The official publication
of the Association
of Physical Plant
Administrators of
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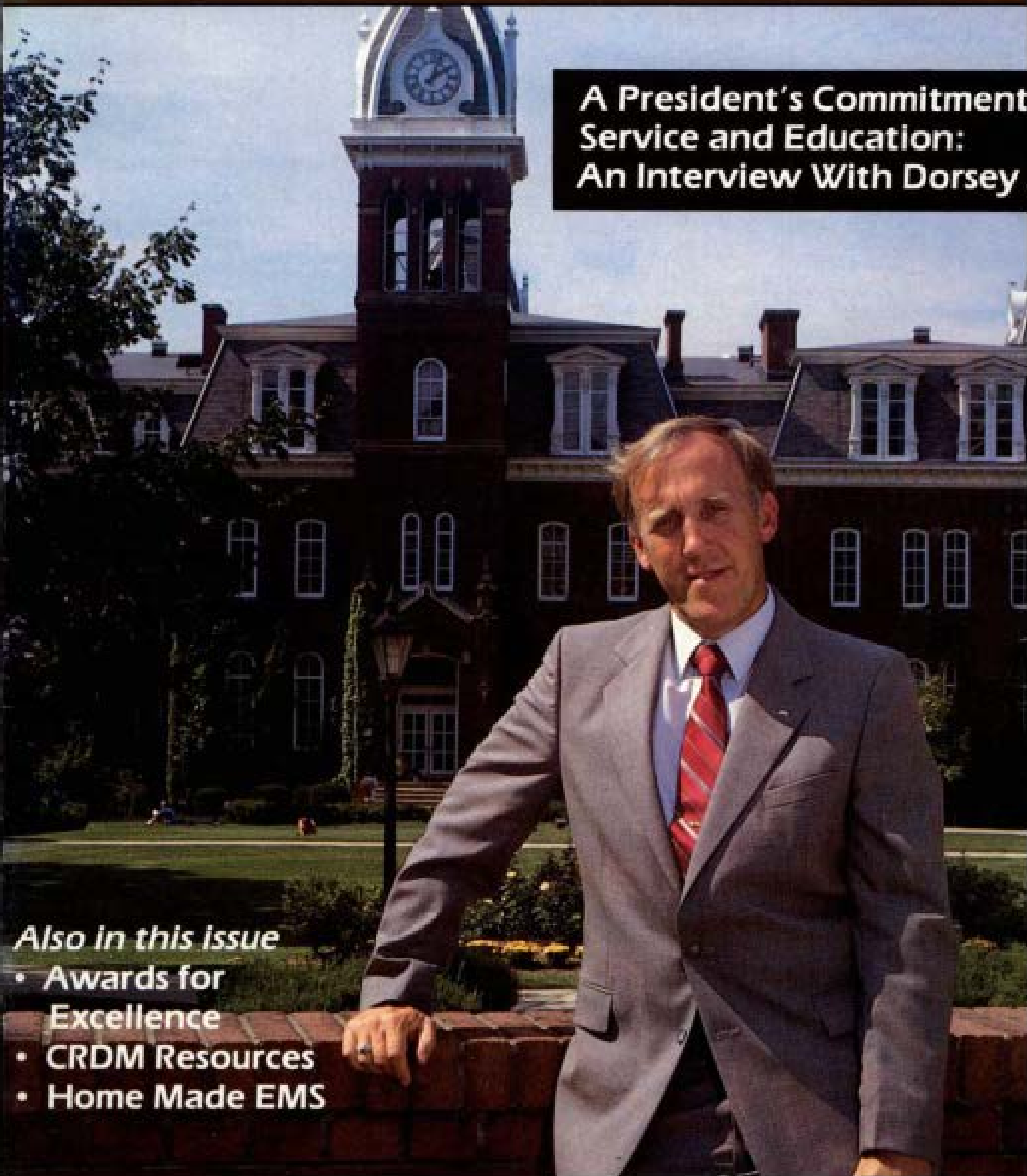
Facilities Manager

Volume 4 Number 3 Fall 1988



A President's Commitment to Service and Education: An Interview With Dorsey Jacobs

Also in this issue

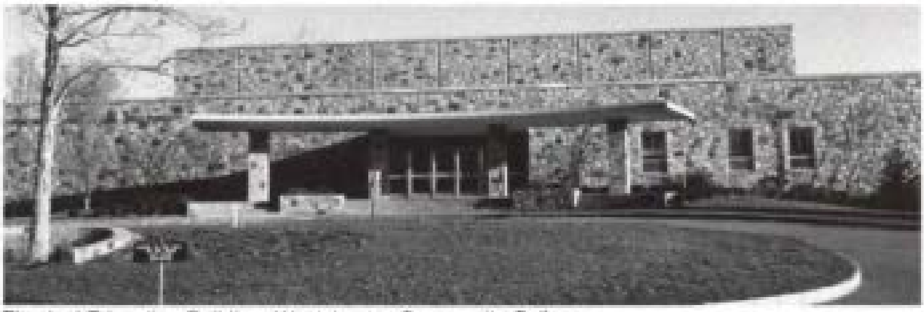
- Awards for Excellence
- CRDM Resources
- Home Made EMS

PCPLUSYSTEMS™ SOLVE THREE REROOF PROBLEMS

Tapered FOAMGLAS® Roof Insulation, featured in PC PLUSYSTEMS,™ provides a unique and desirable combination of long-term operating efficiency, reduced maintenance costs, and safety.

Kenwood High School, Baltimore County School District

Hertz Hall, Central Washington University



Physical Education Building, Westchester Community College

Kenwood High School, Baltimore County School District, MD

The fiberboard insulation in this school's original 1953 roof was completely saturated with water in some sections—a total reroofing was required.

Since PC PLUSYSTEMS™ had previously proved successful in other Baltimore Schools, PC PLUSYSTEM 1, the All-FOAMGLAS® system — the only insulation on the market resistant to moisture in both liquid and vapor forms — was selected for Kenwood.

The over-110,000 ft^2 of FOAMGLAS® insulation is providing Baltimore school officials with energy savings, reduced maintenance costs, the security of total noncombustibility, and dimensional stability which will add years of efficient performance to the *entire* roof.

According to E. Joseph Martin, assistant supervisor of building inspection and major roof renovation for the Baltimore County Public Schools, the PC PLUSYSTEMS™ are "literally trouble- and maintenance-free."

Hertz Hall, Central Washington University, Ellenburg, WA

Severe water damage necessitated a total reroofing of Hertz Hall, which houses the music department, and the roof on the University's Central Boiler Building.

Considered but rejected were fiberglass…too cost prohibitive; EPS foam… highly flammable and too low in density; and perlite which is thermally inefficient and absorbs moisture.

Based on performance tests and building code drainage requirements, tapered PC PLUSYSTEM 3 was specified for Hertz Hall. This system of FOAMGLAS® insulation with polyisocyanurate underlayment provided high R-value; noncombustibility; an ideal surface for the new single-ply, modified bitumen system; and economy.

For the Central Boiler Building, a non-tapered, All-FOAMGLAS® PC PLUSYSTEM 1 was selected because of its high compressive strength and it's ability to provide the total moisture resistance necessary to avoid vapor penetration and blistering problems.

Physical Education Building, Westchester Community College, Valhalla, NY

"For this type of facility we wanted the best insulation we could get," says Anthony Loscri, Senior Civil Engineer, Westchester County Department of Public Works.

This State University of New York (SUNY) building required reroofing over both its gymnasium and natatorium. Membrane cracks had developed and severe ponding and leaking were occurring.

Anthony Loscri specified *guaranteed*, totally moisture-resistant, All-FOAMGLAS® PC PLUSYSTEM 1 over the humid natatorium; and *guaranteed*, high R-value, PC PLUSYSTEM 2 — FOAMGLAS® with Phenolic Foam underlayment — over the gymnasium.

"It costs a little more," says Mr. Loscri, "but after seeing the results of other roof board insulations I was willing to spend more for a better insulation system."

For roof insulation on your facility… where reliability, efficiency and safety are "required subjects," a PC PLUSYSTEM can meet *all* of your demands.

For copies of Case Studies on the three facilities, or more information, call (412) 327-6100, Extension 356. Or write Pittsburgh Corning Corporation, Marketing Department FB-8, 800 Presque Isle Drive, Pittsburgh, PA 15239. In Canada, 106-6 Lansing Square, Willowdale, Ontario M2J 1T5, Tel: (416) 222-8084.

PITTSBURGH CORNING®

THE INNOVATIVE INSULATION PEOPLE

Volume 4 Number 3
Fall 1988

Facilities Manager

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Features

Departments

Cover photo by Edward A. Petrosky.

Congratulations!
from APPA and *Facilities Manager* to
HARVEY H. KAISER,
Syracuse University
Recipient of the 1988 Rex Dillow Award for Outstanding Article for "Capital Needs in Higher Education," Summer 1987.

PHOTO BY STEVE GLAZNER

Facilities Manager (ISSN 0882-7249) is published quarterly (Spring, Summer, Fall, Winter) by the Association of Physical Plant Administrators of Universities and Colleges, 1446 Duke Street, Alexandria, Virginia 22314-3492. Editorial contributions are welcome and should be sent with SASE to this address.

Of APPA's annual membership dues, $30 pays for the subscription to *Facilities Manager* and *APPA Newsletter*. Additional annual subscriptions for both periodicals cost $40 ($50 for non-U.S. addresses).

For information on rates and deadlines for display and classified advertising, telephone 703/684-1446.

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APPA UPDATE

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

$20 Billion Needed to Repair Crumbling Campus Facilities

Cost Expected to be Higher When Final Capital Renewal/ Deferred Maintenance Report is Released

More than $20 billion is urgently needed to repair crumbling campus facilities, according to preliminary results of the Study of Capital Renewal and Deferred Maintenance Costs. The cost to repair and replace higher education facilities is expected to be considerably higher when an executive summary of the final results is released at a press conference on October 13.

Preliminary results of the joint study, sponsored by APPA and the National Association of College and University Business Officers (NACUBO), were released at APPA's 75th Annual Meeting in July. The study is the first nationwide effort to identify the extent of deferred maintenance and capital renewal in higher education facilities since the 1974 HEGIS study.

The survey was developed by APPA's Research and Survey Committee and NACUBO's Facilities Management and Planning Committee. Sean Rush of Coopers & Lybrand, the firm that ultimately analyzed survey data, devised the questionnaire which APPA sent to 750 randomly selected colleges and universities.

Preliminary results of the survey indicate the following minimum total verifiable deferred maintenance and repair needs of the nation's 3,300 institutions of higher education:

- Research institutions—$7.2 billion
- Doctorate-granting institutions—$3 billion
- Comprehensive institutions—$5.4 billion
- Liberal arts colleges and universities—$1.9 billion
- Two-year colleges—$2.4 billion
- Medical institutions—$462 million

At least $15 billion is needed to repair and renovate academic facilities such as buildings, laboratories, and offices. Auxiliary structures such as dormitories, dining halls, and athletic centers require at least $5 billion for repair and renovation.

Other preliminary results show that the gap between "urgent needs" and actual spending for capital renewal and deferred maintenance is wider at research and doctorate institutions. For instance, research institutions spent an average of $6 million on deferred maintenance in the 1986-87 academic year. However, $18.9 million is needed annually just to maintain buildings already in good condition; this excludes the cost of tackling the backlog of repairs. Doctorate-granting institutions spent an average of $2.4 million in the 1986-87 academic year; $7.9 was needed for upkeep.

The final report, *The Decaying American Campus: A Study of the Condition of College and University Facilities in America,* will be released at an October 13 press conference at the National Press Club in Washington, D.C. Walter Schaw, APPA executive vice president, Caspa Harris, NACUBO executive vice president, and Sean Rush, Coopers & Lybrand, will be present to release the report.

Because of the importance of the report to higher education, APPA member institutions may be contacted by the press for a local perspective. The complete report, when available in November, will be sent free to the institutions that participated in the survey. Additional copies for APPA member institutions is $25; nonmember price is $50. Add $8 for shipping and handling and order from APPA, 1446 Duke Street, Alexandria, VA 22314-3492.

Member News

Duke University, Durham, North Carolina, is an honor award winner in the 1987 Grounds Maintenance Awards Contest, sponsored annually by the Professional Grounds Management Society and *Grounds Maintenance* magazine. The university won for its athletic fields in the contest's Category 6 for park, recreation area, or athletic field.

• • •

Iowa State University and **Southern Illinois University at Carbondale** tied for first place in the 13th annual Cost Reduction Incentive Awards Program, sponsored by the National Association of College and University Business Officers (NACUBO) and the USX Foundation. Both institutions received an unrestricted cash award of $7,500 for their on-campus chemical-treatment methods for disposing of hazardous waste.

Iowa State University conducted an inventory of their hazardous waste to identify chemical waste that could be treated locally to eliminate the need for disposal. The university now uses a number of simple chemical-treatment methods such as acid-based reactions, oxidations, and filtrations to break down the waste. This new method of handling hazardous waste saves the university more than $295,000 annually. In addition, the university is avoiding potential cleanup costs of shipping hazardous waste to land disposal facilities.

The pollution control department at Southern Illinois University was instrumental in developing a plan to neutralize hazardous waste. The plan was designed around three types of waste—acids and bases, cyanide compounds, and acidic waste containing high levels of toxic metals generated by environmental water analysis. Acids and bases are neutralized using relatively simple techniques, cyanide compounds are destroyed with a hydrochloride solution, and waste from water analysis is solidified in a cement mixture. The project saves the university approximately $20,000 annually.

Inside APPA

194 Attend August Institute

The August Institute for Facilities Management, which was held in Charleston, South Carolina, had 194 participants including an enrollment of 33 in the special program, Energy and Utilities Management. In addition, this Institute marked the first offering of the small college track of the regular program. Previously, the Small College Program had been offered as a separate special program at the Institute.

The August Institute integrated small college sections into the classes of Programs 1 and 2. Attendees can now graduate from the Institute by taking some of their classwork with an emphasis on small college needs. The small college sections will be offered at all subsequent Institutes.

