

The official publication
of the Association
of Physical Plant
Administrators of
Universities and Colleges

Facilities Manager

Volume 4 Number 1

Spring 1988

MOVING UP THE LADDER:

***FACILITIES MANAGERS REACH
THE VICE PRESIDENT LEVEL***



Also in this issue

- 75th Annual Meeting Preview
- Deferred Maintenance Study
- Index to Volume 3

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PERSONNEL MANAGEMENT
AND DEVELOPMENT

COMPUTER APPLICATIONS

WORK ORDER CONTROL

CAPITAL RENEWAL
AND DEFERRED MAINTENANCE

PREVENTIVE MAINTENANCE
SYSTEMS

Critical Issues in Facilities Management

1

COMPUTER APPLICATIONS

Published by
Association of
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of Universities and Colleges
APPA

Critical Issues in Facilities Management

is a new series that addresses today's key concerns in physical plant administration.

Each book features a collection of articles drawn together for the first time in a handy, readable resource. A wide range of authors brings an unusual breadth of perspective to the practical application of each topic. Each soft cover book in the Critical Issues series has a 6" x 9" format, is approximately 200 pages, and includes a complete bibliography of further readings.

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Every plant manager, whether needing a primer in these areas or simply looking for a ready desk reference, will want a set of Critical Issues in Facilities Management.

Individual copies of these titles may be purchased at their regular price of \$17 each [\$25/nonmembers], plus \$8 shipping/handling. Titles planned for 1988 include **Management Basics**, **Capital Renewal and Deferred Maintenance**, and **Preventive Maintenance Systems**.

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APPA Publications

APPA

Dept. CR 2, 1446 Duke Street, Alexandria, VA 22314

Books will be sent as they are published.

APPA UPDATE

NEWS FROM THE ASSOCIATION OF PHYSICAL PLANT ADMINISTRATORS OF UNIVERSITIES AND COLLEGES

New Source of Capital Available for Campus Facilities

Universities and colleges may borrow up to \$100 million dollars from Capital Access Trust, a major new source of funding. Capital Access Trust provides low interest loans to universities, colleges, and other non-profit organizations. It is expected that Trust loans will be faster and more convenient to obtain than other sources of financing.

For instance, while an institution's treasurer might need months to arrange a single tax-exempt bond issue, Trust administrators expect to give loan commitments in about three to six weeks. Also, institutions need to complete a 34-page application to apply for a Trust loan, whereas tax-exempt loan applications can run hundreds of pages.

Institutions with good credit may obtain funds for temporary or permanent financing and to capitalize either entire or partial projects—including facilities construction and renovation projects. Dr. Joseph Pettit, director of the program and currently on sabbatical from Georgetown University as its vice president for planning and university research, explained, "Capital Access Trust offers a new, imaginative, flexible, and inexpensive way" for institutions to meet construction and renovation needs.

Funds may also be used for cash-flow needs or any ongoing institutional money requirements. Loans may be paid off early without penalty; this is particularly

attractive to institutions that need to borrow for short-term needs.

Capital Access Trust is expected to bridge the financing gap when institutions are either no longer eligible or choose not to use tax-exempt bond financing. The program, announced on February 25, was founded and is administered by the Washington, D.C.-based University Support Services, a non-profit corporation founded in 1986.

The Reverend John P. Whalen, president of U S Services and former president of Catholic University, said that by pooling the credit needs of many borrowers, Capital Access Trust will be able to offer low interest rates and reduce administrative costs.

U S Services obtains money for Capital Access Trust and its other programs the way other major corporations do, through tapping the commercial money market by selling taxable commercial paper notes to large investors. Because of the low borrowing costs in the commercial paper note market, the money will be loaned to universities and colleges at rates lower than those offered by other sources of borrowing. U S Services Commercial Paper Notes are backed by a major money market bank and underwritten by Shearson Lehman Hutton, Inc.

The interest rate for Trust loans, tied to the commercial paper rate which is currently at 6.5 percent, is significantly lower

than the prime rate. Although this rate is higher than the rate for tax-exempt financing, it is lower than the rate colleges could obtain from banks, said Father Whalen.

The market for commercial paper—short-term unsecured discounted paper usually sold by one company to another for immediate cash needs—is currently worth \$380 billion. Because it is unlikely that a single university could enter the commercial paper market on its own, U S Services entered the market, thus enabling universities to gain access to it.

Citing the dire need for capital by universities and colleges, and U S Services' commitment to American education, Father Whalen said, "Knowledge is the capital of our future, an imperative national need, and at the heart of any knowledge industry is education. Universities are the 'producers' of education."

Georgetown University, the first customer of Capital Access Trust, borrowed \$75 million to refinance an outstanding line of credit at Capital Access Trust's lower interest rate.

For more information on Capital Access Trust, contact Dr. Joseph Pettit or Dr. Morna Conway, Capital Access Trust, 1717 Massachusetts Avenue, N.W., Washington, DC 20036; 202/234-2432.

Deadline Approaches for Right-to-Know Compliance

May 20, 1988 is the deadline for universities and colleges to comply with the Occupational Safety and Health Administration (OSHA) Chemical Hazard Communication Standard. OSHA has expanded its 1986 legislation, which affected the manufacturing industries, to include the non-manufacturing sector. The expansion will affect universities, colleges, hospitals, hotels, restaurants, shopping

centers, theaters, office complexes, apartment buildings, and similar establishments.

If employees have the potential to be exposed to hazardous chemicals, employers must inform employees about hazardous chemicals by labeling containers and other means, prepare material data sheets for each hazardous chemical, and train employees on what to do if they become

exposed to hazardous chemicals.

OSHA expects the expansion of the right-to-know rules to significantly decrease the number of chemical-related injuries, illnesses, and fatalities. For instance, it predicts that 286,500 cancer cases and 143,300 work-related cancer deaths will be averted in the next 40 years in the non-manufacturing sector. [See *Resource Bank*.]

Inside APPA

From the Vice President for Educational Programs



**William D.
Middleton**
University of
Virginia

The sharing of knowledge, experience, and ideas among our membership through our educational programs is one of APPA's greatest strengths. I am encouraged by the eagerness and willingness of so many of our members to contribute so much of their time and energy to develop and present these educational programs.

In planning these programs, APPA's Educational Programs Committee received valuable direction from the 1988 APPA Educational Survey. Responses from more than 300 institutional representatives gave us clear guidelines concerning the educational needs and priorities of the membership. These thorough and thoughtful responses will help our educational programs remain on track in meeting your needs.

The Educational Programs Committee and the APPA headquarters staff continue to develop and offer a wide variety of seminar programs; our own programs and programs that we cosponsor with other associations and organizations. A number of seminars are currently being offered or developed. Among them are:

- *Information Management Workshop* to be presented in the Southeast, at Duke University, in the fall of 1988. Two successful workshops have been held during the past two years at Brigham Young University.
- *Capital Renewal and Deferred Maintenance* seminar to be presented in 1989, using the results of the forthcoming APPA/NACUBO Capital Renewal and Deferred Maintenance Survey. A similar seminar was offered during the early 1980s.

- *Hazardous Waste Management at Educational Institutions* is being developed in cooperation with NACUBO and will be offered in the fall.

- *Financial Management for Facilities Managers* is being explored for offering in conjunction with a recognized business school to provide comprehensive coverage of financial management issues important to higher education facilities managers.

The Institute for Facilities Management—APPA's basic program of training and development for professional physical plant managers—continues to grow and prosper under the leadership of Bill Daigneau, who has chaired the Institute subcommittee since January 1987. An attendance of 278 at the January 1988 Institute in Sacramento, California, set an all-time high for Institute attendance.

Based upon attendance and evaluations, the structured Institute program of three parallel tracks continues to be an effective program for meeting the needs of all facilities management professionals, from new managers to highly-experienced administrators. The Institute subcommittee is currently reviewing the curriculum to assure that all three program tracks continue to provide comprehensive coverage of current practices.

Since 1985 the Institute has offered a series of special programs designed to provide in-depth coverage of contemporary practices in specific areas of facilities management. The first Institute special program, designed for small-college plant administrators, has been extremely popular and has been offered at four Institutes.

Other special programs have been devoted to the needs of energy and utility managers, medical college administrators, and capital project planning and construction managers. At the August 1987 and January 1988 Institutes, two successful special programs were offered.

The August 1988 Institute will be held in Charleston, South Carolina, on August 21-26. In addition to the basic three-track program, the Institute will offer the special program for utilities and energy managers and the special program for small college administrators. However, the

small college program will be offered in a new format. Its overwhelming success has warranted special emphasis integration into the basic three-track system and will become a standard feature at future Institutes.

The first offering of APPA's Executive Development Institute, conducted by the College of Business Administration at the University of Notre Dame, was held August 16-21, 1987. Twenty-nine senior facilities managers attended this highly successful program. Designed to meet the management development needs of senior facilities managers, this program promises to become a strong and continuing component of APPA's educational programs. Refined and improved based upon evaluation of the initial program, a second offering of the Executive Development Institute is scheduled for April 10-15, 1988.

In July APPA will hold its 75th Annual Meeting in Washington, D.C. It promises to be the biggest APPA event ever. The national capital location, an excellent facility, and lots of planning and hard work by the host committee and APPA staff should assure that the meeting will be memorable and educational. At its January meeting, the Educational Programs Committee had more than 90 excellent abstracts to choose from to develop a technical program that will cover a wide range of important facilities management issues. I hope all of you are planning to join us in Washington this July.

Your representatives in developing and guiding APPA's educational programs are the members of the Educational Programs Committee. Committee members for 1987-88 are: **William D. Middleton**, Chair, University of Virginia; **William A. Daigneau**, University of Rochester;

(cont. on next page)

APPA Update appears in each issue of *Facilities Manager* and features news from the Association of Physical Plant Administrators of Universities and Colleges. APPA is an international association, founded in 1914, whose purpose is to promote excellence in the administration, care, operation, planning, and development of higher education facilities. **APPA Update** is compiled and edited by **Beth A. Rosenfeld**.

Inside APPA

Bonita M. Hartman, Northeastern Illinois University; **Diane S. Kerby**, Berea College; **Mohammad Qayoumi**, San Jose State University; **Leroy Sondrol**, University of North Dakota; **L. Joseph Spoonemore**, Washington State University; **H. Allen Stearns**, Prince Georges Community College; and **Brian J. Whalen**, University of Nevada/Reno. Be sure to keep your regional member informed about your education needs.

Member News

V. Scott Cole is the new assistant vice president for plant management at Central Michigan University, Mt. Pleasant, Michigan. Cole was previously assistant director at Arizona State University, Tempe, Arizona. His new position was effective February 29.

Paul F. Tabolt became the director of physical plant at the University of California/Berkeley effective March 28. He was formerly director of physical plant at Penn State University.

Information Exchange

Colin Campbell, Operations Engineer at Trent University, would appreciate hearing from anyone whose facilities use induction boxes (ceiling mixing) made by Barber Colman, circa 1962-68. Specifically, he is looking for the chart linking air flow c.f.m. and pressure differential readings for the model SI Jetronic Induction Unit and associated set-up instructions. Please contact Mr. Campbell at Trent University, P.O. Box 4800, Peterborough, Ontario, Canada K9J 7B8; 705/748-1226.

Charles Hargett, Physical Plant Administrator at Bowie State College, would like to receive information from anyone who may be running their central plant operations and preventive maintenance systems on the Microvax. Bowie State will be operating in a stand-alone, network environment and Mr. Hargett is looking for pre-packaged, readily available software, any software specifications, or other relevant information. Please contact him at Bowie State College, Physical Plant Department, 14000 Jericho Park Road, Bowie MD 20715: 301/464-3375.

APPA Cosponsors FBC Conference

APPA will cosponsor a national conference, *Evaluating the Fluidized Bed Combustion Option*, on May 24-25 in Washington, D.C. The conference is designed for physical plant managers and engineers who are planning or currently implementing solid fuel and/or cogeneration programs for their facilities.


Paul Hoemann, director of energy management for the University of Missouri/Columbia, will present a case study on the construction and start-up of a 200,000 lb./hr. FBC-cogeneration plant on his campus. He will discuss the technical parameters of the project and the economic reasons for choosing FBC boilers over traditional oil- and gas-fired ones.

For more information contact Government Institutes, Inc., 966 Hungerford Drive, #24-APPA, Rockville, MD 20850; 301/251-9250.

Mississippi Adopts Certified Energy Managers' Program

The Mississippi Energy Department has adopted the Certified Energy Managers' Program for statewide use. The program, sponsored by the Association of Energy Engineers, recognizes individuals who have demonstrated high levels of experience, competence, proficiency, and ethical fitness in the energy management profession. More than 1,500 people have become Certified Energy Managers.

The prerequisites to become a Certified Energy Manager (C.E.M.) are flexible to accommodate diversity of education and practical experience. The C.E.M. exam is given three times a year in different areas of the country. For more information, contact the Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340; 404/447-5083.



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APPA



*July 24-27, 1988
Washington Hilton and Towers
Washington, D.C.*

An exciting and challenging blend of educational sessions and entertainment has been planned for the 75th Annual Meeting to be held July 24-27 in Washington, D.C. This is a unique event in APPA's history as we celebrate the 75th Annual Meeting and remember back to March 1914 when the first annual meeting was held. This meeting is historic for another reason—it is APPA's first visit to Washington, D.C., the nation's capital.

The social activities and your free time are of course going to be devoted to seeing the sights of this city, with its famous landmarks and memorials, our government, and the Smithsonian museum complex. But this city also houses all the federal agencies and a majority of the higher education association community. The educational program has been designed to take advantage of these opportunities as well. APPA is honored to have as keynote speakers—Dr. Linus Wright, Undersecretary for the U.S. Department of Education and Dr. Ernest L. Boyer, President of the Carnegie Foundation. In addition, Dr. Robert Atwell, President of the American Council on Education will present the new Awards for Excellence at the banquet.

A new educational offering—Critical Issues in Higher Education will focus on topics of vital interest to the present and future of the facilities management profession. Many of these topics rely on participation from federal government agencies, higher education, and others in the Washington, D.C. community. More than 25 educational sessions will be presented by your colleagues and others related to the facilities management profession. A complete list of the topics follows.

Washington is a city full of many things to do and see and ranks as one of the top vacation spots for families from all over the United States. The spouse/guest activities and children's program include some unique tours into the heart of this city. The optional evening activities give you a chance to

The Preliminary Program way to all APPA members. please contact the APPA

see Washington and its surrounding area in its finest splendor. and registration information is currently in the mail on its. If you have not received information by the end of April, office.



