to miss the future." You can change things now.

I visited with a group in the southeastern part of our country and spoke to a facilities manager who complained, "Woe is me, things are terrible, things are bad, we're all going to fall apart tomorrow." I asked him a few simple questions: "What are your options? Is the university going to close?" The answer was no. "Are the buildings going to go away?" The answer was no. "Are your problems going to go away as far as cleaning or maintaining?" The answer was no. We started talking about available options, and it turned out there were several changes he'd been waiting to make for years. For instance, eral years he wanted to close one of his shops, but could not do so. He had another area where he had a considerable amount of what I loosely call "deadwood." Due to the budget crisis, he will be able to accomplish his goals in both of these areas as an effect of the decentralized decision-making process.

If I were to leave you with one message, it is that these tough times aren't going to last forever; you'd better take advantage of them now. Instead of just planning for growth, colleges and universities must also plan for downsizing. Instead of just planning for enhancement, we must plan for elimination. I maintain that this is the time that all three populations of the college and university community should plan for the future. We need to develop real vision of what we want our institution to become twenty-five and fifty years from now. If you take a twenty-five- or fifty-year view of the future, if you develop a long-range vision, then many of our short-term problems fall into perspective as opportunities.

For those of you in facilities management, a long-range vision is your best argument. When you start talking about what your institution should be twenty-five or fifty years from now, the question of items such as deferred maintenance falls into a better perspective. The question of increasing costs of facilities falls into place. If you have a long-term vision—and it doesn't have to be crystal clear—the permanent population of the university and its perspectives rise to the forefront.

I've often been told that you cannot plan twenty-five or more years in advance. I disagree. If you look at demographic trends, if you look at many of the trend lines, there are not that many surprises. Let's assume your institution recruits high school graduates, many of whom enter your college or university right out of high school. You can count the number of people born, you can count the number that are in the kindergarten-12 system, you can count the number that are in the seventh grade, you can estimate the dropout rates, and you can count the number of older students returning. You can make some reasonable projections over a twenty-year period. You can view a series of demographic trends and make a convincing case about what your institution should be doing. The more you shift the university's view to the long range, the easier your job is going to be and the better you can serve and build your college or university.

Washington State University, which is isolated in the southeast corner of our state, took this as a challenge several years ago. In 1985, we were told by a number of legislators in our state that support for universities would start to be reduced.

We had a choice. We could have stood around and said, "Woe is me." We could have circled the wagons and shot inward, or we could have attempted to go out and do something. To make a long story short, we moved out, and started three new campuses, which are doing well. We're in the midst of one of the biggest growth periods in our history, we're doing the best we've ever done as far as grants and contracts, and we're probably doing an even better job of recruiting faculty and students than we've ever done, because we tried to portray a long-term vision.

This is a time to take risks. You're probably now in a better position to influence your institutions and the direction of your profession than you've been in the last twenty years. If you can help develop the concept of long-term goals and vision, if you can move more effectively into that decision-making process, if you can get away from being the disfavored relative, I think you will then see a better future for campus facilities, in a better and more optimistic manner, than we've had in many, many years.

It is true, "Someone's coming, Pa. Someone's coming." Actually, *something* is coming down that road, and it is an opportunity. Please go out and take advantage of it. What you don't want to do is say to yourself ten years from now, when things are better, "I should have made more changes when I had the chance."

These tough times are not going to last forever. We had better take advantage of them now. ■

POWER, INFLUENCE, and SURVIVAL in DIFFICULT TIMES

by Dr. Mark Pastin



Pastin challenged APPA members to take more control of their futures.

W

e are talking about power and influence today, and, mainly, I want to give you some fighting words. But before I do that, I want to share with you some thoughts on power that I've gathered over the years. Here's a Chinese proverb that you need to think about: "If we don't change directions, we'll end up where we're headed."

I've been reading some of the statistics gathered about where we are headed in terms of the physical facilities of our universities and colleges. Here's another great one: "You can never plan the future by the past," Edmund Burke. And: "Action may not always bring happiness, but there is no happiness without action," Benjamin Disraeli. That's a lot of what I'm going to talk about. Here's a great one; I attribute this quote to God: "Complain to some-

one who can do something about it or shut up."

But this talk is going to be built around one final quote, and this is from Henry Luce, who was chairman and chief executive of Time, Inc. He said, "In life, there are no permanent victories or solutions. To win is to stay committed and maneuver."

I'm going to talk to you about winning in facilities management because, generally speaking, you, and I really mean *we*, are not winning today. I'm not going to repeat the sorry statistics on deferred maintenance and capital renewal, which you know much better than I do. I want you to consider a few things.

Higher education is the only major U.S. industry not making a record commitment to plant and equipment today. Across this country, people have realized that competing in the international environment requires constant reinvestment in plant and equipment. You're in one of the few industries not deeply concerned about providing the highest quality physical environment for its customers. The customer really is king today, and we must recognize that the customer judges both the service itself and the physical environment in which it's presented.

You're in one of the few industries not making massive investments in anticipation of stricter environmental regulation

Mark Pastin, Ph.D., is director of the Lincoln Center for Ethics and Professor of Management at Arizona State University, Tempe, Arizona. He has also taught at Indiana University, University of Maryland, and Harvard University. He is author of The Hard Problems of Management. This article was adapted from his closing keynote address at APPA's 79th Annual Meeting last July in Indianapolis.

and enforcement. We are in the environment decade, and industry is really investing in anticipation of where this is going. By and large, we in higher education are not investing at that level. We are in an industry that doesn't realize that a superior physical plant provides a sharp competitive advantage over low-cost, low-quality competitors, and that is part of what the competitive game is about today.

We're in an industry in which money is galloping away from us, and our leaders have been reduced, frankly, to begging. I'm not saying this to discourage you. There is no point in getting discouraged in anything you do in life. But I am saying this because we have a crisis in higher education today, and, by and large, the facilities management function is not winning.

I don't want to ask you how bad it is but, rather, what will it take to change this—to exercise some power to influence—and not merely survive?

Facilities officers can strengthen their positions not at the expense of their institutions, but instead *on behalf of their institutions*. I'm going to give you some ideas about how to do this, and I'll start with one that should be very obvious.

I've had the chance to observe APPA over the past three years, and I will tell you that it is an excellent, constantly improving organization. Some of the things I've seen are the name change to add prestige to the profession and some very strategically important studies. I'm

not a great believer in studies for the purpose of printing paper, but APPA's studies really support the mission of higher education. The Facilities Management Evaluation Program is an important service, and one that will make a big difference in the profession. And of course, public and government relations is an area in which your field will see vastly growing needs. *Power by association* is important in gaining influence within your own institutions.

You've made a lot of progress, but I want you to stop and think about the next phase. What is the next phase for APPA as an association? From my distant and less-involved perspective, I'm going to urge you to continue what you're doing. But I think the time has come to play much, much tougher. If you please, the gloves have got to come off.

To win at the level of association, there are some things you are going to have to think about doing. One is focusing attention on the environmental and safety problems caused by deferred maintenance. We've been too polite about this. As part of the education establishment, it's time to take your cue from other campus interest groups. Who of us has not sat in wonder as the real need goes unmet while the squeaky wheel of the day attracts resources? That's a fact of life. It is time to learn from special interests who are highly effective in the institutions in which we operate.

It's time to start creating awareness of the environmental impact of these things by using the tools used in industry and by other associations. For example, environmental hotlines

encourage people who see the effects of deferred maintenance or a lack of capital renewal to report environmental problems and help you build a record of what needs to be done. For facilities management as a profession, there is the job of learning the regulation and litigation environments and using them. By and large—and it won't feel this way to you—higher education has gotten a "free pass" on the environment. Compared to the kind of litigation, regulation, and frankly, outright terror you see out there in the corporate world, we've gotten a free pass. But that free pass is in the process of being canceled. It's time to build even deeper alliance with the suppliers, regulators, and the media and to begin to use these alliances aggressively.

The things I'm talking about are extremely hazardous *individual* pursuits. They may be career killers. But they are highly effective association pursuits, and that's one of the reasons why people associate. There are things that need to be said that the individual cannot easily say. But the individual as part of an association gains voice.

I also want to focus some attention on what needs to happen at the individual level. Power and influence cluster together with leadership. And there is so much academic baloney on leadership that you need a wheelbarrow to carry the books around. But there are some things that I've observed that really work for people who are trying to increase their power and build influence. Remember that your job as a leader is to motivate or to influence, and also remember that the great motivators are unchanged: fear and greed. Much has changed in higher education and much has changed in the world, but not the basic human motivations of fear and greed. The strategies that work in power and influence, when you cut through the fancy-shmancy language, generally relate to fear and greed.

Here are some specific things that I think are important as you go forward.

One is to *stick with your message*. Of course the times are tough and it's hard to do this, but leaders win by sticking with their message even when the going gets tough. If what you're saying all along has been true, then it's still

true. The fact that times are tough doesn't make the bricks and mortar need repair any less. If what you're saying has been true then it's still true so keep saying it.

There is a lot of what I call noise in the environment now—a lot of pain, a lot of suffering, and a lot of interests competing with each other. But the noise may actually make it easier for a *consistent* message to get through. People tend to discount the noise when everybody's yammering. If, however, you're saying the same thing today that you were saying one year ago, two years ago, and you are saying the same thing a year from now, your credibility increases in this kind of an environment. On the other hand, if you change your tune, if

Power by
association
is important in
gaining influence
within your own
business.

something that was critical and had to happen last year isn't so important this year, you'll have a hard time regaining your credibility. If it's true, it's still true and you ought to still be saying it.



he next point, and this is one I really want to drive home, is that you must **operate from the stance that you can and will win**. Many facilities officers assume that they really cannot win and, bluntly, it shows. The positions taken are soft, losses are graciously accepted, and altogether it doesn't work. This

was brought home to me by a fellow who served as western regional human resources manager for Motorola. He was talking about why human resources people often have the ideas and knowledge to change their organizations but very seldom do it. He said that it's because they never come from the position that they really can win on the things that matter. And it shows. Your position, your stance, will only prevail if you hold it in a context that says, "We can win, we need to win, we will win."

In measuring power and influence, there's a transaction that occurs when somebody looks in your eyes and asks, "Is this person negotiating, or is this person taking a real position?" Operate from the position that you can and will win.

The next point is to **set the terms of debate**. You cannot buy into the death-by-a-thousand-small-blows game; there is no winning in that game. You must argue your perspective first by the issues and then by the realities of the budget—never, ever the other way around. There is no winning in 1 percent, 3 percent, 5 percent. My view is that the budget is gravity, and you can't change gravity. I'm sure people in the early days of flight wanted to wish gravity away. But you cannot fly by standing on the ground and saying, "I wish there were no gravity because then I could fly." But you also don't fly by letting gravity depress you and hold you to the ground. You fly by designing the aircraft that will work given gravity. You think first about what it is that will work, and then you deal with gravity or with the budget. But you have to define your issues.

Align your staff with your plan. Teach your staff that the facilities perspective really can win. And know that if your team believes it can't win, then it can't. It can win, but only if the whole team continually sells that perspective. That means on a day-to-day basis, every day, explaining to people why things that should work, don't. If people don't understand why, then they blame you and they blame your team. Explain to people what the risks may be of not doing something the right way and what the long-term costs may be.

Let me share an experience. I have an office in a building

that has one of the slowest elevators on Earth. There are two elevators in the building, and one of them is broken much of the time. I can't tell you how many times I've stood at the base of that elevator and heard people say, "When are those bozos from physical plant going to get over here and do something about this piece of junk? I'm fed up." One day we're in the elevator with a fellow from physical plant, and everybody is standing there with their arms folded thinking, "Okay, he finally showed up." And I said, "You know, it would be interesting to understand why we have so much trouble with this." And the fellow said, "Let me take a moment and explain." Then he held up a component and said, "This is a used, remachined component, and it's not quite to the specifications we want. But we're under orders, because of the budget, to remachine parts, and it's not so easy to do that. We know they're safe, but they're not the best they might be." Then some other people in the elevator said, "Yeah, we get that; we're up against the same problem. We're trying to run some numbers in our computer and our version of Lotus is ten years out of date." Suddenly, we were on the same side. We understood the facilities management world a little bit better, but only because that person took the time, had the patience, and felt he had the right to discuss the problems as he saw them.

The academic environment is one in which you have very high volume, in the sense that people speak loudly, but there is little real communication. People are used to listening to themselves. They are used to writing articles that few will read and speaking to hostage audiences—to kids who are locked in because they've got to get their final exam and their grade. Consistent, careful communication can pay big dividends in an environment in which people need communication and mutual understanding, because there is so little of it.

Your facilities staff is probably more a team than any function on campus. Your interests really are shared. You sink or swim together. Build upon that sense and authorize people to talk and to support your function.

The next point is to **identify issues on which those above you can win**. True, people don't see that they can win by spending a lot of money and only being 10 percent behind. But the people to whom you report are trying to find issues on which they can win, because there aren't that many. So don't argue the incremental gains or losses. Argue the issues, the topics, the projects on which people can win.

These issues might include things such as historic and sentimental renovations. People have a longing for things that are going away. Help them keep some of them. Advance approaches to environmental problems. Since we've got 98 percent of the world's environmental scientists on our campuses, administrators can win by showing that they want to be environmental leaders. You can help them.

Get people involved in their physical environment—things that will help attract grants to a campus. How many people have taken the time to think about the extent to which a poor physical facility inhibits grant money? How many people have taken the time to learn what changes can be made to facilitate grant activity for the campus? Believe me, this is something that the campus powers will listen to. You also want to look at things that will earn the school credit in the community. Most schools are a big factor in their communities, and the physical state of the school is important to the community. Property values rise and fall with the physical

Operate from
the position
that you
can and
will win.

The Principles of Executive Power

1. "In life there are no permanent victories or solutions. To win is to stay committed and to maneuver." —Henry Luce
2. In the final analysis, executives manage power. The rest is incidental.
3. Politics is the art of managing power.
4. Effective politics means directing power without taking possession of it.
5. In order to direct power, first find out who the power groups are.
6. There are two kinds of power groups—those who have power but no ticket and those who have a ticket.
7. Those who forget the ticket-holders don't get to play.
8. Those who forget the power groups play but don't win.
9. Let others be the source of power, while you give their power form.
10. If you can't say "goodbye," you have no power.

© Dr. Mark Pastin

quality of your campus. Get out there and raise those issues with the community.

If you create opportunities for your business officer or president to win—even if they are not, in your professional opinion, the things most needed—the things that are most needed will follow. If you make somebody a winner, they are more inclined to meet your needs.