This Institute also boasted the largest group of graduates—32 in all. Graduates are individuals who have completed all three tracks of the regular Institute program. The following are graduates of the Institute for Facilities Management:

Richard Begg, Iowa State University
Andargeh Belachew, University of the District of Columbia
David Booth, University of Virginia
Lawrence Bradley, North Carolina State University
William Brazeal, North Carolina State University
John E. Bruning, University of Colorado/Boulder
Ted Bruns, University of Oregon
Fred Chukes, University of California/San Diego
Bobby J. Criminger, University of North Carolina/Asheville
Adrian Cuarta, University of South Florida
Larry Joe Daughtry, University of Southern Mississippi
Chonna Delaney, Stanford University
Greg Fichter, Indiana University
Troy Foster, University of Science & Arts of Oklahoma
Thomas Goodman, University of Virginia
James Harkness, Stephen F. Austin State University
Hank Hewetson, Indiana University
Khurshed Irani, Ryerson Polytechnical Institute
Carey Jennings, University of California/San Diego
Janice Lapinski, Oberlin College
Patrick Lawlor, Virginia Commonwealth University
Evan Lopez-Stickney, Ohio-Wesleyan University
Kenneth Morrill, University of Rhode Island
Ray Phoenix, Southern Illinois University
Polly Pinney, Arizona State University
William Ross, University of Nebraska/Omaha
Mark Schwartz, University of Rochester
Richard Stevens, St. Louis Community College
Mark Streckenbein, Atlantic Community College
Richard Vidal, University of Houston
Joseph Weiland, University of Nebraska/Omaha
John Wood, University of Tulsa

Pacific Coast APPA Officers Elected

The Pacific Coast region of APPA elected new officers in July. They are: president-elect, C. Ron Hicks, director of plant operation, California State University/Fresno; secretary-treasurer, Howard A. Wells Jr., director of physical plant, Oregon State University; vice president for annual meetings, Dale M. Klein, director of physical plant, Claremont Colleges (CA); and vice president-elect for annual meetings, Judd Whetten, director of physical plant, Brigham Young University/Hawaii.

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

Upcoming Educational Programs

For more information or to register for any of these programs, please contact the APPA Education Department, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446.

October 23-27, 1988
Information Management Workshop: Information Systems and Computer Applications for Facilities Management
Duke University
Durham, North Carolina

What are the goals of your management team and how can computers support these goals? Is computerization cost-effective? Where do you find the support you need and how do you know which systems are right for you?

These and many other issues will be addressed in this upcoming Information Management Workshop. The program focuses on sharing experiences and hands-on examination of existing computerized systems. Applications used in the colleges and universities in North Carolina will be presented. Tours of Duke's facilities and the NC Micro Electronics Center in Research Triangle Park are included in the program.

In addition, exhibitors have been invited to demonstrate their software applications and to encourage one-on-one consultation with attendees on existing needs.

Outline of Topics:
- Purchasing software vs. in-house development
- Managing information: a systems model
- Designing a practical in-house model
- Purchasing decisions
- Networking options
- Assimilating new information
- Concurrent sessions: CAD systems, facilities audit, energy management systems, key systems, preventive maintenance, project estimation, utility tracking, service order, and small college applications

Registration fees:
$295 for employees of APPA member institutions, affiliates, and subscribing members
$265.50 (10% discount) for additional registrants from the same institution
$345 for nonmembers

Hotel Accommodations:
Durham Brownstone Inn
$46/single; $54/double

January 15-20, 1988
Institute for Facilities Management
Austin Marriott at the Capitol
Austin, Texas

The January Institute will host the traditional three-track basic program including small college sections. To accommodate the increasing enrollments for Program 1, we will offer two complete Program 1 sections. This should allow everyone who wishes to attend the Institute the opportunity to participate and will decrease the class size to approximately 35 to allow more class participation and individual attention. There will also be two special programs offered.

Physical Plant Personnel Management and Training

This program will focus on the personnel function and managing the physical plant workforce. Topics to be covered in this week-long program include:
- Job classification/compensation
- Legal issues of hiring, firing, and employment
- The changing workforce
- Employee selection—hiring, interviewing, and promotions
- Employee orientation
- Employee relations and unions
- Safety and health issues
- Training programs
- Apprenticeship programs
- Managing performance problems and disciplinary actions
- Policy and procedure manuals
- Communication skills
- Newsletters as a training/development tool
- Principles of motivation and leadership

Capital Project Planning and Construction

This program will focus on the stages of the capital construction process—planning, design, contract administration, management of construction, and closing the project for occupancy. Topics to be covered include:
- Organization and space management
- Campus master planning
- Project planning and programming
- Funding, budgeting, and estimating
- Selection of A/E consultants
- Design process and review
- Design approval and specifications
- Value engineering and code compliance
- Computers in design
- Project contract documents
- Bidding process and alternatives
- Contract administration and project management
- Alternative construction methods
- Computers in construction
- Acceptance and occupancy

Brochures on the programs will be available at the end of October. Separate brochures cover in detail each of the special programs. For more information, contact the APPA Education Department, 703/684-1446.

(Inside APPA continued on page 8)

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 **November 10** for the December issue, **November 23** for January, and **January 10** for February. Closing deadlines for job announcements are posted at the request of each institution. In some cases, deadlines may be extended by an institution. APPA encourages all individuals interested in a position to inquire at the institution regarding its closing/filing date.

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

• • •

Director of Physical Plant. Innovation and challenge are key for the individual we seek to manage university facilities and physical plant operations, encompassing 6.5 million square feet and 145 buildings, spanning 800 acres, with an operating budget of $30 million, $150 million in capital projects in planning or under construction. Position requires knowledge of facilities, long-range planning, engineering, maintenance, construction, utility and financial management, and human resource management, which must be complemented by exceptional communications and leadership skills. Bachelor's degree in engineering, architecture, or business administration with six to ten years of related management experience and a proven track record of accomplishments are required. Master's degree in related field preferred. Please provide a resume and salary history by **October 21, 1988** to Charles Leffler, Assistant Vice Chancellor for Facilities, North Carolina State University, Box 7232, Raleigh, NC 27695. *EEO/AA Employer.*

DIRECTOR OF DESIGN/ CONSTRUCTION

The Facilities Department of the University of Rochester is seeking an energetic, responsive individual to direct, organize, and manage the department's Design/Construction Division. The Director will serve as the primary representative of the division providing facilities engineering, architectural services, and construction/project management to all university departments. The university is a private institution in upstate New York, which enrolls 9,030 undergraduate and graduate students. The individual selected for this position must have considerable knowledge of and experience in administrative and managerial practices, and overall project management skills including planning, design, estimating, construction methods, and scheduling. An ability to maintain effective working relations and strong communication skills are highly desirable.

MINIMUM REQUIREMENTS: Bachelor's degree in engineering or architecture and eight years' supervisory experience in management of a large facility complex or equivalent combination of education and experience.

HOW TO APPLY: University of Rochester, Personnel Department, P.O. Box 636, 260 Crittenden Boulevard, Rochester, NY 14642. Please include salary requirements.

UNIVERSITY OF
ROCHESTER

DIRECTOR, PHYSICAL PLANT DEPARTMENT
Stetson University

Stetson University invites applications for the position of Director of Physical Plant. This position reports to the Vice President for Business and Finance with duties which encompass the operational and administrative responsibilities for departmental budget development and planning, the management and upkeep of campus facilities including minor construction, and other related support service operations. The campus contains 40 major buildings covering 117 acres with a departmental support staff of 80 personnel. A bachelor's degree in engineering, business, or related field, and at least five years' experience in physical plant management is required. Strong leadership ability and excellent communication skills are essential. An advanced degree in engineering, business, or related field is highly desired. Salary is commensurate with experience and qualifications. To apply, qualified candidates should submit a current resume with salary history, the names, addresses, and telephone numbers of five references, and a detailed cover letter addressing the qualifications for the position relative to work experience and the reasons for interest in the position. Completed applications will be accepted until **October 28, 1988**, or until a successful candidate is found. Send applications to:

Steven Burley
Director of Personnel
Stetson University
421 North Woodland Boulevard
DeLand, Florida 32720-3756

Stetson University is an equal opportunity educator and employer.

Job Corner

Site Planner/ Engineer

Lawrence Livermore National Laboratory, located in Livermore, California, is one of the Nation's premier research and development organizations. Employing over 8,000 people, we offer the opportunity to work in a professional and consistently challenging atmosphere. Currently we have an opening for an experienced Site Planner/Engineer.

The selected candidate will be responsible for planning site improvements, siting new utility structures and storage facilities, and translating program requirements to siting criteria. Will also prepare five year programmatic facility and area development plans and studies.

Requirements include BS/MS in Urban Planning, Architecture/ Engineering, or equivalent; and a minimum of five years planning experience. Strong analytical, organizational, and communication skills are essential. A demonstrated ability to graphically represent conceptual plans is also required. Professional certification or registration in California preferred.

We offer a competitive salary and benefit package. For immediate consideration, send your resume with salary requirements to: **Jack Willis, Professional Employment, Lawrence Livermore National Laboratory, P.O. Box 808, L-725, Dept. JAQA1802A, Livermore, CA 94550.** U.S. citizenship required. We are an equal opportunity employer.

University of California

Lawrence Livermore National Laboratory

SUPERINTENDENT OF BUILDING MAINTENANCE AND OPERATIONS

The Metropolitan Community College District of Kansas City, Missouri, has two openings at its suburban campuses for a Superintendent of Building Maintenance and Operations. The successful applicants will have bachelor's degrees in a related field and four years of directly related work experience. The normal starting salary range is $2,242 to $2,534 per month. The maximum salary is $3,548 per month. Excellent fringe benefits and educational benefits are also provided. This position will remain open until filled with initial screening to commence on **October 21, 1988.** To apply, send cover letter and resume to:

PERSONNEL OFFICE
THE METROPOLITAN COMMUNITY COLLEGES
3200 BROADWAY
KANSAS CITY, MO 64111

An Equal Opportunity/Affirmative Action Employer

DIRECTOR OF FACILITIES PLANNING, DEVELOPMENT, AND SERVICES
Northern Virginia Community College

Responsible for facility planning, development, inventory, maintenance, and control for all campuses. Coordinate the development of capital outlay requirements for campus development, new construction, and equipment. Supervises college-wide maintenance services. Contact person with A & E firms, contractors, and Virginia Community College System in all matters pertaining to planning, construction, and renovation of college facilities. Master's degree with eighteen graduate semester hours in engineering or related field and four years' full-time related occupational experience required. Experience in plant management and development desired. Send application or resume postmarked by **October 15, 1988** to NVCC Personnel Office, 4001 Wakefield Chapel Road, Annandale, VA 22003. Effective January 1, 1989. ***EOE/AA.***

UNIVERSITY OF DELAWARE
DIRECTOR, ENGINEERING AND CONSTRUCTION

The University of Delaware seeks candidates for the position of Director, Engineering and Construction Department.

This department has responsibility for management and supervision of planning and program development, architectural and engineering design, and construction for the university's multi-million dollar capital development program.

The Director supervises the department's staff of designers, design coordinators, and construction inspectors assisted by two Assistant Directors. In addition, the Director provides supervision for the budget control and construction document sections of the department.

Additionally, the Director serves as a consultant to the university administration in matters relative to facility planning and construction.

The position requires a bachelor's degree in architecture or in one of the appropriate engineering disciplines, with an advanced degree in these fields or in business administration or construction management preferred. Minimum of ten years' experience in architectural or engineering design and construction with at least five years' experience in a senior supervisory or managerial position is expected.

Salary is negotiable and will be commensurate with the responsibilities of the position and the qualifications of the incumbent.

Send letter of interest with resume to **Dr. Robert Mayer, Associate Vice President for Facilities Management and Services, University of Delaware, Newark, Delaware 19716.**

Job Corner

ENERGY MANAGEMENT ENGINEER
OKLAHOMA STATE UNIVERSITY

Applications are being accepted for an Energy Management Engineer to coordinate a university-wide energy management program in cooperation with individuals responsible for maintenance, engineering, and design of new construction and plant operations. Excellent communication and leadership skills are essential since incumbent must develop good working relationships with federal and state officials, students, faculty, and staff. Position will also serve as staff assistant to Physical Plant Director.

QUALIFICATIONS: Bachelor's degree in Mechanical Engineering and a minimum of five years' related experience in HVAC system operations. Applicants should have a strong background in large HVAC systems and related controls as well as electric power and lighting systems, computerized energy management control systems, and related programming. Professional engineering registration is required. A master's degree is desirable. IRCA requirements must also be met.

Excellent benefits program is available. Salary is dependent on the applicant's qualifications and experience. Qualified applicants should send a letter of application, resume, salary requirements, and a list of three references by **November 1, 1988** to:

Oklahoma State University
Energy Management Coordinator
Personnel Services
407 Whitehurst Hall
Stillwater, OK 74078

OSA is an Affirmative Action/Equal Opportunity Employer

PLANT ENGINEER

OKLAHOMA STATE UNIVERSITY seeks registered Professional Mechanical Engineer responsible for operation of the Physical Plant Engineering office. Will supervise estimators and drafting technicians and perform engineering design and cost estimating for HVAC and miscellaneous alterations and construction projects. The Plant Engineer reviews plans and specifications, maintains current plans of underground utility systems, and acts as facilities consulting engineer.

MINIMUM QUALIFICATIONS: BSME, PE registration, five years' plant engineering experience, two of which included supervisory duties, and meet IRCA requirements.

SUBMIT: Application letter, resume, salary requirements, and three references to: Plant Engineer Search, 407 Whitehurst, OSU, Stillwater, OK 74078.

OSU is an AA/EOC Employer

Inside APPA

CUFMA Update

The College & University Facilities Management Association (CUFMA), the New York Chapter of ERAPPA, has scheduled a workshop on changes and controversies in the national electrical code for November 21-22 at the Desmond Americana in Albany. The workshop will be conducted by Joseph McPartland, editorial director of *Electrical Construction and Maintenance* magazine. Registration cost is $75 for CUFMA, ERAPPA, and APPA members; $95 for nonmembers. For more information contact program chair, Jack Hill, Director of Campus Operations, Union College, Schenectady, NY 12308; 518/370-6181, or James J. McChesney, Director of Physical Plant, SUNY/College at Cortland, West Road, Route #281, Cortland, NY 13045; 607/753-2100.

CUFMA held its annual conference June 26-29 at St. John Fisher College in Rochester. The following officers were elected for a two-year period: president, James McChesney; vice president, James E. Sala, director of physical plant at Syracuse University; secretary, Richard Drury, director of physical plant at Hofstra University; and treasurer, Michael J. Dailey, assistant vice president for facilities and planning at SUNY/College at Geneseo.

Facilities Funding Increase Authorized by Congress

The House of Representatives authorized an increase of up to 19.3 percent in funding to the National Science Foundation for fiscal year 1989. The authorization includes $85 million for a new program to renovate campus research facilities and will allow an increase up to 30 percent for the science- and engineering-education office. It allows the foundation to spend $20 million to finance new science and technology centers and will prohibit the foundation's money from being spent at any facility where illegal drugs are found to have been used.

The Senate authorized an increase of up to 19 percent in funding to the foundation for fiscal year 1989. This authorization will allow up to $50 million to renovate campus research facilities and up to $30 million to provide the first year of support for new science and technology centers.