U.S. Capitol



Educational Sessions

SUNDAY, JULY 24

◆ Conference Workshops

- W-1 Strategies for Leadership
by Dr. Jane Holcomb
- W-2 The Art of Making a Presentation
by Jay Boyar
- W-3 Managing Stress Effectively
by Dr. Dale Hannah
- W-4 Planning & Producing a
Physical Plant Newsletter
by Penny Frey, Steve Howard,
Paul J. Schneller, Cynthia P. Stone,
and Diane Turner

MONDAY, JULY 25

◆ Experience Exchange Sessions

- Comparative Cost & Staffing Survey:
A User's Perspective
- Governance/Organizational Structure:
Who Should You Report To?
- Medical College Management
- Small College Management

◆ Critical Issues in Higher Education

- Deferred Maintenance/Capital Renewal
(APPA/NACUBO Research Study)
Sean Rush, Coopers & Lybrand
Randy Turpin, University of Utah

◆ Education Sessions

- Carpet: Its Problems and Solutions
Robert F. Burch,
George Washington U.
- Computer Applications in the
Management of Custodial Services
Herb Fong, Stanford U. and
Peter Vesanovic, Acme Bldg.
Maintenance Inc.
- Mandatory Recycling at a
Major University
Vernie R. Coston, Rutgers U.
- Planning & Implementation of a Fiber
Optic Local Area Network
Donald P. Alexander,
GA Inst. of Tech.
- Planning an Integrated Waste Disposal
& Incineration Program
Lawrence G. Doucet, Doucet,
Doucet & Mainka
- Training Craftsmen for Work on
Historic Buildings
James Murray Howard,
U. of VA

◆ Exhibitor Technical Sessions

- Designing or Modifying Central Heating/
Cooling Plants for Maximum
Energy Conservation
by Flack & Kurtz Consulting
Engineers
- Concrete and Masonry Restoration
by The Western Group

TUESDAY, July 26

◆ Critical Issues in Higher Education

- Energy Issues
Frank Stewart,
Department of Energy
- Hazardous Materials
Lee Thomas, Environmental
Protection Agency
John Lathrop, National Center for
Hazardous Communications
- Low Bid Purchasing
Dorsey Jacobs, West Virginia U.
Tom Bostick, State of Georgia

◆ Education Sessions

- Budgeting for Adequate Operation &
Maintenance—Treating the Disease
John A. Burnett, U. of California



*The White House
(South Lawn)*

Campus Lighting: Criteria for Projects
David W. Safford, U. of Rochester
and Leroy W. Brown, Lozier

Developing Positive Visibility:
A Marketing & Sales Strategy for the
Physical Plant
Robert Hutson,
San Francisco State U.

Eagles 100%—Turkeys 0:
Hiring Practices That Really Work
Katie Smothers,
U. of CA/San Diego

Electrical Power Distribution System

*The Supreme Court of
the United States*





Design for a Small College Campus
Glenn H. Schott, U. of Pittsburgh
and Patrick Flanigan,
R.T. Patterson Co.

**Improving Customer Relations,
Even During Tough Times**
Ronald T. Flinn, Michigan State U.

**Marketing Your Deferred Maintenance
Program**

Joseph P. Metro and
Michael K. Getter,
Oberlin College

**Negotiating the Labor Contract—
A Strategy for the Physical Plant**
E. Spencer Hall, VA Polytechnic
Inst. & State U.

**Practical Roof Management Program
for Colleges and Universities**
William R. Steinmetz, Jr.,
Midland Engineering Co.

**Relevance of Life Cycle Costs & Its
Impact on Building Delivery Systems**
William J. Humble,
U. of Queensland;
Maurice R. Pawsey,
U. of Melbourne

**Superconductors:
Hot Prospects in Cold Materials**
Mohammad H. Qayoumi,
San Jose State U.

**The United Kingdom Universities:
A Buildings Officer's View**
Fred J. Tims, Aston U.

Who Motivates the Motivator?
George B. Wright, Jr.,
The George B. Wright Co.

WEDNESDAY, JULY 27

◆ Critical Issues in Higher Education

In-House vs. Contract Custodial Services
Kirk Campbell, U. of Minnesota

**Finance/Accounting Practices
(FASB and GASB)**

◆ Education Sessions

(Best of the Regional Papers—Eastern)
The American Campus in Transition
Richard S. Hawks,
State U. of New York

**Animal Care Issues and the
Operation & Maintenance of
Research Support Facilities**
Paul F. Barrett, MIT and
Nickolas J. Sojka,
U. of VA Med. Ctr.

**(Best of the Regional Papers—
Central States)**
**Grounds Maintenance as a
Recruiting Tool**

Herb Collier, Dr. Wayne Sigler
and Raymond Dale,
U. of Houston

Hazardous Waste Management
Diana L. Wilbur, Mogul Division
**The Multi-Campus
Long Range Master Plan**
Nathan Ivey,
Dallas County Comm.
College Dis.

**Telecommunications & Systems
Intelligence in the Health Science
Related Institution**
Alan B. Abramson,
Electronic Systems Associates

Jefferson Memorial



Highlights

Saturday, July 23

AM & PM Optional Tours—Alexandria and Mount Vernon
Washington Highlights

Sunday, July 24

12:00– 1:30 pm Regional Meetings
2:00– 6:00 pm Opening Ceremony and Exhibit Hall Reception
evening Optional Activities—Private Tour of the National Museum
of Natural History
Pool Party & Cookout

Monday, July 25

7:15– 8:45 am Keynote Breakfast—Dr. Linus Wright
12:30– 3:00 pm Exhibit Hall Open
evening Optional Activities—Dine Around in Old Town Alexandria
Washington After Dark Tour

Tuesday, July 26

7:15– 8:45 am President's Breakfast
12:30– 3:00 pm Exhibit Hall Open
6:00– 11:00 pm Reception & Annual Awards Banquet

Wednesday, July 27

10:30– 11:45 am Brunch and Closing Keynote Speaker—Dr. Ernest L. Boyer
afternoon Post Convention Tours—Great American Heroes
(Arlington National Cemetery)
On the Waterfront—Annapolis, MD

Thursday, July 28

all day Post Convention Tour—A Day in Williamsburg, VA

Watch for more details each month in your APPA Newsletter.

Resource Bank

Right-to-Know

The University of Texas at Austin has produced a video, *Your Right to Know*, on federal and state hazard communication standards. Filmed on location at the university, the video shows employees and students conducting work in a campus setting that involves hazardous materials.

The video, available in 1/2-inch and 3/4-inch formats, includes information on Material Safety Data Sheets, labeling, workplace chemical lists, training, protective measures, and employee rights. With the exception of the opening statement, the video makes no reference to any specific educational institution, thereby allowing other campus right-to-know training programs to use it.

The video, which was made in cooperation with the university's College of Communication, Radio-Television-Film Department, costs \$200. Prospective buyers may preview the video for \$25; \$20 of

which may be applied toward purchase. Contact: The University Safety Office, The University of Texas, 2617 Speedway, Suite 104, Austin, TX 78705; 512/471-3511.

TPC Training Systems can assist employers in meeting the OSHA Chemical Hazard Communication Standard. Contact: TPC Training Systems, 310 South Michigan Avenue, Chicago, IL 60604; 312/537-6610. A few copies of TPC's *Chemical Hazards* are still available from APPA at a cost of \$60 each. Send check or purchase order to APPA Publications, 1446 Duke Street, Alexandria, VA 22314.

Asbestos

The National Asbestos Training Center has developed *Coping With the Asbestos Problem*, a five-videotape resource library

covering management of an asbestos abatement project. The videotapes are: *Asbestos: Uses, Hazards and Potential Liabilities*; *Compliance with the Asbestos-in-School Rule*; *Building Evaluation, Risk Assessment and Abatement Options*; *Getting Advice, Specification Writing, and Contractor Selection*; and *School Case Histories: Abatement Decisions, Funding and Public Relations*. The series and its five accompanying viewer's guides can be purchased as a set or separately. Cost for the five-tape set is \$495, individual tapes are \$125, and individual viewer's guides are \$12; a six-minute preview tape is available for \$75 and can be applied toward purchase. There is a 20 percent discount for universities, colleges, and schools. Contact: National Asbestos Training Center, 5005 West 95th Street, Shawnee Mission, KS 66207-3398; 913/648-5790 or 913/648-5042.

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Job Corner

Job Corner Deadlines

Job Corner 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. Upcoming Job Corner deadlines are **May 10** for the June edition, **June 3** for the July edition, and **July 8** for the August edition. 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 you may send your ad via FAX machine, 703/549-APPA (703/549-2772). Call 703/684-1446 for more information.

• • •

Facility Planning Officer. The Smithsonian Institution is seeking candidates for the position of Facility Planning Officer, Washington, DC. This position will be filled at the GM-14 level (promotion potential to GM-15) in the competitive civil service with a salary range of \$46,679 to \$60,683 per annum. In addition to serving as the Institution's expert on long-range facility planning, the incumbent will organize, direct, develop, and coordinate comprehensive long-range facility plans, development programs, and other technical planning for museums, research installations, collection storage, and other

support activities. The incumbent will identify long-range facility requirements, develop programs and preliminary plans for major construction projects (estimated individual project cost in excess of \$1 million), coordinate and develop facility master plans and special design studies, and coordinate and develop real property development programs. Currently identified facilities expansion or improvement requirements total in excess of \$700 million (rough estimate). Current backlog of essential maintenance and repair needs is estimated at \$216 million. Candidates must possess professional experience in a field with emphasis on institutional or corporate urban/long-range facility planning (e.g., urban planning, architecture, engineering, etc.); must possess managerial, analytical, and evaluative skills; and excellent communication skills. The closing date for applications is **April 21, 1988**. Send a Standard Form 171, Personal Qualifications Statement, to: Employment Office, Smithsonian Institution, Washington, DC 20560, ATTN: 88-160-F. An Equal Opportunity Employer.

Director of Physical Facilities. Illinois State University in Bloomington/Normal, with an enrollment of 23,000 students, seeks applications for the director of physical facilities. The director is responsible

for the operation and maintenance of the university physical plant, consisting of 75 buildings (3.2 million square feet), covering nearly 920 acres. The physical plant department has an annual operating budget of over \$10,000,000 and a staff of over 300. Areas of responsibility include building operation and maintenance, utilities, building renovation, preventive maintenance, energy conservation, and university vehicle fleet. Required qualifications include bachelor's degree in engineering, architecture, business, or related fields. Ten years of directly related, progressively responsible experience in physical plant management, including significant experience as a senior facilities manager required. Experience in a university setting, a master's degree, and an appropriate professional certification highly desirable. The successful candidate will possess excellent oral and written communication skills and bring to the position proven leadership experience. Starting

DIRECTOR OF PHYSICAL PLANT SERVICES

Reporting to the Assistant Vice President for Facilities and Space Planning, responsible for the budgeting, management, and long-range planning of all facility maintenance and plant operations. Manage staff of 270 employees and be responsible for 2.6 million square feet of space on a 32-acre campus.

Must have significant experience in the field of a large and complex facility operation including at least three years in a full-time managerial/administrative position. Preference given to NYS Registered Architects, NYS Professional Engineers, and NYC High Pressure Stationary Engineers. Experience with computer applications, labor relations, preparation of bid documents, and construction management preferred. Experience with preventive maintenance programs and quality control procedures desirable.

Salary competitive. Send resume and the names of three references, postmarked no later than **May 2, 1988** to: Assistant Vice President Anthony Rodriguez, Search Committee for the Director of Physical Plant Services, Affirmative Action Office.



THE CITY COLLEGE OF CUNY

Convent Avenue at 138th Street
New York, NY 10031

An AA/EC Employer M/F

DIRECTOR OF PHYSICAL PLANT

A large Philadelphia employer has an opening for Director of Physical Plant. The Director is responsible for administration, operation, maintenance, repair and renovation of the entire physical plant consisting of 7,500,000 square feet. Qualified applicants must possess extensive knowledge of building crafts and trades, plus demonstrated managerial and human relation skills. The position also involves overseeing the housekeeping program, upkeep and maintenance of vehicles, operation of post office, grounds maintenance, and monitoring the Fire & Safety Program.

Successful applicant should have a Bachelor's degree in related field, as well as considerable prior physical plant experience. We offer an excellent salary & benefits package. Send resume and salary history to: P-36, P.O. Box 2069, Philadelphia, PA 19103. An equal opportunity, affirmative action employer.

Job Corner

date is negotiable. Applications accepted until position is filled. For full consideration, send resume and list of three professional references with cover letter by **April 22, 1988** to Dr. Richard C. Runner, c/o Linda Ritter, Secretary of the Physical Facilities Director Search Committee, 302 Hovey Hall, Illinois State University, Normal, IL 61761. *Illinois State University is an Equal Opportunity/Affirmative Action University.*

PHYSICAL PLANT

SWARTHMORE COLLEGE Search Reopened

SWARTHMORE COLLEGE has extended its search for the following two positions reporting to the Associate Vice President of Operations.

DIRECTOR OF PHYSICAL PLANT: Manages a staff of 120, a campus of 330 acres (operated as an arboretum), and 1.5 million sq. ft. in over 45 major buildings. Requires BS in Engineering or related field, 5 years' experience in Physical Plant management, and excellent human resource management as well as technical skills. Institutional experience preferred.

PROJECT ENGINEER OF PLANNING AND CONSTRUCTION: Works cooperatively with the Director of Physical Plant in the implementation of construction projects through the planning, design, construction, and occupancy phases. Also responsible for short and long-range capital planning, minor renovations, and major capital construction projects. BS in Engineering or Architecture, 5 years' experience in facilities or construction project management required; professional registration desired.

We offer a competitive salary and excellent benefits package for these challenging career opportunities. For immediate consideration, please send letter and resume to: **Assistant Director, Office of Personnel Services, SWARTHMORE COLLEGE, Swarthmore, PA 19081. PREVIOUS APPLICANTS FOR DIRECTOR OF PHYSICAL PLANT SHOULD REAFFIRM INTEREST. EOE.**

Mechanical Engineer. This position will be directly responsible for the utilities division of the physical plant department and provide mechanical engineering design and operating support to other areas of the department. Specific areas of responsibility include energy accounting, zone pressurization, fire alarm systems,

refrigeration systems, security systems, specialized research environments, and utility distribution systems, including lab air, vacuum, and pure water. Duties include control of the facilities environment with a JC80/55 and JC/85 building automation systems, writing mechanical specifications, preparing division budget, an-

CONSTRUCTION MANAGEMENT

Rutgers, the State University of New Jersey, has embarked on a multi-million dollar construction program and is seeking experienced individuals to fill the following positions:

Assistant Vice President for Facilities Construction

This officer is responsible for the overall management of the University Capital Construction and major Plant Alterations and Repair efforts. Ensures quality, timely, and efficient completion of all construction and alteration projects. Negotiates, manages, and administers construction contracts with construction management firms and contractors, and oversees internal construction operations. Requires a bachelor's degree in Engineering, Architecture, or related area, and professional registration plus extensive experience in facilities design/construction to include major program construction responsibility. Also requires excellent interpersonal and communication skills. An advanced degree in Engineering or Engineering Management is highly desirable. (Reference No. 251).

Director, Construction Management Division

This officer develops, coordinates, and implements effective and efficient construction planning, inspection, and acceptance of new facilities, as well as major alterations to existing facilities. Directs construction efforts of contracting firms, architects, engineers, project managers, and project superintendents. Coordinates with the Design, Landscape Architecture, Physical and Capital Planning, Maintenance, and Operations functions during project construction implementation. Oversees the administration of construction contracts, including liaison with appropriate Federal and State funding agencies.