Think about the fact that your audience, the academic administrator, is more survival-oriented than progress-oriented. Frankly, you seldom make it as a university administrator by taking big risks and unpopular positions. You make it by getting the job done and keeping your head low. This means that you must advocate the real risks of environmental violations and safety issues, and the real embarrassment of compliance violations and waste problems. No university president can afford to be viewed as environmentally unconcerned. And the most direct aspect of environmental concern is one that you control.



universities, as I mentioned earlier, have had a curiously easy time on environmental and safety issues, and in fact on other regulatory issues. Just to give you an idea of how this has changed, when I first became a professor I bought malpractice insurance, more as a joke than anything else. It cost five dollars a year. Today the only company that will sell malpractice insurance to a professor is Lloyds, and it costs two-and-a-half times my annual salary. That's my risk exposure, as an individual, to litigation and regulation.

The idea that universities and colleges are polite places that don't have to play by the rules that everybody else has to play by are over. People are suing us, they're angry at us, they think we're just like anybody else. This will be the decade in which we get our regulatory comeuppance, and we're not going to like it.

For example, consider the 1991 Federal Sentencing Guidelines for Organizations. The guidelines will raise fines for certain violations of the law by as much as ten times their current level, if the courts decide that you haven't done an effective job of preventing those violations. It's called the "culpability index." Soon an extension of the sentencing guidelines deal-

ing with environmental infractions will be issued. They will raise fine levels across the board and then add a multiplier of one to ten times for a lack of effective reporting and prevention. The guidelines apply to all organizations including universities. This is just one example of the fact that what we decide in-house may not be good enough anymore.

Both your position within higher education and external realities require that you begin playing hardball on safety and the environment. You're going to do yourself and your institution a favor by doing so. Remember, your audience is survival oriented. You don't survive by being environmentally irresponsible in 1992, 1995, or at any time from now on.

The last general point I want to make is to **build alliances inside and outside** the university and college. For the level of accomplishment and responsibility that facility officers have, most are virtually unknown off and on campus. This is a choice, and it may have been a good choice at one time, but it isn't today. Today the ding on the door of the vehicle gets fixed because it can be seen, but the oil isn't changed in the engine.

People on and off campus really do care. Get support on campus. Get support from your suppliers. Be involved in public events. Be involved in the community's concerns about your campus. Seek involvement where it's available. If you begin taking a higher profile and building alliances—and there's no reason not to do it—your interests will align with campus interests, with community interests, and with most regulatory interests. You may offend some, but it will also heighten awareness and build respect for you and the issues that you advocate.

In today's environment of harsh competition for scarce resources, invisibility is not a winning strategy.

Let me review some of the points I've made.

- 1 You win by association. Learn what the special interests have learned: Campuses respond to sharply focused interests; become a focused interest yourself.
- 2 Stick with your message even in tough times. When others are waffling and vacillating, you may have your best chance to be heard. You have a solid message; it's real. Stick with it.
- 3 Operate from the stance that you can and will win. This is an important point. Leaders are more concerned about what it will take to win than about what will happen if they lose. As soon as you think about what will happen if you lose, you lose. There are many examples of this, the most famous is the Flying Walendas. Old Karl Walenda never had an accident until the last time he walked the high wire. It was the first time in his life when he didn't trust his team. He rechecked the fastenings on both ends of the wire, and when he was on that wire he looked again to see if everything was okay. He fell and died. Leaders aren't worried about what will happen if they lose; they're worried about what will happen *when* they win. You have to come from that position.
- 4 Set the terms of the debate. Define the issues first, and then react to the conditions. Don't react to the conditions and then define the issues. Determine the issues that you want to address over the next three to five years on your campus, and align your staff with the plan.

5 You have a team, so use it well. You've got something that very few people have, so use that team. Use it as an influence resource. Remember, you're on the same side as they are.

6 Find the issues and projects that will make winners of those to whom you report. Find some winners in the list of issues, things that people can get behind and get credit for. And advocate the realities of risk. If making winners plays to greed, then advocating the realities of risk plays to fear.

7 Finally, build alliances and be a consistent participant. Particularly on campuses, all you have to do is want to be involved and you are involved. Take advantage of some of the opportunities.



What I've delivered to you should be no news; there should be nothing new here. But I am recommending a big change in approach. There is a rule in life and it's really true: no risk, no gain. In tough times you must certainly take risks or you will definitely lose. Of course, you might also lose if you take a risk. That's what makes risks exciting, that's what makes them invigorating, that's why they promote personal and organizational growth.

These really are not tough times. In other words, this isn't a bad time that's going to go away. My belief is that the economy and education are not in a recession. They're in an adjustment. We'll call this recession over when we're used to it.

And incrementally, that's what's going on; we're getting used to it. Those big, high-paying, heavy-benefit, lifetime jobs aren't being manufactured. And the competition around the world isn't going away. Competition isn't getting less just because we want the recession to end. The deficit isn't getting paid off. This is going to be with us for a while.

The days when campus needs would *eventually* get met because things *eventually* got better are over. There is no choice or alternative to advocating today, because otherwise it just won't get done. I predict a decade in which facilities officers will need to take a much more aggressive stance. Those who don't will eventually be blamed for the sorry state in which their campuses end up. In other words, the choice of keeping your head low is really not available. Those who really play have a chance to win, and it doesn't mean you necessarily will win if you take risks.

I want to conclude by going back to what I said at the beginning. "In life, there are no permanent victories or solutions. To win [and winning is good] is to stay committed and to maneuver." I have one final quote that you may enjoy thinking about. It is, "If you can't say goodbye, you have no power." What that really means is that in tough times we may have to risk our jobs to have real power. We have to have that strength to admit that one of the values of associations is to give that strength to each other. I see a lot of friendship and a lot of affiliation within APPA, as well as a lot of opportunity for growth. It is very important to maintain those strengths as we move forward. ■

Chapters include

- ▲ Maintenance Management for the 1990s
- ▲ Developing an Effective Facility Information System
- ▲ Predicting Maintenance Resources
- ▲ Automating Plant Maintenance Pays Off: Myth or Reality?
- ▲ Guided Tour of an Electronic Work Order System
- ▲ A Project Management Approach to Work Control
- ▲ Cutting Custodial Costs: The Name of the Game is Labor Savings
- ▲ The Magic of Zip and Zap in Grounds Management
- ▲ Electrical Energy Management Through Lighting Retrofits
- ▲ Cooling Tower: The Facilities Orphan
- ▲ Water Treatment Specifications for Colleges and Universities
- ▲ Optimizing Your Elevator Service
- ▲ Managing Roofs at Oregon State
- ▲ Restoration and Waterproofing of Concrete Structures
- ▲ Physical Plant Performance Evaluation Pulse Points
- ▲ Measuring Maintenance Productivity Through Work Sampling

softcover, 173 pages

ISBN 0-913359-69-6

\$27/APPAs members

\$35/nonmembers

Add \$8 for shipping and handling

Send check to

APPAs Publications, Dept. OMAD, P.O. Box 1201,
Alexandria, Virginia 22313-1201

Critical Issues in Facilities Management

8

OPERATIONS AND MAINTENANCE

APPAs
The Association of
Higher Education
Facilities Officers

CUSTODIAL STAFFING GUIDELINES FOR Educational Facilities

ORDERLY SPOTLESSNESS
ORDERLY SPOTLESSNESS

ORDINARY TIDINESS
ORDINARY TIDINESS

CASUAL INATTENTION
CASUAL INATTENTION

MODERATE DINGINESS
MODERATE DINGINESS

UNKEMPT NEGLECT
UNKEMPT NEGLECT

APPA
THE ASSOCIATION OF HIGHER
EDUCATION FACILITIES OFFICERS

Provides you with the tools to:

- determine staffing levels
- assess your facility's "level of clean"
- respond to institutional needs, service, and budget constraints
- examine alternatives when resources or needs change

Ten space categories are addressed:

- Classroom
- Entranceway
- Locker/changing room
- Office
- Public (circulation) area
- Research laboratory with hazardous waste containers
- Research laboratory without hazardous waste containers
- Stairwell
- Storeroom
- Washroom

Published by



The Association
of Higher Education
Facilities Officers

To order:

All orders must be accompanied by this order form and a check in U.S. funds made payable to APPA. Telephone and credit card orders will not be accepted. Orders are shipped via UPS; please allow 3-4 weeks for delivery. Contact APPA for quantity purchases.

Order Form

Custodial Staffing Guidelines for Educational Facilities

92 pages, softcover

ISBN: 0-913359-66-1

Price: \$50/APPA member institutions
\$75/all others

Please check here:

☐ APPA member institution ☐ other

Title	Qty	Price	Total
Custodial Staffing Guidelines	1	\$50/APPA \$75/others	

Shipping & Handling

(U.S. orders add \$8. All international orders add 20% of subtotal—\$10 minimum)

Total \$

Orders must be prepaid. Enclosed is a check made payable to APPA.

Name _____

Title _____

Institution _____

Street Address _____

City/State/Zip _____

Phone (____) _____

Send order form and prepayment to

APPA Publications

Dept. CSG

P.O. Box 1201

Alexandria, Virginia 22313-1201





DEMAND SIDE MANAGEMENT

by Mohammad H. Qayoumi

Illustration by Ted Benson

THE ELECTRIC UTILITIES have been going through some fundamental changes that will significantly change their industry structure by the end of this decade. This is mainly in response to external forces such as environmental laws, fuel prices, and cost of capital, which have fundamentally altered their traditional paradigms. Thus, a new era of challenges and opportunities has been created both for the utilities and their customers. One of the innovative concepts that has emerged in the past few years is demand side management (DSM); namely utility stimulated activities to change the configuration and magnitude of the electric load shape.

The purpose of this article is to provide a synopsis of what DSM is and how it applies to facilities managers. In order to have a better appreciation of DSM, let's first define it.

What is DSM?

Demand side management includes all the activities planned and implemented by the utility to influence customers' consumption of electrical energy, thus producing the desired changes in the load shape. DSM is the combination of such activities that intervene in the marketplace as load management, strategic conservation, electrification, and customer generation. The common load shape changes are as follows.

Peak Shaving. This consists of the classical form of lowering the peak demand when the utility is faced with the capital cost of building peaking generation units and the related distribution system, or purchasing power from a neighboring utility at much higher cost.

Valley Filling. Valley filling is a means of increasing power consumption during the off-peak periods in an effort to improve the overall plant utilization. Projects such as thermal energy storage come under this category.

Load Shifting. This involves shifting certain loads from peak to off-peak periods. Projects such as space heating

storage, cooling storage, and domestic hot water storage are examples of load shifting.

Strategic Conservation. This consists of all utility stimulated energy conservation efforts that will lower the overall consumption. Such projects will normally be done by the customers, but the utility incentive programs will accelerate or stimulate the customer's decision. Projects such as weatherization and application of more energy efficient products are examples of such efforts.

Strategic Load Growth. This involves the electrification of products or processes that are served by competing fuels (e.g., natural gas, gasoline), such as electric vehicles and heat pumps.

Flexible Load Shape. This consists of giving incentives to customers to identify curtailable loads (especially in the presence of dual fuel options) as well as interruptible loads in an effort to help the utility attain some flexibility on the overall shape of the load.

Based on one or a combination of the desired load shape alterations, the electric utilities identify alternatives to attain the desired result. The first step is to decide which one of the four categories of customers—residential, commercial, industrial, or agricultural—should be the appropriate target group. The utility programs are influenced by their capacity expansion plans, generation mix, reserve margin, and regulatory climate.

The key element in the success of DSM programs is customer's acceptance. That is why the utilities' evaluation of alternatives goes well beyond the wide variety of technical choices. In investigating the characteristics of the commercial market, there is a tremendous diversity in terms of size, energy intensity, and load profiles. Another important element is the institution's psychographic profile, which will be an important indication of the complexity of decision making as it relates to energy purchase.

The above data is then analyzed using statistical techniques such as factor analysis, cluster analysis, and discriminant analysis to define market segments and design the appropriate DSM program. A synoptic illustration of the processes consists of the following steps:

- Specifying the program objectives.
- Formulating research design and developing a test program.

- Implementing the test program.
- Analyzing the test program using statistical techniques.
- Concluding the test results and commencing the full-scale program.

Therefore, by the time the full-scale program is developed, the utility will have determined its penetration ratios in all segments of its customer base. The success of the program will be capitalized in the areas where the utilities and the customers have mutual benefits. The utilities benefit by causing a change in the time pattern and magnitude of electrical demand. This results in a cost effective use of their resources while the customers are better able to control their total energy usage and cost.

Historical Background

Let's take a brief look at the historical overview of the electrical utilities. In the United States, electricity has been commercially available as a source of energy since Thomas A. Edison's Pearl Street generating facility was constructed in 1890. From the early 1900s, electricity use increased steadily to about 10 percent of the total energy consumed by 1940. In 1935, the Public Utility Holding Company Act (PUHCA) broke the large utility holding companies into regulated franchise operations, which established the current industry structure. For the thirty-year period between 1940 and 1970, the use of electricity increased at 7 percent per year, almost twice the rate of GNP (gross national product) growth. This was mainly due to higher economic activity, population growth, and a dramatic proliferation of electricity use in the nation.

These were the golden days of electric utilities; capital cost, inflation, and fuel prices were low and stable. Moreover, owing to economies of scale, as utilities were building larger and larger plants, they were able to reduce the generation cost. This, in turn, was stimulating higher demand for electricity. Such conditions produced a bullish expansion of nuclear and fossil fuel plants by the utilities.

The 1970s marked an end to the halcyon days of electric utilities. This resulted from the 1973 energy crisis, a higher inflation rate, and the Three Mile Island accident. Utilities faced much higher capital costs, longer de-

Mo Qayoumi is associate executive vice president of facilities development and operations at San Jose State University, San Jose, California. He wrote "The 2020 Vision" in the Spring 1992 issue of Facilities Manager. The author would like to dedicate this article to the memory of his late friend and colleague Edward C. Knipe, in recognition of his valuable contributions in the field of energy management.

lays in the approval process, and uncertainty on future load growth. Moreover, owing to current technology, there were no additional gains to be had from economies of scale.

Consequently, out of 446 generation units that were under design and construction between 1975 and 1982, more than 100 plants were canceled, and another 130 were deferred. Even on plants that were not canceled or deferred, cost overruns and delays were significant, which in some cases caused more than a ten-fold increase from the original projected cost.

As new plants were being activated in the 1970s, unlike the 1950s and 1960s, the unit cost of electricity was skyrocketing. When utilities are building new plants, they must raise capital to finance the projects during construction, i.e., pay interest on that capital. In most regulatory jurisdictions, a utility is not allowed to earn a return on that money until the plant has been completed and put into service. The regulatory agencies do not want the current earnings of the company to be whittled away by charges associated with a plant that will not function until some time in the future.

That is why the accountants add an AFUDC (allowance for funds used during construction) line item into the income to offset those charges and defer the cost to the future. AFUDC is a bookkeeping income item and not real dollars collected from customers. When a new plant comes on-line, all prior years' AFUDC related to the new plant is applied to the electric rate and results in much higher cost. The cost impact is even more significant if the electric demand is such that the new plant is not fully utilized.