Coming Events

Oct. 31-Nov. 1—**Facilities Management for Senior Executives.** Scottsdale, AZ. Contact: Dody Threlfall, Administrative Officer, Massachusetts Institute of Technology Office of Facilities Management Systems, E19-451, 77 Massachusetts Avenue, Cambridge, MA 02139; 617/253-0595.

Nov. 1-3—**Second Vermont Conference on Fire Safety and Historic Preservation.** Ascutney Mountain Resort, Brownsville, VT. Contact: Charlotte K. Barrett, Director, Preservation Institute for the Building Crafts, P.O. Box 1777, Windsor, VT 05089; 802/674-6752.

Nov. 2-4—**Disaster Preparedness in Hospitals: A Teamwork Approach.** Westin Cypress Hotel, Fort Lauderdale, FL. Sponsored by the American Hospital Association. Contact: Marcia Neuhart, program coordinator, 800/621-6712 ext. 6379; in Illinois, 800/572-6850.

Nov. 2-5—**Urban Land Institute's Fall Semiannual Meeting.** San Francisco, CA. Contact: ULI, 1090 Vermont Avenue, NW, Washington, DC 20005; 202/289-8500.

Nov. 13-17—**Tree Biology Seminar.** Appalachian State University's Camp Broadstone, Valle Crucis, NC. Contact: Office of Conferences & Institutes, ASU, Boone, NC 28608; 704/262-3045, Monday-Friday, 8 a.m.-5 p.m.; Jim Rice, 704/264-4882, evenings and weekends.

Nov. 16-17—**SARA Title III Compliance Update.** Sheraton Crystal City Hotel, Arlington, VA, near Washington National Airport. Contact: Government Institutes, Inc., 966 Hungerford Drive, #24, Rockville, MD 20850; 301/251-9250.

Educational Calendar 1988-89

October 23-27, 1988
Information Management Workshop: Information Systems and Computer Applications for Facilities Management
Durham, North Carolina

January 12-13, 1989
Hazardous Waste Management
cosponsored by NACUBO
Anaheim, California

January 15-20, 1989
APPA Institute for Facilities Management
Three-track program plus special programs
- Physical Plant Personnel Management and Training
- Capital Project Planning and Construction

Austin, Texas

February 21-22, 1989
Custodial Staffing and Standards
San Diego, California

February 22, 1989
Sucessfully Working with People
Video Conference

March 23-24, 1989
Hazardous Waste Management
cosponsored by NACUBO
Kansas City, Missouri

April 9-14, 1989
APPA Executive Development Institute
University of Notre Dame
South Bend, Indiana

July 16-19, 1989
APPA 76th Annual Meeting
Reno, Nevada

August 20-25, 1989
APPA Institute for Facilities Management
Three-track program plus special programs
- Management of Medical, Health Science, and Research Facilities
- Maintenance Management

Baltimore, Maryland

For more information or to register for any of these programs, please contact the APPA Education Department, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446.

Resource Bank

Lighting

The National Lighting Bureau's free publications directory is available. All publications are inexpensive, written in nontechnical terms, and extensively illustrated. Titles include *Getting the Most from Your Lighting Dollar, Performing a Lighting System Audit, The Energy-Savers's Guide to Good Indoor Lighting,* and more. Contact: National Lighting Bureau, 2101 L Street, NW, Suite 300, Washington, DC 20037; 202/457-8437.

Publications

The *Selected Resources in Facilities Management 1988-89* brochure of APPA publications is now available. The brochure lists thirteen publications including: *Computer Applications, Work Control,* and *Personnel Management and Development* from the Critical Issues in Facilities Management series; *Facilities Management: A Manual for Plant Administration; Facilities Audit Workbook; 1984-85 Comparative Costs and Staffing Report; Energy Management Workbook; Energy Management Planning; Modifying the Existing Campus Buildings for Accessibility; Fundamentals of Pesticides; Manual of Roof Maintenance and Repair; Proceedings of the Seventy-Fifth Annual Meeting;* and *Management of Professionals: Insights for Maximizing Cooperation.* Contact: APPA Publications, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446.

A revised edition of *A Handbook for Developing Higher Education Personnel Policies* has been published by the College and University Personnel Association (CUPA). The book was written to assist personnel administrators in designing, developing, and administering personnel policies. It contains more than 400 pages of policy issues and sample language for establishing policies. The cost is $25 for CUPA members, $40 for nonmembers. Contact: CUPA, 1233 20th Street, NW, Suite 503, Washington, DC 20036-1250.

Roofing

The American Roofing Corporation is offering a technical bulletin on seaming modified bitumen sheets using a six-inch roller. According to the company, this method is less time-consuming and less expensive than top seaming procedures and produces a better seam when done in accordance with the procedures outlined in the March 18, 1988 technical bulletin. Contact: Ray Norton, Director of Tech Services, American Roofing Corporation, 5401 Dansher Road, Countryside, IL 60525.

The National Roofing Contractors Association offers slide/cassette and videotape presentations for architects, engineers, specifiers, general contractors, building owners, plant engineers, maintenance supervisors, and roofing contractors. Programs offered are *Roof Membrane Systems, Roof Problem Analysis: The Repair or Reroof Decision, Roof Construction Details, The Modified Bitumen Membrane, The Built-up Roof Membrane, Roof Insulation and Energy Payback,* and *The EPDM Membrane.* Contact: NRCA, One O'Hare Centre, 6250 River Road, Rosemont, IL 60018; 312/318-6722.

Membership

New Institutional Members

Algonquin College, 1385 Woodroffe Avenue, Nepean, Ontario, Canada K2G 1V8; 613/727-7710. Representative: Yvon Saint-Jules, director, physical resources department.

Bay of Plenty Polytechnic, Private Bag, Windermere Drive, Tauranga, New Zealand; 0-75-440920. Representative: Barry W. Mead, deputy principal.

Columbia State Community College, P.O. Box 1315, Columbia, TN 38402-1315; 615/388-0120 ext. 280. Representative: Rick Lee, director of physical plant.

Grinnell College, Grinnell, IA 50112; 515/269-3300. Representative: Daniel Tindall, director, physical plant.

Jackson State University, 1325 J.R. Lynch Street, Jackson, MS 39217; 601/968-2522. Representative: Dr. Sam Polk, director of physical plant.

La Trobe University, Bundoora, Victoria 3083, Australia; 03 479-2079. Representative: Denis A. Stephenson, facilities.

Lewis and Clark Community College, 5800 Godfrey Road, Godfrey, IL 62035; 618/466-3411. Representative: Dennis L. Young Jr., director of facilities.

MacArthur Institute of Higher Education, Goldsmith Avenue, Campbelltown, Sydney, NSN 2560, Australia; 046 203319. Representative: Robert D. Waugh, properties manager.

Minneapolis College of Arts and Design, 2501 Stevens Avenue South, Minneapolis, MN 55404; 612/870-3149. Representative: Stella Gimmestad, director of facilities.

University of California/Agriculture and Natural Resources Agricultural Field Stations, Davis, CA 95616; 916/752-3932. Representative: Fred Perry, assistant director, equipment and facilities.

University of Canterbury, Ilam Road, Christchurch, New Zealand; 03 667001. Representative: Donald Gunn, buildings registrar.

University of Maryland/University College, University Boulevard at Adelphi Road, College Park, MD 20742; 301/985-7306. Representative: Michael F. Healy, assistant director, physical plant.

University of Waikato, Private Bag, Hamilton, New Zealand; 071 62889. Representative: Robert B. Grant, works and services registrar.

Victoria University of Wellington, Kelburn Parade, P.O. Box 600, Wellington, New Zealand; 04 721-000. Representative: David Tai, works registrar.

New Institutional Representatives

Broward Community College, Ft. Lauderdale, FL: **Thomas Goddard,** director of physical plant.

Cranbrook Educational Community, Bloomfield, MI: **Francis M. Nataluk,** director, physical plant.

Fairleigh Dickinson University, Hackensack, NJ: **Regis Ebner,** executive vice president, facilities planning and management.

Gordon College, Wenham, MA: **Paul Helgesen,** director of plant operations.

Hampton University, Hampton, VA: **Alphonso M. King,** superintendent of buildings and grounds.

Indiana University/Northwest, Gary, IN: **Jack Doyle,** director of physical plant.

Philadelphia College of Osteopathic Medicine, Philadelphia, PA: **Kevin F. Eiss,** director of engineering/plant operations.

University of Auckland, Auckland, New Zealand: **Maurice B. Matthewson,** works registrar.

University of the District of Columbia, Washington, DC: **Toussaint L. Parker,** director of physical plant management.

New Associate Members

Bay of Plenty Polytechnic, Tauranga, New Zealand: **C.B. Plank.**

Broward Community College, Ft. Lauderdale, FL: **Doug Ellis.**

California State University, Seal Beach, CA: **Ed Torres.**

Central State University, Edmond, OK: **John L. Knight.**

Clemson University, Clemson, SC: **L.E. Anderson.**

Fairleigh Dickinson University, Hackensack, NJ: **Robert Terraforte, John van Teeckelenburgh.**

Florida International University, Miami, FL: **Robert Keegan.**

Jackson State University, Jackson, MS: **Larry Jennings, Aaron Lee.**

Kansas State University, Manhattan, KS: **Lee V. McQueen, Timothy M. Poell.**

Lewis and Clark Community College, Godfrey, IL: **Terry Cross.**

MacArthur Institute of Higher Education, Sydney, NSN, Australia: **Peter Faber, Alex Volcov.**

University of Arizona, Tucson, AZ: **Peter H. Scott.**

Victoria University of Wellington, Wellington, New Zealand: **John Leslie Hall.**

New Affiliate Members

First Baptist Church, 808 Needham Avenue, Modesto, CA 95352; 209/521-0181. Representative: Richard McKee, buildings and grounds supervisor.

North Slope Borough School District, P.O. Box 4710, Barrow, AK 99723; 907/852-4709. Representative: Merlin Walsh, coordinator of maintenance and operations.

New Affiliate Member Representative

Fordham University, East Fordham Road, Bronx, NY 10458; 212/579-2325. Representative: **Julio Vazquez,** director of facilities for residential life.

New Subscribing Members

Entech Sales and Service, 3404 Garden Brook, Dallas, TX 75234; 214/241-8188. Representative: Pat Rucker, president.

Provides re-manufactured air conditioning chillers, rental chillers, and used chillers.

GE Industry Sales and Services, 1 River Road, Building 2, Room 111B, Schenectady, NY 12345. Representative: Angie Pomykai, specialist, marketing communications.

GE is a total service supplier of PCB services including retrofits, retrofill, and disposal of PCB equipment and fluids, to assist building owners and operators in determining their PCB risk. Other services such as power system studies, risk analysis, and testing are offered.

Peter Recchi & Son, Inc., #1014 Radnor Road, Wayne, PA 19087; 215/688-2441. Representative: Steve Cowen, director of development.

PR provides design, construction, management, and maintenance of prestigious landscape environments.

The Pickering Firm, 821 South Barksdale, Memphis, TN 38114; 901/726-0810. Representative: Wayne Tansil, vice president.

Provides full service A/E with specialty in asbestos—program management, identification, management plans, abatement design, and construction management.

A President's Commitment to Service and Education: An Interview With Dorsey Jacobs

by Ruth E. Thaler

At its 75th Annual Meeting, held in July in Washington, D.C., APPA inducted its newest president into office. Dorsey D. Jacobs, director of physical plant at West Virginia University (WVU), will serve a one-year term as president of the association.

An APPA member for twenty-one years, Jacobs served as president-elect last year, served on the APPA Board of Directors for two years, and has been president of APPA's Southeastern region and the West Virginia chapter. He has been the regional representative to the APPA Executive Committee and a member of the Nominating, Personnel and Compensation, and Governance committees.

Among Jacobs' many professional accomplishments has been implementing an innovative natural gas direct-purchase program for his university, a topic on which he has presented thirteen conference programs.

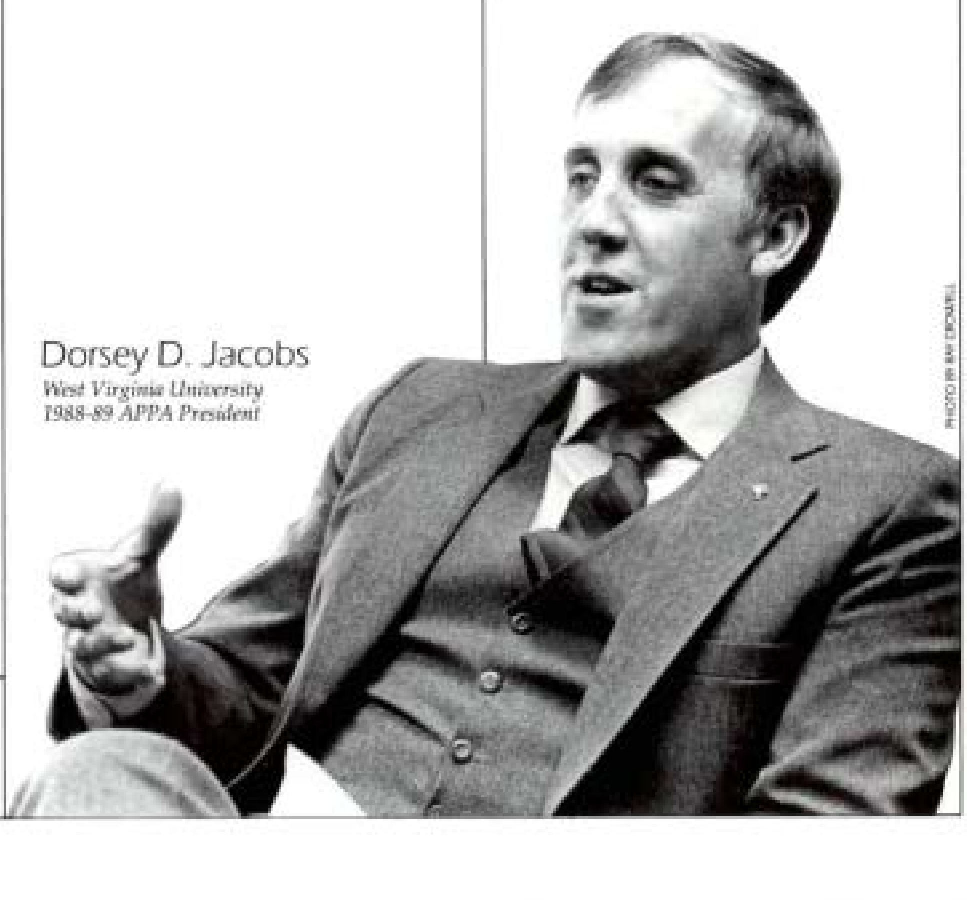
Jacobs has worked his way up through the ranks at WVU, from electric shop to scheduler/expediter, manager of the engineering department, and onward to become director of the WVU physical plant operation in 1978, after serving as acting director for six months and assistant director from 1974-1978. He originally joined the university in 1961, leaving only to gain industry experience as plant engineer and southern division chief engineer for the Ozite Corporation in Georgia from 1972 to 1974.