Requires a bachelor's degree in Engineering, Architecture, or related area, or equivalent experience plus extensive experience in major program design and construction management. Licensure (or eligibility for) as a New Jersey Construction Official, Sub-Code Official and Inspection Official required. Also requires excellent interpersonal and communication skills. Professional registration desirable. (Reference No. 252).

Salary is negotiable. Please submit resume, professional references, salary history, and salary requirements for EACH position, indicating appropriate reference number to:

THE STATE UNIVERSITY OF NEW JERSEY
RUTGERS

The Division of Personnel Services
New Brunswick, NJ 08903
Successful candidate to provide
employment eligibility verification
AA/EOE

Job Corner

analyzing mechanical systems, and preparing engineering reports proposing alterations and/or additions to mechanical systems for most efficient operation and for coordination into the total system, reviewing monthly utility bills, and directing activities of the energy conservation program. Qualification requirements include a bachelor's degree with a major in mechanical engineering with five to seven

years' supervisory experience in the design, installation, and maintenance of building mechanical systems. A broad range of experience with mechanical systems controls and building automation systems is preferred. Successful applicant must be licensed by the Texas State Board of Registration for Professional Engineers. Interested applicants should send a cover letter with current resume includ-

ing salary requirements to The University of Texas Health Science Center at San Antonio, Office of Human Resources, 7703 Floyd Curl Drive, San Antonio, TX 78284. *An Equal Employment Opportunity/Affirmative Action Employer.*

Director of Physical Plant. Yavapai College, a community college located in Prescott, Arizona, is seeking a director of physical plant. Responsible to the vice president for administration and financial services; provides major assistance with the planning, design, and construction of facilities; responsible for the operation, maintenance, renovation, and repair of college facilities. Supervises a staff of 20 full-time and some part-time/temporary positions, and is responsible for the preparation, execution, and monitoring of the annual budget. Qualifications include a

POSITION RE-POSTED DIRECTOR OF PHYSICAL PLANT

Full-time position available July 1, 1988. Baccalaureate Degree in Architectural, Civil, or Mechanical Engineering required. Five years' administrative experience in physical plant operations, two of which must have been in a multi-building facility. Proven skills in leadership, planning, and communication. Working knowledge of computerized systems/software appropriate to physical plant operations. Salary range effective July 1, 1988—\$37,784 - \$54,408. Call for application:

SCHOOLCRAFT COLLEGE
Livonia, Michigan
313/591-6400 Ext. 223

Completed application, transcripts/credentials must be received in the Personnel Office by **May 20, 1988.**

SCHOOLCRAFT COLLEGE consists of 13 major buildings totaling 400,000 square feet on a 183 acre site located 25 miles northwest of Detroit, plus an extension center of 88,000 square feet located 8 miles southeast of the main campus.

AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER

DIRECTOR OF HOUSING Department of Buildings and Grounds Williams College

Williams College seeks applications for the position of Director of Housing. Founded in 1793, Williams is a highly selective, coeducational, liberal arts college of 2,000 students located in the Berkshire Hills of western Massachusetts, a setting in which the residential housing system plays a vital role in the quality of undergraduate life.

Reporting to the Director of the Physical Plant, the Director will be responsible for the development and control of the overall housing budget, including monitoring the condition of housing and directing its renovation and repair. Working closely with the Deans of the College, the Director of Housing will oversee housekeeping and maintenance of 45 student residences, assist in overseeing the system of House Managers, and work with the House Presidents to ensure the smooth operation of student residences. Will also supervise housekeeping for all other college facilities, and in conjunction with the Provost and the Dean of the Faculty, will be responsible for the maintenance of faculty housing.

Candidates should possess five or more years' administrative experience in college housing and a bachelor's degree, with work experience in a small, residential college preferred. Excellent planning, organizational, and communication skills are necessary.

POSITION AVAILABLE: JULY 1, 1988.

To apply, mail letter of application and resume to:

Mr. Richard B. Bullett
Director of Personnel
Williams College
P.O. Box 476
Williamstown, MA 01267
413/597-2681

EEO/AA EMPLOYER

ASSOCIATE DIRECTOR FACILITY PLANNING

Montclair State College, a 13,000 student, public college located in suburban northern New Jersey, 14 miles from N.Y.C., is seeking an experienced engineer for its annual \$2,000,000 construction and renovation process.

This new position will assist with the planning, budgeting, inspection, design, and construction of both small and large construction and renovation projects. Responsible for small projects and for the review of all electric and mechanical components of large projects. Responsible for the computerized building space system.

A Bachelor's degree in electrical, mechanical, or industrial engineering, with at least six years' experience related to building renovations. Registration as a Professional Engineer in the state of New Jersey may be substituted for the degree. Working knowledge of PC-based data base software packages, or ability to acquire same. Ability to drive an automobile, and work in adverse environments. Ability to communicate orally and in writing with a wide range of individuals.

Competitive salary and benefits.

Submit a letter of application, resume, and list of three references by **May 5, 1988** to Chairperson, Facility Planning, Box C316, Upper Montclair, New Jersey 07043.

An equal opportunity/affirmative action institution.

Job Corner

minimum of a bachelor's degree in an engineering or closely related field with substantial experience in design, construction, maintenance, and operations. Requires five years of experience in physical plant administration, preferably in a college or university environment. Starting salary in the range of \$29,000 to \$35,000. Anticipated start date of mid-June to mid-July. Write or call to request our application packet. Yavapai College, Personnel Office, 1100 East Sheldon, Prescott, AZ 86301; 602/776-2217. Firm closing date of **April 22, 1988**.

MANAGER OF PHYSICAL PLANT

KENYON COLLEGE, a small, private liberal arts college with an enrollment of approximately 1,500 students, is accepting applications for Manager of Physical Plant. Kenyon College is a nationally recognized leading academic institution. Located in the rolling hills of central Ohio, the campus has 107 buildings containing 965,000 square feet of space. The College owns over 800 acres of land, which includes 100 acres of main campus and 70 acres of athletic facilities.

The primary responsibilities of the position include the management, supervision, and coordination of preventive maintenance programs, general maintenance, mechanical and electrical systems, custodial services, grounds, landscaping, energy conservation, and facilities planning.

Candidates should have at least five years' experience in physical plant administration, preferably in a private college environment, and have demonstrated management skills. Candidates must be effective communicators and have the ability to work with all constituents of the College. Candidates should possess a bachelor's degree, with an engineering degree preferred.

Send resume with salary history to:

Joseph G. Nelson
Vice President for Finance
Kenyon College
Gambier, Ohio 43022

The position will remain open until a qualified candidate is appointed.

Equal Opportunity Employer: Women and minorities are encouraged to apply.

Director of Space Management

San Jose State University is seeking candidates for the position of director of space management. Areas of responsibility are for campus space allocation, space scheduling, space planning, and other allied functions. The director is responsible for all activities related to the effective use of space on campus. Candidate should possess a master's degree in planning or related field with five years of related experience in a university environment. Salary commensurate with qualifications.

Engineering Design Construction Manager

San Jose State University is seeking a qualified candidate for the position of engineering design construction manager. This position is responsible for long-range planning and evaluation of physical facility needs of the university, which includes the mechanical, electrical, and architectural projects involving major and minor capital outlays and special repair projects. Includes supervision of all engineering and architectural project activities, from pre-construction contracts through project completion, final testing, and acceptance. Combination of five years of experience in mechanical, electrical, and structural engineering. B.S. in Mechanical Engineering; professional engineering license is desirable. Salary commensurate with qualifications. Applications accepted through **May 1, 1988**.

San Jose State University
Human Resources and Employee Relations Dept.
1 Washington Square
San Jose, CA 95192

An equal opportunity, affirmative action employer.

ASSISTANT VICE CHANCELLOR

Facilities Design & Construction

The University of California, San Diego has a major capital construction program underway. Projects under construction or in planning exceed \$400 million. The Assistant Vice Chancellor, Facilities Design & Construction is responsible for the overall management of the design, construction, and fiscal management of this capital program. Requires extensive related management experience and excellent interpersonal skills. Reports to the Associate Vice Chancellor Resource Management.

Salary commensurate with experience and qualifications. Please submit cover letter with resume by April 29, 1988, referencing position #23529-M, to: UCSD, Personnel, Q-016, La Jolla, CA 92093. AA/EOE.

UCSD
University of California,
San Diego

Coming Events

APPA Events

Apr. 10-15—Executive Development Institute. College of Business Administration, University of Notre Dame, South Bend, IN. Contact: APPA, 703/684-1446.

Apr. 21-22—Roof Inspection, Diagnosis, and Repair. Boston, MA. Cosponsored by the Roofing Industry Educational Institute. Contact: RIEI, 303/770-0613.

Jun. 7-9—Public Buildings: Today and Tomorrow. St. Louis, MO. Cosponsored by the American Public Works Association. Contact: APWA, 312/667-2200.

Jul. 24-27—APPA's 75th Anniversary Annual Meeting. Washington Hilton & Towers, Washington, DC. Registration and program information will be available in April. Contact: APPA's Educational Programs Department, 703/684-1446.

Aug. 21-26—Institute for Facilities Management. Charleston, SC. Registration and program information will be available in May. Contact: APPA's Educational Programs Department, 703/684-1446.

Regional Meetings

Sept. 21-24—Rocky Mountain Region Annual Meeting. Calgary, Alberta, Canada. Program Chair: Bill Mutch, University of Calgary; 403/220-7555.

Sept. 24-28—Midwest Region Annual Meeting. Cincinnati, OH. Program Chair: Jim Landers, Xavier University; 513/745-3151.

Sept. 24-28—Southeastern Region Annual Meeting. Memphis, TN. Program Chair: E. Dudley Howe, Rhodes College; 901/726-3870.

Sept. 26-29—Central Region Annual Meeting. Kearney, NE. Program Chair: Tom Jones, Kearney State College; 308/234-8533.

Oct. 2-5—Pacific Coast Region Annual Meeting. Fresno, CA. Program Chair: C. Ron Hicks, California State University/Fresno; 209/294-2027.

Oct. 16-19—Eastern Region Annual Meeting. Valley Forge, PA. Program Chair: Frederick Klee, Ursinus College; 215/489-4111.

Other Events

May 3-4—Automatic Temperature Controls. Rochester, NY. Sponsored by the American Society of Heating, Refrigerating and Air-Conditioning Engineers. Other seminars scheduled through May. Contact: Deborah Sellers, ASHRAE, 1791 Tullie Circle, NE, Atlanta, GA 30329; 404/636-8400.

May 5-6—Prescription for Performance. Century Plaza Hotel, Los Angeles, CA. Seminar on developing and managing medical office buildings sponsored by Building Owners and Managers Association International. Contact: BOMA International, 1250 Eye Street, NW, Suite 200, Washington, DC 20005; 202/289-7000.

May 17—Indoor Air Quality—Putting the Puzzle Together. Holiday Inn, Rolling Meadows, IL. Sponsored by ENACT and Grace Dearborn. Contact: Jeff Schimmel, Grace Dearborn, 300 Genesee Street, Lake Zurich, IL 60047; 312/438-8241.

Membership

New Institutional Members

Alexandria Technical Institute, 1601 Jefferson Street, Alexandria, MN 56308; 612/762-0221. Representative: Edsel Thompson, physical plant manager.

New Institutional Representatives

Aquinas College, Grand Rapids, MI: **John T. Walker,** director of services and facilities.

Ball State University, Muncie, IN: **Thomas A. Smith,** physical plant director.

Bethel College and Seminary, St. Paul, MN: **Craig A. Hjelle,** director of physical plant.

Mesa College, Grand Junction, CO: **Ronald F. Gray,** director of physical plant.

South Dakota School of Mines and Technology, Rapid City, SD: **Robert Reznicek,** acting director of physical plant.

University of Alabama/Birmingham, Birmingham, AL: **Brooks H. Baker III,** executive director, facilities management.

Vermont Technical College, Randolph Center, VT: **Richard Ethier,** director of physical plant.

New Associate Members

Lamar University, Beaumont, TX: **Dan Johnson, Charles Robinson.**

University of Georgia Coastal Plain Experiment Station, Tifton, GA: **Wayne C. Kilgore.**

University of Kentucky Medical Center, Lexington, KY: **Robert W. Tudor.**

New Affiliate Members

Oakland Intermediate School District, 2100 Pontiac Lake Road, Pontiac, MI 48054; 313/858-2104. Representative: William T. Lee, consultant, plant and facilities.

Starr Commonwealth Schools, 13725 Starr Commonwealth Road, Albion, MI 49224; 517/629-5591 ext. 132. Representative: Gary Hammonree, physical plant director.

New Subscribing Members

American School and University, NAPCO, 401 North Broad Street, Philadelphia, PA 19108; 215/238-5300. Representative: Mike Spring, publisher, *American School and University* is a magazine serving facilities, purchasing, and business administration in the educational environment. Readers include presidents, business officers, physical plant directors, and other top-level administrators in junior colleges and four-year colleges and universities nationwide.

Gale Associates, Inc., 3920 Vero Road, Suite C, Baltimore, MD 21227; 301/247-8508. Representative: Edward Madden, senior associate. Gale is a multi-disciplined A/E firm with offices in Boston, MA, and Baltimore, MD. Services include evaluation and design for the

rehabilitation and renovation of building envelope components (roofs, walls, glazings, etc.) to provide watertight, thermally efficient building envelope systems. The firm also offers civil/environmental services as well as architectural design.

Hanbury Evans Newill Vlattas & Co., 120 Atlantic Street, Suite 400, Norfolk, VA 23510; 804/627-5775. Representative: S. Michael Evans, AIA, president. HENV & Co. is a 40-person architectural and interior design firm specializing in academic facilities. The firm has completed campus planning, renovation, historic restoration, and interior space planning projects as well as residential and classroom facilities for numerous colleges and universities in the mid-Atlantic region.

Inspec, Inc., 5616 Olson Memorial Highway, Minneapolis, MN 55422; 612/546-3434. Representative: Richard Phillips, general manager. Inspec, Inc. is an independent inspection, testing, and consulting firm in the highly specialized area of roofing and pavement design and system evaluation. Inspec's experts offer unbiased, objective service and advice—the firm is completely independent of any product, manufacturer, contractor, supplier, or designer. Inspec provides a professional service that enables the designer and owner to get the most from maintenance and construction dollars.

Sun Environmental, Inc., 1700 Gateway Boulevard, S.E., Canton, OH 44707; 216/452-0837. Represent-

tative: M.J. Motter, manager, market development. Sun Environmental, formerly the Sunohio Company, solves PCB transformer problems nationwide by providing solutions to virtually every PCB situation. Services include testing, turnkey disposal/replacement, system 50 retrofit/reclassification, chemical treatment, and transportation. Many universities and colleges have contracted Sun Environmental to become non-PCB.

Member Update

Advanced Technology, Inc., 2121 Crystal Drive, Suite 200, Arlington, VA 22202; 703/769-3000. New representative: Anthony R. Giancolo, P.E., principal engineer.

Burns & McDonnell, 4800 East 63rd Street, Kansas City, MO 64141-0173; 816/822-3178. New representative: Greg Mack, P.E., university projects director.