Historically, public utility commissions (PUCs) have established rates based upon a rate of return of fixed assets of the utility. So, the more fixed assets a utility had, the more revenues it was permitted to collect for those assets. If the utility was able to purchase new fixed assets for less than the rate of assets established by the regulators, its profit would increase. In the past, rates of returns were set high enough to attract investors, and many utilities increased their fixed cost and were increasing their profit, which was

another stimulus for utilities to build new plants.

Since the 1970s, utilities have faced stiff resistance from consumers for rate hikes. Consequently, recognizing the political backlashes, PUCs have prevented utilities from increasing their fixed costs when doing so has been perceived to be nonessential to providing service to the customers. These factors have negatively affected the credit rating of electric utilities. For instance, in 1970, 96 percent of utilities had a credit rating of "A" or better, while by 1980, it was only 67 percent.

Another serious challenge utilities have faced is a growing number of customers who will bypass their own service utility and produce or purchase power, at a cheaper rate, from another domestic utility, foreign supplier, or an unregulated independent power producer (IPP). This bypass has shattered the traditional boundaries that utilities had enjoyed as an exclusive monopoly. According to a *Wall Street Journal* article, the IPP market may soon produce about 10 percent of the nation's power.

The above conditions have forced planners at electric utilities to look for innovative ways to meet future power demand increases. By the mid-1980s, the concept of demand side management gained popularity and acceptance as another option for meeting future increases in power demand and improving the financial performance of utilities. Because the electric utility industry has matured and had uncontrolled growth, the future will hold higher rates and perhaps poor financial performance. This is antithetical to the

conventional wisdom of the pre-1970 era.

Benefits of DSM

Demand side strategies offer several advantages over supply side approaches. First, generation of electricity by burning fossil fuels pollutes the air, acidifies lakes, and contributes to the build-up of greenhouse gases, especially carbon dioxide. Presently one third of the United States' carbon dioxide is attributed to electric power plants. By contrast, DSM—specifically strategic conservation—is environmentally benign and mitigates against harmful environmental effects.

Second, DSM assists the utility in managing fuel resources. For instance, according to a 1989 Department of Energy report, by the turn of the century natural gas use for electricity generation as well as gas prices will have doubled. DSM can help manage the fuel mix used for producing electricity and keep a downward pressure on prices for natural gas.

Third, reducing peak load DSM not only lowers the need for peaking generation units, it also reduces the need and capital cost for new transmission lines, substations, feeders, and other ancillary equipment. According to an Electric Power Research Institute (EPRI) report, DSM can save as much as 11 percent of transmission and distribution costs.

Finally, unlike the supply side strategy that benefits those who control interests in fuel resources, DSM can help the local service territory of the utility. This is possible because DSM creates more jobs locally, and a larger portion of the ratepayers' money remains local, where it circulates through the economy and helps the ratepayers even further. According to Oak Ridge National Laboratory's Energy Division estimates, by 2010 the annual electricity bill savings could be as high as \$61 billion with DSM.

DSM Alternatives

There are numerous DSM alternatives that have been pursued by the utilities. Some of the common ones follow.

Load Control. This is the technique used to manage and limit the peak demand experienced by the utility system, thus obtaining a diversified load profile. This application presumes that the customer will agree to service inter-



ruptions for economic incentives. Some of the techniques are duty cycling of ventilation equipment, domestic hot water heaters, and space heating.

A lighting retrofit of all commercial buildings could reduce U.S. electrical consumption by 15 to 20 percent.

Energy Storage. This consists of thermal energy storage for heating and cooling purposes. Some of the technologies utilized include underslab electric heat storage system, electric storage system, ice storage, chilled water, and eutectic salt storage media for thermal energy storage as well as electrochemical systems.

Strategic Conservation. This is by far the most important DSM technique. It reduces the customers' energy consumption, which reduces their monthly bills. Since a cost effective conservation option will reduce the overall revenue requirements of the utility, it can serve as a means of reducing the rates for all customers. The main categories of conservation programs involve enhancing the efficiency of building equipment and appliances, as well as improving the building envelope. There are a number of new technologies that have created exciting opportunities for conservation.

New Technologies

One of the sources of building energy loss is leaking windows. As much energy drains through American windows every year as flows through the Alaska pipeline, which is about 450 million barrels of oil per year. For the past decade, double-glazed windows have been used in many commercial installations. This consists of two sheets of glass separated by a quarter-inch air space and has an R-2 rating. A new low emissivity coating (Low-E) applied to the glass facing the sealed air space raises the window rating to R-3. The rating will be R-4 if the space between the glass panes is filled with a nontoxic gas like argon, which has twice the insulation value of conventional double-glazed windows.

In the past few years a new generation of "superwindows" technology

has been developed. To create a super-efficient window, the space between the two panes is filled with transparent, non-conducting gas such as xenon or a material such as aerogel. Aerogel is a transparent, multi-cellular material developed by the Lawrence Berkeley Laboratory. These technologies can increase the thermal resistance rating to a range of R-6 to R-10. These superwindows selectively block solar load, which reduces the need for artificial lighting. Superwindows cost 20 to 50 percent more than commercially available doubled-glazed windows, but the higher investment can be paid back in less than four years. The next generation of windows currently under development are electronic, photosensitive windows, which will automatically absorb or reflect light based on sunlight or the customer's desire.

Utilizing computer-controlled louvers is another approach to natural sunlight control. One such solution has been applied at the Albany County Airport terminal in New York. On winter days, the louvers by the inclined skylights are opened to allow natural light to heat a black wall. The warm air behind the wall is circulated within the building. At night, the louvers are closed to keep the heat within the building. In the summer, the louvers are reversed so that sunlight is reflected during the day while still admitting diffuse sunlight. The warm air that is collected near the louvers is exhausted and does not impose a load on the cooling system.

Lighting constitutes about 40 percent of the electrical consumption in commercial buildings and is another major area where there are significant opportunities for efficiency improvements. In the United States, about 20 percent of electricity consumed is used directly for lighting. An additional 5 percent is used in space cooling to compensate for the unwanted heat generated by lighting. With today's technology, this consumption can be theoretically reduced by more than 80 percent, while about 50 percent can be saved through cost-effective and practical means.

A lighting retrofit of all commercial buildings could reduce U.S. electrical consumption by 15 to 20 percent. This would reduce the need for 70 to 120 gigawatts (a gigawatt is a billion watts, or one million kilowatts) of generating capacity, which would cost \$85 billion to \$200 billion to build, in addition to

\$18 billion to \$30 billion per year to operate. Similarly, advances in high efficiency motors have the potential savings equivalent of about 80 to 190 gigawatts of power generating capacity.

The progress toward more energy efficient appliances is also significant. New refrigerators, freezers, televisions, and photocopiers consume between 50 to 90 percent less power than the conventional models. According to one study, Britain could reduce electrical consumption by 70 percent simply by switching to the most energy efficient appliances, motors, and lights that are now commercially available.

Another area where energy consumption can be reduced is building insulation. Presently, an average U.S. home consumes 14 Btu/hr. for heating energy per square foot of floor space per degree day. In Sweden the average is 5.7 Btu/hr., and in some buildings is as low as 1.6. The new "superinsulated" buildings can reduce heating fuel needs by more than 75 percent. The superinsulated houses in Minnesota consume an average of 4.4 Btus for heating energy per square foot of floor space per degree day.

The reason for this reduction in energy consumption by superinsulated buildings is that the heat generated by lights, electrical equipment, and people is trapped in the building; in a conventional building, a large percentage of this energy escapes. A good example of the performance of superinsulated buildings is illustrated by the office complex of the Rocky Mountain Institute. This 4,000-square-foot building has eliminated 99 percent of the energy requirement for space and water heating when compared to conventional construction.

In addition, there are other technologies in the developmental stages that will further enhance energy efficiency. For instance, according to a study by Energy Department of the Argonne Lab, underground superconducting cables can reduce power transmission costs by 40 percent, generator costs by 60 percent, and large motors by 25 percent—in addition to increasing the capacity of existing plants by 15 percent. Although such technologies offer hope for the future, there are many other commercially available products to reduce energy consumption.

Environmental Impacts of DSM

In response to the concern two years ago over the "greenhouse effect," President Bush set a goal of planting a billion trees. It is interesting to note that if every American turned off a 100-watt bulb for ninety minutes each day, it would have the same impact as planting one billion trees in reducing carbon dioxide emissions that contribute to global warming. The 1990 Clean Air Act Amendments indicate that from now on more of the environmental externalities associated with electricity generation will be internalized. In the next decade, compliance will cost the industry more than \$22 billion. In the coal burning states, electricity prices will increase by 5 percent as a direct compliance cost.

Therefore, DSM can clearly serve as a positive force in ameliorating the environmental concerns. For instance, Pacific Gas & Electric (PG&E), through improving customer energy efficiency,

will be spending \$2 billion in the next decade not only to offset 75 percent of its projected demand growth, but also to prevent emissions of about 18 million tons of carbon dioxide. To illustrate the commitment of some nations, Denmark is planning to cut its 1988 carbon dioxide emissions by half by the year 2030, while Germany is planning by 2005 to reduce its 1987 emissions by 25 percent.

DSM Benefits to Utilities

Since the fuel cost is only 3 percent of the total cost of producing electricity, utilities have realized that investing in DSM will yield them substantial dividends. Therefore, most utilities have become active in starting DSM initiatives. In 1985, seventy-five utilities spent \$582 million for energy conservation measures to offset about 7,240 megawatts of new generating capacity. By the end of 1989, 90 percent of the 208 publicly held utilities in the United States had spent about \$1 billion toward conservation. The impact of this effort has deferred building twenty-one large plants, at an average cost of \$5 billion per plant. In the U.S. between 1990 and 2010, DSM could cut the need to build more than 400 power plants with an average size of 500 megawatts each.

Analysts at the American Council for an Energy Efficient Economy estimate that 35 to 40 percent of U.S. electricity consumption could be saved at a cost of three cents per kilowatt hour or less, which is a much lower cost than building new generating capacity. Similarly, Lawrence Berkeley Laboratory estimates conservation potential at 50 percent of the current peak demand. Therefore, this testimonial indicates why utilities have actively pursued DSM as an economic necessity. Since 1989, many PUCs have made regulations that uncoupled utilities profit from energy sales, removing the last disincentive for utilities to invest in energy efficiency.

Opportunities for Facilities Management

Since by now almost all electric utilities offer some DSM programs, it is essential for facilities managers to investigate what type of DSM programs are offered by their local utility and how they can seize this opportunity to lower the overall cost of energy for their institutions. These programs can include rebates, cash grants, low- or no-interest loans, subsidized installations, variable

services rates, and technical assistance. In many institutions, facilities managers can get frustrated by a lack of support from institutional leadership for energy conservation projects. Many DSM programs offer attractive incentives that enable them to overcome the institutional barriers to such endeavors.

In 1990, New York and California regulators approved a \$165-million DSM incentive program. Philadelphia Electric planned to spend \$32 million on DSM in 1991 and 1992. Similarly, Metropolitan Edison and Pennsylvania Electric are proposing to spend \$90 million each over the next five years.

Improving energy efficiency can potentially save the world upwards of a trillion dollars annually, which exceeds global military expenditures.

According to one scenario by Oak Ridge National Lab, within the next twenty years utilities will spend \$165 billion on DSM programs. This will cut the United States carbon dioxide emissions by 11 percent relative to what levels would have been without the DSM programs. Needless to say, the opportunities to benefit our institutions and the environment from these programs are tremendous.

The Future Agenda

If the United States were using the same energy per unit of its GNP today as it did in 1973, it would need to spend an additional \$150 billion per year for energy resources. It is an impressive drop, but compared to other nations, the United States is in the bottom fifth of countries in the world, along with the former Soviet Union and other Eastern Bloc countries, for energy intensity as it relates to GNP. Japan and West Germany are twice as energy efficient as the United States. In 1986, the United States spent 10 percent of its GNP for the national fuel bill, while, by comparison, Japan used only 4 percent of its GNP. If the United States were as energy efficient as Japan, it would be spending \$200 billion per year less for energy today, which could be used for

DISPOSING OF FLUORESCENT LIGHT BALLASTS?

Recycle with FulCircle!

- Eliminate potential Superfund liability associated with landfilling your PCB ballasts.
- Save 30% off the cost of whole ballast incineration.

FulCircle's recycling solution safely segregates and incinerates all PCBs, and recovers 90% of the ballast material for recycling. It's the environmentally responsible solution to one of your toughest disposal problems.

Call for your FREE copy of the 15-page "Practical Guide to Ballast Disposal." 617-876-2229 Fax 617-876-6055



**FulCircle
Ballast
Recyclers**

168 Brattle Street Cambridge, MA 02138
617-876-2229

investment to improve American competitiveness in the emerging global economy.

U.S. energy conservation is still in its infancy. The building sector alone has the potential for an annual savings of \$50 billion to \$100 billion dollars. The key word for the next few decades will be "negawatts" (a contraction of the words "negative watts") or avoided new energy consumption. This is the only practical short term way that the United States can respond to environmental concerns, reduce energy costs, and safeguard economic growth. To mention the commitment of some western nations, Sweden is planning to phase out nuclear power by 2010, which now provides 50 percent of its electricity generating capacity, as well as pass legislation to protect its rivers. The Swedish parliament has passed a resolution restricting future carbon dioxide emissions to present levels while phasing out its heavy dependence on nuclear power.

Improving energy efficiency can potentially save the world upwards of a trillion dollars annually, which exceeds global military expenditures. Therefore, energy efficiency is going to be a prerequisite for economic prosperity and the main pillar for a sound environmental policy.

The Department of Energy projects that U.S. electricity use will rise at a rate of 2.4 percent annually in this decade. This means that the current electric bill of \$150 billion will rise to \$250 billion by the end of the decade, which translates to a shortfall of 53 gigawatts of demand by the year 2000. Therefore, DSM will be a highly viable option in helping meet the projections.

Looking at DSM in the global perspective, the phrase "Spaceship Earth" was coined about twenty-five years ago to express our limited environmental boundaries. As the shuttle

Challenger tragedy was the result of overconfidence and a lack of adequate care, the same can be true of "Spaceship Earth" through expansion of fossil fuel usage and potential worsening of global warming. Addressing environmental concerns and reducing energy consumption with demand side management does not mean draconian changes in our lifestyle—drinking warm beer, taking cold showers, or

having to work in chilly offices in the winter.

In conclusion, to convey the important role of the energy manager in the context of demand side management, I refer to the story of bricklayers who were asked by a passerby what they were doing. The first one responded, "I am building a wall." The second responded, "I am building a cathedral."

Similarly, energy managers of the 1990s can view their role as merely doing a job to reduce the institutional energy consumption, or they can view themselves in a much broader perspective doing their part in cleaning the environment, helping the national economy, and reducing energy waste. The choice is ours as to which approach we pick. ■

We've done our homework



And we're ready to be put to the test.