At Ozite, Jacbos initially was responsible for all maintenance, capital improvement, major changes, and specifications. He trained maintenance and conducted training classes for supervisory personnel, an indication of his long-time commitment to personal development and lifelong education. He established a maintenance program that incorporated preventive maintenance and resulted in substantial reductions in scrap waste for the company. As chief engineer, Jacobs introduced a new method of printing design on carpet and traveled widely as a consultant to relay that technique to colleagues in the field.

Jacobs is active in his community as well as his profession. In addition to his long-time involvement in APPA, he is a member of the Monongalia County Vocational Technical Advisory Council, has been president and first vice president of the Suncrest Kiwanis, and is a board member of Literacy Volunteers of America.

Jacobs' career at WVU encompasses his vision of the physical plant administrator as a community citizen as well as a campus employee. This commitment was illustrated during the disastrous 1985 flood that hit West Virginia. His involvement with the university Flood Relief Office efforts has been chronicled by the general and professional media and demonstrated the value of a university physical plant staff in resolving community crises.

APPA executive vice president Walter Schaw has said of Jacobs, "When my own batteries need charging, I give Dorsey Jacobs a call." He brings to APPA a special enthusiasm, vision, and commitment to the physical plant administration profession and the higher education community.



Dorsey D. Jacobs
West Virginia University
1988-89 APPA President

Ruth Thaler is a Washington, D.C.-based freelance writer. She interviewed APPA members at the vice presidential level for the spring issue of Facilities Manager.

From left: Dorsey Jacobs, West Virginia University, 1988-89 President; H.C. Lott, University of Texas/Austin, 1987-88 President; Walt Schaw, APPA Executive Vice President

Facilities Manager: *Would you say that your background is typical or atypical of today's campus physical plant administrator?*
Dorsey D. Jacobs: That's hard to say. I started in APPA at the ground floor and worked through the ranks. I moved up in West Virginia APPA and was chapter president for four years. I took the regional route, getting involved in the Southeastern region, then becoming regional president and moving through the channels and becoming involved in the national association.

I am probably a typical physical plant administrator today. We are operating with less money and fewer people, a trend we all have to cope with.

I seem to be in the younger generation of APPA members and the profession—I understand I'm one of the youngest APPA presidents.

FM: *Is that a trend—younger people in the field or association?*
DDJ: Younger people are now getting involved in the national association because they know it is a way to advance in the profession. We learn quickly that APPA colleagues are willing to help each other.

FM: *What are some of the ways in which APPA has helped you professionally?*
DDJ: APPA's educational programs help in many ways. For example, I was the first to buy natural gas for the campus on the open market for higher education. This was something I learned from an APPA meeting.

FM: *So the professional meetings have helped you do your job better?*
DDJ: Certainly. Those meetings help us keep on top of the latest technology in the field.

FM: *How else has involvement in APPA helped you professionally?*
DDJ: Well, I've presented papers to APPA meetings, which has helped me be recognized by my peers as someone who is creative and willing to give 100 percent to the profession. I've brought into the association an energy and a willingness to work hard.

FM: *Tell us a little about your involvement in the chapter and regional levels of APPA. How has the region changed? How do you see the regions interacting with national?*
DDJ: When I first attended regional meetings, I found them very interesting; I still do. I found that the problems I encountered at my school were not unique. Trading ideas with colleagues encouraged me to get involved, to give something back in return for what I got from the group. You really have to put something in to get something out of this experience. I took on various assignments and then talked to the president of my school about hosting a regional conference, which we did in 1983.

Regional activities tied me in with other higher education institutions and really opened doors. Then I began getting involved in national activities.

I see the state and regional associations as very important to APPA, with a relationship similar to the way the state institution is tied to a governing body of regents. It strengthens your links with your colleagues and helps you do your job better. It's the first leg in your journey toward national. Your colleagues in the state association become like your family. The region provides a cluster of common concerns. It's the most important step in APPA membership. I feel you should belong to your regional organization even if not to the national association.

With higher education trends and the dollar crunch, our members will need more educational sessions to keep on the professional cutting edge. I see the regionals offering more educational sessions to create a close network, with national staff coming into regional meetings to offer services through the regions. In the next two years we hope to offer satellite programs offered by APPA at regional and state programs.

FM: *How do you feel about being APPA's new president?*
DDJ: Being named president of APPA is the highest professional award I could receive. If I ever had a goal, this would be it— recognition from my peers.

FM: *You seem to feel that APPA needs to do more to let people know what the organization is doing for its members and for the profession. Is that accurate?*
DDJ: Our goal is communication with our members—to let them know what's going on in the profession and the association. We may go back to some basics.

FM: *What do you have in mind when you say basics?*
DDJ: Communication—that's why the organization was founded. Training, education. We need to look at basic training, management skills,

PHOTO BY EDWARD A. PETROSKY

Jacobs during a boiler room inspection at WVU's Evansdale Steam Room.

communication, budgeting, as well as the latest technology and hazardous waste problem.

FM: *Would you say that training is part of an effort to help APPA members improve their professional skills and in moving ahead in the field?*
DDJ: Oh, yes. In the past, once you've worked your way through the ranks, gotten your education and training, you're pretty near retirement. Looking at this year's annual meeting, you see a lot of people with gray hair, older people. We need to train people coming into the field to replace those of us who are working in it now—to expand the field and offer incentives to stay in it.

A related concern is that we want to make a special effort in membership. I'd like to see more members from medical schools and community colleges. Community colleges are a big part of today's higher education scene. We haven't really worked to involve them in APPA. I attended all the regional meetings this past year and learned that the old thought of a community college as a school with only 400 students is just not true. Some of them now have up to 20,000 or more students. That's a real challenge for the physical plant manager.


PHOTO BY EDWARD A. PETROSKY

Jacobs with staff members of WVU's Physical Engineering Department.

As the campus grows larger, physical plant management becomes more extensive.

FM: *What do you see as the key goals for your administration as APPA's president?*
DDJ: We have many operating goals for the year. For example, we want to bring into the APPA office a survey that would put all the latest information on buildings at our fingertips, to be shared across the country. That way, if you're ready to build a new building, we would have information available on similar projects, with about forty construction and other values, right off the computer.

We want to do the same type of listing for the latest energy projects. Each of us in the field is doing the same job, so there's no need to reinvent the wheel. We all make mistakes—this way, we can learn from each other.

FM: *What are some of your other goals as president of APPA?*
DDJ: We have a large list of ideas. Education programs are a priority. We always offer the latest technology in programs.

We will continue working with other higher education groups. This past year, there has been a major effort in that area and I want to see it expand.

Our Higher Education Facilities Trust also is an innovative idea; I hope to expand it.

We see several major issues to address this year—custodial staffing; deferred maintenance; energy; coping with less money and fewer staff; historic preservation, which is new for a lot of campuses; federal regulations, whether in PCBs, asbestos, or pollution; financing; and others.

FM: *How does APPA—and the profession it represents—fit into the higher education association picture?*
DDJ: Programs such as HEFT and our efforts to educate the profession about financing, planning, and other concerns allow us to pull the higher education community together around common issues. We provide solutions in all areas of higher education.

FM: *Can you give an example of such a solution?*
DDJ: Sure. Our low-bid policy forum developed ways for institutions to obtain quality materials at the lowest price and with quicker deliveries, with life-cycle costing figured in, and ways of getting small and emergency equipment in place without major delays. That's one important area. The idea of buying materials and supplies as needed rather than stockpiling—we've made contributions there as well.

FM: *How has the physical plant administration profession changed?*
DDJ: Physical plant management has moved from general maintenance only to planning, engineering, building, architecture, historical preservation—that's what we do and how we're now being recognized. The contributions of physical plants are now recognized on campus.

FM: *What is now being recognized?*
DDJ: Well, planning is one—thinking ahead to what brings in new students. The physical plant is part of that today, but it wasn't in the past. Preparing buildings to use energy efficiently in response to changing patterns of use—so a building can be used sixteen hours a day and on evenings and weekends, instead of just eight hours a day. Today, Saturday classes are standard, in part because of physical plant administration. That means realigning staff and responding to new needs.

Historic renovation is another area that is fairly new—dealing with federal guidelines in preserving and managing historic campus properties and buildings.

FM: *How about changes in APPA?*
DDJ: I have noticed that, since higher education is faced with all of its current problems, the association has grown stronger, because everyone has to work together—there has to be teamwork. We have gotten more aggressive about bringing in new members.

We are working together to solve problems. This organization is allowing us to solve problems. Our organizaion is meant to be doing so—to find and identify problems, to share solutions with workers and colleagues so higher education can lead industry, instead of the other way around.

FM: *Where do you see APPA going in the future?*
DDJ: APPA has taken major steps to work with other groups. In ten years, we will see the major higher education groups working together; APPA will be working with this combined team. That's why we made the decision to have the international office in the Washington, D.C. area, where we are close to and working with all the other higher education organizations.

FM: *What are some of the trends you see affecting today's physical plant administrator in higher education?*
DDJ: To keep higher education running, we have to operate with fewer dollars and fewer people today. That is something we will continue to bring to the table. It means operating more efficiently.

FM: *What about advancement—how can people in the field move ahead today?*
DDJ: To advance, you pay your dues. It's part of any job you do—learning the basics, politics, processes. People can take advantage of training seminars and classes—they're available from the basics to the advanced levels. I find that in physical plants, more than in other fields I've encountered, people are striving to move up.

FM: *APPA in general, and you in particular, place a high premium on continuing education. Do you think that the trend toward more education might scare some people off?*
DDJ: There may be some who would react that way, but we will see higher education demanding master's degrees and Ph.D.s from physical plant administrators in the future.

APPA offers education programs, such as the Institute for Facilities Management and the Executive Development Institute for Facilities Managers, that deal directly with the problems of the field. These are recognized by the campuses. Taking APPA educational programs is seen as a value in advancement. Our programs should be the equivalent to a Ph.D. in physical plant administration!

FM: *How does your employer feel about your involvement in APPA?*
DDJ: My organization is extremely happy about my involvement in APPA.

FM: *Would you say that physical plant administration is a field worth going into?*
DDJ: Absolutely. If I had a son, I'd encourage him to go into the profession.

FM: *How about a daughter? Is this a good field for women?*
DDJ: If my daughter were interested, absolutely. Physical plant administration offers a good career for women. There are no minority roadblocks in the field. This is probably an area in which you'll find the greatest range of people.

FM: *Is that a factor within APPA as an organization, as well as in the profession?*
DDJ: Yes, it is. I'm very proud that a woman will be president of the Southeast region within the next two years.

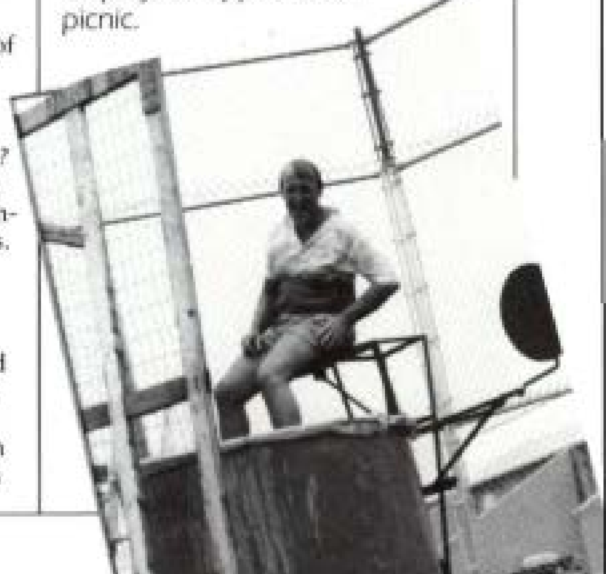
FM: *What kind of person is today's physical plant administrator?*
DDJ: We aren't only deeply involved in the campus, but our members are also active in their cities, in civic organizations, in their communities, in volunteer programs. It seems to be a must, because we always do it. It's amazing that our members find time to do all of these things.

FM: *How do you see physical plant administration fitting into the higher education community? What are some of the rewards of working in higher education?*
DDJ: Higher education allows you to be involved with the country's oldest historical buildings at the same time that you're involved with the newest—you always have both sides. At no time will you lose that edge or get stale. You have the opportunity to attend classes and pick up new ideas.

That's a major reason why I left the industry position and returned to the higher education community. We all have a problem in higher education, where you're making $18,000 and industry offers you $30,000. That's what happened to me. I had a lot of fun working in industry, but I was dealing with a large organization and I didn't enjoy that type of work, in the long run. I enjoyed working with academics and I missed the range of activities, topics, and people at the university. I felt that after ten years in industry, I would know everything about the carpet industry but nothing else. When the assistant director who replaced me at the university left and they called me about coming back, it was the unanimous vote of my family that I go back, even though it was at a lower salary!

By working in physical plant administration, I feel I am accomplishing something—that there is a visible result. The physical plant administrator has a real impact. There is always part of you on campus. ■

Jacobs in dunking booth at employees' appreciation picnic.




APPA
Award for Excellence in Facilities Management
Brigham Young University
APPA
Award for Excellence in Facilities Management

The Pursuit of Excellence in Facilities Management

by Beth A. Rosenfeld

Dr. Robert Atwell, ACE (center), presented APPA's first Awards for Excellence in Facilities Management to Dr. Jeffrey Holland, Brigham Young University (left), and Dr. Francis Tedesco, Medical College of Georgia, at the 75th Annual Meeting, Washington, D.C.

APPA's new Award for Excellence in Facilities Management recognizes outstanding achievement in facilities management at college and university campuses and emphasizes the vital services provided by physical plant departments and their impact on the institution's educational mission. Ten institutions were honored with the first annual awards, which were presented in July 1988 at APPA's 75th Annual Meeting in Washington, D.C.

Brigham Young University, Provo, Utah, is the national winner of the Award for Excellence in the large campus category (5,000 and above FTE student enrollment). The winner in the small campus category (under 5,000 FTE student enrollment) is the Medical College of Georgia in Augusta, Georgia. The presidents of both winning institutions accepted the award from Dr. Robert Atwell, president of the American Council on Education.

The winners of the regional Awards for Excellence in the large campus category are: Eastern, Rochester Institute of Technology; Southeastern, Georgia State University; Midwest, Michigan State University; Central, University of Oklahoma; Rocky Mountain, Brigham Young University; and Pacific Coast, University of Idaho.

The regional award winners in the small campus category are: Eastern, University of Maryland/Baltimore; Southeastern, Medical College of Georgia; Central, Saint Mary's University; and Rocky Mountain, The Colorado College.