Holmes & Narver Services, Inc., 999 Town & Country Road, Orange, CA 92668; 714/567-2543, 714/567-2400. New representative: Lee A. McIntire, director, business development.

Intergy, Inc., 10100 Brecksville Road, Brecksville, OH 44141; 216/526-1600. New representative: David J. Lowenfeld, vice president, sales.

Nalco Chemical Company, 1 Nalco Center, Naperville, IL 60566-1024; 312/887-7500. New representative: Stephen D. Newlin, manager, Waterly Chemicals.

Moving Up the Ladder: Facilities Managers Reach the Vice President Level

by Ruth E. Thaler

Professionalism and an ability to see the overall issues have brought a number of campus physical plant administrators to new career heights in recent years. At colleges and universities both large and small, private and public, four-year and two-year, physical plant administrators are moving into vice presidential and vice chancellor slots.

While most of them agree that this career movement does not yet constitute a trend and few have identical academic training or professional experiences, they do exhibit a variety of common skills and responsibilities. To discover some of those skills, *Facilities Manager* interviewed several physical plant administrators who now hold high-ranking titles—and responsibilities—at a variety of campuses.

Shared Views, Varying Backgrounds

One commonality, of course, is training and experience in administering physical plants; yet even within that area, the backgrounds of these vice presidents show a lot of variety. One has a degree in architecture, one in

chemical engineering, another in education. Previous experience runs the gamut as well—corporate engineering, college and high school teaching, consulting, student admissions, and construction, just to name a few.

All of these facilities managers at the vice presidential or comparable level do share one important responsibility—campus-wide planning. At this level of professionalism, administrators cannot limit their vision or involvement to only one part of the institution. A view of the institution's long-term needs and future development becomes essential.

In many instances, physical plant administrators who now serve as vice presidents or vice chancellors are the first people in their current positions. Either the title was created for the individual or the nature of that individual's responsibility increased over time to warrant the upper-rank title.

Risks and Rewards

Achieving the rank of vice president is a heady experience, especially for someone who may not have seriously planned to get to that level. For many of these facilities vice presidents, the advancement seemed somewhat of a surprise. "I'm doing essentially the same thing as I did before, just under a more impressive title," said one. Or it was something conferred from out-

Ruth Thaler is a Washington, D.C.-based freelance writer who specializes in communications and business news.

Hinds Community College District serves 10,500 students and has nearly 100 buildings on 1,500 acres at several campuses. Pictured: Nursing Allied Health Center.



Troy H. Henderson

side—"The chancellor asked me to handle a special project that eventually led to this title," said another.

All of these physical plant professionals enjoy direct access to their chief executive officers (CEOs), although that can have its drawbacks. "I can reach my president directly at any time, night or day; but then, he can reach me any time, too—and he does," one said wryly.

Among the risks of moving up from physical plant director or administrator to the vice presidential level is a sense of detachment from the "fun stuff" of hands-on activity. Meetings and more meetings are a hallmark of the vice presidential position, it seems. "I miss getting out there and actually doing some of the construction work," said one. "There's never any time."

Who They Are

Tracking the educational and career paths of people who have vice presidential responsibility for facilities

management and planning yields a surprising variety of backgrounds.

For **Troy H. Henderson**, vice president for physical plant and auxiliary services at **Hinds Community College District** in Mississippi, the path to the vice presidency and campus-wide physical plant responsibility began in education. "I started out teaching high-school-level biology and went from teacher to principal to superintendent of schools in West Jasper, Mississippi," Henderson said. In 1979, Henderson was offered and accepted the position of director of physical plant at Hinds. He moved up the ladder fairly quickly, being named vice president in 1982.

Henderson is responsible for all maintenance, repairs, new construction, grounds, transportation services, security, and insurance. The school operates a small airport, which Henderson oversees as well. Auxiliary services within his domain include a bookstore, eighteen-hole golf course, cold storage/slaughterhouse facility, and farm opera-

tion. "This is a unique situation," he said. "At a two-year institution, you normally don't have such a wide range of auxiliary services."

Henderson is a physical plant administrator whose educational training focuses more on overall management than specific plant issues—he has a B.S., M.A., and Ed S. degree in school administration.

As with most of the people interviewed for this article, Henderson is the first person at his institution to hold a vice presidential title for physical plant responsibilities. "The vice president for business services retired, and that person's duties were divided into two new positions," he said of his move up.

For **Thomas G. Nycum**, the move to senior vice president at the **University of California/Riverside** followed a somewhat more traditional path in terms of training for physical plant administration.

Nycum, a registered Professional

Syracuse University serves 16,000 students and has nearly 260 buildings totaling 7.5 million square feet. Pictured: Hall of Languages.



Harvey H. Kaiser

Engineer, has a B.S. degree in mechanical engineering and master's degree in business administration, and he has completed all but a dissertation toward a Ph.D. in finance. He began his career in the private sector, working as a reactor operations engineer for Idaho Nuclear Corp. and plant engineer for NIBCO Inc.'s Colorado division plant. He then moved to the university position as an industrial engineer in the physical plant at the University of Nebraska. At Nebraska, Nycum moved up to assistant to the director of physical plant and then assistant director.

In 1980 Nycum moved to the University of Florida/Gainesville as director of physical plant. One of the few current vice presidents to hold a similar-level position before his current one, he headed west in 1982 to become assistant vice chancellor for facilities management at the University of California/Berkeley. He took on the same responsibility at UC/Riverside in 1986.

"The vice chancellor titles existed

when I came to the university system," Nycum said. "I replaced the past vice chancellor. My job is traditionally vice chancellor of administration [at other institutions]. I oversee accounting, campus police, business services, auxiliary services, personnel, physical plant, capital construction, and institutional and campus planning."

Nycum's physical plant activity includes campus planning and capital construction responsibilities. "This area takes up as much as 50 percent of my time, because we are in a rapid growth mode," Nycum pays a price for his high rank. "Unfortunately, this means that I am removed from hands-on design, the fun part. I miss it!" he said. "I miss getting out and working on the construction project, working directly with the construction group. Now, I am a lot more involved in long-range planning and administration."

Nycum sees some institutions "leaning toward having an assistant vice chancellor for physical plant or facilities

management evolve from the title of director of physical plant" as more campus leaders recognize "the importance of the physical asset. The value of [buildings and physical plant components] is coming to the forefront as plant assets are being used up," he said. "We are at a point in the cycle where we have to build new or renovate."

This recognition of the importance of facilities management and planning makes it natural to place that function at a high administrative level. Currently with an enrollment of 160,000 students, the UC system plans to expand to 200,000 in the next few years. "This makes the importance of the physical plant in building and renovation critical," he said. "Bringing facilities up to modern quality is important across the country, especially—as indicated by a recent National Science Foundation survey—for institutions that want to be known for modern research."

Academic and professional training in architecture led to **Harvey H.**

Kaiser's appointment as senior vice president for facilities administration at **Syracuse University** in New York. Kaiser is a registered architect with B.A. and M.A. degrees in architecture and—an unusual combination—a Ph.D. in social science.

"I became involved in large-scale architecture projects and became aware of the socio-economic aspects of them when I began practicing architecture," said Kaiser, who wrote his dissertation on community conflict arising from the construction of physical plants. He "broadened this study from the basic approach of architecture" through a fellowship in Sweden, furthering the connection between urban housing and planning and his own interest in larger projects.

While working as an associate partner and director of design for a large architectural firm and attending graduate school, Kaiser began teaching at the Syracuse University School of Architecture. He left the firm to start his own practice in architecture, specializing in urban planning. "The university invited me to become vice president of facilities after I had been asked to serve as a consultant and help organize facilities planning," Kaiser said. After a major administrative change, Kaiser was then invited to become a full-time administrator as assistant vice president for facilities planning.

Kaiser's position was important to the future of the institution because "the university was initiating and trying to complete several buildings at once that were off schedule," he said. "Over the years, that job evolved with other responsibilities being added." He now oversees facilities management, security, mail service, telecommunications, and parking.

Kaiser was made full senior vice president when he completed his dissertation, although he notes that the timing was somewhat of a coincidence, since the appointment was not dependent upon the degree. "The academic credentials were less important than the management, architecture, and administrative experience," he said. He



Thomas G. Nycum

University of California/Riverside serves 6,500 students and has 2 million square feet of building space on about 1,100 acres. Pictured: Bell Tower.



is the first to hold a facilities related vice presidential title at Syracuse.

"I see it [the vice presidency] as an opportunity rather than a trend," Kaiser said. "It is a rather unique combination of campus needs, the CEO's personal interests, and the individual's personal qualifications."

Massachusetts Institute of Technology (MIT) senior vice president **William R. Dickson** followed a relatively traditional path to his current position. An MIT graduate in building

engineering and construction, he finds himself "surprisingly enough, fairly qualified" to handle the wide-ranging responsibilities of his position.

Dickson considers his "on-the-job training" as invaluable. "All you have to do is keep your eyes and ears open," he said. "You can immerse yourself and never look at anything else except your immediate responsibilities—and never move on. You'll do a better job and you'll move up if you take a look at the other aspects of the institution. You

Massachusetts Institute of Technology serves 9,000 students and has more than 100 buildings on 155 acres. Pictured: The MIT campus.



William R. Dickson



Hood College serves 1,900 students and has 34 buildings on approximately 50 acres. Pictured: Marx Center.



Joseph A. Pastore



have to broaden your scope. If someone wants you to serve on a committee, you should do it. That's how I progressed—it seems that I was always being asked to do other things, and I did them."

Dickson worked as an engineer at MIT's Lincoln Laboratory for two years and spent two years in the corporate sector at Avco Corp. He has been at MIT for twenty-seven years, joining the university as assistant to the director of physical plant and working

"almost solely in construction for six to seven years." He handled new buildings and represented the university in design issues. In 1967 he was made assistant director for construction and then became associate director for operations and construction—"in other words, responsible for the whole plant," he said.

Dickson was named vice president for operations in 1980 and senior vice president in 1982. "Technically, I am still vice president for operations," he noted.

Moving up the ladder demands patience, according to Dickson. "I spent a lot of time in some of these assignments," he said. "It certainly is not limited to MIT, but there seems to be a nationwide phenomenon that people today are in a hurry to move up. You can't be too impatient."

Leadership mobility also demands the ability to delegate, Dickson noted. "Obviously, as I moved up, I had to start relying on other people to do some of what I had done," he said. "As

Lafayette College serves 2,000 students and has about 57 buildings on 110 acres (plus another 77 acres for a separate athletic complex). Pictured: Morris R. Williams Center for the Arts.



Donald U. Noblett

you start to take over operations, it is an entirely different aspect of the university—that is where the people problems are. You have to lead people. You take over general responsibility for everything that went wrong as well as things that went well."

The military offered **Joseph A. Pastore**, vice president for administration and finance and treasurer of **Hood College** in Maryland, a path into higher education physical plant administration.

Pastore spent "all my time in military service." He has taken courses at the University of Maryland and University of Kentucky. During thirty-five years in the military with the Army Medical Service Corps, Pastore's main area was hospital administration; he also worked with data and computer systems before moving on to command posts. When he retired, with the rank of colonel, he had served two years as commander of Fort Detrick, located near Hood.

According to Pastore, the Army Medical Service Corps provided ideal training for the university setting. "In the corps you deal with professionals all the time," he said. "People there are readily adaptable to the university setting because of the variety of [management] experience that relates so closely to what universities are doing now."

Of his move from the military to the civilian life, Pastore said, "I was invited to the president's house for a luncheon shortly before I was due to retire. When the president heard I was retiring, she offered me a position at the college, which I gladly accepted." Hired as superintendent of buildings and grounds, Pastore started work two weeks later as director of college support services, overseeing all business activities and physical plant matters. Less than three months later Pastore was appointed vice president for administration. He was later named to his

current title.

Pastore was not the first vice president to oversee physical plant activities at Hood; the title "had been retired for some time," he said. The then-new president revived the title. Pastore now is one of four vice presidents.

"I get involved in anything to do with college facilities including planning and construction," Pastore said. "I kept that role when I moved up. The director of physical plant only gets responsibility for a facility when it is completed."

The area of admissions offered a fertile training ground for **Donald U. Noblett**, currently vice president for physical planning and operations at **Lafayette College**, a private, independent college in Pennsylvania.

Noblett has a B.S. degree in chemical engineering and an M.A. in educational administration. His career followed an unusual path into overseeing physical plant areas. He worked as a chemist for the Glidden Company and then as

University of Lethbridge serves approximately 3,000 students and has 919,000 square feet of building space on 457 acres. Pictured: The Lethbridge campus.



R.F. Comstock

assistant director of admissions at the Case Institute of Technology (now Case Western Reserve). He moved to Baldwin-Wallace College as director of admissions, then to Lafayette as director of admissions in 1958.

"Because of what was going on then—we went into a new library campaign and new building campaign—it was an uncommon tradition," Noblett said of the first step of his move into physical plant responsibilities. "The president was looking for help and said, 'You're an engineer, you can help.'"

The next step was being asked to develop what became a successful proposal for a three-year Ford Foundation matching grant, part of a program initiated in the early 1960s to help small colleges improve "in any way the college saw fit."

Developing the grant proposal involved creating a five-year profile of "where we had been, and a ten-year projection of where we were going."

Noblett said, which gave him unprecedented insights—and a long-range perspective—on the college's physical status and planning needs. "When we received the grant, the president asked me to become director of development, the first formal position with that title. I was still handling facility planning and construction, not managing existing facilities, when I was asked to be secretary to the Board of Trustees/Committee on Grounds and Buildings."

Noblett "gave up admissions, took on fundraising, and kept handling new buildings," he said. His admissions background, however, was valuable in his transition process. "In admissions, you have to understand the entire institution so you can give prospective students the full view," he said.

In 1966 Noblett moved into a new program in college planning. He used his master's thesis—on creating a new college office of planning that incorporated both physical and institutional

planning—to help structure that position. When the school's treasurer retired, "facilities management responsibility was moved into my new department," said Noblett. That department now handles security as well. In 1968 Noblett was named vice president, the first to hold the title.

"That was a very unusual development for a small college," he said. In the 1960s, "there was relatively little college-wide or institutional planning going on, and little analysis of teaching loads and how curriculum fit into the whole fabric. It was not a college-wide process. We were involved in a lot of physical plant activity—new construction and building."

The position hasn't changed greatly over time, and having a vice presidential position for physical plant is still unusual for small colleges, Noblett said. "I am not aware that this exists at many other small colleges."

The picture in Canada is similar.

according to **R.F. Comstock**, vice president for campus development, **University of Lethbridge** in Alberta, Ontario, Canada. Physical plant administrators with vice presidential titles and responsibilities are "probably the exception" in Canada, although it would depend on the size of the university, Comstock said.

Comstock has a B.S. in civil engineering and an M.S. degree in environmental engineering. He also followed an unconventional path to the vice presidency, starting out as an engineer with a municipal health center and teaching civil engineering—primarily sanitary engineering—at the University of Toronto for four years. He spent nine years as the branch manager for a consulting engineering firm and joined Lethbridge in 1968 as capital development officer, a title that was revised to physical plant coordinator. Comstock joined Lethbridge only a year after the university was founded.