For over 80 years we've majored in providing high quality contract building maintenance services without the high cost. And we've learned how to do that by listening to our clients. People like you. Learning your needs. Studying ways to save you money. Analyzing costs, productivity and quality levels so well that some of our clients have saved as much as 20% compared to in-house programs.

Because we've done our homework, you'll find that our proposals are detailed, accurate, and meet the unique needs of your campus. ABM contract cleaning, engineering services, and ground care all pass the test. Every time. On time. On budget.

Go ahead. Test us. Call today—

415-597-4500, Ext. 148. Or write Robert Ramirez, Vice President, ABM College and University Division. He'll show why we're at the head of our class.



ABM
AMERICAN BUILDING
MAINTENANCE CO.

a subsidiary of
American Building
Maintenance Industries, Inc.

Robert Ramirez, Vice President
College & University Division
American Building Maintenance Co.
50 Fremont Street, Suite 2600
San Francisco, CA 94105-2230

Productivity-Based Facilities Management: Managing to the University Bottom Line

by Thomas C. Hier

Decaying physical plants, shrinking public and private funding sources for facilities development and maintenance, and continuing pressure to use high-quality facilities as recruitment tools for attracting students and faculty are challenging higher education facilities officers in the 1990s to do more with less. Fortunately, with respect to facilities, real opportunities exist. Through productivity-based facilities management—managing existing and planning new facilities to achieve university-defined levels of productivity—facilities officers have the opportunity to increase the efficiency of existing facilities, minimize the need for new facilities, and ensure that those facilities that are newly constructed will be well-utilized. Productivity-based facilities management rests on the concept of managing to a “university bottom line.”

The University Bottom Line

The idea of a university bottom line derives from private sector real estate concepts, where transactions are structured to maximize the productivity of

real estate assets. The measure of the bottom line is profit or, more specifically, the financial rate of return. Assets are managed to achieve the desired bottom line.

Assessing the productivity of campus facilities is somewhat more difficult

Research and Office/Support Space:

Approach

Create database of existing spaces

quantitative / qualitative

Identify target standards

Track optimal against existing spaces

Identify shortages and excesses

Evaluate research productivity

because of the nature of the university, which is driven primarily by an institutional mission and program goals rather than by profit. For example, a university committed to maintaining

world class research in one or more of the basic sciences or engineering will, of necessity, require large expenditures of capital to build and maintain state-of-the-art laboratory facilities. Where residential living is mandated or viewed as an important part of a student's overall developmental, extensive housing and support facilities will be needed. And the university that promotes a diverse liberal arts education may find itself maintaining specialized art, theatre, and music spaces that have limited utility for other, more mundane uses.

Although it would probably be difficult to justify the facilities requirements called for in each of the above cases purely from the standpoint of the financial return generated, there is no question that such buildings are necessary to enable a university to respond to its mission and goals. This notwithstanding, land and buildings are resources with an associated cost. Without some benchmark of productivity against which to judge the efficiency of existing buildings, as well as the merit of new projects (in terms of both capital requirements and the opportunity costs of using scarce university land), universities run the risk of underutilizing existing facilities and overspending for new capital projects.

As in the private sector, universities need to define an appropriate set of bottom-line guidelines against which to evaluate and manage the productivity of their facilities for the institution's maximum benefit. In this sense, universities would do well to think of their land and buildings as part of their endowment, to be managed carefully to yield the highest return consistent with overall university objectives. This, in essence, is productivity-based facilities management.

Productivity-Based Facilities Management

Underlying the principles of productivity-based facilities management is the philosophy that maximizing a facility's productivity is an essential part of facilities management—as important as updating building systems to be more energy efficient or planning for renewals and replacements. To the extent that this kind of thinking can be incorporated into planning and management activities, universities will derive greater benefit from existing facilities

Thomas Hier is vice president of MPC Associates, Inc., Washington, D.C. He heads MPC's university planning group.

through increased utilization or enhanced net revenue generation, and may lessen or delay the need for construction of new buildings.

Undertaking productivity-based facilities management requires three steps:

1. Defining measures for the productivity of existing facilities;
2. Evaluating existing facilities against productivity targets; and
3. Identifying opportunities for increasing productivity of under-utilized facilities.

Defining Measures for Facility Productivity

The range of facility types on most campuses requires that different productivity measures be devised consistent with the nature of a building's operation. In general, productivity measures break out into three categories: physical, financial, and programmatic.

Physical productivity measures focus on how effectively or intensively a space is used, and are generally most suited for evaluating spaces that are not supported by underlying revenue streams.

Financial productivity measures focus on revenues generated, costs saved, or the more traditional concept of a financial rate of return.

Programmatic productivity measures focus on less quantifiable benefits—the enhancements to the university's ability to conduct its programs—that accrue from certain types of facilities. A good example is the improved recruitment potential that a high-quality housing project or recreation facility offers.

Selecting Productivity Targets

For the above measures to be meaningful, they must be associated with target levels of productivity. These targets will differ among building types and from university to university based on each institution's goals and objectives, financial position, and age of facilities. Once identified, however, they provide the benchmarks against which to evaluate and improve a building's productivity.

Targets can be expressed in terms of space utilization, cost control, revenue, or productivity enhancements.

Space utilization targets specify standards against which to compare the ef-

fectiveness of existing space. For general space allocation standards and classroom utilization rates, various national norms are available. Two well-known sources are standards published by the Western Intercollegiate Commission on Higher Education (WICHE) and guidelines of the California Post-Secondary Education Commission (CPEC). Universities may use published standards directly, adapt them to their own specific requirements, or create their own standards entirely.

ancillary facilities requires consideration of both financial and programmatic objectives. A good example of this is a faculty housing project in a high cost area, where the university may knowingly accept a below-market financial rate of return on a financial assistance program, or university-sponsored housing in return for the ability to attract high-quality faculty with affordable housing.

Programmatic enhancement targets can apply to all types of campus facili-

Research and Office/Support Space:			
Standards (nasf)			
	FTE FACULTY	POST DOCS	GRAD STUDENTS
Research			
Intensive Lab	350 to 500	175 to 250	175 to 250
Wet Lab	350	175	175
Office-Based	150	100	100
Office	150	75	50
Support	45	15	10

Cost control targets are used for both revenue- and non-revenue-producing facilities. Cost targets are typically set on a comparative basis; that is, against similar buildings in the private market or at other universities, or, if appropriate, in relation to other buildings on the campus. For example, operating costs for a high-rise building housing administrative offices could be compared to selected high-rise commercial office buildings in the local market. Another approach is to evaluate historical costs of campus buildings, identifying costs that have increased beyond targeted percentage growth rates or the inflation rate.

Revenue targets apply primarily to investment properties and ancillary operations, where revenue streams are present. Investment properties should be considered as part of the endowment portfolio and target financial rates of return should be consistent with the overall return objectives for the portfolio. Identifying target rates of return on

ties. The difficulty, of course, is in trying to identify these targets explicitly. In many cases, judgments regarding programmatic benefits are implicit when decisions are made to undertake projects that are not warranted purely on the basis of financial return or physical need. For example, sensing that a student housing shortage is hurting recruitment efforts, a university may opt to construct new housing, the implicit expectation being that improved student yields will result.

In evaluating such a project, it is appropriate to look not just at the expected financial return, but also at the program benefits that will accrue. It may not be possible to state a specific target for enhancing programmatic productivity, but it may be possible to quantify, to some extent, the benefits of improved student yields—such as additional tuition generated by increased enrollment or the increase in average

SAT scores resulting from the attraction of a higher caliber of students. Whenever possible, identifying programmatic productivity more explicitly will be helpful in evaluating the true benefit that a facility adds to the campus.

Identifying Opportunities for Increasing Efficiency

Once productivity measures and targets are chosen, the task is to evaluate existing facilities systematically to find opportunities to improve space allocation, reduce costs, and increase revenues. This requires you to identify discrepancies between existing and target productivity goals and select options for reducing these discrepancies to improve productivity.

Identifying Discrepancies in Productivity

When tracked against productivity targets, many campus facilities are likely to present options for improvement. To keep the exercise realistic, however,

Research and Office/Support Space: Departmental Example	
SPACE TYPE	NET SQ. FT.
Research	
Current	15,700
Standard	12,100
Difference	3,600
Office and Support	
Current	10,800
Standard	5,500
Difference	5,300
Total	
Current	26,500
Standard	17,600
Difference	8,900
Personnel: 17 FTE Faculty, 2 Post Docs, 33 Grad Students	

some judgment should be made as to the severity of the discrepancy, the feasibility of implementing changes that will reduce it, and the time frame required to do so. For example, space uti-

lization in older buildings may be highly inefficient according to a university's defined targets for square footage allocations. Without significant changes to the interior layout, however, reallocations of space within such buildings may not yield significant improvements in productivity. Such spaces are probably better left alone until a major renovation can be undertaken.

Selecting Options For Improving Productivity

Options for improving productivity should be selected in the context of long-term academic plans and goals, to the extent that they are known. From a physical standpoint, once there are standards for allocating and using space, a university should be able to determine what its current space requirements are and how these match up to existing space available. The difference between these two will point out whether the university has adequate space on campus, whether options exist for judicious reallocation to allow the university to gain additional space through better utilization, or whether new space is required. To the extent that assumptions about long-term growth are known, space standards can be applied to growth projections to estimate future space requirements as well.

From a financial standpoint, an analysis of facility productivity will identify resources that are not in line with productivity targets, and suggest options for further investigation to determine what cost saving or revenue enhancement measures are appropriate. If wide discrepancies exist and if cost control and revenue targets have been set realistically, then there should be several opportunities to improve the overall financial position of campus facilities. In the context of long-term planning, net revenues generated as a result of this exercise can be committed to funding future facilities projects or other campus needs.

Examples of Productivity-Based Facilities Management

Academic and Administrative Facilities

Typically, academic and administrative facilities (i.e., classroom buildings, office and support space) are non-reve-

ENVIRONMENTAL HEALTH & SAFETY PROGRAMS ARE:

- ALL COST-NO BENEFIT
- TOO TIME CONSUMING
- OVER-REGULATED
- IMPOSSIBLE TO MANAGE

UNTIL NOW!

CON-TEST's Environmental Management System will address your facility's environmental health and safety issues in one comprehensive program tailored to your needs. Diagnostics, remediation, training and database software are all available.



CALL for a FREE
Building Owners and Managers Guide
to Environmental Management
1-800-634-8165

SERVICE CONTRACTS AVAILABLE

nue-generating. As such, productivity of these spaces can be measured in physical terms—such as the amount or intensity of space utilization.

Classroom Space

One standard utilization measure for classroom space is the number of hours used per week. According to WICHE standards, the norm is about 67 percent (an average of 30 hours over a 45-hour scheduling week). A detailed room-by-room analysis of classroom utilization on campus points out how each room tracks against the norm. While modest variations from the norm are to be expected, any rooms that are significantly below average bear further scrutiny to identify whether the low usage is justifiable (e.g., poor ventilation or sight lines make the room difficult for teaching) or whether it is possible to schedule the room more intensively.

Other ways of analyzing classroom productivity include grouping classrooms by 1) size, to evaluate whether the current mix of classroom sizes is appropriate, and 2) hours of usage, to illustrate peak-load usage and to deter-

minimize the additional square feet of space.

Office and Support Space

Productivity of office and support space can be measured by actual square foot allocations per person compared to norms published nationally or set specifically by a university. Actual norms used should be determined within the university by a group of decision makers including senior administrators, faculty, and physical plant staff. The important point is to establish consistent standards for all levels of personnel (e.g., department chairs, senior faculty, assistant faculty, graduate students, staff, etc.) for major categories of space (e.g., office, departmental conference rooms, storage, etc.).

Comparisons of space allocation on a department-by-department basis identify which departments are "space rich" and which are "space poor." This type of information is useful to senior administrators when trying to make

judgments about resource allocation and long-term planning requirements. At a more pragmatic level, the existence of a set of square footage norms is useful as a check against faculty-generated program requirements for space in renovation and new construction projects.

Research Facilities

Laboratories, while not revenue-generating in a traditional sense of rental income, provide space for sponsored research. Thus, one means of measuring the productivity of lab space is to evaluate sponsored research dollars per square foot. On a department-by-department basis, such comparisons provide insight into the equity of space allocation among research areas and, again, can be useful in making long-term decisions about resource allocations among departments.

To the extent that the university has limited research space or wishes to promote greater sponsored research activity, this measure provides an objective

Research and Office/Support Space:

Findings and Recommendations

- Objective identification of current capacity and expected need
- Short-term: reallocation options
- Long-term: productivity-based assignment of research space

University Bottom Line:

Objective allocation methodologies reduce need to provide for non-productive uses.

mine the additional scheduling potential by increasing scheduling in off-peak hours.

Through a comprehensive analysis of classroom utilization, many universities are likely to find opportunities for improved scheduling, effectively resulting in increased classroom capacity

Unparalleled baseball stadiums.



The trademark of Southern Bleacher.

Baseball stadiums from Southern Bleacher will assure your college of the highest quality and best value in design, engineering, manufacturing and installation. Designs to meet budget and seating capacity requirements include the custom mitered stadium with optional roof, and base line and outfield bleachers. Since 1946 the name Southern Bleacher has stood for unparalleled achievements in permanent grandstands, stadium seating and portable bleachers.

**Southern BLEACHER
COMPANY**

P.O. Box One, Graham, Texas 76450

Toll Free: 1-800/433-0912 In Texas: 817/549-0733 FAX: 817/549-1365

tool for allocation. For example, the university might adopt target levels of sponsored-research per square foot for any new space available, with the understanding that research teams must maintain these levels to retain their space.

Revenue-Generating Facilities

Facilities that are expected to be self-supporting, such as student housing, can be evaluated according to the traditional real estate concept of a financial rate of return. This measure requires an initial investment of capital and a set of cash flows returned over the life of the investment. The target rate of return may be determined by comparable rates in the private market; it may also be adjusted to reflect program enhancements that result from the facility.

However the target level is defined for each type of facility, gaps between actual and target returns suggest action on the part of the university to improve

the facility's productivity. This is particularly true for new projects, where many opportunities exist for cost savings during the planning and design phases. In a student housing project, for example, the bottom line can be improved through careful analysis of program requirements and conceptual drawings to avoid space redundancies and improve interior layouts, thereby reducing square foot requirements. Value engineering can also reduce costs per square foot. Each square foot eliminated and every dollar of cost per square foot reduced is a direct reduction in cost over the life of the project and improves the rate of return.

Mixed Facilities

Where facilities may have a mix of revenue- and non-revenue-generating functions, it is appropriate to devise separate measures according to the nature of each of the components. For example, student centers typically are not wholly self-supporting but have at least some operations—such as food service and/or a bookstore—that are revenue-generating. These components can be assessed according to financial rate of return concepts, while the non-revenue-generating areas are evaluated according to space utilization measures. The types of analyses discussed for administrative spaces and self-supporting facilities then apply.