APPA's Professional Affairs Committee made the selections based upon the following seven criteria: policies and procedures that foster communication between the physical plant department and campus community; quality of relationships between the physical plant department and campus community; campus appearance and condition; physical plant department initiative and innovation to support departmental and/or institutional overall mission; campus planning; training, education, and development of physical plant department employees; and ability to measure physical plant department success.

Following are examples that illustrate the excellence of facilities management at the winning institutions.

Beth Rosenfeld is assistant editor of Facilities Manager *and editor of* APPA Newsletter.

Winner of 1988 Award for Excellence (large campus category), Brigham Young University, Dr. Jeffrey Holland, President (left), and Douglas Christensen, Director of Physical Plant.

Winner of the 1988 Award for Excellence (small campus category), Medical College of Georgia. Director of Physical Plant Clay Adamson, holding award, with members of his staff and president Francis Tedesco (right).

BRIGHAM YOUNG UNIVERSITY

Physical Plant Communications with Campus Community

During the past seven years, the physical plant department at Brigham Young University (BYU) developed an online information system that gives immediate information to shop personnel, administrators, directors, and customers in the university community. Labor, materials, and cost information on orders and projects is continuously updated. The Physical Plant Information System facilitates communication between physical plant and other departments and provides detailed information on a daily basis so that proper management decisions can be made.

The university has about twenty-five locations on campus where departments can request service directly by using the system. Access to the system is based on a preapproved funding and billing procedure (standing work orders). Users can also utilize the system to track the progress of orders and projects.

Electronic Policies and Procedures Manual

BYU has implemented a computerized policies and procedures manual. Physical plant department policies and procedures are in the data base and are accessible to anyone on campus. Users gain easy access by entering words that relate to the subject of inquiry. For instance, if someone wants information about renting a vehicle from the motor pool, they simply enter MOTOR POOL, RENT, TRAVEL, or other related words. The computer will then cross reference MOTOR POOL to a number of these words. Also listed within the policy is the person responsible for it.

Information is divided into two groups, campus-wide policy and department policy. The information can be easily updated, thus assuring its accuracy. The system has saved the university thousands of dollars by eliminating the need to update and print traditional policies and procedures manuals.

Community Relations

For the past five to six years BYU has established the following programs to help the community and local school system deal with maintenance:

- Grounds personnel and custodial crews from community schools, churches, and government are invited to attend seminars presented on campus addressing maintenance problems, techniques, and training.
- Experts are brought in from all over the country to address groups and devise new ways to handle grounds in a variable climate such as that experienced at BYU.
- BYU organized within the state of Utah a transportation services group that addresses concerns related to motor pool management.
- BYU is currently developing a total program of physical plant maintenance to support the community and reduce the number of hours spent orienting people to BYU techniques and procedures.

Student Employees

To encourage students to work on campus, the BYU administration allows the physical plant department to pay one dollar more than minimum wage. The department employs as many as 1,000 to 1,200 students. Most students work as custodians, gardeners, or laborers.

Full-time employees supervise the students, teach them good work habits, and help them succeed. The department has found that many of their student employees are innovative and highly motivated; therefore, the supervisors give students as much responsibility as they can handle. In addition, students might be given responsibility for other students.

The university benefits because student employment has reduced the cost of maintaining facilities. Student employees, who work a four-hour day, can be used in projects that require shorter time periods or unusual hours of work, thereby enhancing management's flexibility. The department also reports that student involvement reduces clean up problems and vandalism.

Students benefit because their work experience in physical plant coupled with their education help them obtain other jobs that require background and skill in facilities management.

Maintenance Personnel Input

BYU maintenance personnel must sign off on any expansion plans before the plans are completed. Many maintenance problems are found and corrected at this stage. The department also inspects projects for installation and, later, for maintenance after warranty.

BRIGHAM YOUNG UNIVERSITY
Provo, Utah
Douglas K. Christensen
Director of Physical Plant

Abram O. Smoot Administration Building.

Material and Supply Purchasing

Limited purchase drafts (LPDs) are used at BYU to purchase items that cost less than $300 per vendor visit. The checks are distributed by managers to the various shops and are used as immediate payment to vendors who give cash discounts. The receipt is brought back to the department and checks are charged directly to the project or work order. As a result, records are updated and time-consuming invoicing and tracking procedures are eliminated. Savings of 3 to 4 percent on purchase price are realized by using the LPDs.

BYU has also established a systems contract program with local vendors. First, the purchasing department negotiates a volume cost directly with vendors. Vendors then go directly to their suppliers to get additional volume discounts based on quantities. Once the university and the vendor sign a contract, the vendor becomes the university's only supplier of a particular item. The only requirement of vendors is that they must be willing to make deliveries at least once or twice a day.

The system contract allows physical plant to use one vendor and eliminates shopping at various suppliers. Full or partial systems contracts currently exist for electrical, plumbing, hardware, trees and shrubs, lumber, air conditioning supplies, paint, upholstery items, locks, keys and closures, and automotive parts. The physical plant department is currently experimenting with hooking up vendors' terminals to the physical plant's system making direct ordering possible.

Specialized Vehicle Training and Certification

BYU's transportation services section runs a training and certification program for employees who must operate specialized and heavy equipment such as forklifts, loaders, lawn mowers, high rangers, and back hoes. The training meets OSHA safety standards and federal safety regulations.

To be certified, employees must pass a written test on the purpose and function of the equipment, demonstrate how the equipment works and identify what dangers exist when using the equipment, and perform a "road" test to demonstrate use of the equipment. In some cases, employees must receive a minimum number of hours of training to attain certification. Certification is valid for one year and renewable.

By assuring that employees who cannot handle special equipment don't, the program helps the physical plant department reduce the number of accidents and manage the liability that usually accompanies use of such equipment.

Physical Plant Administrators Internship

The BYU College of Engineering and Technology offers a bachelor of science degree in physical plant administration. The program prepares students for facilities management jobs in hotels, hospitals, resorts, and manufacturing, as well as in colleges and universities. BYU's Department of Industrial Education reports that since the program's inception in 1981, the demand for graduates outweighs the number of graduates available.

To learn facilities management operations, students are required to perform an internship in the physical plant department for a minimum of one semester to a maximum of four semesters. The internship provides practical hands-on experience as well as decision making from a supervisor's perspective in order to understand the problems facing both workers and supervisors. The department has been given a grant by BYU to pay students for the internship.

The interns are routed through physical plant operations (HVAC, electrical, mechanical, building services, etc.), taking as much time in each area as they feel is worthwhile. After going through most of the operations, interns choose an area of interest and conduct research. The interns complete the program by making a formal presentation of their research to physical plant administrators.

MEDICAL COLLEGE OF GEORGIA

Campus Communications

The Medical College of Georgia (MCG) publishes the *Physical Plant Division Handbook of Services* to acquaint the campus community with department services and show how to obtain them. The book contains organizational charts with photos, an illustrated, general information section containing information on topics ranging from bicycle racks to vehicle repair, a breakdown of all physical plant division sections and services which describes section responsibilities, and a detailed index.

MEDICAL COLLEGE OF GEORGIA
Augusta, Georgia
W. Clay Adamson Jr.
Director of
Physical Plant

Student Center.

Personnel

In 1986 MCG's employee services section revised performance evaluation forms to provide more comprehensive and meaningful evaluations. Three separate forms were devised: one for office management, secretarial, and clerical personnel; another for supervisory and management personnel; and still another for technical, services, and crafts employees. The forms were structured to emphasize appropriate aspects of each job division.

Over the past three years, the physical plant division has conducted six telephone surveys on salaries to ensure competitiveness of department salary levels. Telephone surveys allow actual duties of positions—not just job titles—to be compared.

Computer Support

MCG has one of the largest institutional broadband local area networks in the country. In 1985 the physical plant department recognized the need for shared access of departmental and institutional data throughout the various facilities of the college; therefore, a consultant was hired and a broadband cable system was recommended. Physical plant provided support and technical expertise during initial installation, which was completed in 1986.

The broadband cable system allows microcomputer local area networking, institutional mainframe terminal emulation, and access to other institutional resources including the college's library catalog system and academic exchanges. Nine separate divisions and departments have more than ninety computers on the expanding system; physical plant is still one of the largest users of the cable system.

In-House Elevator Repair

In July 1976 the physical plant division implemented an in-house elevator program to maintain and repair the college's fifty elevators and dumbwaiters. The elevators include passenger and freight, geared and hydraulic, Westinghouse, Otis, Dover, General, MATOT, and Sedgewick.

The elevator shop is the responsibility of an electrical services manager who has an inspector's license through the National Association of Elevator Safety Authorities. The manager is currently the only Certified Licensed Inspector in the state of Georgia. The shop employs one foreman and one electrician who are trained to conduct all elevator maintenance and repair without the help of outside contractors.

The elevator shop has reduced downtime because waiting for outside contractors to arrive has been eliminated. Maintenance is performed daily on all elevators and related equipment and parts are ordered from supply houses throughout the country. The in-house elevator program is saving the department $140,000 annually.

Automated Chemical Treatment

MCG has been instrumental in helping Betz Entec Corporation, the provider of chemical treatment to the college since 1982, develop its Genesis System. In 1983 the Betz Entec Equipment Division proposed to develop and install a computerized chemical feed system in the central energy plant. The Genesis System was developed over the next eighteen months at no cost to the college.

In 1984 the college connected the central energy chilled water, high temperature water, and condenser water systems to the new automated chemical treatment system. The system controls pH levels, conductivity, tower blowdown rates, and chemical injection rates for central energy water systems. Since its inception, refinements to the system include management reports and color graphic displays using the system's operational data. Even though Betz Entec has begun marketing the Genesis System, the college will use it at no cost in return for continued assistance to the company in developing new water treatment technologies.

Renovation

MCG has a renovation crew of carpenters handling projects ranging in cost from $1,000 to $175,000. The crew provides needed renovations to areas of the hospital not scheduled for capital funding or major renovation. Using an in-house renovation crew has proven to be more cost-effective than using outside contractors.

Community Relations

MCG serves its community in several ways. Each year physical plant employees help the Student Faculty Committee obtain vehicles and construct floats for the annual sophomore parade held during Alumni Week. The physical plant division has been a leader in supporting efforts to build the proposed MCG Children's Medical Center by serving on Miracle Network Telethons and holding golf tournaments to raise money for the hospital. The

ROCHESTER INSTITUTE OF TECHNOLOGY
Rochester, New York
William H. Mets
Director, Physical Plant

RIT's "quarter mile" walk.

shops build display booths in area malls for fund-raising. In addition, the division supports United Way by donating a higher percentage of its salaries each year than any other group on campus and helps maintain the Ronald McDonald House, which provides a home for out-of-town parents whose children are hospitalized for long periods. Staff members also serve as an integral part of student, faculty, and alumni support committees throughout the campus.

Capital Renewal and Replacement

MCG completed a state-of-the-art power plant at substantial savings to the college and the state of Georgia by purchasing two 1600-ton Carrier chillers originally purchased for the never completed Hartsville, Tennessee, Nuclear Power Plant. The Tennessee Valley Authority bought the chillers in 1978 for $280,000; in 1984, each chiller would have cost about $500,000 if purchased new from Carrier.

Nutemp Company purchased the unused chillers at a reduced cost for resale as used equipment. Before selling the chillers to the college, the company stored them in accordance with Carrier's specifications and had Carrier inspect them semi-annually to assure proper storage and maintenance.

Not only did the college buy the chillers at a greatly reduced price, but also realized additional benefits because the equipment was built for use in a nuclear facility. Its quality and construction surpasses anything available commercially and even exceeds the college's specifications and requirements.

ROCHESTER INSTITUTE OF TECHNOLOGY

Emergency Telephone System

The campus safety department and telecommunications services at the Rochester Institute of Technology (RIT) has developed the Emergency Telephone System (ETS). The system provides the campus with a 24-hour-a-day link to the campus safety department's emergency and public services. ETS consists of ten, easy-to-identify telephones strategically placed on the exteriors of heavily used buildings.

Health emergencies, criminal activity, suspicious conduct, and vehicle problems can be reported, and escort service and building keys can be requested using ETS. The system is capable of two-way communication; however, it is designed so that the user does not need to speak in order to report emergencies or request assistance.

To use the system, the individual must open the telephone box and push a red button. The system automatically dials the campus safety communication center and the caller's location is displayed on the center's phone display panel. If a telephone is activated and the communication center does not receive a response from the caller, a campus safety officer is immediately dispatched to the origin of the call.

Physical Plant Advisory Committee

In the fall of 1985 RIT established a Physical Plant Advisory Committee to promote communication with students. The committee consists of representatives from student activity groups from both on and off campus, and physical plant directors. Students have the opportunity to ask questions, relay concerns of their constituents, and become acquainted with physical plant personnel, policies, and procedures. Physical plant personnel in turn have become more aware of and have responded to students' needs.

Cost Saving Measures

The environmental services department at RIT instituted two cost saving measures that have decreased the time required to service restroom facilities. Single-fold paper towel dispensers were replaced with ones that dispense roll paper towels, and sixteen-ounce liquid soap dispensers were replaced with forty-ounce dispensers.

Labor time is saved because the need to refill dispensers has been reduced. The measures were easily implemented, cost was minimal, and the time savings enables RIT to cover an increased number of square feet per custodian, and still maintain the campus without a corresponding decrease in service levels.

Purchasing Manual

The RIT physical plant purchasing department is one of the largest satellite purchasing departments at the institution with current procurement values of more than $9 million. Because purchasing procedures are extensive and require written documentation to ensure efficient implementation, the *Purchasing Procedure Manual* was compiled to train new purchasing assistants and help super-

UNIVERSITY OF MARYLAND/BALTIMORE
Baltimore, Maryland
Robert M. Rowan
Director, Office of Facilities Management

UMAB's ice storage tanks.

visors understand what the department needs to process requests efficiently and accurately.

The manual includes the code of ethics of the National Association of Educational Buyers, brief job descriptions of physical plant purchasing positions, a commodity list, a flow chart describing the purchase requisition process, and examples of various forms such as purchase requisitions, change orders, and shipping memos, and instructions for completing them. In addition, accounts payable invoice processing, a list of personnel who must authorize requisitions and purchase orders, bidding policies, central supply procedures, additional materials and reports, and a list of physical plant personnel are included.

The *Purchasing Procedure Manual* is currently being updated and will eventually be included in a complete *Administrative Services Procedure Manual*, which is in the process of being written.

Quality Control

The quality control program at RIT was designed to reduce costs and customer complaints, increase productivity and morale, and attain higher quality. The preventive maintenance administrator is also the quality control administrator and must have working knowledge of all HVAC, plumbing, utility, and electrical systems, maintenance procedures for the systems, and general building maintenance and cleaning.