Soon after, those duties were expanded and the university created two vice presidencies, one in finance and one in capital development, as a result of university growth. In 1980 a new vice presidency was created. Comstock's current title of vice president for campus development; he is the first to hold it.

"This position was a natural evolution in the university's growth and size," Comstock said. He is responsible for building maintenance and caretaking, the vehicle pool, grounds maintenance, plant utilities, security, and planning—building design and construction, new buildings, and alterations.

A Perspective for All

Judging from the experiences described here, it is clear that expertise in physical plant administration offers APPA members a path into university senior management. The educational and career diversity among the vice presidents interviewed by *Facilities Manager* indicates, as well, that there are many routes to follow on the path.

As more physical plant administrators move into campus-wide planning and responsibility, the number of vice presidents from the physical plant administrators' ranks should increase steadily. ■

Reporting In: Facilities VPs Have a Direct Line to the Top

One of the most exciting aspects of moving into the ranks of vice president is the opportunity to help shape campus-wide planning and gain direct access to the CEO.

All of the vice presidents interviewed for this article have direct access to their presidents or chancellors; many also serve on board committees and report to university trustees. They also are active in institution-wide planning, through specific job responsibilities and/or membership in the CEO's top management team—the president's council, chancellor's cabinet, etc.

"I report directly to the president," said Hood College's Joseph Pastore. "The president holds a weekly staff meeting with the four senior officers—the four vice presidents. I also have ready access as needed; she has an open-door policy for one-on-one contact. I can just tap on the door and walk in."

Pastore also reports to Hood's Board of Trustees and serves on three board committees: Buildings and Grounds, Finance, and Investment. He is involved in overall planning for the college, especially in new construction.

At Lafayette College, Donald Noblett is a member of the President's Council, which meets regularly. Noblett reports directly to the president and meets with him weekly and as needed.

Noblett has been active in overall campus planning activities since 1962. "We have an ongoing campus planning program, with a special committee that reports to the President's Council," he said.

Hinds Community College District's Troy Henderson also reports to the president. He is a member of the President's Cabinet, which meets with the president weekly. "I have a weekly meeting with all supervisors and the director of facility use. I meet with the president as needed," he said.

Thomas Nycum of UC/Riverside reports directly to the chancellor. He is part of the campus long-range planning process as well. "We are developing a new and revising the old long-range plan," he said. "These activities will tell us what types of facilities are on-line and what our short-term goals should be, too." Short-term needs tend to focus on reallocating existing space to accommodate the university's recent and continuing rapid growth; mid-term planning looks at temporary facilities to tide things over during growth; and long-term plans are for permanent accommodation and expansion.

Nycum is involved heavily with "three distinct groups"—the deans and vice chancellors through the president's Executive Council; vice chancellors of non-academic areas, such as student services, development, and enrollment management, through the President's Cabinet; and the Campus-Based Planning Committee, which also includes deans and vice chancellors. He meets weekly with the UC/Riverside chancellor.

Syracuse University's Harvey Kaiser reported to the vice chancellor for administrative operations from 1972 to 1985, when "we were a highly centralized administration." He now reports directly to the chancellor. He and the chancellor meet biweekly and, he explained, "I have access to the chancellor at all times—and vice-versa." Kaiser joins the weekly Chancellor's Cabinet meeting of the school's six senior managers.

"I am definitely part of the overall planning process, at two levels," Kaiser said. "I am involved in strategic policy making at the chancellor and Board of Trustees level and in the operational aspect of implementing those policies." Kaiser serves on a subcommittee on facilities, which will become a standing committee of the Board of Trustees. "Then, I will be responsible for setting agendas and responding to requests from the board for programs."

At MIT, William Dickson is involved in planning "more with others in the institution," he said. "When I became vice president for operations, the mantle had to be passed. Then I became a lot more involved in other activities, such as housing and dining facilities, campus police, graphic arts, safety, and property."

Dickson is a member of the president's Academic Council, which meets once a week. "I am now exposed to much more of the longer-range planning view." He reports directly to the president, with meetings every two weeks. "I am chief administrative officer, and I now spend more time with the provost, who is the chief academic officer."

University of Lethbridge's R.F. Comstock reports directly to the president, as he did in his earlier position. Meetings with the president are on an as-needed basis. He is a member of the Executive Group, which meets every two weeks.

Comstock's role in overall campus planning is limited "strictly to physical planning" from the perspective of "planning to meet student needs," he said. ■

—Ruth E. Thaler

Deferred Maintenance: A Rose By Any Other Name

by Pieter van der Have



A bard whose writings were to survive the rigors of time once felt inspired to write that a rose by any other name smells as sweet. What was he really saying? Perhaps it was this: a name or a label is a symbol, which exists to enable and facilitate understanding in communication.

Perhaps another way of saying the same thing might be: it doesn't really matter what you call the damn thing, it still is what it is.

Last July in New Orleans, at APPA's 74th Annual Meeting, the Research and Survey Committee spent nearly an hour with an enthusiastic group of plant

Pete van der Have is division manager, central services, at the University of Utah, Salt Lake City, Utah. He is a member of APPA's Research and Survey Committee.

administrators discussing deferred maintenance. Judging by comments received afterward, I believe that most of the participants considered the topic and the discussions relevant, pertinent, and important. But, one might ask, was the purpose for the discussion actually accomplished?

I'm sorry, but I don't really think so—at least not completely.

What we are faced with is that we are all desperately clinging to our own respective breeds of deferred maintenance, because, in many cases, "that's the way we have always done it." Is there a problem with that? Not necessarily, especially if we like operating in a vacuum, without taking advantage of the operational and political benefits that an association such as APPA, through the Higher Education Facilities Trust (HEFT), can offer to its members.

But I don't think that is the case. I believe that we belong to APPA because we want to take advantage of its benefits, one of which is to be able to prove

to our critics and admirers alike (and especially to ourselves) that we know what we're doing. Being consistent across the profession in our use and definition of deferred maintenance is one step toward accomplishing that goal.

After the discussion in New Orleans, one member suggested that we come up with a brand-new name, something sounding Latin or scientific, so that we could avoid some of the infighting we are experiencing today regarding the concept of deferred maintenance. Unfortunately, I have not been able to come up with anything catchy or appropriate. (Somehow, I don't believe that something like "aperforma trabalum facilitata collapsum" will ever catch on.)

The problem is complex. Over the years plant administrators have had to operate frequently on their own, without the benefit of a central group or association such as APPA. What occurred as a result of that is in one way

an interesting variation of the title of this article.

Instead of taking a clearly recognizable flower which we now know as a rose and perhaps attaching different names to it, our profession has taken the word rose (deferred maintenance) and has assigned to it a whole variety of flowers, ranging from dandelions to orchids, with an occasional "rose" thrown in. In other words, we have independently of each other taken a term which had become a buzzword and made it fit or include whatever we wanted it to include.

The result is that when we ask for a count of roses, from one respondent we may really get dandelions and ragweed, and from another we could get water lilies and forget-me-nots. Conclusions drawn from that feedback then become meaningless.

There are some 3,000 members of APPA. I would not be surprised to find just as many definitions of deferred maintenance among those members. Can APPA come up with a definition which is all inclusive, satisfy everyone, and still help us convince ourselves (as well as outsiders) that we really know the magnitude of our deferred maintenance problem? If you believe the answer is "yes," let me introduce you to my brother-in-law who has a great deal on some property.

One characteristic of a professional is to have the ability to adjust to the needs of the times, to possess both the ability and willingness to bend when needed, and to flex when necessary, and to have the wisdom to know when to do which. Folks, *this is one of those times.*

A New Definition

The Research and Survey Committee is asking you to allow your definition of deferred maintenance to be modified to fit a national mold. We are not asking you to throw your current program into the incinerator. We are asking you to consider accepting the definition accepted by APPA for the purposes of future surveys and inventories, to the maximum extent which your own political environment will allow.

I can already hear the creaking of your respective executive chairs as you lean back and wonder out loud, "Yeah, sure, I have to do all of that and what

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do I get out of it?" Well, I'm glad you asked!

As some of you probably heard more than just a few times at the New Orleans meeting, HEFT will exist to help all physical plant departments do their jobs more effectively. *When*, not *if*, we are able to collect deferred maintenance data from all institutions, and we are able to assemble that data into meaningful and realistic conclusions, those conclusions will be shared with participants.

Those participants, as well as the many bodies politic to whom our institutions answer, and other groups with vested interests in our institutions, will be able to accept those conclusions as realistic and indisputable. Whereas, up till now we have had to rely so often on educated guesses to provide substance to our arguments, we will from now on have bare bone facts. [Ed. Note: See sidebar for specifics on a new APPA/NACUBO survey to collect deferred maintenance data.]

There is not a campus CEO or governing board around worth their respective salts who do not rely on data for making decisions. If they really know their business, and yours, they will also know whether you are convincing them with facts, or merely dazzling them with smoke and mirrors. We expect that through your full commitment this deferred maintenance study, with a substantial dose of financial support from HEFT and resulting assistance from professionals in the research and survey field, we will be able to issue tangible, concrete information—and not merely provide you with a bundt cake mix without a recipe. We intend to give you information which you can take to your administrators, and which they in turn can take further up the organization chart—information which will help you with your deferred maintenance plight/blight.

"For Having Lost but Once Your Prime, Ye May Forever Tarry"

The poet who wrote those words was certainly not thinking about deferred maintenance at the time. However, when taken out of context, the message pertains to what we are trying to accomplish right now. Deferred maintenance is a hot item today, and administrators

are becoming increasingly aware of its urgency—not just a little as a result of the writings of Dr. Harvey Kaiser¹. Governing bodies appear to be getting ready to spring with some money to start addressing the problem. But we do not think that they are ready to spring with enough, because neither they nor anyone else really knows the magnitude of the problem. Let's face it, we don't even know ourselves, so how could they?

The time is at its prime right now, and we're concerned that if we tarry too long, we may have lost whatever is precious to us and our institutions. So, perhaps the analogy drawn above is not so far-fetched after all. We need to work hard, and work together, both for the benefit of the few and all if we are to sustain this country's huge capital investment in its campuses.

Now have I got your attention?

On the presumption that anything worth saying once is worth saying twice, I will briefly rehash what was presented to those in attendance at our session in New Orleans.

1. APPA, through our committee, will design as simple a survey form as possible which will still allow achievement of the objective.
2. A small pilot group was selected to receive the first edition of the survey in

1. Including *Crumbling Academe: Solving the Capital Renewal and Replacement Dilemma*, 1984, AGB; and *Mortgaging the Future: The Cost of Deferring Maintenance*, 1979, and *Facilities Audit Workbook: A Self-Evaluation Process for Higher Education*, rev. 1987, both from APPA.

February to help determine the functionality of the form, and to evaluate the reliability of the data—are we going to get what we expected?

3. Adjustments are being made in the form and/or process as determined by the pilot program.

4. Institutions, in most cases, will need significant time to assemble the information requested by the survey. The length of time provided for this purpose will also be determined by the pilot survey as one month maximum, although some took only a few hours to complete the pilot. It will be a substantial challenge for some institutions to quantify their deferred maintenance backlog.

5. Information will be requested regarding current value of buildings, current operating budgets, "ideal" operating budgets, gross square footages, respective ages of individual buildings, and a few other related items. Most of this information will already have been compiled by many institutions in response to other surveys, especially from APPA and HEGIS.

6. VERY IMPORTANT: It is the intent of the committee to publish data acquired in such a way that confidentiality of information is not violated. That is to say, it will not be published in a style similar to *The Comparative Cost and Staffing Report*, where everyone theoretically knows what everyone else is doing. That is not the purpose of this survey. We feel this is especially important, since the balance which exists between many campuses and their respective facility insurance pro-

APPA and NACUBO Conduct a Joint Facilities Survey

APPA, in cooperation with the National Association of College and University Business Officers and with assistance from Coopers & Lybrand, is currently conducting the first comprehensive study of capital renewal/deferred maintenance needs in higher education since the early 1970s.

Seven hundred fifty randomly selected colleges and universities have been asked to participate in the survey, which has been sent to the institutions' business officers for completion. Physical plant directors and business officers of selected schools will be separately notified by APPA to solicit their assistance. The results will be tabulated and published prior to APPA's 75th

Annual Meeting, which will be held July 24-27, 1988 in Washington, D.C. In addition, a Critical Issues session at the annual meeting will be devoted to the survey results and their effects on individual institutions.

"The results of the survey," according to APPA Executive Vice President Walter A. Shaw, "are expected to create a greater awareness of the question of the capital renewal and deferred maintenance by those in governance and by funding sources such as legislators and donors. Our objective is not a redistribution of existing funds, but to furnish evidence as part of a larger issue of overall increases in funding for higher education."

grams is so delicate. We will attempt to share an institution's own profile with that institution after we conclude massaging the data.

7. Conclusions drawn from the survey will be shared with all respondents, and other interested parties, for the common benefit of all.

8. Here is the definition, determined to be acceptable by the Research and Survey Committee, of accumulated deferred maintenance: **maintenance projects from prior years and the current year that were not included in the maintenance process because of perceived lower priority status than those funded within available funding.** Deferred maintenance included postponed renewal and replacement and under-performed unscheduled major maintenance.

It will be a considerable challenge to take all the data which we expect to receive from respondents, and assimilate it into meaningful information. That is why a reasonable degree of homogeneity of data is essential.

Summary

Last summer we were (over-)exposed to the highly publicized goings-on of the Iran-contra hearings. A common thread throughout the hearings was the implication that individuals in key positions did not know what was going on, and/or were never plainly informed as to what actual conditions were, and/or intentionally disregarded events and circumstances, and/or the truth concealed from them by subordinates with what could be construed as questionable motivation.

Could that same circumstance, although certainly less dramatic, potentially exist in our profession? Who's to say, but can we afford to take the chance? We should certainly take advantage of all reasonable means available to us to help diminish the chance of that happening with our facilities. We already generally admit that we have an alarming problem with deferred maintenance backlogs. We cannot be like those consumers who do not balance their checkbooks because

they know they are in the hole already anyway. We must not only face the music, we have to be willing to dance to it as well!

The Research and Survey Committee has been assigned the task of quantifying the deferred maintenance burden nationally. The expectation is that, through a dedicated willingness on the parts of all potential respondents, and through the provision of reliable data to anyone or any groups of responsible influence, positive benefits will result through additional funding and other perhaps more subtle forms of general support.

Furthermore, there is no doubt that there are some institutions which, for a variety of valid reasons, have never been in position to assess their own deferred maintenance backlogs. Participation in this survey, in conjunction with utilization of published results, can be of real benefit to individual managers and their institutions of higher education. ■

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Value Analysis of Competitive Design and Build Tenders

by E.A. Dews

Since the emergence of "design and build" procedures for building projects, a new dimension has been added to the problem of bid selection. Some owners have been deterred from competitive design and build procedures, not only because of the detail required at an early stage, but also because they have not been confident that they could complete a fair appraisal of the bids once received. Thus in some cases, the most suitable system for the solution of an owner's problem has not been used simply because of the lack of availability of a suitable management tool for bid appraisal.

This article proposes a method that allows a logical system of appraisal that minimizes the subject judgments that must be made, and relates them to a common single variable that is readily understood.