Implementing Productivity-Based Facilities Management

The preceding paragraphs have provided the theoretical foundation for productivity-based facilities management, along with selected examples illustrating the concepts for different building and space types. Implementing these concepts requires, first and foremost, the adoption of a philosophy that university facilities should be tested against defined standards of performance with some regularity to ensure that buildings are efficiently run and space is allocated to productive uses that are consistent with the long-term goals of the institution.

Productivity-based facilities management also requires a set of evaluation tools, including a space data base and defined productivity measures. The space data base provides the raw data for analyzing space utilization and includes basic information for each room

on campus (e.g., square footage, room use, room user), as well as scheduling data for classrooms, sponsored research dollars, etc.

The productivity measures identified here (e.g., space allocations per square foot, measures of cost savings, revenue generation, and financial return) are critical elements in managing productivity, as they form the basis against which all facilities are measured. Therefore, their creation should be the result of a consensus-building process among key university players involving a serious assessment of university goals, programs, and financial objectives.

Finally, responsibility for productivity management must rest with a defined entity on campus, to ensure that productivity concepts are implemented in an ongoing fashion. This entity, which should probably be a committee of administrators, faculty, and facilities personnel, should be charged with maintaining productivity standards, creating a plan for periodic evaluations of each facility type, reviewing recommendations for improving productivity, building the necessary consensus to implement recommendations, overseeing the implementation, and monitoring the effectiveness of actions taken to improve productivity.

Summary

Productivity-based facilities management is not an exact science. Rather, it is an attempt to impose a discipline on the creation, operation, and allocation of university facilities that ensures that buildings are used, to the greatest extent possible, in accordance with the goals and objectives of the university.

Managing the productivity of university facilities will improve the university bottom line in terms of yielding more efficient use of existing spaces and increasing the overall financial return from facilities, either through cost savings or enhancing revenue generation potential. Further, it provides a set of objective tools by which scarce university resources—both space and dollars—can be allocated.

Finally, if carried out effectively and on a continuous basis, it has the potential to minimize the need for new facilities, and can improve the chances that those facilities that must be built will be well-utilized.

ENVIROWASTE MANAGEMENT

New Career...Bright Future

Be a Certified Specialist Consultant
Your business...job...profession

- Waste management
- Compliance/regulations
- Environmental laws
- Hazard management
- Reporting regulations

Home Study Program Includes:

- Physics and chemistry
- Human physiology
- Ecology
- Envirowaste sciences
- Laws and regulations

For a free booklet, call or write:

1-800-527-9537 • Fax 1-800-842-7574

1509 Baltimore • Kansas City, Mo. 64108

ENVIROWASTE MANAGEMENT INSTITUTE OF AMERICA

Division of
National Institutes of America
Since 1981



Name _____
Address _____
City _____
State/Zip _____
Telephone _____

APPA Answers

Maxine Mauldin

Indianapolis, Indiana was the setting for APPA's 79th Annual Meeting last July. The annual meeting has always been an excellent source of new information for me. Working directly with exhibitor registration this year allowed me to learn a lot more, mainly about the different products and services that APPA subscribing members and exhibitors have to offer our members.

I was also fortunate to meet some of the members who have used APPA's Information Services and found it to be helpful. Helping members over the phone, by mail, or fax is Information Services' link to members. But I enjoyed being at the meeting and connecting names and institutions with faces. It felt good to finally meet some of the people that Information Services has helped.

One of the most popular requests for the International Experience Exchange Data Base is in the area of new or renovated construction. I recently prepared a program based on new library construction and found that 140 records were generated. This report shows that sixty-seven institutions within the last three years built new library facilities, while seventy-three institutions in the last five years renovated their libraries. It also shows that more institutions with a full-time equivalent enrollment of 5,000 or more have been building new libraries. This type of report would be helpful to members planning to build or renovate not just a library, but any of the ninety-four facilities listed on the Experience Exchange survey.

Other popular requests are in the area of computer applications. I ran a

program of all institutions that are currently using some form of facilities inventory program that has been custom-developed to fit their institution's needs. The statistics from this report show that custom-developed programs are widely used on mainframe computer systems.

APPA will be looking into developing a computerized facilities audit/condition inspection component. In addition, Harvey H. Kaiser, author of APPA's famous *Facilities Audit Workbook*, is currently at work on a completely revised edition. Look for more information in the months to come on this book's release date.

By now you will have returned the 1991-92 Comparative Costs and Staffing survey, which was due October 16. It looked a bit different this time, appearing in the form of a diskette. We

hope that you also noticed the added attraction that we included on this disk. From the prompt you can access the demonstration program of APPA's Experience Exchange Data Base. This is a good way to show you how the data base works.

Sometimes, Information Services needs the help of APPA members on questions about which we have little or no information. One such area is multi-use parking facilities. Do you have an underground parking lot with a practice tennis court on top? Have you developed a unique program for siting, payback, or priority use of your lots or garages? If you have information you are willing to share, please let me know.

Information Services is a free service to all APPA members, so write us or give us a call at 703/684-4338. ■

"Maintenance Warehouse is the best. You make everyone's job so easy!"

Paula Hall
Lynwood Park Apartments
San Bernardino, California

Call Now
For Free
Catalog

**MAINTENANCE
WAREHOUSE**

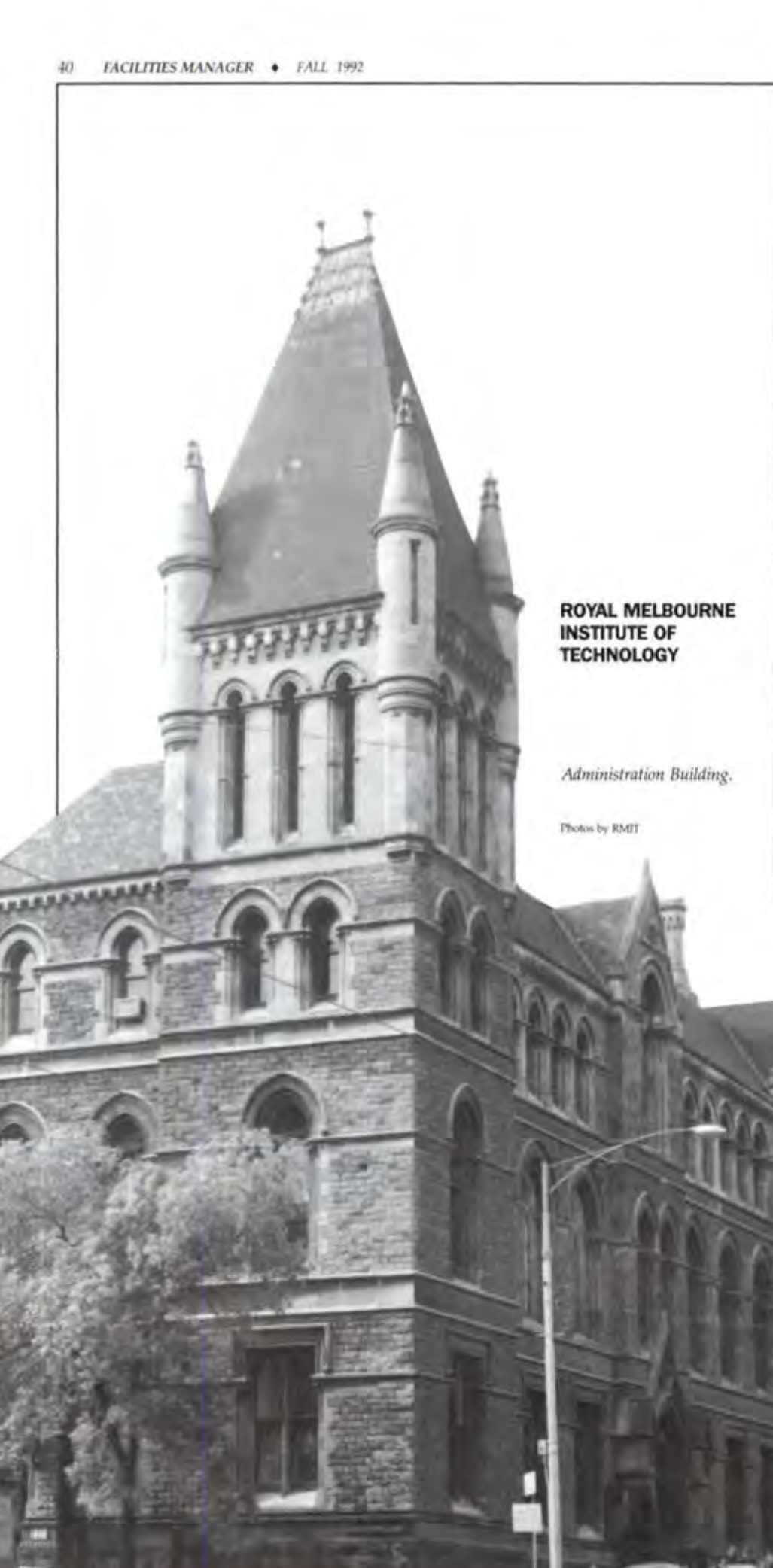
Hardware Electrical Plumbing Appliance

1-800-431-3000

Maxine Mauldin is APPA's information services manager.

Global Exchange

Marcus Taylor



ROYAL MELBOURNE INSTITUTE OF TECHNOLOGY

Administration Building.

Photos by RMIT

At 105 years old, the Royal Melbourne Institute of Technology is the oldest, as well as the largest university in Australia. It serves primarily both the technical and further education sector (TAFE) and the higher education sector (HES) requirements of the State of Victoria, as well as Australia and the South-East Asian market. RMIT has a wealth of experience and tradition, as well as an international reputation for its academic and research excellence. It has built strong ties with business, industry, and all levels of government and is committed to quality applied research and multi-level vocational education.

The HES has nine faculties, apart from various centers for teaching and research, that include applied science, applied social sciences, art and design, biomedical and health sciences, business, education, engineering, environmental design and construction, and



Student recreation area outside union.

nursing. The TAFE sector consists of the schools of building and construction, business studies, communication and social science, electrotechnology, health and information sciences, and mechanical technology.

Victoria is in the southern part of Australia and, as such, enjoys a moderate climate, with temperatures ranging from a low of around 0°C in winter to a maximum of just over 40°C in summer. These temperatures require that our buildings are generally provided with air conditioning. Particularly for the older buildings, a major effort is required to provide adequate working conditions.

Funding, which is in the order of \$A 160 million annually, comes mainly from the Australian Federal and Victorian State governments.

In 1992, RMIT has 40,000 students. The city campus is about 7.6 hectares, which does not include outlying buildings. The buildings vary considerably in age, from those built in 1848 to those built in 1981. In 1991, construction commenced on the development of an eight floor extension to an existing four-floor building. The construction cost of this project is approximately \$A 32.5 million and when taking ancillary works into consideration, the total project cost will be about \$A 47.5 million.

Including rented accommodations, there is a total of 126 buildings that provide us in the order of 230,241 gross square meters. These buildings vary in construction, with the older ones built in bluestone, and the later ones being brick and concrete construction with some even having a sandstone facade.

On 1 July, 1992 the *Royal Melbourne Institute of Technology Act 1992* was proclaimed, granting official university

status to RMIT and enabling the merger between RMIT and Phillip Institute of Technology. The decision not to change the name RMIT is based on the premise that RMIT is different and does not seek to become another traditional university. The three RMIT campuses are known as RMIT City, RMIT Bundoora, and RMIT Coburg campus. This move increased the grounds area by 125 acres and the student population by approximately 7,700.

Our primary energy source is electricity, with gas and some oil used for heating purposes in the older buildings. The facilities group reports directly to the deputy Vice-chancellor (resources), who in turn reports to the vice chancellor of the university.

The university employs some 2,400 staff, of which 1,880 are full-time and 500 part-time.

The facilities group consists of about 242 staff and is divided into northern, rental, administration, engineering, workshops, cleaning, and security sections. It is responsible for the development, modification, operation, rental, and maintenance of university buildings and associated campus environs. It is also responsible for security, cleaning, car parking, and other related services.

I have been extremely supportive of APPA, attending most meetings held by the local branch and one workshop in Atlanta, Georgia in 1990. I also had the good fortune to attend the 1991 APPA Annual Meeting in Orlando, Florida.

The primary concern for RMIT's facilities group can be stated as follows: To present to the public, staff, and students of the Royal Melbourne Institute of Technology a constructed environment conforming to the statutes, regulations, and codes applicable to the state of Victoria, conducive to the attainment of knowledge while maximizing the effective utilization of the institute's allocated resources. ■

Marcus Taylor is director, facilities group, at the Royal Melbourne Institute of Technology, Melbourne, Australia.

PLANNING FOR Improved Campus Facilities

APPA
MEMBERSHIP



Plan for a better campus.

Anyone who wants to improve campus facilities will want to read this book's chapters on value for money, management renewal, the classroom of the future, adapting old buildings for new uses, successful parking systems, design-build construction, designing for maintainability, and the changing student population.

Cost:

\$25/APPA members

\$31/nonmembers

Add \$8 for shipping/handling.



Send orders to
APPA Publications

Dept. P

P.O. Box 1201

Alexandria, Virginia 22313-1201

All orders must be prepaid.

APPA

The Association of Higher
Education Facilities Officers

Data Base Update

Howard Millman

WINDOWS OF OPPORTUNITY

Microsoft's Windows 3.1 is as sharp a two-sided saber as was ever rattled. Currently, thanks to millions of dollars spent to hype Windows and Windows compliant software, its impressive advantages are universally known. I half expect Microsoft to rocket copies into space soon just in case there's life elsewhere.

But back to Earth. What does Windows offer you? What is it that you can do better, faster, or less expensively by using Windows? Plenty. For starters:

1. *Reduce software training costs.* You cannot believe the amount of time and money you will save while simultaneously increasing your staff's productivity. Why? Simply because Windows programs are consistent. Regardless of whether you run a word processor, spreadsheet, or a CAD program, the menus of all those programs look the same, the terminology is similar, and the commands elicit similar reactions. F1 always summons Help. The File menu always contains the Print command. Those little arrows in the upper

right hand corner always shrink or expand the current windows. In other words, when you learn to use any one Windows program you are well on your way to knowing dozens more. It's like assembling children's toys at Christmas. The first bicycle takes two hours, the second one takes fifteen minutes.

2. *Dress your correspondence for success.* Generate eye-catching printouts that range from drop-dead gorgeous to riveting. Whether you are printing a spreadsheet detailing a needed project, a memo to a professor explaining why you unfortunately can't . . . , or a proposal to the budget office explaining the costs of ADA compliance, it is comparatively simple to deliver a crisp, businesslike document that reflects your commitment to professionalism.

3. *WYSIWYG*, pronounced "Wizzy-Wig." That stands for "What You See Is What You Get." Translated, whatever you see on the computer screen is (most often) what the printer will produce.