The quality control program consists of the following:

- Random inspections of facilities and equipment are conducted. By using a computer data base program, reports of inspection results are prepared indicating level of maintenance and/or cleanliness. Reports instructing supervisors on preventive actions needed or ways to improve level of cleanliness are also generated.
- Analyses of work order systems are conducted to establish frequency of work occurrence, type of repairs, labor time involved, and cost of parts. Reports are prepared to alert managers to problems and recommend corrective actions.
- Periodic reports and charts of physical plant operation and expense of labor and supplies are submitted including cost of preventive maintenance inspection and repair, crisis maintenance, contract work, cleaning operations, overtime, and total maintenance.
- Review of maintenance labor standards for routine cleaning are conducted, all procured materials, supplies, and equipment are analyzed, reports on usage rates are prepared, recommendations are made for corrective action, and procurement specifications are prepared to ensure that quality materials are obtained.
- The quality control administrator recommends and helps develop training programs to improve employee performance.

Two quality circles have been established within two of the physical plant divisions. The department hopes to eventually establish quality circles in every division.

UNIVERSITY OF MARYLAND BALTIMORE

Vandalism Policy

In hopes that keeping a clean campus will foster neatness and respect from visitors and students, the University of Maryland/Baltimore (UMAB) has a policy of removing graffiti immediately. There is no graffiti that is more than two days old of which the office of facilities management (OFM) is aware. This is a major accomplishment for an inner city campus consisting of thirty-six buildings.

Utilities Management

UMAB's office of facilities management is the first organization in the state of Maryland to become involved in a third-party energy conservation project. In July 1987 Washington Gas Light Company was selected to design, construct, and finance the project.

Washington Gas Light will create a heat recovery system for the Medical School Teaching Facility. In return, UMAB will pay the company approximately 86 percent of its energy savings over four years. Savings will result from recapturing, separating, and reusing energy, and installing more efficient reflectors, which will provide the same amount of light using half the amount of energy.

The project is expected to save the university $240,000 annually. The state may begin similar programs at other state-owned buildings.

Other energy conservation measures have been instituted at the university. Measures include installing

GEORGIA STATE UNIVERSITY
Atlanta, Georgia
Michael R. Renfrow
Director of
Physical Plant

Aerial view.

new roofing, reinsulating, repairing windows, installing storm windows or double-paned glass, shutting down equipment in vacant buildings, maintaining minimum heating and cooling levels after hours, upgrading HVAC systems using state-of-the-art digital control systems, changing to a less expensive energy source, using energy at a less costly time of day, and remote monitoring of electric meters and building mechanical systems.

The thermal storage cooling system in the administration building reduces energy costs. The system consists of charging (ice-making) and discharging (ice-melting) operations. A 100-ton air-cooled chiller cools a glycol solution, which is fed into the ice storage tanks for ice-making. During discharge, chilled water is mixed with return water to achieve the desired temperature. Although BTU costs are higher when the chiller is used to make ice, actual cost is lower because the chiller is operated at night.

A jet air heating system in the Pratt Street gym provides heat through a jet propulsion system. This moves warm air through the gym's playing area and prevents heat from rising to the ceiling. When this system was installed, it was the only one of its kind in operation in the country.

The utilities management program has reduced overall energy consumption at the university by about 22 percent and has saved the state nearly $8.5-$9 million, even though the campus has grown about 31 percent since the start of the program in 1983.

Management Training

The vice chancellor for administration at UMAB recently developed a continuing education program for middle- and top-level administrators. The curriculum, consisting of about eight courses, will take eighteen to thirty months to complete. Professional educators will provide training that will focus on complex management issues including managing people, behavior, organizational development, self-management, and integrating political and business considerations in decision making. The program is expected to begin this year.

Construction Management

UMAB's office of facilities management has developed a construction management program to provide faster response to campus needs. Because UMAB is a research-oriented institution, work must be done to accommodate research project timetables and usually needs to be done immediately. This leaves no time to go through the normal bidding process.

To avoid the delay of bidding, OFM has made blanket awards to contractors to work on a time and materials basis in the following trades: HVAC, plumbing, general construction, electrical, masonry, painting, roofing, and special flooring. A construction manager from the architecture and engineering office oversees the project.

The program has shortened OFM's response time. In addition, OFM has developed good relationships with contractors, thus assuring better quality work. At any one time, A&E is involved in more than 200 projects ranging in cost from $100,000 to $500,000. This year the group will be involved in projects totaling $3.2 million.

GEORGIA STATE UNIVERSITY

Safety First

Georgia State University (GSU) publishes the *Safety Guidebook for Physical Plant Personnel*. The 77-page manual includes detailed safety procedures for using the most common hand and power tools, safety in the carpentry, welding and cutting, and motor pool repair shops, floor maintenance safety practices, and groundskeeping safety—including use of pesticides, herbicides, and fertilizers, and safety during grass cutting and plant trimming. A chapter on miscellaneous procedures addresses lifting, ladders, electricity, lightning, and cigarette smoking on the job.

The manual was used as the department's entry in the National Safety Council's awards program. For two years in a row, 1986 and 1987, the university won an Award of Merit from the National Safety Council's Campus Safety Association.

Other Awards

The GSU physical plant department has won various other awards for the university in the past three years. Last year the university won a Professional Grounds Maintenance Honor Award for the best maintained college or university campus from the Professional Grounds Management Society and *Grounds Maintenance* magazine, and an Award for Distinguished Service from the Atlanta Clean City Commission.

In 1986 the university won a Cost Reduction Incentive Award from the National Association of College and

MICHIGAN STATE UNIVERSITY
East Lansing, Michigan
Ronald T. Flinn
Assistant Vice President for Physical Plant

T.B. Simon Power Plant.

University Business Officers and the United States Steel Foundation. The department reduced the number of hours required for overhead work by obtaining battery-operated, self-propelled scaffolds that saved the university $4,640 the first year.

The university originally decided to get the scaffolds when the cafeteria needed renovation. The facility contains more than 2,600 square feet of ceiling tile and light fixtures. Using traditional rolling scaffolds would have required two tradesworkers during the nine-week project to move and position scaffolds for craftworkers. The battery-operated scaffolds, which are six feet long and can be used for working areas up to 12-1/2 feet high, can be folded and assembled easily, fit in elevators, require little maintenance, and are expected to last ten years. Workers are able to propel themselves quickly and easily without leaving the platform. The battery is recharged overnight by plugging the unit into a 110-volt outlet.

Emergency Repairs

To provide immediate response to emergencies, GSU's physical plant department developed the DIN, or Do It Now, Squad. The squad most often handles electrical emergencies but also performs emergency plumbing, elevator, and other repairs. Large jobs that require specialized knowledge are referred to appropriate crafts shops.

Another team on campus that handles emergencies is the ACC (Air Conditioning Control) Team. ACC handles small emergencies and work requests in thirty minutes or less for clients who have problems related to HVAC such as minor temperature adjustments. The group also responds to miscellaneous problems that can be solved in less than an hour.

MICHIGAN STATE UNIVERSITY

Dean's Booklet

In 1984 Michigan State University's (MSU) newly appointed assistant vice president for physical plant visited each dean to answer questions about the physical plant division, support services, and the university budget. To help him with this task, the assistant vice president carried a collection of documents that has become known as the *Dean's Booklet*. Deans who have arrived subsequently have confirmed the booklet's usefulness.

The booklet contains the APPA classification of accounts for physical plant, funded maintenance responsibilities of the physical plant division, physical plant unit cost data comparing MSU to other Big Ten institutions, facts about construction costs, an annual report, and a booklet on MSU energy programs. Also included is an explanation of budget reductions to alleviate complaints from administrators about custodial and maintenance cutbacks, and a document that clarifies grant overhead. This document, which explains that physical plant only receives funds for "normally funded" services, was designed to reduce complaints from researchers who must pay for repairs on research equipment out of their own budgets.

Flood Data Book

Because MSU is located in a poorly drained area, the *Flood Data Book* was compiled. It contains flood data and procedures for the physical plant department to follow in order to limit flood damage to buildings and utilities.

The book includes instructions on using a water stage recorder, the sandbag storage and filling process, protective methods for facilities, a flood control procedures list, a critical utility vault map, small scale plans of campus buildings in the flood plane, and a campus flood map. Appendices include a flood control information list, detailed building data about possible flood threats and specific procedures to implement in case of flooding, building floor elevation tabulation, flood data, previous flood records, and the Red Cedar River hydraulic gradient.

Troubleshooting Crew

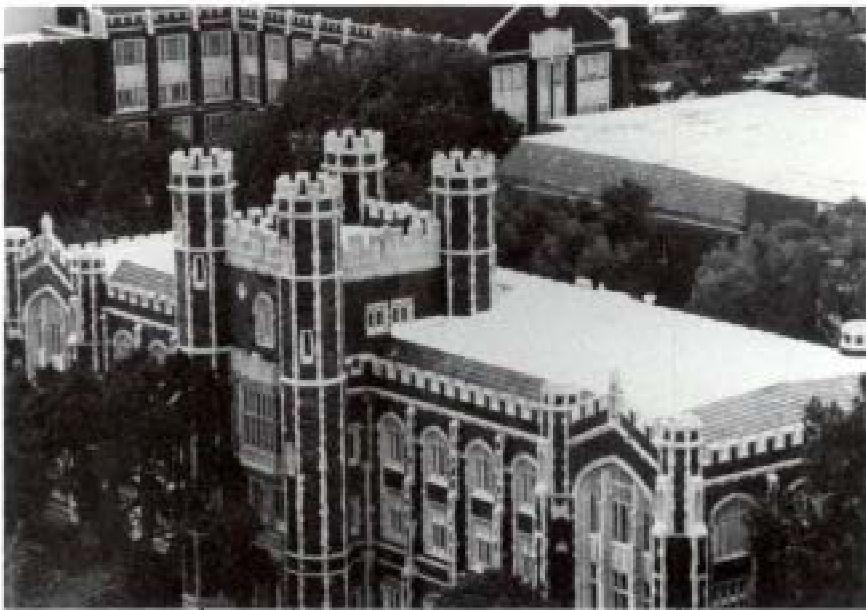
Since the 1940s MSU has had a troubleshooting crew answering calls ranging from common problems such as electrical emergencies and flooding caused by broken pipes, to unusual problems such as ducks in sewers, snakes in vents, and bats on ceilings. The Trouble Truck deals with campus problems after the physical plant department closes at 4:30 p.m.

Automotive Services

In 1987 MSU was awarded special recognition and $2,500 in the Cost Reduction Incentive Awards Program, cosponsored by NACUBO and the U.S. Steel Foundation. MSU received the award for the "prompt oil program" developed by the automotive services department.

The program reduced vehicle maintenance time during the work week by having student employees

UNIVERSITY OF OKLAHOMA
Norman, Oklahoma
Morris B. Kinder
Director of
Physical Plant



Foam roofs done by Physical Plant.

perform routine vehicle service on weekends. The students change the oil, replace filters, lubricate engine parts, and handle other minor vehicle repairs.

The program has resulted in reduced maintenance time during regular working hours, greater vehicle productivity during the work week, and greatly reduced service cost. The university has realized an annual savings of more than $92,300 so far.

In 1985 MSU installed an automated, 24-hour fuel dispensing system. The system allows drivers of university vehicles to refuel vehicles at any time. The only requirement is that the driver must present a vehicle card, which is carried in each vehicle, and a driver's identification card. The system won sixth place in the NACUBO/U.S. Steel Foundation Cost Reduction Incentive Awards in 1986.

When refueling, the driver enters the odometer reading into a computer that monitors fuel dispensing, records vehicle fuel consumption, updates fleet fuel economy information, and automatically prepares interdepartmental billings. The equipment to implement the program cost about $23,000. Annual savings are estimated at $58,000.

Emergency Procedures

To help departments deal with emergencies on campus, MSU's physical plant division compiled the *MSU Emergency Procedures Book*. The book is a cooperative effort—thirteen sections are maintained by business and personnel; ten sections are maintained by maintenance services in cooperation with business and personnel; one section is maintained by public safety; and one section is maintained by the grounds department.

The book addresses procedures to use in case of fire, electrical blackout or cutback, natural gas emergency, steam failure or cutback, major broadband cable outage, and extreme cold, flooding, snow, and other severe weather emergencies. It includes the names and telephone numbers of contacts for all physical plant sections, a university disaster plan, and an extensive appendix.

UNIVERSITY OF OKLAHOMA

Resident Advisor Handbook

Dormitory resident advisors at the University of Oklahoma (OU) serve as intermediaries between students and the physical plant department. To help them perform their duties, the university annually updates and distributes a handbook for all resident advisors. The handbook outlines routine and emergency maintenance procedures, lock recombination procedures, a damages charge list to determine how much to charge a student who has damaged university property, phone numbers of physical plant personnel, and hours of department operation. A lock recombination form, room inventory and check-in/check-out report, and a repair and maintenance request/student charge form are included.

Foam Roof Program

The University of Oklahoma was plagued by worn-out, leaking roofs and a lack of resources to repair them in the early 1980s. Because most of the roofs on campus are flat, the physical plant department decided that the most cost-effective solution to the problem was to develop an in-house foam roof repair team.

The department hired a lead roofer who had experience in foam roofing, sent crews to a school sponsored by a commercial foam roof coating manufacturer, and purchased necessary equipment. In 1983 the roofing crew foamed 115,200 square feet of roof; by 1985 that amount grew to 189,716 square feet. The department then organized several teams of qualified mechanics and temporary workers so that several cleaning, foaming, and coating teams could work on two or three buildings simultaneously. As a result, the roofing crews completed 322,114 square feet of roof in 1987 at a lower unit cost. Originally, the cost of reroofing was about $2.00 per square foot; in 1987 it was reduced to $1.20 to $1.60 per square foot.

The in-house roofing operation has been so successful that personnel from other campuses have observed the operation. The physical plant department also reports that the roofs have never been in better shape and that the in-house roofing program is saving the university at least 30 percent on the cost of roof maintenance.

Blanket Purchase Orders

OU's physical plant department developed a blanket purchase order policy to implement when three major factors occur: a product or service is widely used on campus, quality must be consistent, and the amount of spare parts kept on campus and the cost of maintenance training needs to be reduced. The department buys high technology products, such as variable

ST. MARY'S UNIVERSITY
San Antonio, Texas
Charles W. Jenkins
Director of
Physical Plant

Aerial view.

frequency drives and computerized controls, and high maintenance items, such as deep well water pumps, using this system.

The department finds products of appropriate quality and circulates bids asking for unit prices based on expected yearly use quantities. Bids are evaluated according to product quality and cost, life cycle costs, and parts and service availability. When an acceptable vendor is found, a three- to five-year, annually renewable contract with the vendor is signed. Prices are adjusted yearly according to changes in the consumer price index.