It is worth noting that in most cases when an owner is making a major

expenditure, either in the purchase of a capital item or in the employment of staff, it is not possible to compare like with like.

The usual process, either subconscious or deliberate, is to measure what is offered against a set of criteria, make valuations, prepare a summation, and finally announce a selection.

Although this has not been the traditional approach to the construction of buildings, there is no good reason why it should not be the method used if it is in the best interests of the owner—the person or institution who pays for what is built and pays the operational costs. It is quite anomalous to impose management conditions on the construction process that might jeopardize the long-term success and viability of a project. The penalty in terms of operational costs can reach quite large amounts during the life of the building.

The method proposed inevitably involves the institution and its agents in more work than under the conventional system. But this work should result in an appropriate benefit; the

project selected should meet the owner's needs in the best possible way, given the resources available.

The system used could well be used during the design phases of the traditional system, although such is rarely the case, and designers tend to work intuitively on the basis of general instructions from the owner. Specific directions, such as application of this system would imply, tend to be rejected or ignored, the claim being that they inhibit unreasonably the designer's creativity.

The importance of the approach taken is that it is logical, it can be as comprehensive as the owner wishes, and it can reflect preferences accurately. The corollary to this statement is that you must consider all aspects and determine your policy; if you fail to do so, the fault is yours alone.

Value Analysis Method

The method adopted is simple, and comprises the following steps:

1. The facilities manager identifies those characteristics of the building that are of particular importance. Al-

though the project can be subdivided into as many sections as desired, it is generally preferable to limit the number to the fewest that can accurately identify the principal areas of concern. Too detailed a breakdown could lead to difficulties with the assignment of priorities. It could also lead to an illusion of an accuracy of result that in fact is not achievable, because many of the detailed decisions must be subjective. There are characteristics that cannot be measured with the degree of accuracy that the mathematics might imply.

2. A simple points scale is established to give a rating to each characteristic to be assessed. For the same reasons as in #1 above, the range of points should be realistic.

- 0 Minimal adequacy
- 1 Fair
- 2 Good
- 3 Above average
- 4 Top quality

3. Points are awarded to each characteristic according to the scale. Judgments may be subjective for items such as aesthetics, or may result from cost benefit analyses such as in the case of mechanical plant. It is important that at this stage price is ignored. Assessments may in fact be made by separate groups of assessors who preferably would have no knowledge of the pricing.

4. The various points scored are weighted according to the predetermined stated preference of the facilities manager.

To this point the method describes a system consciously applied to various types of projects. If differing proposals are judged solely on the basis of points, or weighted points, the selection of the best value for money in terms of owner preferences may not be achieved.

5. The bids are examined and the price of the lowest acceptable bid is adjusted to indicate the price that would be expected if his or her bid rated a zero points score. Since a design and build specification necessarily defines the minimal acceptable standard, this involves comparison of the

bidder's specification with the minimal brief and making marginal notional adjustments to the bid. Complete accuracy is not necessary, as the figures derived will be used for comparative purposes only.

6. The value of the weighted points scores of the various components of each bid is determined according to the importance of each degree of improvement. Note that if increased sophistication is required, increments for each component can be valued separately according to different formulae. The maximum total value that can be awarded for a given bid is equal to the difference between the value assigned to a zero points score and the value assigned to a maximum possible points score, the maximum available budget sum.

7. The values of above minimum features of each project are added to the zero points value to establish the relative value of each bid proposal.

8. The relative value established for each bid proposal is compared with the actual bid price to establish the best value for price bid.

It must be a matter of institutional policy (made in advance of assessment) to decide whether the best total value that can be afforded is to be purchased (step #7) or the best value for the price offered is to be accepted (step #8). See *Example*

Example

An owner receives four bids for a project that comply with the specification and are within the acceptable budget range:

- A. \$2,000,000
- B. \$2,200,000
- C. \$2,500,000
- D. \$2,600,000

The maximum allowable budget is \$2,800,000.

Steps 1, 2, 3, 4. The criteria against which the proposals will be measured are fixed thus and points assessed and weighed according to institutional preference as shown. The five-point rating scale is then adopted. (See **Figure 1.**)

Step 5. The zero point score bid value is established by adjustment of the lowest acceptable bid, at \$1,800,000.

The maximum total value that can be awarded according to point preferences is therefore

$$\$2,800,000 - \$1,800,000 = \$1,000,000$$

Step 6. For purposes of the example, the value to be assigned to the weighted point scores will be calculated in two ways:

a) assuming equal value for each increment of improvement (linear relationship), and

b) assuming diminishing value for increasing increments of improvement, in this case an inverse square relationship will be adopted. (Any desired relationship can be used.) This is then added to the zero points value (BASE VALUE) to determine the Total Notional Value.

Then for:

a) we have

$$\text{Value per point} = \frac{\$1,000,000}{400} = \$2,500$$

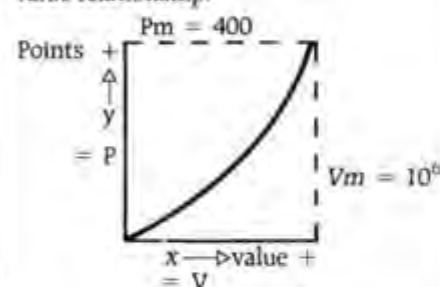
(The max possible points score is $4 \times 100 = 400$)

(See **Figure 2.**)

Thus, on this basis of assessment, BID B offers the best value for the bid price; BID A offers both a lower value and lower value for the price; BID C offers the highest total value to the owner, but the value for price is not as good as A or B; and BID D offers a marginally higher value than B but is significantly over-priced in comparison with the lowest bid.

Then for:

b) we have an inverse square points value relationship.



General Form $y = mx^2$

In this case $P = \frac{400V^2}{10^{12}}$

or $V = 50,000 \sqrt{P}$

For $P = 120$ $\sqrt{P} = \$10.96$

220 14.83

265 16.28

230 15.16

The Bid comparison table is shown in Figure 3.

Thus, according to this assessment, BID A represents best value for price; BID B represents higher value, but is not such a good bargain; BID C again represents higher value but lower value for price; and BID D is lesser value than C and is slightly over-priced. If you elect to buy the highest value according to your own preferences, you will pay an additional \$500,000 for work valued at \$266,000 (Bid C compared with Bid A).

It is clear from this example that the owner's declaration in advance of receipt of bids of the basis on which bids will be accepted is of paramount importance to the maintenance of fair assessment. This statement is further supported by an examination of the relative ratings of the bids according to the various stages and types of analyses used.

Figure 1

Feature	Weight	Points				Weighted Points			
		A	B	C	D	A	B	C	D
Functional Plan	20	3	3	3	1	60	60	60	20
Aesthetics	15	1	3	2	3	15	45	30	45
Internal Finishes	15	0	2	3	4	0	30	45	60
Built-in Equip.	10	2	3	3	4	20	30	30	40
Mech. Services	15	1	0	3	3	15	0	45	45
Operational Cost	20	0	2	2	0	0	40	40	0
Site Development	5	2	3	3	4	10	15	15	20
TOTALS	100	9	17	19	19	120	220	265	230

Figure 2

BID	BASE VALUE	NOTIONAL VALUE TO BE ADDED \$	TOTAL NOTIONAL VALUE \$	ACTUAL BID \$	AB TNV%
A	1,800,000	$120 \times 2500 = 300,000$	1,200,000	2,000,000	95.2
B	1,800,000	$220 \times 2500 = 550,000$	2,350,000	2,200,000	93.6
C	1,800,000	$256 \times 2500 = 662,500$	2,462,000	2,500,000	101.5
D	1,800,000	$230 \times 2500 = 575,000$	2,375,000	2,600,000	109.5

Figure 3

BID	BASE VALUE \$	NOTIONAL VALUE TO BE ADDED \$	TOTAL NOTIONAL VALUE \$	ACTUAL BID \$	AB TNV%
A	1,800,000	$10.96 \times 50,000 = 548,000$	2,348,000	2,000,000	85.2
B	1,800,000	$14.83 \times 50,000 = 741,500$	2,541,500	2,200,000	86.5
C	1,800,000	$16.28 \times 50,000 = 814,000$	2,614,000	2,500,000	95.6
D	1,800,000	$15.16 \times 50,000 = 758,250$	2,558,000	2,600,000	101.6

If you are to get the best bids according to your own preferences, the design brief should include full details of the assessment procedures to be used. Designers will have positive guidelines to use in the preparation of their designs without restrictions on the method used to provide the solutions that will have greatest value to the institution.

Although the procedure demands a significant amount of work, there can be no doubt that the long term consequences of failure to obtain the best value for funds spent outweigh many times the cost of the additional work involved.

Summary

The method provides a systematic basis for the fair assessment of competitive design and build proposals. It can also be used for the objective comparison of various proposals for any given project once a cost base has been established. The basis of appraisal can be tailored to fit your priorities

Appraisal Method Bid Rating by Various Criteria

BID	PRICE	POINTS	WEIGHTED P's	LIN. VALUE	LIN. VALUE/ PRICE	NL VALUE	NL/VAL PRICE
A	1	4	4	1	2	1	1
B	2	3	3	2	1	2	2
C	3	1	1	4	3	4	3
D	4	1	2	3	4	3	4

and preferences, and if incorporated in the building documents can add substantially to the ability of the bidders to offer what the owner requires.

The basis of assessment should be established in advance of the bidding procedure to demonstrate the objectivity of the process.

Since the procedure provides a quantitative basis of analysis, care should be taken not to assume degrees of refinement that are not achievable in the total design and construction process.

Acknowledgment

The method proposed in this chapter is an extension and simplification of work presented in a paper entitled "Building Planning With Value Analysis," a report to the CIB Working Commission 55 on Building Economics, by Dan Ove Pedersen of the Danish Building Research Institute, as presented in a preliminary translation of the Direction No. 107 from the Danish Building Research Institute, published December 1976. ■

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An Overview of New Energy Management Technologies

by W.L. Christy Jr., P.E.

In the midst of complacent attitudes toward energy management, the industry has moved into a new generation of control technology. Three significant technical advancements in the energy management industry have lowered the cost and truly optimized control while reducing the need for expensive central computer station investments. These are parallel distributed processing, direct digital control, and adaptive control.

Distributed processing, now ten years old, changed the architecture of every major system on the market and greatly increased the capabilities of energy management systems. The concept is similar to organizational concepts in that a chief executive officer delegates specific decisions and criteria to lower ranking officers who in turn may or may not delegate to managers. This concept is illustrated in Figure 1.

The primary advantage lies in system expansion without loss of control or a mandatory increase in the processing power of the central station. With an appropriate communications network and remote intelligent devices, some of

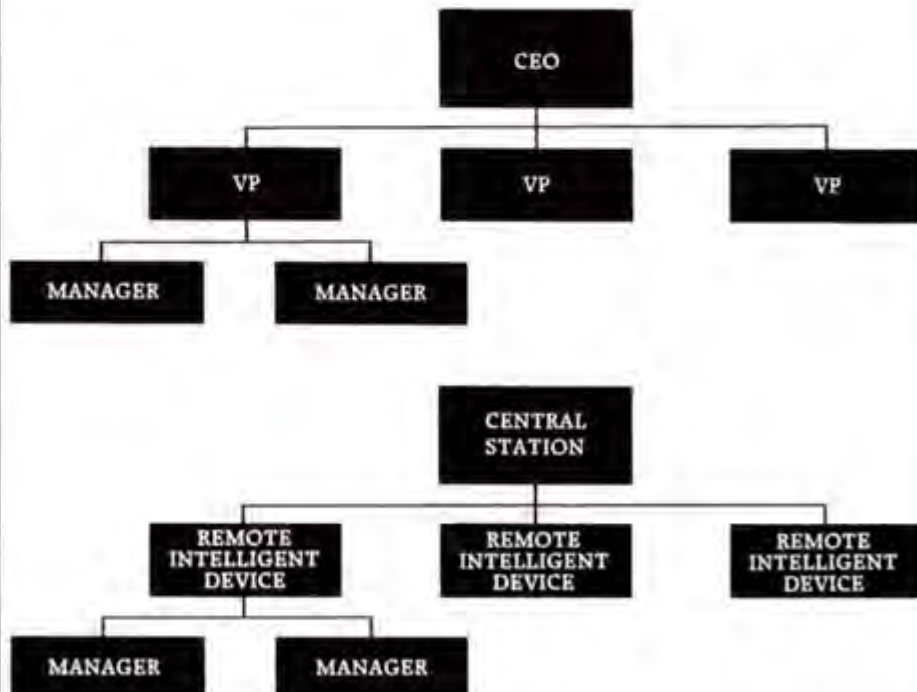


FIGURE 1

the largest and most sophisticated manufacturing facilities in the country are controlled and monitored from a single microcomputer. The underlying fundamental is eloquently simple. The central or host station does not have to know (or process) every single byte of

data in order to effectively manage thousands of processes.

For example, schedules for equipment ON/OFF functions can be downloaded (delegated) to a remote intelligent device (RID); operation will continue as such until a schedule change is

desired. Between the initial schedule download and the desired change (which could be weeks or months), the central station need only monitor periodically the effectiveness of the RID's performance. Typically, anytime an equipment item is performing outside the schedule, this is transmitted as an alarm to the central station and/or logged as a user override. In either case it creates a management record.

Direct digital control (DDC) has become widely implemented in the last three years. Previously, pneumatics have been used almost exclusively because of the lack of better technology. The drawbacks of pneumatics compared with DDC are numerous. Installation and materials (tubing and pneumatic controllers), operational costs (pressurized air), and maintenance costs (air leaks are common) are much higher than 24 volt 18 gauge wire and corresponding electronic controllers and sensors. Additionally, there is an ever present conversion from analog to digital (AD) and visa versa (DA) when a computer (digital processor) is interfaced with pneumatics (analog sensors and controllers, i.e., 3 to 15 psi). DDC is lower in cost for installation and maintenance is more accurate and eliminates AD-DA conversions.

An example of this would be a pneumatic temperature transmitter,

The microprocessor monitoring the process must have a digital value. This value is provided through the use of an AD converter which, given an input pressure (proportional to the temperature measured) in the typical range of 3 to 15 psig, will output a discrete signal of 0 to 5 volts or 4 to 20 milliamperes, which can then be digitized. In a DDC system the temperature measurement device will output the electrical signal directly, eliminating loss of accuracy in the conversion process.

While commonly used in the process control industry, only recently has the *adaptive control* concept been adopted by a few manufacturers in the HVAC control industry. The concept arises from the fundamental theory of closed-loop (feedback) control as employed in energy/HVAC management and process control fields.

Feedback control is a technique by which a variable to be controlled, i.e., space temperature, is controlled to some desired value, i.e., setpoint, through the use of information fed back about how accurately the variable is being controlled. This is shown in **Figure 2** where the measurement device measures the controlled variable and sends the information back for comparison to the setpoint. Any deviation from the setpoint generates an error signal and subsequently a correc-

tion signal to the actuator in the process, such as a chilled water valve. The ultimate goal is to eliminate or minimize the deviation between setpoint and the controlled variable (i.e., thermostat setting equals 72°F and space temperature equals 72°F regardless of changes in external condition, such as open doors or changing outside temperature).