4. *A mouse.* Controlling a program by using a mouse to point to the commands or components you want to manipulate is more intuitive. DOS-based (non-Windows) software programs most often require that you describe

the actions you want to take. Compared to DOS' arm's-length method, a mouse (or trackball, which I recommend) is hands-on. It just lets you go ahead and do it. Newer Windows compliant programs boast of "WYWIWYG, What You Want Is What You Get." That's more accurate but the acronym will never take off, because propeller heads with pocket protectors can't figure a way to pronounce it.

5. *Exchanging data between programs.* Windows contains some exotic features (clipboard, dynamic data exchange, and object linking and embedding) that weds software together as if it were all one tightly-knit program. For example, you can reliably insert spreadsheet graphs, CAD sketches, clip art, or photographs into word processing documents. By implication, Windows' multitasking feature (not to be confused with multiuser or multiprocessing, which Windows cannot do unaided) allows you to simply switch back and forth between numerous Windows programs. Since you copy data by pointing to and grabbing it, you eliminate rekeying. That increases accuracy by minimizing transcription errors.

6. Finally, at least by my critical reasoning, is the reality that *certain trends in the computer world are inevitable.* One



Howard Millman is a system integrator with twenty years of experience in facility management. He assists universities and hospitals in planning their purchase, update, or installation of information management systems. He is based in Croton, New York.

example is, the move to networks and away from standalone systems. Another is the slow but foregone migration to more powerful 32-bit operating systems, like OS/2 2.0, Windows NT, and UNIX. Yet another is the move to graphic user interfaces. Apple recognized it years ago and this accounts for the explosive growth of their Macs. (You know it wasn't Apple's low prices!)

The Downside of Windows

First let me declare that I am NOT a Windows evangelist, just a realist. Windows has a few glaring shortcomings:

1. *It demands top-end hardware.* Despite what you hear to the contrary, please do not even consider running Windows on anything less than a 386SX, 25 MHz box with 2 megabytes of RAM, an 18 millisecond, 100 megabyte hard drive, 3.5" HD floppy, Super-VGA paper white or color monitor (800 x 600 resolution), and a bubble jet printer. With the recent plummeting of prices, this system should cost about \$2,000. Better yet is a 486DX, with 4 megabytes of RAM, a 200 megabyte hard drive, twin HD floppy drives, 1024 x 768 x 28 mm dot pitch, analog color monitor, and a 12-page-per-minute laser printer. Top-end hardware like this will cost about \$3,500. The laser printer alone runs about \$1,200.

2. *It's s-l-o-w.* In fact, it's a slug. Even with top-end hardware, the fastest Windows applications run noticeably slower than their DOS counterparts. Briefly, that's because everything appearing on your monitor's screen in Windows is a picture, a graphic. In DOS-based programs (sometimes called "character based"), the screen is usually composed of text stored in the computer's firmware. When a computer updates a DOS text screen it redraws just 2,000 locations (80 characters x 25 lines). It retrieves the text from its pigeonhole, where it is already formed and waiting. To redraw a Windows screen, the computer updates as many as 786,432 locations (at 1024 x 768 resolution). Also, it has to calculate each of those points. Any wonder it's slower?

Another real world frustration with Windows' lethargy is printing. Printing a document containing pictures (graphics) can take two to three minutes. Sure, you can buy accelerator boards for your printer and spoolers for the computer, but why should you have to invest in even more additional hardware just to get Windows to perform acceptably? Incidentally, the printer you

use does not make much of a difference in printing speed. It's the formatting of the data that the computer sends to the printer that takes most of the time, not the actual printing process.

Just because I listed only two limitations and six advantages, does that mean I would suggest you consider migrating to Windows? Yes. Why? Because although the hardware is more costly, you will soon save more than

you invest for hardware upgrades through increased productivity, reduced training costs, and increased accuracy. What's more, you can more readily exchange information within your own department, with other campus groups, or other universities.

Those reasons are quantifiable. The final one defies quantifying but it's every bit as important—you are a professional and your work should reflect it. ■



Why re-invent the wheel when it's already been done for you!

Over the years the Physical Plant Department at Virginia Tech has developed a unique series of contract documents which have helped procure high quality and cost effective construction, services, and materials critical to the care, maintenance, repair, and renovation of the university.

Set of 5 Volumes: \$350
Each: \$85

These complete contracts are now available in a spiral bound format for adaptation and use by the Physical Plants of other colleges and universities.

Available both individually or as a set:

- **Grounds Services Contracts** (includes Excavating, Mowing, Trash Disposal, Dining Hall Garbage Disposal, and Moving Services)
- **Equipment Maintenance Contracts** (includes Elevator Maintenance, Elevator Inspection, Furnace and Boiler Maintenance, HVAC&R Maintenance, Mechanical Services, and Electrical Services)
- **Building Services Contracts** (includes Custodial Services, Pest Control, Carpet Cleaning, and Window Cleaning)
- **Construction Services Contracts** (includes Concrete, Masonry, Carpentry, Drywall, Ceiling Tile, and Floor Tile)
- **Materials Procurement Contracts** (includes General Building Materials & Hardware, Plumbing & Heating, Electrical, Ready-Mix Concrete, Crushed Stone, and Masonry Supplies)

These contract documents are *complete!* They include the technical specifications, terms and conditions, contractor qualifications, personnel requirements, quality of materials, and standards of workmanship as required for each contract.

FOR ADDITIONAL INFORMATION OR TO ORDER:
Physical Plant Publications, 64 Maintenance Bldg.,
Virginia Tech, Blacksburg, VA 24061

(703)231-7536

The Bookshelf

Campus Design, Take One

The Campus as a Work of Art, by Thomas A. Gaines. New York: Praeger Publishers, 1991. 184 pp. \$45, hardcover.

From the start, colleges and universities have held a favored place in the hearts of the American public. During the most impressionable period of their lives, young men and women have experienced stimulating and sensuous college years. As they go forth into the "real," mundane world, they carry with them happy memories of friendships made, knowledge gained, and visual impressions savored on their daily rounds across the college grounds.

While the American public may take the beauty of the campus grounds for granted, the professional literature has nearly overlooked it, ignoring the valuable lessons in architecture, landscape, and civic design inherent in the typical American campus. Had it not been for Paul Venable Turner's historic research and exemplary publication *Campus: An American Planning Tradition* (1984), the American campus would have remained the best kept secret of American civilization.

It is therefore with a sense of gratitude that campus planners and architects welcome the publication of two new books on the American campus. To redress the imbalance, Thomas A. Gaines wrote *The Campus as a Work of Art* and Richard Dober wrote *Campus Design*. Far from being identical in focus, presentation of material, style of writing, and critical responses, both authors praise the American campus for its accomplishments and the architectural lessons it holds for other institutions. Both publications are the result of monumental personal efforts, conveying on every page the abiding love the authors feel for the American campus. (Dober's book is reviewed elsewhere in this issue.)

Considering the overwhelming amount of information both writers collected and analyzed; they presented their material with professional skill and wise judgment. There are more than 2,000 campuses in the United States, with more than 12 million students, nearly one million teachers and support personnel on thousands of acres of prime real estate, generating billions of dollars of benefits to the communities and regions in which they are located. Yet such delicate subjects as art, aesthetics, and beauty produce personal responses im-

possible to measure with a yardstick and difficult to report on.

In *The Campus as a Work of Art*, Gaines approaches the subject forthrightly and fearlessly, propelled by a sense of pride in the American campus as well as by a sense of loss for the many missed opportunities.

An architect and critical commentator on architectural and planning issues, he looks at the campus with respect to its regional influence, historic precedents, climate, landscape, materials, and methods. It appears as though he had visited every campus on the American continent and observed everything of importance: location, height, and bulk of every significant building; construction material; roof forms; thickness of masonry joints; landscaping; access roads; parking; and surrounding neighborhoods in urban or rural areas. Visceral as well as trenchant, the author's comments combine into an easily readable, penetrating, often witty text, spiced with plentiful, colorful adjectives, as in a "classical Virginia, Gothic Chicago, harmonious Emory, botanical Michigan State, monastic Harvard, exquisite Chapel Hill, historic Brown, delicate South Carolina"—all in one sentence.

Not for a moment does the author hesitate to call out the "biggest disappointments" nor ignore "banal campuses not worth much comment." Amherst College "misses every opportunity," while Wellesley "did everything right." Kresge College's architectural "cutouts" create "a cardboard campus," while UC/Irvine is "chaotic sprawl preventing the creation of an urban space relationship." He supports experimental modern architecture, but scorns many post-modern and deconstructivist buildings. "Whimsy is not enough," he writes.

At the same time, he finds reason for praising many campuses for the use of homogeneous building material, natural landscaping, skillful exploitation of sites and vistas, or the responsible way in which they interface with their urban neighborhoods. Oberlin, Williams, Amherst, Yale, overall appeal reflecting the obvious personal preferences of the author.

Not everyone will be ready to agree with Gaines when he suggests that all decisions on campus design and architecture should be "left to the professionals. The quality of design is inversely proportional to the involvement of the client. Let the designer have his head," he postulates. How realistic is it to expect such scenarios to occur in an intellectually charged, highly volatile environment, where involvement of faculty and students is an essential expression of academic freedom? While the well-illustrated book abounds with sometimes sedulous descriptions of individual buildings, only occasionally does the author succeed in conveying a vivid picture of the

overall layout of the campus under consideration. Instructive photographs, but no campus plans, are used to underscore the book's message.

The generally fluid colorful writing is marred by spots of flat sentences, particularly of basic definitions, and by hyperbole and colloquialisms. If all the author intended was to "enhance the appreciation of campus making as an artistic discipline," he succeeded admirably. Rich in lore and reality, in art and emotions, the American campus is still waiting for its Lewis Mumford to sing its praises and celebrate its beauty. *The Campus as a Work of Art* is available from Praeger Publishers, Greenwood Publishing Group, Inc., 88 Post Road West, Box 5007, Westport, CT 06881.

—Werner K. Sensbach
Retired Facilities Planner
University of Virginia
Charlottesville, Virginia

Campus Design, Take Two

Campus Design, by Richard P. Dober. New York: John Wiley & Sons, Inc., 1992. pp. 559.95, hardcover.

Richard Dober is one of America's foremost authorities in the field of campus planning. His landmark book, *Campus Planning*, was published almost thirty years ago and remains to this day the definitive source book in the field. *Campus Planning* addressed itself to a broad spectrum of subjects relevant to the field of campus planning. It dealt not only with the design of campuses, but also the various functional parameters, techniques for assessing need and developing plans, standards that might be applied, and virtually every aspect of campus planning as faced by the practicing professional.

In his latest book, *Campus Design*, Dober focuses more specifically on the issue of the design of the physical environment for college and university campuses. As Paul Venable Turner points out in his book, *Campus: An American Planning Tradition*, the idea of campus is a uniquely American contribution to the history of the development of higher education. The word was first applied to Princeton University in the mid eighteenth century and has come to signify the American concept that the lands and buildings required to support the activities of higher education can be assigned and grouped together into a compatible physical entity. This entity will provide a harmonious environmental statement of the mission and contribution of higher education to American society as well as solve the functional problems of providing the resources necessary to carry out the mission of higher education.

The idea of campus has come to play an influential role in American society.

Young men and women often shape their notions of an ideal environment in large part from their college experience and the environment to which they are exposed in the process of gaining a higher education. This idea is often carried forward into later life, and we commonly see developments such as office complexes, medical complexes, even industrial parks referred to as "campus" settings.

The alumni of our colleges and universities revere their campuses and often react quite strongly when proposals are made that would alter the image they hold of the campus they identify with their own educational experience. The development of office is quick to remind us of the importance of campus image to fundraising, and faculty and students are only too eager to point out to the planners areas in which the campus fails to live up to their own expectations, both functionally and latest book seeks to deal in some considerable detail with the issue of how one goes about creating and preserving the quality physical environment that we have come to associate with the idea of "campus." He begins by drawing a distinction between two fundamental concepts of campus design: Place making, which he defines as "the structuring of the overall design, the broader skeleton, the articulated pattern, i.e., the campus plan,"; and place marking, which is the manipulation of certain physical attributes that give a campus a visual uniqueness appropriately its own.

He then proceeds to discuss in some detail the various elements utilized by the professional planner in the implementation of these two concepts. He deals with such elements as architectural style (both historical and contemporary), and touches on issues such as the range of styles available, the factors involved in the choice of style, and how one deals with stylistic issues over a long period of time that may see changes in functional requirements and technological capacities.

Dober then discusses the area of materials and their use and associative meanings. He covers other areas such as landscape, fine art, pedestrian pathways, ecology and climate, and parking. In his final section, he discusses the ways in which these various elements are used and combined to develop an overall campus plan—whether it be for a new campus or for the extension, infilling, and development of existing campuses.

The book is well written and profusely illustrated with photographs, plans, and diagrams that illustrate the author's points. The only shortcoming that I can identify in terms of the format and presentation of the book is the fact that some of the photographs do not appear to be as well reproduced as I would like to see. None are so bad that the reader cannot understand the point that is being made by

the inclusion, but I nonetheless would like to have seen better quality reproduction.

This is clearly a book that I would recommend to any practicing professional in the field of campus planning or anyone who has direct responsibility for administering the planning and design function. But above and beyond this, it is a work that would be useful to anyone who is involved with the planning, design, operation, or maintenance of the physical facilities that comprise the university campus. It is a book that would be every bit as important for those who must operate and maintain the campus as for those who plan and design it. All too often it seems that there is a gulf between the planners of the physical environment and those who must operate and maintain it. They often don't seem to understand or respect the contribution that each makes to the overall success of the campus.

Planners will read this book in order to gain a fuller and deeper appreciation of the techniques that they employ in the design of the physical environment, in an effort to improve and enhance their own techniques in this area. Operations and maintenance people will find it important to gain an understanding of what it is the planners are attempting to achieve in the design of the campus environment. They may come to understand why it is that planners do some of the things that they do and the goals they are seeking to accomplish as a result of their design decisions and programs. They may gain a heightened appreciation of the values and attributes that the campus planner strives to obtain in his or her efforts to shape the physical environment of the college and university campus.

By the same token, planners need to be constantly aware of the dilemmas faced by those who must operate and maintain the environment that the planners have worked so hard to create. They must avoid the temptation to make arbitrary or capricious design decisions that will ultimately cause problems in the area of operation and maintenance without providing compensatory benefits in terms of the overall quality of environment created.

Dober's book is a major contribution to the published material now available in the field of campus planning. Not only because of the contribution it makes to the work of the practicing planner, but also because of the contribution it can make to enhanced understanding between the planners and the operation and maintenance people.

I would encourage anyone involved in or with college and university planning to read this work. The reader will gain a thorough understanding of the concepts of campus design, which will greatly enhance our efforts to develop an effective and more positive approach to the devel-

opment of the physical environment of the college and university campus.

This book is available from John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158-0012.

—Frederick W. Mayer
University Planner
University of Michigan
Ann Arbor, Michigan

Books, etc.