This system reduces bidding time, allows final designs to be produced sooner because exact configurations are known, and reduces installation and maintenance time because physical plant crafts personnel are already familiar with the products.

Mechanical Trades Training

The OU physical plant department augments its training program by using the services of the United States Postal Technical Training Center, which is located on campus. The center is operated by the U.S. Postal Service and offers intensive training to postal workers from all over the country in building and equipment maintenance and repair. Students attend courses, most of which are two to three weeks long, for eight hours a day, and spend considerable time studying at home. More than sixteen different courses are offered in subjects such as industrial electrical service, elevator, maintenance, low pressure boilers, and environmental controls.

ST. MARY'S UNIVERSITY

Maintenance Priority

St. Mary's University prioritizes maintenance according to the type of maintenance requirement and type of facility. Following are types of maintenance requirements:

- Priority I includes repair or maintenance requiring immediate attention before further damage or rapid deterioration occurs, such as roof, pavement, plumbing, and building exterior maintenance.
- Priority II includes repairs or maintenance that enhances building or utility system maintainability, energy efficiency, or safety. Repair and maintenance of windows, outside doors, HVAC, and utility distribution systems are examples.
- Priority III includes repair or maintenance that enhances appearance.

Facilities are placed in four classifications: Type I, dormitories and food service facilities; Type II, classrooms, laboratories, and lecture halls; Type III, offices and other administrative space; and Type IV, recreational and other facilities.

Requirements compete first by priority and then by facility. For example, a Priority I maintenance requirement in a Type III facility ranks higher than a Priority III in a Type I facility.

Maintenance by Territory

For years the grounds superintendent has divided St. Mary's campus into geographic segments to which one or two specific groundskeepers are assigned. The groundskeeping crew takes pride in their particular segments, which results in enhanced campus appearance.

Because this approach worked well in groundskeeping, it was extended to building maintenance in 1983. Buildings were divided among five maintenance technicians and unless a task is beyond in-house capability, every request for maintenance goes first to the technician. The technician can later ask for assistance from the carpenter, electrician, plumber, or laborer if needed.

Just as groundskeepers developed pride in their segments, technicians developed pride in their buildings. Using the territorial approach in building maintenance has an additional payoff—relations between the campus community and the physical plant department are enhanced as technicians become familiar with the occupants of the buildings.

Monthly Inspections

Building maintenance technicians at St. Mary's make monthly inspections of all building areas except offices, residence hall rooms, and other areas that are regularly occupied by the same people. Following are areas and items that are included in the monthly inspection program:

- Light fixtures in hallways, restrooms, classrooms, lounges, and lobbies
- Seats, chalkboards and trays, movie screens, and bulletin boards in classrooms
- Faucets, fixtures, drains, and mirrors in restrooms
- Doors in exterior areas, classrooms, and community areas

THE COLORADO COLLEGE
Colorado Springs, Colorado
Claude A. Cowart
Director of Physical Plant

Physical Plant offices in renovated pottery factory.

• Windows, shades, and blinds
• Lights, pipes, and drain lines

Roofs are checked every third inspection for water accumulation, cracks, tears, blisters, and separated areas. In addition, loose debris is removed.

Because the cost of the inspection program is charged to departments' facility maintenance budgets, the physical plant department notified the departments about the program before it was implemented in March 1985. Departments had the opportunity to be removed from the inspection program and continue to receive and pay for only the services they requested.

THE COLORADO COLLEGE

Landscaping

The Colorado College employs a head arborist who oversees the upkeep of approximately 2,000 trees, some of which are more than 100 years old, on the sixty-acre campus. His six- to eight-person full-time summer crew (fewer are employed in winter) consists mostly of students who are responsible for the survival of the beautiful trees in the dry climate and harsh winters.

The arborist also makes recommendations for improvements and new types of trees to be purchased. He usually buys smaller trees, which are cheaper, and allows them to mature at a nursery he maintains near his office before he replants them on the campus.

Renovation

Last year the Colorado College won an Award of Merit for its contribution to the preservation of the architectural heritage of Colorado Springs from the city's Historic Resources Advisory Board. The board, which is appointed by the city council, presented the award to the college in recognition of the Tutt Alumni House renovation as an example of historic rehabilitation for institutional use.

The physical plant department, using mostly in-house personnel, renovated the 10,000-square-foot house. The house is located adjacent to the campus in an exclusive residential area of turn-of-the-century homes and had become run-down when it was used as a rental property.

Transportation

The Colorado College physical plant department is solving its transportation problems in an unusual way. The department entered into a lease/purchase agreement with a charter travel company for a low-mileage, ten-year-old highway bus complete with a three-year full engine and transmission warranty. The college will pay $2,000 per month for three years, thus avoiding a large capital outlay of $60,000. The arrangement also allows the bus to be purchased out of operating funds offset by mileage fee charges to other college departments that use the bus.

The department also buys used military vehicles for maintenance purposes. They have also bought pickup trucks for less than $200 that were in excellent mechanical condition and only required body work and painting.

And how does the college fuel its ever-growing fleet? It purchased a Texaco station across the street from the campus.

Honnen Ice Rink Renovation

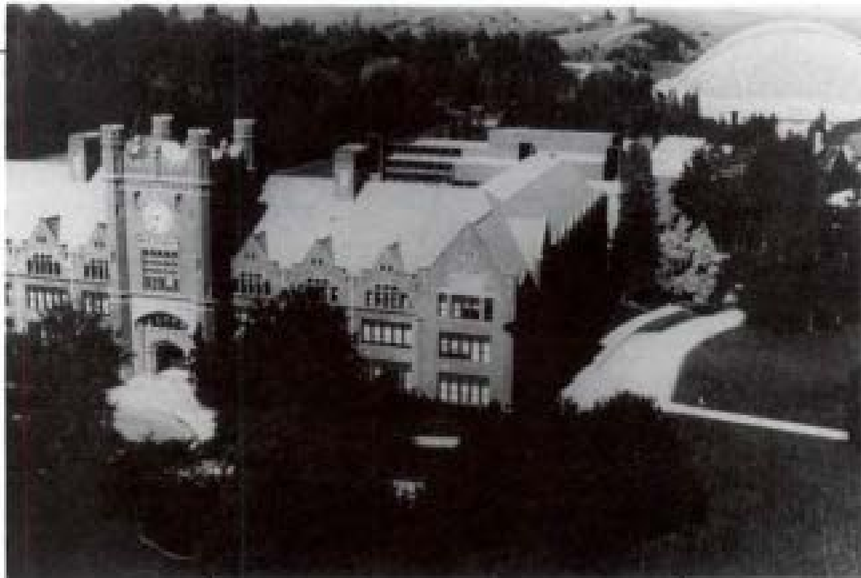
The Colorado College enclosed and upgraded its outdoor Honnen Ice Rink so that the facility could operate year-round to satisfy increased demand for ice time by the college community and to produce rental income. Previously, the rink could only operate mid-October to mid-March partly because refrigeration equipment could not maintain ice when outdoor temperatures rose above 60° F.

Upgrading included installation of a "low E" ceiling, waste heat recovery system, and backup compressors. The "low E" reflective ceiling material hangs on aircraft cables and has the effect of adding thirty tons of refrigeration equipment. It reduces energy loss by 20 to 30 percent by keeping warmth from the ceiling away from the ice. The waste heat recovery system was designed in-house from used equipment purchased from a closed ice rink; waste heat is used to melt ice shavings to supplement the rink's heating system. The smaller backup compressors are used in the winter to save energy and allow shutdown of main compressors for maintenance.

Physical Plant Department's Home

For twenty years Colorado College's physical plant department has been located in the former home of a pottery business owned by Artus Van Briggle. The Artus Van Briggle Memorial Pottery Building was virtually unchanged to accommodate the department. Two giant kilns that took

UNIVERSITY OF IDAHO
Moscow, Idaho
Kenneth A. Hall
Physical Plant Director



Administration building with physical education complex in background.

up most of the space inside the 15,000 square foot building were removed, steel-frame supports were built around the stacks below the roof to assure their stability, and heating and plumbing were installed. The curved smokestacks above the kilns, with their ornamental designs and figurines, were left intact.

Campus Expansion

Construction at Colorado College's 73,000-square-foot science building began January 1987. The building will contain faculty offices, classrooms, laboratories, the academic computer center, a four-level atrium, and greenhouses. At the north end of the science quadrangle between Olin and Palmer Halls, the new building will be connected to Olin Hall by walkways. Olin and Palmer Halls will also be renovated and expanded. An exciting addition to the science building is an observatory dome containing a powerful telescope that was put in place last November.

UNIVERSITY OF IDAHO

Operations Manual

The University of Idaho physical plant department has compiled virtually everything anyone needs to know about its operations in the *Physical Plant Operations, Maintenance, & Procedures Manual*. This comprehensive four-volume guide was developed to eliminate the need for crisis management and is distributed to all managers and supervisors.

Volume I contains information on the university and physical plant missions, organization, policies, and procedures, Volume II contains policies and procedures for each physical plant division, Volume III contains appendixes on long-range plans, budgets, and goals, and Volume IV, *Building Manager Position Description Folder Manual*, contains specific guidelines for job duties as well as university and department policies and procedures.

Physical plant managers and supervisors receive Volumes I through III and a Volume IV of position descriptions appropriate to their divisions. New employees are also given position description folders containing university and physical plant department policies and procedures, job descriptions, staff personnel evaluation forms, and step-by-step procedures for each job responsibility. To complement the manuals, the university community receives physical plant service guides.

Orientation

Immediate supervisors in the University of Idaho physical plant department give new employees an orientation when they start their jobs, and the university holds an orientation each fall for employees hired within the previous year. The university orientation includes information about the university and Moscow communities, regional recreational activities and areas, schools, university organization, and insurance, educational, retirement, and other benefits.

In addition, new physical plant employees meet with the physical plant account technician and the payroll office to arrange payroll and verify employment status. This is done before employment begins or on the first day of employment.

Personal and Professional Development

The University of Idaho physical plant department purchased the video training program, "Increasing Human Effectiveness," which is produced by Edge Learning Institute, Inc. of Tacoma, Washington. The department's assistant director for administrative services has been trained as a certified facilitator of the program and presents approximately four, two-day programs a year to the physical plant, faculty, staff, spouses, and others from the community and other state organizations.

Workshop topics, such as attitude, self-image, motivation, goal-setting, and managing change, are designed to help employees feel better about themselves, thereby improving their performance. Employees who are first-time participants are given leave with pay to attend; those who have attended before pay to attend again.

In addition, the physical plant department purchased audio tapes of "Increasing Human Effectiveness," some of which are available in versions adapted for children. The tapes are available to employees for free check-out at the physical plant center.

The deadline for applications for the 1989 Award for Excellence is March 31, 1989. An application booklet has been mailed to all institutional and associate members of APPA. Contact the APPA office at 703/684-1446 for more information. ■

A Bibliography of Capital Renewal/ Deferred Maintenance Resources

compiled by
Steve Glazner

The Association of Physical Plant Administrators of Universities and Colleges (APPA) and the National Association of College and University Business Officers (NACUBO) have just released their joint final report on the capital renewal and deferred maintenance needs in higher education in the United States. The survey, conducted in spring 1988 with the cooperation of Coopers & Lybrand, serves as the first comprehensive attempt since 1974 to determine the scope of the deferred maintenance problem.

But APPA has not just recently become interested in this massive crack in higher education's infrastructure. The following list is an unannotated bibliography of materials published by the Association since the late 1970s on the topic of capital renewal and deferred maintenance.

The materials are broken out under five separate headings: articles and short reports from *APPA Newsletter*, APPA's monthly membership publication; longer, in-depth articles from *Facilities Manager*, APPA's quarterly professional magazine; papers presented at APPA's annual meetings and published in the *Proceedings;* books published by the Association; and pending publications on the subject.

Many of the items listed here are out of print or not readily available. Some articles may be made available in reprint form, depending upon interest. To receive a current brochure of available books, contact APPA Publications, 1446 Duke Street, Alexandria, VA 22314-3492; 703/684-1446. FAX # 703/549-2772.

Steve Glazner is editor of Facilities Manager *and APPA's director of communications.*

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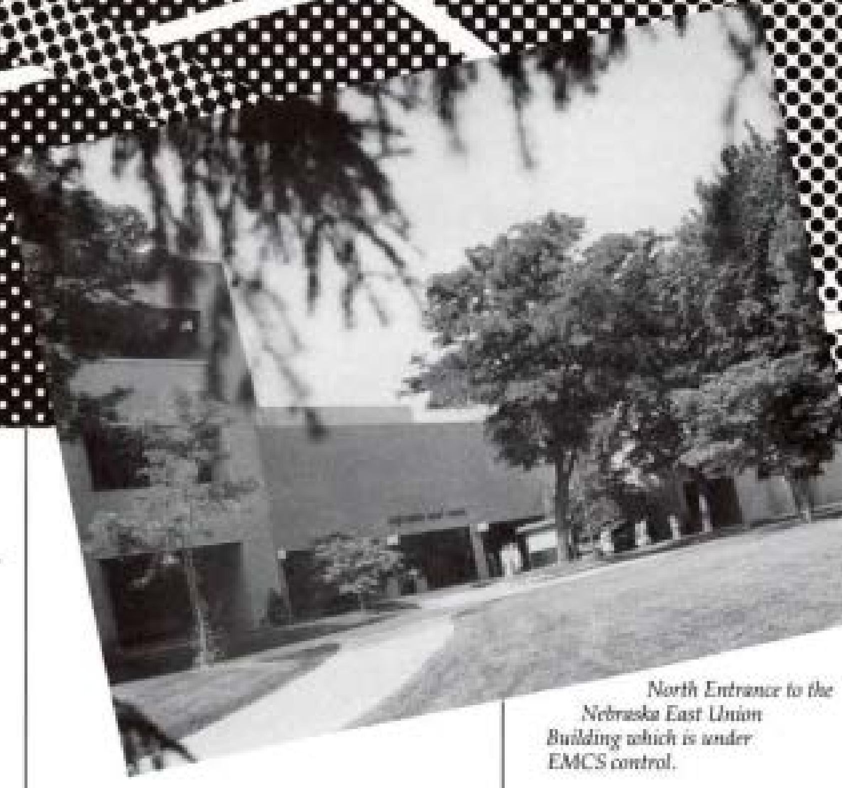


This article describes why and how we built our own EMCS (energy management control system) at the University of Nebraska-Lincoln (UNL). Since the design is public domain, we would be glad to give you a copy of the design documentation. With this you can build a duplicate system if you desire.

I will also explore some reasons why many EMCSs fail to provide the anticipated results and what you can do to give your EMCS project a greater chance of succeeding.

WHAT DO I MEAN BY EMCS?