The most sophisticated pneumatic control systems operate with PID control (proportional + integral + derivative). The significant practical problem in this application is that some person must physically adjust the mechanical field settings for the amounts of proportional, integral, and derivative control to use. There is typically one control adjustment (knob or other device) for each mode. Proper setting of these controls will achieve the best performance under one load condition and the current efficiency of the various components in the process, such as pumps, fans, and dampers.

In real life these system characteristics continuously change; therefore, optimum control would require an operator to continuously adjust the settings and do so accurately. From this it is easy to understand that most controllers are poorly tuned or, at best, tuned to settings that result in compromised performance.

In a digital control system the settings discussed above can be optimally calculated with fundamental control equations and adjusted automatically to the new optimum positions for each component and system. In other words, it monitors its own performance and adjusts itself accordingly. This is called adaptive control and provides the most precise control possible.

The use of a system incorporating all three of these technologies transfers the bulk of the work to the remote intelligent controllers which, in turn, function in a prespecified manner and do so optimally. The work at the central station is reduced to a monitoring and analysis function, which is ideal. While the central station monitors the system for any alarms or abnormal conditions annunciated by the associated remote controller, the operator can simultane-

CLOSED LOOP (FEEDBACK) CONTROL

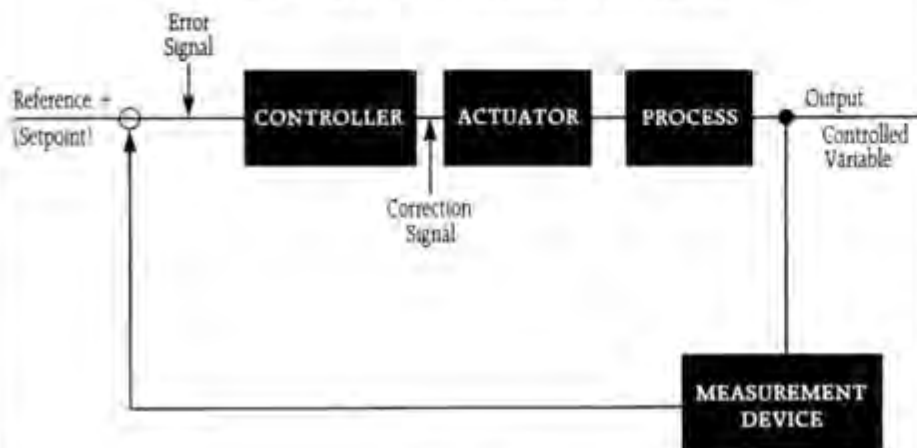


FIGURE 2

ously perform high level individual analysis on any aspect of the system performance without suppressing notification of alarm or abnormal condition.

Since the technology discussed thus far is available today in off-the-shelf systems, the current topic of concern for energy managers has shifted to another problem that has only recently

gained widespread attention.

The problem arises from either 1) the installed system not providing information in a usable format, or 2) the existence of two or more manufacturers' systems within one facility and no common central station. Typically, there is a central station for each manufacturer's system—whether it consists of one remote panel or fifty.

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The industry is currently taking two separate paths that will ultimately lead to the same point. A few companies have developed software that utilizes an already adopted communication standard, RS-232, and is available as standard or optional in most manufacturer's hardware. The software contains a protocol converter for each EMS model and reports and displays information in a consistent format regardless of its source.

Simultaneously, ASHRAE has created a new standards committee, SPC-135P, whose goal is to establish a common protocol which may be used to communicate information between different brands of remote intelligent panels on a common network. The good news for the end user in this two-path approach is that software properly designed in the beginning will be virtually 100 percent operationally compatible with any new hardware conforming to the adopted standard protocol.

What this means to the end user is the ultimate in flexibility with respect to control over the information and its use in analysis. In a microcomputer environment this means the ability to automatically transfer, for example, history and trend data into other popular systems such as dBASE III or Lotus 1-2-3. With this capability the energy manager can accurately and attractively present program effectiveness to other non-technically oriented individuals in the organization. In other words, an energy manager will have the capability to quickly and accurately evaluate the situation and then format the results in a Board-ready presentation.

There are hundreds of inexpensive software packages for PC type microcomputers that can be used to prepare impressive text, tabular, and graphic presentations in multiple colors if desired. Almost all can use the type of standard formatted data produced by these systems.

In summary, the technology that exists today is two to three generations ahead of that which existed when the concern for reducing energy costs was high. Ironically, energy costs are still relatively high, and many opportunities still exist for significant reductions. Yet the industry has failed to effectively disseminate the information. My recommendation is don't wait, investigate!

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A Preview of Facility Management Software

Computer maintenance programs, like everything else, range from sorrowful to superb. Committing your facility to the former is like shooting yourself in the foot. Ask someone who has done one or the other; they'll confirm how painful and expensive either one is.

In the course of sorting through vendors' literature and demos, we heard a lot of

Data Base Update

Howard Millman

them singing their product's praise. Ordinarily, we'd dissect these programs, evaluate their features, analyze their claims, weigh their value, and balance all this against their cost. But that's neither fair nor feasible.

Computerized maintenance programs are sophisticated and multi-faceted. That's not to say they're difficult to use, but they're unlike most general application programs. As a result, their suitability to a task is decided by you, the user.

We looked at these programs to decide if they do what they say they do—their user

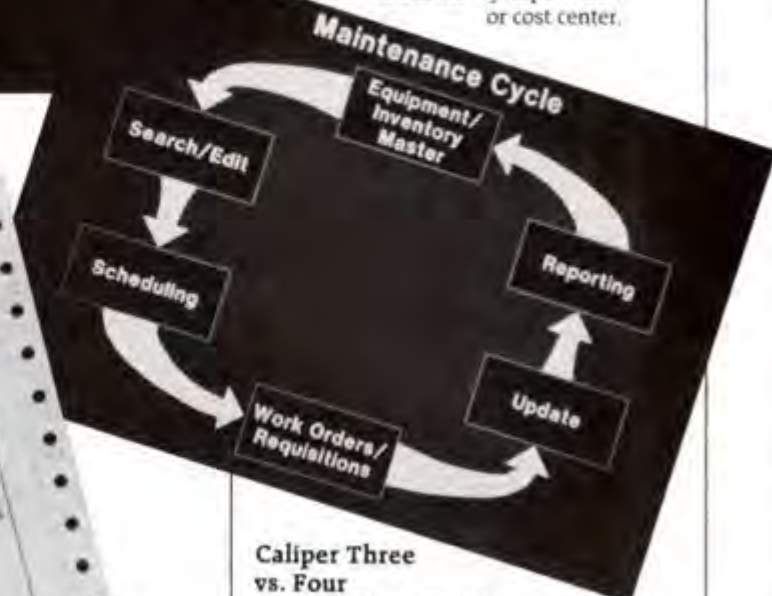
interface, speed, graphics, and so on. These are quantifiable entities. But whether or not it delivers what you expect is ultimately your decision. You best know your facility priorities along with the availability and limitations of its resources.

With that in mind let's preview three products offered by Diagonal Data Corp. of Lakeland, Florida. In a prior life two of their systems, Series Three and Series Four, were marketed by Acme Visible Record. They have been reintroduced and renamed by Diagonal Data and are called Caliper.

Both Caliper Three and Four are preventive maintenance systems designed to automate and schedule PM procedures. They share such features as maintaining detailed equipment history, and tracking spare parts inventory and parts usage by equipment. Either will notify users when stock falls below a predetermined minimal quantity. Additionally, they will track vendor/equipment part numbers as well as last price paid.

To varying degrees, the repair history of equipment and some commentary about specific tools or requirements can also be

included. Repair, replacement, or routine maintenance costs per job can be allocated by department or cost center.



Caliper Three vs. Four

Caliper Three schedules maintenance by days only. Caliper Four can schedule by days, miles (for rolling stock), and runtime.

Caliper Three permits listing of five crafts with up to twenty procedures per trade. Caliper Four accommodates an unlimited number of crafts and operations. Additionally, Caliper Four accepts unscheduled corrective and emergency maintenance.

Caliper Three is restricted to four PM operations per machine; Caliper Four is unlimited. We feel that even though users can label the procedures, four procedures is too restrictive for all but the simplest of equipment. Yet another of Caliper Three frailties is spare parts—it accommodates only thirty-nine spare parts per machine. Caliper Four, once again, is unlimited in this area.

Caliper Four offers other advancements as well. One is a password-secured message center for exchanging messages between shifts or operators; another is a bar coding module for larger inventory stores. Along these same lines, users can append a detailed commentary to specific equipment regarding special procedures or spare parts/tools required for repairs. This last feature impresses us as the place to spotlight the political considerations that occasionally influence our maintenance decisions.

Well, if Caliper Four is so much more flexible, why would anyone buy Caliper Three? The price, Caliper Three, suitable for smaller institutions, is entry priced at \$3,495—a bargain basement price in the world of expensive special purpose software.

Caliper Four, priced at \$5,495, includes a basic maintenance plus an inventory module. The fleet (automotive) and bar coding

Howard Millman is assistant director of facilities at Columbia University's Lamont Doherty Geological Observatory in Palisades, New York, and Nevis Nuclear Laboratory in Irvington, New York. He is also a freelance technical writer and frequent contributor to several national computer magazines.

SPRING 1988

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		LAST						LAST			
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LABOR	132.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	132.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MONTH TO DATE PARTS :		0.00		LABOR :		132.50		TOTAL :		132.50	
YEAR TO DATE PARTS :		0.00		LABOR :		132.50		TOTAL :		132.50	
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DOWN TIME 2		0.00		0.00		0.00		0.00		0.00	
DOWN TIME 3		0.00		0.00		0.00		0.00		0.00	
DOWN TIME 4		0.00		0.00		0.00		0.00		0.00	

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modules are an additional \$1,000 each. The

Overall, Micro appears somewhat more and adaptable. With its enhanced writer, reports can be custom for relatively disperse high data

modules are an additional \$1,000 each. The price for reading bar codes in the field is \$2,000, the cost of the portable handheld scanner.

Caliper Three also contains other shortcomings from a facility manager's perspective. Our overall impression is that it is designed to track maintenance on equipment rather than buildings. So while it might suffice for a heating plant, we would not recommend it for tracking an entire facility.

And in This Corner... Micro Maint

For total facility management, consider either Caliper Four or another of Diagonal Data's packages, Micro Maint. At \$5,950, its price is comparable to Caliper Four. Besides price, Micro Maint is similar to Caliper Four in many other ways. They both print and track purchase orders, provide expanded management reports capable of highlighting selected trades or operations, as well as recapping costs by operation or specialty. Both programs offer a comprehensive hard copy report generator.

While Caliper uses preprinted work orders, available from Diagonal Data, Micro Maint's work order and requisition forms are printed on blank sheets initially formatted by the user. With the bar code module, the code is also printed directly onto purchase and work orders, thereby reducing the paper trail's length.

Caliper Three and Four run on IBM compatible micros. Although both are written in compiled dBase, only Four supports local area networks for multi-user systems.

Micro Maint, written in Cobol, runs on desktop as well as on IBM's System 36. The prices quoted above, incidentally, are for single-user systems. Prices of packages configured for LANs are based on the number of users.

Overall, Micro Maint appears somewhat more flexible and adaptable. With its enhanced report writer, reports can be custom formatted to selectively display or hide data. Both Caliper Four and Micro Maint can import and export Lotus 1-2-3 and dBase files.

All three programs seem reasonably easy to use. Depending, however, on the number of modules, amount of data to be backfilled, and computer expertise of the users, they will require at least some formal training. Caliper Three and Four prices include a one-day class in Diagonal Data's Chicago office plus ninety days' telephone support.

Micro Maint's training is an extra cost. Classes are offered in the Lakeland, Florida office (which tells us that more Micro Maint packages are sold in February than at any other time of the year). On-site training classes are available as an option.

Before committing your facility to a system, Diagonal Data's or another vendor's, you must be reasonably sure it will do the job. Even the hefty initial capital investment is eventually dwarfed by the cost of keying in the initial data and keeping that data current.

Usually a vendor will offer demos of the software, as does Diagonal Data. Caliper is available as an automated demo. Micro Maint is offered on a modified "try it before you buy it basis." They send a modified copy limiting, for instance, the number of equipment entries. After receiving the sample disks, a salesperson "walks" the user through it via the telephone. This no-cost (and apparently no obligation) telephone talk-through demonstrates the program's capabilities.

Obligation notwithstanding, take advantage of offers such as these. A reputable vendor will willingly demonstrate its product as well as supply references. While this is still no guarantee that the program is right for you, it will enhance your chances of eventual success.

The risk is worth the rewards. Take the chance and go for the gold. And if you

should, despite your best efforts, make a mistake, keep in mind that we all occasionally slip up. Even Noah took mosquitos on the ark.

So work with the program and learn its capabilities. You'll then be better able to decide if it suits your objectives. Remember, you best know your facility and its resources.

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COMING UP IN OUR NEXT ISSUE

In future articles we'll continue to preview facility management programs as well as profile member institutions that have maintenance tracking software on line. We'll ask them about their systems' strong and weak points. How difficult was it to learn? To have accepted by their staff? What is its cost/benefit ratio? Finally, is the administration singing the system's praises or howling the blues? See you in the summer issue.

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The Bookshelf

Technology Transfer

Trends in Technology Transfer at Universities: A Report of the Clearinghouse on University-Industry Relations. Washington: Association of American Universities. 1986. 59 pp. Free, softcover.

This study is based on responses to a 1985 questionnaire and examines the method universities are using to accelerate the flow of results of their research into industrial application, with attendant financial benefits. The report is concerned primarily with patent licensing and organizational methods used to promote commercial applications of research.

Survey results reveal widespread changes in internal patent and licensing activities, as well as increases in the number of invention disclosures provided by faculty members to the university. *Trends in Technology Transfer at Universities* explores the circumstances that may have contributed to this trend:

1. Federal patent policy changes that permit universities to own patent rights to inventions developed with federal funds;
2. Growth of state economic development programs that provide incentives for universities to link technology with business;
3. A new approach to public service by universities;
4. Faculty requests for technology transfer capabilities and the attendant financial incentives for faculty; and
5. Reduced research funds.

This study clearly shows that universities do not have a unified view of their role in the development of technology and its relationship to business. Nonetheless, most universities stressed their commitment to transmitting knowledge to the public domain. Many universities are now arranging for developing and marketing their own inventions. Others establish nonprofit or profit entities outside of the university.

The sampling of forty-two leading research institutions in this report offers varied approaches and practices of technology transfer activities. The range of possible activities reaches from an active patent and licensing program to the establishment of a corporation to develop products resulting from university research.

The report is interesting, informative, and easily readable, but the topics are not, for the most part, of interest to plant ad-

ministrators (although university finances certainly affect physical plant budgets). On the other hand, the acquisition, operation, and maintenance costs of the facilities in which the research was performed should be recognized when subsequent commercial applications are envisioned.