Books Available for Review

The following books are available for review. Reviews will be published in future issues of *Facilities Manager*. When you submit a completed book review you may keep the book you reviewed with our compliments. You will also receive copies of the issue in which your review appears. Call Stephanie Gretchen at 703/684-1446 for more information or to reserve a book.

- *Americans with Disabilities Act Facilities Compliance Workbook*
- *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities*
- *Design of General-Purpose Classrooms and Lecture Halls*
- *The Facility Management Handbook*
- *Introduction to Efficient Electrical Systems Design*
- *Managing the Facilities Portfolio*
- *1,000 AutoCAD Tips & Tricks*
- *Power Generation, Energy Management & Environmental Sourcebook*
- *Practical Plumbing Engineering*
- *Recreation Resource Management*
- *Safety Management for Health Care Facilities*
- *Software Applications and Directory for Energy Analysis*
- *Solid Modeling with AutoCAD*
- *Strategic Corporate Facilities Management*
- *Thermal Insulation Building Guide*
- *Track Construction Manual*
- *Training in Asset Management*
- *Waste Heat Recovery Handbook*
- *Wayfinding for Buildings and Architecture*

Job Corner

Job Corner Deadlines

Job Corner advertisements are available to any nonprofit institution with a facilities-related position opening available. Regular classified advertisements cost \$20 per column inch; display ads cost \$25 per column inch. There is a two-inch minimum charge on all ads, and no agency discounts are available. If you would like to include a logo with your display ad, please mail it into APPA by the ad deadline. APPA does not accept faxed logos. Upcoming Job Corner deadlines are **November 23** for the January issue, **January 8** for February, and **February 10** for March. Closing deadlines for job announcements are posted at the request of each institution. In some cases, deadlines may be extended by an institution. APPA encourages all individuals interested in a position to inquire at the institution regarding its closing/filing date.

Send all ads, typed and double-spaced, with an official purchase order to Diana Tringali, Job Corner Advertising, APPA, 1446 Duke Street, Alexandria, VA 22314-3492. Or send your ad via fax 703/549-APPA (703/549-2772). Call 703/684-1446 for more information or to receive a Job Corner brochure.

■ ■ ■

Manager, Environmental Services. Personnel status: associate staff, full-time, with full University of Maryland benefits. Salary is negotiable. Responsibilities: Plans, coordinates, and manages all phases of the university housekeeping program including quality control, directing activities of assigned supervisors and staff; coordinates assigned activities and special projects with various academic and administrative departments to ensure effective service

levels; works closely with the operations and maintenance groups to provide services and utility surveys to determine those areas of technical deficiencies that undermine safety and sound operational practice; maintains appropriate records; provides evaluations involving building service performance criteria against previously established standards of cleanliness; maintains records for cost accounting, verification of building operations and submits management reports as required; uses engineered work standards, develops detailed work assignments and project reports; assists in the preparation of the capital budgets and works independently in preparing recommendations for the annual custodial operating budget. Ensures that all operations provide facility conditions that comply with accreditation, health agency, federal, state, and university regulatory requirements, codes, and guidelines. Minimum qualifications: bachelor's degree from an accredited university required with documented accomplishments in a similar field totaling at least five years of experience. Strong management background with heavy emphasis on communication, organizational, and motivational skills. A Maryland State driver's license required. Interested, qualified applicants should submit a resume and three names of references to: Department of Human Resources, J.T. Williams Build-

ing, University of Maryland/Eastern Shore, Princess Anne, MD 21853. The successful candidate must be able to show acceptable documentation proving identity and establishing the right to accept employment in the United States of America. *UMES is an EEO/AA employer, a drug-free workplace, and enforces a no-smoking policy applicable to all campus buildings.*

Director of Facilities Management, Chapman University. This position, reporting to the vice president of finance and administration, directs all activities related to daily operations and long-term planning for the facilities management department. Qualified candidates must possess understanding of facilities management and construction operations as demonstrated with a minimum of five years of related progressive experience. A four-year degree is required in one of the following areas: engineering, architecture, construction, or facilities management. Completion of a graduate degree is desirable. Salary competitive and commensurate with experience. Benefits include group health care and retirement plans. Please send cover letter with resume to: Chapman University, Personnel Department, Facilities Management Search, 333 North Glassell Street, Orange, CA 92666. *Chapman University is an equal opportunity, affirmative action employer.*

PROCUREMENT MANAGER INDIANA UNIVERSITY/PURDUE UNIVERSITY AT INDIANAPOLIS

Indiana University/Purdue University at Indianapolis, a comprehensive, urban, public institution with an enrollment of 28,000 students, offering 166 degree programs in more than 200 fields of study, invites applicants for the position of procurement manager in the campus facility services department. This position reports to the associate director for business affairs, will provide and facilitate procurement services for the purchase of materials and supplies, contractual services, and equipment for the department. Conduct ongoing research and evaluation on goods and services, solicit quotes, select vendors, prepare requisitions, authorize purchases, and provide leadership to the procurement and inventory management staff.

Requirements: A bachelor's degree in business administration or related field and a minimum of five years of experience in the acquisition and inventory of supplies and materials, computer literacy required. Preferred: certified purchasing manager certificate, previous working experience in a college or university setting.

Salary Range: \$30,000-\$32,500. Submit letter of application, resume, and names, addresses, and telephone numbers of three professional references to: Marcia Combs, Human Resources Administration, Indiana University/Purdue University at Indianapolis, Student Union Building, 620 Union Drive, Indianapolis, IN 46202-5168. Applications accepted until position is filled. *IUPUI is an affirmative action, equal opportunity employer.*

PHYSICAL PLANT DIRECTOR

The Collegiate School, a K-12 independent school, wishes to hire an experienced facilities manager to oversee its maintenance, housekeeping, and grounds operations. Collegiate's campus includes twenty buildings, totalling 210,000 square feet, on a fifty-five-acre campus in suburban Richmond, Virginia. Candidates must have substantial supervisory experience. Experience in a multi-building setting and in a nonprofit campus environment is desirable. Salary and benefits package will be competitive. Please do not telephone. Submit resumes and salary history to:

The Collegiate School
Attention: Vice President-Finance
North Mooreland Road
Richmond, VA 23229
Equal opportunity employer.

ASSOCIATE DIRECTOR OF RESIDENTIAL FACILITIES CLEMSON UNIVERSITY

Clemson University is a land-grant, state-assisted university, fully accredited by the Southern Association of Colleges and Schools. The university is currently serving 17,000 students in nine colleges. Clemson University is located in the northwest corner of the state of South Carolina, on the former plantation of statesman John C. Calhoun. It encompasses 1,400 acres in the foothills of the Blue Ridge Mountains on the shore of Lake Hartwell.

The associate director of residential facilities is one of three associate directors reporting to the division director of residential facilities within the department of university housing. Through a staff of 14 professional maintenance workers and 10-15 student maintenance workers, and in cooperation with the Clemson University Facilities Maintenance and Operations Department, the associate director of residential facilities administers the maintenance program serving approximately 7,000 residential students living in 17 residence halls and four campus apartment areas (an approximate area of 1.5 million square feet). Areas of primary responsibility include supervision of university housing maintenance staff; establishment and enforcement of ongoing maintenance procedures and quality performance standards for HVAC, electrical, plumbing, carpentry, locksmithing, painting, and appliance repair; review and evaluation of facilities maintenance and operations (plant operations) maintenance reports for accuracy and appropriate charges; inspection and followup on housing facilities compliance with fire safety codes, OSHA guidelines, and DHEC regulations; procurement of tools and other supplies necessary for the performance of maintenance-related tasks; plan, analyze, and expend annual maintenance budget of \$1.18 million; coordinate the computerized maintenance data base; provide opportunities for staff training; and work with students and student groups on special projects.

Qualifications: High school graduation and five years of experience in a specialized trades area or in a diversified building maintenance or construction activity, or any combination of training and experience that would enable an applicant to acquire the necessary knowledge, skills, and abilities. Prefer a bachelor's degree in a technical field with a minimum of two years of experience in facilities management or related field.

Salary: State pay grade 34 with a minimum annual salary of \$25,996. Starting salary is negotiable within state guidelines.

Search timeline: All letters of nomination and interest must be received no later than **October 15, 1992**. Starting date is negotiable.

Applications: Applications for the above position should include a resume/vita and the names, addresses, and phone numbers of three references. Apply to:

Clemson University
Personnel Services Division
106 University Square
Box 345337
Clemson, SC 29634-5337

Clemson University is an affirmative action/equal opportunity employer.



DIRECTOR PHYSICAL PLANT OPERATIONS

Southern Illinois University/Edwardsville, a 2,600 acre campus with more than 2 million square feet and 11,000 students (including a school of dental medicine) invites applications for the position of director of plant operations who will report to the assistant to the vice president for administration. The director of plant operations plans, organizes, coordinates, directs, and manages all day-to-day physical plant operations and maintenance functions. He/she is responsible for planning, estimating, and scheduling; building maintenance; custodial operations; grounds maintenance; energy management and conservation; and business management. Bachelor's degree required; master's degree preferred. Working knowledge of business administration, engineering, architecture, or related fields is desired. Significant supervisory/management experience in physical plant administration, preferably in higher education. Demonstrated ability to perform the wide range of complex and responsible management and technical assignments associated with physical plant administration. Ability to establish and maintain effective working relationships with diverse constituencies, and accomplished written and oral communication skills are required. Computer literacy is essential, preferably utilizing an automated job cost and work order system. Strong commitment to productivity and quality in operations and maintenance. Salary negotiable. Closing date: **October 15, 1992**. Submit letter of application and resume to: Coral Rice, Assistant to the VPA, Southern Illinois University/Edwardsville, Box 1039, Edwardsville, IL 62026-1039. AA/EOE.

DIRECTOR FACILITIES MANAGEMENT

Responsibilities: Under the general direction of the vice president, business services, is responsible for the planning, organizing, supervision, and administration of the college's maintenance, remodeling, grounds, custodial, and energy conservation programs. The college is situated on 421 acres with 79 buildings totalling 692,084 square feet. The director supervises the supervisor, custodial services; supervisor, grounds; supervisor, structural maintenance and transportation; and supervisor, utility maintenance for a total staff of 93 people. The total annual facilities budget is \$4,908,437.

Qualifications: Minimum: associate degree or two years of formal course work or equivalent training and experience. Desirable: bachelor's degree in engineering, architecture, horticulture, property management, or related field.

General Information: Mt. San Antonio College is a comprehensive, public community college located approximately 25 miles east of Los Angeles civic center. The college is situated in the beautiful San Jose Hills within an hour's drive from several beach and mountain resorts. The college serves a population of more than 800,000 in 16 cities and communities. With approximately 41,000 credit and non-credit students and a staff of more than 1,900, the college is one of the largest in the nation.

Salary/Benefits: \$67,968-\$73,200/year. (Salary will increase 5.8 percent effective January 1993.) Excellent medical, dental, vision plan. Paid lifetime medical for retiree and eligible spouse.

Applications: A complete application must include district application, resume, two letters of recommendation, and transcripts. Open until filled. The screening process will begin **October 23, 1992**. To receive application materials, please contact

Personnel Office
Mt. San Antonio College
1100 North Grand Avenue
Walnut, CA 91789
714/594-5611, ext. 4225

An equal opportunity/affirmative action employer.

ASSISTANT DIRECTOR FOR BUILDING SERVICES

Indiana University/Purdue University at Indianapolis, a comprehensive, urban, public institution with an enrollment of 28,000 students, offering 166 degree programs in more than 200 fields of study, invites applicants for the position of assistant director for building services. IUPUI is one of eight campuses in the Indiana University system and offers academic programs from both Indiana and Purdue universities on a single campus.

This challenging senior level position reports to the director of campus facility services and is responsible for planning, coordinating, and directing the daily work activities of a large scale custodial operation in 67 academic, administrative, and auxiliary buildings. The building services division, with an annual operating budget of \$6.5 million, employs 20 exempt supervisory and administrative personnel and approximately 280 custodians. Directs routine and periodic custodial service, purchase of supplies and equipment, trash removal, pest control; evaluates and implements new and revised cleaning procedures to ensure maximum effectiveness and appropriate standards of cleanliness, sanitation, and safety; provides administrative and technical directions to supervisory staff; represents the department in all matters related to custodial services.

Qualifications: Bachelor's degree plus five years of progressively responsible custodial management experience required. Experience in a college or university setting and working with a unionized workforce; strong human relation skills; leadership, communication, organizational, and motivational skills are essential.

Salary: commensurate with qualifications. Submit letter or application, resume, names, addresses, and telephone numbers of three professional references to: Marcia Combs, Human Resources Administration, Indiana University/Purdue University at Indianapolis, Student Union Building, 620 Union Drive, Indianapolis, IN 46202-5168. Applications accepted until position is filled. IUPUI is an affirmative action, equal opportunity employer.

ASSISTANT DIRECTOR FOR CONSTRUCTION WILLIAMS COLLEGE

The assistant director reports to the director of physical plant and is responsible for coordinating the supervision of construction projects on campus, assisting the director in developing long- and short-range planning, providing support to the CAD/Facilities Management System in the building and grounds department, providing consulting services for renovation and new construction requests from the college community, and developing and controlling construction budgets.

The assistant director will regularly participate in the design and planning process for all renovations and new projects undertaken by the department with an annual capital budget in excess of \$8 million.

The buildings and grounds department staff of 160 employees, including eight professional staff, is responsible for planning, design, and construction for all capital projects and the maintenance and operation of 2 million square feet in 100 buildings on a campus of 450 acres.

The position is open immediately. Applications should be submitted by **October 20, 1992** to the Personnel Office, Droppers House, Williams College, Williamstown, MA 01267. AA/TOE.

MANAGER, CONSTRUCTION PROJECTS II

Bachelor of science degree in engineering required. Must be registered as a professional engineer in the State of Rhode Island. Must have a minimum of five years of construction estimating experience, a minimum of five years of construction field engineering experience, and a minimum of three years of construction management and administration experience. Experience using computer-aided design systems preferred. Submit a letter of application and resume by **October 26, 1992** to: Paul DePace, Search Committee Chair, Position 211056, University of Rhode Island, P.O. Box G, Kingston, RI 02881. An affirmative action/equal opportunity employer.

DIRECTOR OF PHYSICAL PLANT ROANOKE COLLEGE

Roanoke College invites applications for the position of director of physical plant. Reporting to the vice president-business affairs, the position is responsible for the operations of the department of physical plant in its mission to operate and maintain facilities, utilities, and grounds for the college. Responsibilities include repair and maintenance of buildings, equipment, and grounds; housekeeping; materials management; building renovation and construction; and the planning, scheduling, and supervision of all phases of the physical plant operation. The position will supervise a staff of 58 and manage a budget of more than \$3.5 million. The director is also responsible for overseeing the development of the campus master plan as well as the facility improvement projects program.

Roanoke College is a coeducational, private liberal arts institution with 360 regular employees and an enrollment of 1,650. The campus has approximately 68.5 acres with 45 buildings and 900,000 square feet. The college is located in Salem, Virginia, a city of 25,000 people. Salem is located in the Roanoke Valley, a community of 230,000 people. Roanoke Valley is the economic and cultural hub for Southwest Virginia. It is located between the beautiful Blue Ridge and Allegheny mountains.

The successful candidate should hold a bachelor's degree in engineering or a related field and must have a minimum of five years of progressively responsible experience involving project management, maintenance scheduling, employee relations, budget development and short- and long-range planning, preferably in a college or university setting. Candidates must possess excellent management, communication, and leadership skills, and must be knowledgeable regarding principles and practices of electrical and mechanical systems, construction codes, utility and energy management systems, and applicable federal and state regulations. The individual must have strong human relations skills and the ability to interact positively with physical plant staff, students, faculty, and administrators, and should have a commitment to providing excellent service to the campus community.

Send resume with names and telephone numbers of three references by **October 23, 1992**, to: Personnel Services, Roanoke College, Salem, VA 24153. *Roanoke College is an affirmative action/equal opportunity employer.*

ARIZONA STATE UNIVERSITY MANAGER, ENGINEERING DEPARTMENT OF FACILITIES MANAGEMENT

Salary range: \$37,462-\$59,940 (DOE).

Arizona State University is seeking a manager, engineering, in the department of facilities management. Minimum qualifications: a bachelor's degree in mechanical engineering, or a related field, and eight years of related mechanical engineering, which includes four years of progressively responsible supervisory-related experience; and a professional engineers registration, or the ability to register with the state of Arizona within six months of employment. Under administrative direction, performs work of considerable difficulty in planning, organizing, and directing the activities of individuals engaged in the operation of central plant, building automation and controls and university utilities within facilities management. Plans, directs, controls staff and coordinates the work of subordinate staff. Plans and designs or manages the design of mechanical systems, components, and equipment. Develops budget for equipment and programs and supervises the expenditure of funds for maintenance of equipment and contract services. Considerable knowledge of local, state, and federal codes, regulations, and mandates, and administrative practices and human resources management. Considerable skill in planning and supervising a central heating/refrigeration plant and building automation and controls operation; maintaining effective working relationships; and communicating both orally and in writing. Performs various related duties as assigned.

Arizona State University is an equal opportunity, affirmative action employer and actively seeks the candidacy of women and minorities.

Closing date: **November 1, 1992.**

Please send application materials to:

Arizona State University
Department of Human Resources
Tempe, AZ 85287

ASSOCIATE DIRECTOR OF FACILITIES MANAGEMENT UNIVERSITY OF WISCONSIN/EAU CLAIRE

The University of Wisconsin/Eau Claire is seeking candidates for the position of associate director of facilities management. This position reports to the director of facilities management and is responsible for the management of the mechanical, electrical, plumbing, carpentry, and lock and paint shops on the university campus. The associate director will also supervise the construction inspector, design modifications to HVAC systems, supervise operation of the energy management system and act in the absence of the director.

Qualifications required: Candidates must have a bachelor's degree in mechanical engineering. Successful supervisory experience in a physical plant department is desirable. Candidates must have experience in the design of HVAC systems. Good oral and written communications skills are also necessary.

Proposed start date: February 1, 1993.

Salary: Commensurate with qualifications and experience.

Apply by: November 16, 1992.

Forward a letter of application and resume to: Director of Personnel, University of Wisconsin/Eau Claire, Eau Claire, WI 54701.

The University of Wisconsin/Eau Claire is one of 13 campuses in the University of Wisconsin System with 10,200 students and approximately 1,250 faculty and support staff.

The City of Eau Claire, with a population of more than 55,000 is located 80 miles east of Minneapolis/St. Paul on Interstate 94.

The University of Wisconsin/Eau Claire is an equal opportunity/affirmative action employer and solicits applications from women and minority applicants.



ASSISTANT DIRECTOR FOR FACILITIES STAMP STUDENT UNION UNIVERSITY OF MARYLAND

The Stamp Student Union of the University of Maryland/College Park is searching for an assistant director for facilities. The Stamp Student Union is a 35-year-old facility encompassing more than 250,000 gross square feet of space. More than 17,000 people visit the union daily for services, programs, conferences, and recreation.

The assistant director for facilities is responsible for the overall management of the Stamp Student Union facility to include housekeeping services, room set-up, maintenance, and space renovation. This person will supervise a full- and part-time staff of approximately 20 personnel and will coordinate work performed by outside contractors and other campus service agencies.

The successful candidate will have a minimum of five years of full-time experience in the management of housekeeping, maintenance, and building renovation activities at a college union, conference center, or other multi-purpose university facility. The candidate will possess a minimum of a bachelor's degree, with a master's or other advanced degree work preferred.

The Stamp Student Union and the University of Maryland/College Park is committed to enhancing the diversity of its faculty and staff. We particularly welcome applicants from qualified women and members of minority groups. The university subscribes to a policy of nondiscrimination regarding race, color, religion, age, national origin, sex, and disability.

This is a full-time associate staff position with a salary range from the mid-30s to mid-40s, commensurate with experience.

For best consideration, please reply by **October 15, 1992**. Applicants should provide a letter of interest, along with a complete resume and names of three references. Letters should be addressed to: Ms. E. Lander Medlin, Chair, Stamp Student Union Assistant Director Search Committee, Room 2104 Stamp Student Union Building, University of Maryland, College Park, MD 20732. AVEOE.

Coming Events

APPA Events

Contact the APPA Educational Programs Department at 703/684-1446.

Nov. 15-17—**Institute for Facilities Finance**. Washington, DC.

Dec. 10-11—**Environmental Compliance Seminar**. Washington, DC.

Jan. 17-22—**Institute for Facilities Management**. Newport Beach, CA.

Other Events

Nov. 8-11—**National Institute on Park and Grounds Management Annual Conference**. Richmond, VA. Contact: National Institute, P.O. Box 1936, Appleton, WI 54913; 414/733-2301.

Nov. 11-12—**Southern California Plant Engineering & Maintenance Show**. San Diego, CA. Contact: Professional Trade Shows, 416 South Hillview Drive, Milpitas, CA 95035; 408/946-5600.

Nov. 12-13—**Housekeeping Management Seminar**. San Francisco, CA. Contact: Roesel, Kent & Associates, 4343 Shallowford Road, B1, Marietta, GA 30062; 404/998-1691.

Nov. 13—**NFPA Fire Code Seminar**. San Francisco, CA. Contact: NFPA Seminar Registrar, P.O. Box 9101, One Batterymarch Park, Quincy, MA 02269-9101; 800/344-3555.

Nov. 15-19—**Green Industry Expo/PGMS 81st Annual Conference**. Indianapolis, IN. Contact: PGMS, 10402 Ridgeland Road, Suite 4, Hunt Valley, MD 21030; 410/667-1833.

Nov. 16-17—**Facilities Management for Senior Executives**. Dedham, MA. Contact: Massachusetts Institute of Technology, Office of Facilities Management Systems, Room E19-451, 77 Massachusetts Avenue, Cambridge, MA 02139; 617/253-6148.

Nov. 17-18—**Principles of Facility Management and CAFM**. Scottsdale, AZ. Contact: IFMA, One East Greenway Plaza, 11th Floor, Houston, TX 77046-0194; 800/359-4362.

Nov. 19-20—**Housekeeping Management Seminar**. Orlando, FL. Contact: Roesel, Kent & Associates, 4343 Shallowford Road, B1, Marietta, GA 30062; 404/998-1691.

Nov. 19-20—**Advanced Computer Tools for Space Forecasting and Management**. Scottsdale, AZ. Contact: IFMA, One East Greenway Plaza, 11th Floor, Houston, TX 77046-0194; 800/359-4362.

Dec. 1-3—**Telecommunications Infrastructure Planning**. Orlando, FL. Contact: Nancy Mack, Washington State University, Conferences and Institutes, 138 Dana Hall, Pullman, WA 99164-2712; 509/335-3530.

Dec. 1-4—**CAUSE 92: Grasping the Momentum of the '90s**. Dallas, TX. Contact: CAUSE, The Association for the Management of Information Technology in Higher Education, 4840 Pearl East Circle, Suite 302E, Boulder, CO 80301; 303/449-4430.

Dec. 2-3—**Fundamentals of Energy Management**. Atlanta, GA. Contact: Registrar, Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340; 404/447-5083.

Dec. 2-4—**A/E/C Systems Canada: The 3rd Annual Canadian Computer and Management Show for the Design and Construction Industry**. Toronto, Canada. Contact: Sharon Price, A/E/C Systems Canada, P.O. Box 310318, Newington, CT 06131-0318; 800/451-1196.

Dec. 2-5—**The New 3 Rs: Re-Discover, Re-Structure, Re-Kindle**. Detroit, MI. Contact: National Community Education Association, 801 North Fairfax Street, #209, Alexandria, VA 22314; 703/683-6232.

Dec. 3-4—**Managing DSM Programs**. Atlanta, GA. Contact: AEE Energy Seminars, P.O. Box 1026, Lilburn, GA 30226.

Dec. 7-8—**Fundamentals of Lighting Efficiency**. Houston, TX. Contact: Association of Energy Engineers, P.O. Box 1026, Lilburn, GA 30226; 404/925-9558.

Index of Advertisers

American Building Maintenance	33
APPA Publications	26, 27, 41, cover 4
Black & Veatch	6
Con-Test, Inc.	36
Data Systems Services	3
Dugmore & Duncan	52
Envirowaste Management Institute of America	38
Exeter Architectural Products	9
FulCircle Ballast Recyclers	32
ISES Corporation	2
Johnson Controls	51
Maintenance Warehouse	39
Management Systems Corporation	10
MCC Construction	cover 2
Pittsburgh Corning	cover 3
Scan Conversion Services	17
Southern Bleacher Company	37
Virginia Polytechnic Institute	43

A large photograph of a student with blonde hair and glasses, wearing a white t-shirt, sitting at a desk in a classroom. The student is leaning forward, writing on a piece of paper. In the background, another person is standing near a chalkboard. The lighting is warm and focused on the student.

An improved learning environment made this student a success. Johnson Controls helped make it possible.

The true mark of a quality college or university is in the education opportunities it can offer students.

In fact, in these days of scarce funds,

3:45 P.M. FRIDAY. FIFTEEN MINUTES TO GO. ENGLISH FINAL. HONOR ROLL PENDING.

many schools find it hard to offer innovative instruction, let alone provide basic educational necessities. Like comfortable, well-lit classrooms, safe hallways, and effective professors.

Johnson Controls can help. We'll create an interactive energy management program that turns money you spend on utilities into money you can invest in educating students more effectively. And we'll help you save more through upgraded mechanical and electrical systems. So you get more efficient buildings, as well as more comfortable, productive learning environments.

Best of all, you don't need to raise taxes or tuition. You finance the investment from the energy savings that our products and services produce. Put new solutions in *building comfort, security and productivity*, to the test. Call your local

Johnson Controls office, or 1-800-972-8040, soon.

And expand your honor roll instead of your utility budget.



JOHNSON
CONTROLS

YOU NEED A SUPPLIER
who is *aware of your
changing needs* in
security hardware...



ONE WHO HAS THAT HARDWARE
in stock for *immediate
delivery* from three
convenient locations...



AND WHO HAS THE PEOPLE
with *technical expertise
and product knowledge*
who are committed to
solving your problems...



YOU NEED DUGMORE & DUNCAN!

In the East: 800-225-1595 In the West: 800-325-1595 In the South: 800-232-1595



**DUGMORE
& DUNCAN™**
Established 1897

*The largest stocking distributor of **SARGENT®** lock products in the world.
We also stock Yale, Don Jo, Simplex and others.*

Some things stop moisture naturally.



Insulation should be one of them!

Staying Dry. It's crucial for insulation on chilled water and steam lines—whether they're above or below ground. But *not* staying dry is the most common cause of insulation failure. In fact, when an insulation absorbs just 4% moisture by volume, its thermal efficiency decreases by 70%!

By its very nature, FOAMGLAS® cellular glass insulation stops moisture penetration and maintains constant insulating value for above-ground chilled water lines. It's the *only* impermeable insulation on the market. Consequently, FOAMGLAS® insulation can provide decades of constant thermal efficiency. And, when used *under ground*, in combination with PITTWRAP® jacketing for steam or chilled water lines, FOAMGLAS® insulation is the most moisture-resistant system available.



For over 45 years, owners and engineers at commercial, institutional and industrial facilities have relied on the moisture resistance—as well as the fire and corrosion resistance, and dimensional stability—of FOAMGLAS® insulation for their chilled water, hot water and steam distribution systems.

See Sweet's Mechanical Engineering and Retrofit File, or call to find out more about the nature of FOAMGLAS® insulation.

For Product Literature

800-374-0074

For Technical Assistance

Call: (412) 327-6100

Fax: (412) 327-5890



PITTSBURGH CORNING

800 Presque Isle Drive
Pittsburgh, PA 15239

FOAMGLAS®

Premium Insulation... Performance Proven!

FOAMGLAS® and PITTWRAP® are federally registered trademarks owned by Pittsburgh Corning Corporation.©1990, 1992 Pittsburgh Corning Corporation



**Removing the Barriers:
Accessibility Guidelines and
Specifications**

by Stephen R. Cotler, AIA

ISBN: 0-913359-59-9

\$45/APPAA member institutions; \$55/all others

The new Americans with Disabilities Act expands protections for individuals with disabilities and bars discrimination in employment and in access to public accommodations. The time frame for compliance is relatively short. New facilities to be occupied after January 1993 are to be designed for accessibility. Existing facilities were required to be accessible by January 26, 1992. Barriers in existing facilities must be removed, if removal is readily achievable and can be accomplished without much difficulty or expense. If not, alternative methods of providing services must be offered.

Removing the Barriers will assist you in surveying your campus and identifying barriers. More than 100 drawings are included to illustrate barrier-free entrances, hardware, floor plans, and more. The book outlines suggestions and cost effective solutions for providing accessibility.

CONTENTS:

Chapter 1: Site Accessibility	Chapter 7: Special Spaces and Equipment
Chapter 2: The Building Entrance	Chapter 8: Facilities Inventory and Evaluation
Chapter 3: Doors	Chapter 9: Achieving Accessibility
Chapter 4: Interior Circulation	Chapter 10: Additional Resources
Chapter 5: Restrooms and Bathing Facilities	Glossary
Chapter 6: Drinking Fountains and Pay Telephones	Index

TO ORDER:

All orders must be prepaid in U.S. funds. Please add \$8 for shipping/handling. All international orders add 20% of subtotal (\$10 minimum shipping/handling charge). Enclose check (made payable to APPA) and mail to:

APPA Publications • P.O. Box 1201 • Alexandria, Virginia 22313-1201

Orders are shipped via UPS; please allow 3-4 weeks for delivery.

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

Facilities Manager

1446 Duke Street
Alexandria, Virginia 22314-3492

Nonprofit
U.S. Post Paid
Alexandria, VA
Permit No. 653