An example cited was New Jersey's establishment of technology centers to



promote university-industry collaboration. Such programs, though not mentioned in the report, might involve physical plant administrators in budgeting and in establishing and maintaining facilities. In addition, tours of university facilities and instrumentation for industry are common practices, which emphasizes the importance of physical assets.

Not mentioned in this report are situations in which physical plant administrators and facilities managers of universities might be recipients of technology transfer from university-based work. The AAU study focused on patentable research and did not include specialized areas of interest to particular industries. As an example, the Office of Facilities Management Systems at the Massachusetts Institute of Technology has shared its software technology and expertise in facilities management through a consortium of users, primarily universities, for nearly fifteen years.

During 1986 two new consortia based at MIT with industrial affiliation have been established through the Laboratory for Intelligent Systems in Process Engineering and the Laboratory for Manufacturing and Productivity. The idea for achieving the transfer of technology through university-based consortia seems to be an idea whose time has come.

Trends in Technology Transfer at Universities is available from the Association of American Universities, One Dupont Circle, Suite 730, Washington, DC 20036.

—Mary Frey
Consultant/Editor

Office of Facilities Management Systems
Massachusetts Institute of Technology
Cambridge, Massachusetts

Taking Risks/Making Opportunities

Take the Road to Creativity and Get Off Your Dead End, by David Campbell. Greensboro, North Carolina: Center for Creative Leadership. 1985. 136 pp. \$4.50, softcover.

This is a most interesting book that should be added to your library next to *Up the Organization*, *The Peter Principle*, and *The Ulyssian Adult*. It is a pleasing text that can be easily read in a short period of time and is concise with its suggestions for growth.

The gist of the title is to keep growing and achieving regardless of age or position in life. The examples used are from business and family experiences. If you buy into the belief that our business organizations are in fact family units, the suggestions or examples of family can easily be transformed to the business world.

The author states his philosophy this way: "Creativity demands commitment. To change one's life even in small ways requires energy, participation, and enthusiasm. You can't be creative while inert; you have to get involved."

We all know people who work for their wages, but work harder to stay away from any chance to make decisions. They are interested in maintaining the status quo and do not want to contribute beyond their normal working hours.

I've known a few of these types, and they always choose the safe alternative of doing nothing. Why take a chance when they still can collect their wages for not getting involved? Why take a chance? It doesn't pay any more than taking a risk. These types are normally also quick to second guess or criticize any decision made.

The author also states a number of characteristics in becoming a creative manager—namely, to absorb risks, stretch company policies, be a good listener, do not dwell on mistakes, and enjoy the job.

I'm not sure about stretching company policies, but yet I agree that to be creative you must take risks and not pass onto others the fallout when those steps are unpopular. If you want to be creative, then accept the conviction and move accordingly.

The book continually reasserts the same tone throughout. To live a creative life, one has to gamble, to take some chances. As in gambling, make sure of your facts and probabilities for success, then take the risk. After all, risk is opportunity. Captain Grace Hopper has said, "If we don't learn to take risks, we never succeed." In taking a risk and attempting creativity we have to "get off our dead end."

The book ends by stating the three phases of the creative process.

1. Experience—"The past," which comes to us through history or traditions.
2. Creativity—"The idea" comes about through a change in direction by imagination and flexibility.
3. Leadership—"The future," what lies ahead if we take up the challenge of creativity.

The history and tradition of "we've always done it that way" falls outside the creative process described and is for those who want to extend the status quo and proceed safely. The creative process works much like an inverted cornucopia. Experience leads to the potential for creativity, which leads to the possibility of leadership, which produces more experience, which leads to greater creativity, which demands even better leadership, which leads to expanding experiences, and so on.

This book is well worth the time in reading and would be a worthwhile addition to any library. *Take the Road to Creativity and Get off Your Dead End* is available from Center for Creative Leadership, P.O. Box P-1, Greensboro, NC 27402.

—**Thomas R. Wray**
Assistant Director, Physical Plant
University of Houston
Houston, Texas

Operating High Tech Facilities

High Tech Real Estate, ed. by Alan D. Sugarman, Andrew D. Lipman, & Robert F. Cushman. Homewood, Illinois: Dow Jones-Irwin, 1985. 639 pp. \$50, hardcover.

High Tech Real Estate begins with an overview of the information society and current private branch exchanges (PBX) trends in video conferencing, local area networks, fiber optics, satellite, teleports, videotex, and the implications on present-day buildings.

This is followed by a discussion of telecommunications and related tech-

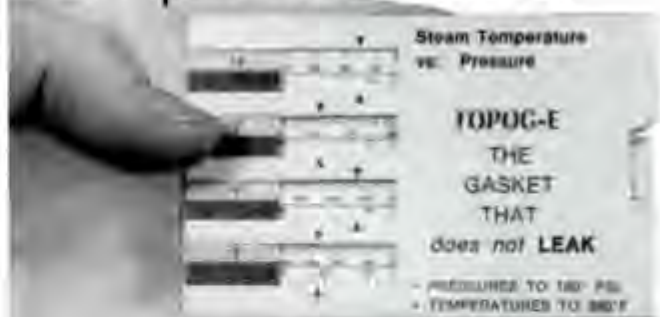
nologies. This section provides a good introduction to basic communications concepts such as types of modulation, analog vs. digital communication, communication mediums—i.e., twisted pair, coax cable, microwave, optical fiber—and various modes of transmission such as half duplex, full duplex, asynchronous, and synchronous systems.

The authors also discuss revenue opportunities of high tech facilities, share tenant facilities, and the economic trends on high tech building. These chapters are written for real estate developers and point out marketing opportunities. Most of the remaining chapters of the book are about telecommunication.

Although there are limited discussions on energy management, HVAC systems, cogeneration, and risk management, these topics have been covered in an incidental and shallow manner. The material in the text is more important for a real estate developer than for a facilities manager.

Thirty-seven of the book's fifty-eight contributing authors are in the communication field, fifteen in real estate development, four are lawyers, three are architects, and

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only one is in facilities operations. Although the authors are competent professionals in their own fields, their emphasis has been on generalities of planning and developing high tech facilities at a macro level.

One of the major problems of this book is that there apparently has been a lack of good coordination by the editors on the material covered by each author. There is hardly any chapter in the book where at least half of the material is not covered in some other chapter. Most of the chapters have some discussion relating to AT&T divestiture and PBXs. This led to confusion as to whether I was reading the chapter for the first time or had read it earlier.

I had expected this book to cover pertinent issues in planning, designing, and operating high tech facilities, and discuss opportunities and problems in these areas. Unfortunately, it failed to meet my expectations. The book perhaps will be highly useful for ambitious developers with business degrees who have no knowledge of the technical aspects of facilities. Therefore, as a whole, I cannot recommend it for facilities managers.

High Tech Real Estate is available from

Dow Jones-Irvin, 1818 Ridge Road,
Homewood, IL 60430

—**Mohammad H. Qayoumi**

Associate Executive Vice President
Facilities Development and Operations
San Jose State University
San Jose, California

Effective Decision-Making

Whatever It Takes: Decision Makers at Work, by Morgan W. McCall Jr. & Robert E. Kaplan. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1985. 132 pp. \$15.95, softcover.

With every problem comes a context, which includes its own history and the host of related and unrelated problems that co-exist with it. Executive decision making is not a series of single linear acts like baking a pie. It is a process, a sequence of behavior, that stretches back into a murky past and forward into a murkier future.

With that preface the authors delve into the decision-making process emphasizing

the "context" and not just the decision. Their stated purposes are:

1. To show what managers are up against as they move through the crowded and shifting vistas of problems, people, pressures and resources, and
2. To suggest rules-of-thumb for managers to use as they attempt to find direction and achieve movement.

We as physical plant managers often find ourselves in the role of fire fighters putting out one fire after another without the benefit of or immediate concern for the underlying causes or long-term impact of the solution.

This book, then, is a blessing. With examples from the "real world," the reader begins to carefully evaluate his or her past (and future) decisions and ask pointed questions. At the end the reader is a better decision maker because he or she is more confident.

This 120-page book is probably the best I've read on decision making, and it's fun reading. The six chapters are well documented and fact-founded. You are convinced that every problem (and opportunity) has its origin well before the decision maker became involved and will subside long after the decision is made.

McCall and Kaplan discuss the decision-making arena. They note that decisions are not simple discrete events; that managers may work on many petty problems at once (where to locate a drinking fountain) or crisis centered (buying a million dollar piece of equipment), that the recognition and definition of a problem are not the same. Clearly, the authors observe, the most important aspect of problem resolution is problem definition. (Does this sound familiar?)

Good managers create problems. They do so through intuition, through listening, and by asking questions. They see or sense that something is askew. Most of their day is spent in information processing—reading, attending meetings, and observing. As they compare: existing vs. some standard, actual vs. a plan or forecast, ours vs. theirs, etc., they wonder at the variances.

Thus, a problem is created. Interestingly, the authors report that their research has found that "beyond a certain point, more information does not improve the accuracy of decisions, but it does increase the decision maker's confidence in, and satisfaction with, the decision."

Ever wonder how you set priorities for which problems to attack first? Read Chapter 3. A manager's day is hectic and fragmented. He or she addresses many issues, accumulates lots of information (interactive, current, mundane, significant). How does the man-

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ager know when to act? The authors suggest three circumstances for action:

1. Know there is a problem or suspect something is wrong;
2. Sense pressure (a deadline, a crisis, a supervisor's demands); and
3. Have the resources to act.

An absence of one of the above could forestall action. But once the decision is made to act, the decision maker will determine whether action should be quick or slow. According to the authors, there are certain contextual factors that strongly affect whether action will be swift and sure or drawn-out and convoluted: a) urgency of the problem, b) how the problem is defined, c) which people will get involved, and d) balance of power and vested interests. The authors suggest that action may be by the "muddling through" process or the brick-by-brick approach.

Many problems, we're told, are not solved but are held off a little longer only to reappear. Often a manager will not know that a decision has been made. Routine actions with foregone conclusions are boring to those watching attentively to see what will happen, but bold-stroke actions

fascinate people. What are the actions?—No decision, decision not implemented, a decision may not work, decision may have an unintended consequence, or decision may not endure forever.

McCall and Kaplan say that there are basically three types of consequences:

1. Formation of a precedent (for organization or manager).
2. Impact on relationships (from participation to exclusion).
3. Affect on manager's track record.

"Put succinctly, a manager needs to consider carefully what role to take in negotiating the outcomes of action," state the authors, who then provide a few rules of thumb.

The authors' concluding chapter emphasizes the observation that it is nearly impossible to change a decision-making pattern. They advise that "managerial decisions have been and will continue to be a product of judgment and luck as well as expertise. In such a case, a slight improvement is no small accomplishment."

There are some things a manager must do to make the most of the latitude available to them: "a) exercise the choices they do have, b) know the organization and business

they are in, c) know themselves, and d) develop and use a wide variety of skills." I would suggest a fifth must: read McCall and Kaplan's book. This is one of those gems that appears periodically and should be read again and again.

Whatever It Takes: Decision Makers at Work is available from Center for Creative Leadership, P.O. Box P-1, Greensboro, NC 27402.

—Gary H. Kent

Assistant Director, Physical Plant
State University College of Buffalo
Buffalo, New York

Design Firm Organization

Design Engineering Project Maintenance: A Reference, by Joseph R. Hilton Jr., Lancaster, Pennsylvania: Technomic Publishing Company, Inc., 1985, 133 pp. \$25, softcover.

This brief book has been prepared in a reference format for the management of design engineering projects. In general, it is oriented toward the organization and ad-

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ministration of design engineering from the perspective of a consultant engineering firm.

The publication is subdivided into four areas: contracts, organization, execution, and administration. The subject matter is adequately described if one is seeking basic information on how a consultant design engineering office might be structured and how it might administer a design engineering project. However, unless an APPA member is considering starting a design engineering firm, I would not recommend this book. Even then it is insufficient in detail to be a working resource for the successful accomplishment of design engineering project management. It can, however, serve as a primer or overview introduction to the subject area.

The contracts section describes types of design and engineering contracts and sub-contracts, while the section on organization describes a typical engineering company organization and general procedures for organizing a project. This latter section not only describes organizational staffing structures but also describes the responsibilities of the various members of the design and engineering team. The execution section describes the development of the informa-

tion about a project and the final product preparation, including production of drawings, specifications, and reports. Construction is not covered in this book except as it affects the engineering and design. Finally, the administration section describes the management functions of project development, including accounting of time, project meetings, documentation and document control, change notices, scheduling, project monitoring and progress reporting, financial matters, office supplies, and personnel.

If an APPA member has the time, this book offers a basic perspective of how a design engineering firm might be organized and how it might administer the advancement of a design and engineering project. Do not anticipate too much from this book, however, since it includes information that many readers probably already know.

Design Engineering Project Management is available from Technomic Publishing Company, Inc., 851 New Holland Avenue, Box 3535, Lancaster, PA 17604.

—Gregory W. Bressler
Associate Vice President
Facilities Management and Planning
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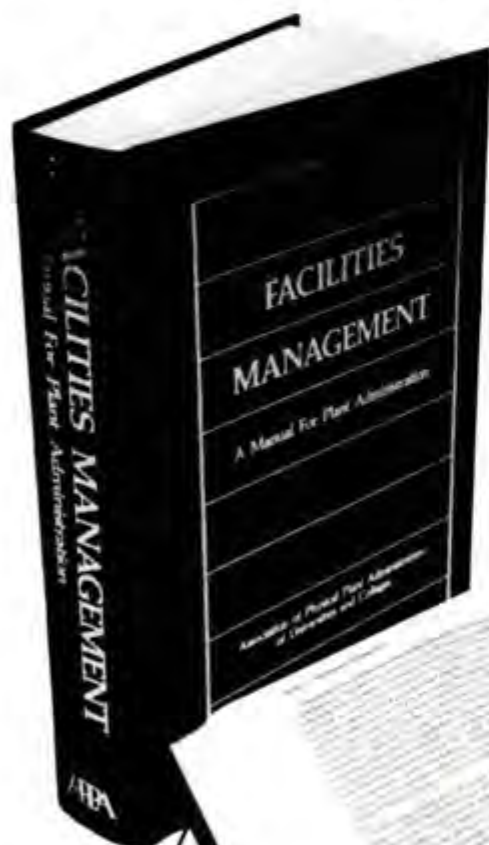
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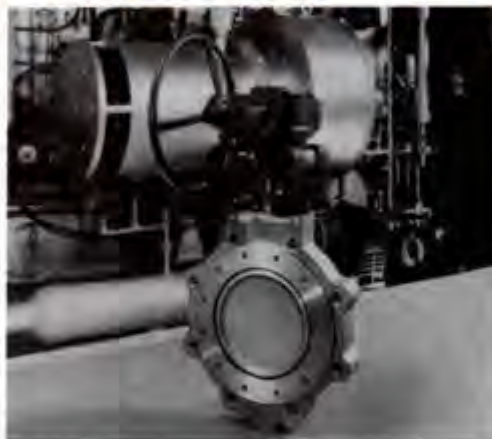
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Find out why colleges and universities, hospitals, and other institutions are switching to Wafer-Sphere® high-performance valves. Simply cut out this ad and mail it to us with your name and address. We'll send you our new brochure containing full details.



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