Within this article I am defining "energy management control system" as a system of computerized electronic devices, connected to energy consuming systems (HVAC systems), for the purpose of controlling these systems in an optimal manner. I am not referring to systems of administrative accounting, such as facilities management computing, or systems for scheduling of maintenance.

I will focus on building automation systems (BAS), also referred to as central supervisory control systems (CSCS) or energy management systems (EMS).

Jim Hines is manager, energy conservation division, at the University of Nebraska-Lincoln.

North Entrance to the Nebraska East Union Building which is under EMCS control.

WHY DO SO MANY EMCSs FAIL?

I have been involved with EMCS since 1974 and have seen many failures. Why do so many institutions with grandiose plans seem to end up with white elephants on their hands? Many factors are involved and I will point out a few of them.

Blue Sky Salesmanship

Many of the systems I have seen have been sold by sales engineers who had wonderful intentions but were selling beyond the available technology. In sales this is often referred to as "blue sky" selling—selling something that does not yet exist but looks great on paper. This is one way companies develop new systems.

In our Energy Conservation Division at UNL we follow the KISS principle—Keep It Simple Stupid. We want our systems to be simple to build, install, and maintain.

We also try to design our equipment using tried and true technology. There is a point of diminishing returns when trying to keep up with the state-of-the-art in computer technology. We believe that if you can use technology that has been around for a while you benefit several ways:

1. It is usually cheaper.
2. You can select a technology that has proven reliability.
3. Multiple sources can usually be found for proven technology.

Some Systems Lack Flexibility

Some EMCSs are not designed to allow owner modification of the system data base or control strategies. The system data base contains information describing the equipment being controlled. A system that does not provide for manager/operator data base definition and modification lacks flexibility.

The reason flexibility is so important is that change is inevitable. Change of operating parameters and control strategies are necessary to

Home Made Energy Management System: A Do-It-Yourself Success Story

by Jim Hines

One of the UNL designed circuit cards.

allow the operator to optimize the control system. There is no one formula or control scheme that is optimal for all variations of HVAC systems. If the EMCS does not provide the means for an operator to modify the control strategy, then increasing optimization is not possible.

Lack of Commitment by Owner

Many institutions have purchased EMCSs with the attitude, "I'll buy this computer system, plug it in, then wait for the utility companies to start sending refund checks." With this attitude it is rare that a commitment is made for someone to manage the system once it is installed.

Someone needs to be charged with the responsibility of seeing that the system is designed, installed, and operated in a manner that will achieve the energy savings desired. This requires a system manager at a minimum. Additional operators and technicians may be appropriate, depending upon the size of the system.

"Change" is another reason a system manager/operator is needed. A control strategy designed today will not necessarily provide the enviromental conditions necessary six months from now, or tomorrow for that matter. Changes are going to be necessary.

Remember that control strategies are based on many parameters and assumptions. Many of these assumptions will prove true, but just as many will also prove false. An EMCS without an operator to monitor, evaluate, and redefine system parameters will never have those false assumptions eliminated from the control strategy.

If you want your EMCS to succeed, you must make a commitment to the operations of the system. An EMCS without a knowledgeable operator is like an airplane without a pilot. You will never get off the ground even though you have acquired a lot of sophisticated electronic equipment.

Lack of Manager/Operator Technical Experience

Do not expect someone without HVAC system knowledge to be able to properly operate your EMCS. The night watchman, your secretary, and the custodian normally do not have the knowledge or experience needed to optimize the mechanical systems using the EMCS. Long before you decide which system to install, make a commitment to fund a full-time system manager for the EMCS. The system manager needs to be involved in the design installation and maintenance of the system.

The qualifications for a system manager are knowledge and experience in HVAC systems and automatic temperature controls. The individual should also have hands-on experience with some sort of computer system. An individual who is intimidated by computers should not be selected for the position. As the number of buildings controlled by the EMCS increases, your system manager should have the resources to recruit support staff to operate and maintain the system.

At UNL we currently have a staff of six technical personnel dedicated to the development, installation, and operation and maintenance of the EMCS. Without this commitment we would not have achieved our success.

UNL'S EMCS DEVELOPMENT STORY

In 1969 the University of Nebraska-Lincoln contracted to purchase a central supervisory control system (CSCS). This system was to provide central monitoring and control of campus building mechanical systems. The initial system was connected to eleven of the 130 campus buildings.

Electronic equipment then was transistorized, but integrated circuits and microprocessors were still under development.

Computers Enter the Picture

In the early 1970s the UNL CSCS was enhanced by the addition of a computer to the central control room. This computer was expensive (five digits) and had slightly more computing power than today's $1.99 pocket calculator. The trend in that day was to centralize control largely because both computer hardware and software were so expensive.

Centralized control is like having

all your eggs in one basket. Two weaknesses are:

1. If the central computer fails, you lose control of all of the building systems connected to the central. The remote electronic panels in a central control system do nothing without the central computer sending signals that tell them what to do.

2. The implementation of direct digital control (DDC) and/or sophisticated optimization control logic in the central computer often results in overloading either the central computer's processing capabilities or its communication channels.

The central computer technology in the early 1970s was primitive by today's standards. The system took hours to start up whenever something failed, and you could count on something failing daily. Needless to say, the system never could be relied upon to do much more than time clock functions, and it did not do that with reliability.

The Frustration Peaks

By 1977 UNL facilities management was frustrated by the poor performance of the central system and decided that the time had come to hire a system manager to oversee any continued design and development of the EMCS system.

In 1979 a new minicomputer system was installed, replacing the entire central control system with computer technology that had been developed for the space program. This computer control system proved to be more reliable and the software provided greater flexibility in defining and changing the control strategies.

This was still a central system, however; when the central computer did fail, or lost power, we lost control of all of the building systems it was controlling.

The next logical step in the process was to install microprocessor-based remote control panels in each building. If the control logic resided in the building microcomputer, then the central computer would not have to perform the control. If the central computer failed or a communication channel failed, the remote microcomputer could keep on controlling the building systems without any interruption.

Today, the prices of microcomputer equipment have fallen to the point where one can now afford to place a powerful microcomputer in each building for EMCS control.

This scheme, in which a central computer communicates with remote building microcomputers, is called distributed processing. This is not a new concept; the banking industry has been using distributed processing for years with computers communicating with computers. The big difference now is the price of computers.

In-House Expertise Develops

During the design and installation phases of the 1979 minicomputer system, we learned a great deal about how microcomputer technology could be applied to EMCSs. It became apparent that we could not only design and build our own microprocessor-based control panels, but we could do so at a significantly lower cost than commercially available systems.

One resource that we regularly tap is the university student body. Our engineering college, for example, is full of brilliant and enthusiatic students. We have hired many students on a part-time basis to perform tasks that range from assembling printed circuit boards to designing microprocessor-based control circuits.

We eventually made the decision to design these microprocessor-based control panels in-house. The technology was somewhat intimidating at first, but we soon found many companies that specialize in the manufacture of custom-printed circuit boards. We now have no trouble obtaining competitive bids for those portions of the microprocessor-based control panels we choose not to build in-house.

We were pleasantly surprised at the cost of our in-house designed panels. For example, we needed several hundred of a particular circuit board used to connect the data points to the microcomputer. We had been paying between $100 to $150 for each circuit board from a large EMCS vendor. Compare that with the $5 to $10 we are now paying for each circuit board manufactured to our design.

This lower cost allows us to purchase more computer power in each microcomputer panel, which provides more flexibility and functionality.

At this writing, the design of the

UNL EMCS is complete and we have installed remote microprocessor-based control panels in twenty-nine of our campus buildings. Our goal is to complete connection of nine additional buildings to the system by the end of the year, bringing our total to thirty-eight EMCS controlled buildings.

Flexibility Built Into the Software

The system software has been designed to provide outstanding flexibility so the system operator can continually increase optimization as desired.

There is one potential drawback to such an incredibly flexible system. The system operator must be knowledgeable of the HVAC systems being controlled and able to grasp the concepts of microprocessor technology and software. This requires the operator be a more technically experienced or educated individual than was necessary for the old central time clock systems.

In reality this is not really a drawback. A capable operator will save his or her salary many times over each year on a large campus system. Please note that I said the *operator* will save money. The computer is just a tool that the operator uses to optimally control the energy consuming systems.

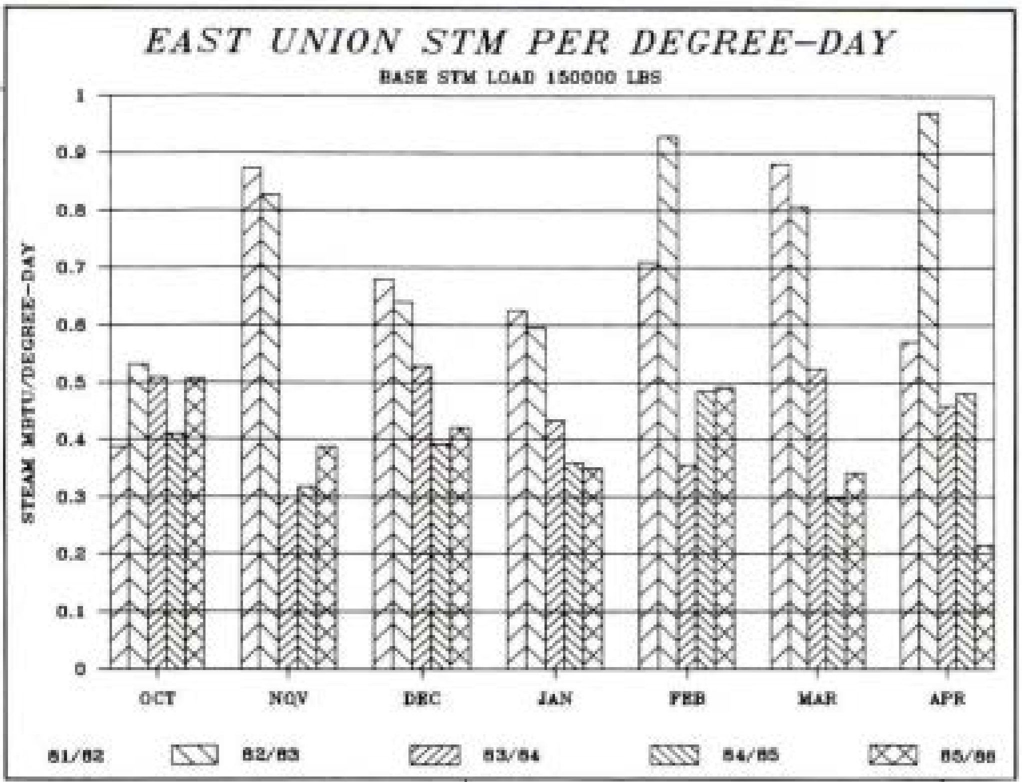
Designing the system in-house has enabled us to interface much of the old CSCS field equipment to the new system without major expense. We are converting each building on the old central time clock system to the microprocessor-based system one at a time.

Whenever we renovate an existing building or construct a new building on campus, we are careful to provide funds to install the EMCS, which is installed as a control system in place of the traditional pneumatic control systems. The dollars traditionally spent on pneumatic temperature control systems are instead used to purchase and install EMCS. In this situation we are getting free energy management control since some kind of control system is needed for the building systems with or without EMCS. The choice is traditional controls or energy saving EMCS controls.

SAVING ENERGY AND DOLLARS: A CASE STUDY

The Nebraska East Union

In summer 1982 we began discussing the possibility of connecting the Nebraska East Union to the UNL EMCS.



The 87,000-square-foot building was constructed in 1976 and offers rooms for conferences, dining, bowling, meetings, student organizations, and lounging, as well as a bookstore and office space.

The mechanical system comprises six air handlers—four air handlers are VAV type (variable air volume), one is a multizone, and the kitchen has a hood exhaust/makeup system for the heavy cooking areas. There is also a perimeter hot water heating system which is the sole source of heat for the areas served by the VAV systems.

As we analyzed the East Union systems we were not overly optimistic about the amount of savings we could achieve with EMCS in a building that already had efficient VAV systems, which, when functioning properly, can be extremely energy efficient.

The building manager had encountered several control problems over the years and, in general, the control systems were not performing as designed. The pneumatic control systems were complicated and difficult to keep calibrated. We then decided to install EMCS controls in the building.

An added incentive for adding EMCS to the East Union building was that we had utility consumption records for this facility for years prior to installing the EMCS. With this data base of consumption information we would be able to measure accurately the results of connecting the building to the EMCS.

The facility was connected to the EMCS in November 1983 at a cost of $33,000. The following is a summary of the monitoring and control points installed:

20	Fan Start/Stop Control
9	Pump Start/Stop Control
27	Duct Temperature Input
13	Duct Temperature Control
10	Water Thermowell Temp Input
6	Water Temperature Control
26	Room Temperature Input
111	TOTAL POINT COUNT

The per-point cost was $297.

Unexpected Results

At this writing we have controlled the building for five consecutive winters. The results have been beyond our highest hopes for a building which was for the most part efficient VAV.

The graph in **Figure 1** shows the steam consumption in BTUs per degree day. The left two bars for each month are before the EMCS was connected. The remaining bars for each month are after the EMCS was connected except for October 1983. The installation was completed and the building went on-line in November 1983.

Our analysis revealed an average annual reduction of 280,000 btu/heating degree day, which is a 32 percent decrease in steam heating energy for this building. This reduction in energy consumption results in approximately $16,000 per year cost avoidance.

Note that this savings is a steam reduction for heating only. Electrical power and chill water cooling savings are not part of this figure. Note also that the greatest savings are in the months with moderate heating requirements. This would seem to imply that energy was being wasted most on those days when the load was substantially less than design conditions.

IS EVERYONE UNCOMFORTABLE NOW?

When most people think of energy management another word comes to mind..."discomfort." While it is true that creating discomfort can sometimes save energy, most mechanical systems can be optimized without an increase in occupant discomfort.

I quote the Nebraska East Union building manager: "Not only has the EMCS reduced our energy consumption dramatically, but our building comfort has improved due to better control of the mechanical systems."

Most of us have been in a position where we knew we could build a better mouse trap if we only had the resources to finance the development. After evaluating many systems available from the traditional temperature control companies we were convinced we could design and build that "better" system if only we could find financing.

That opportunity arose when we became aware of two building construction projects that were to have EMCS controls as part of the project. Could we develop and build the necessary hardware within the budget provided?

An affirmative decision was made after developing a cost estimate of the components and labor required to manufacture the circuit boards. We could hardly believe we could purchase the component parts and assemble the systems circuit boards for 1/20th the purchase price of similar circuit boards from the controls manufacturer at that time.

In fairness to the controls manufacturers, remember that there are costs that they must cover but we do not. We do not have to make a profit. We do not have the overhead of advertising and sales personnel. The warranty costs that they have to tack on increases their prices. We also have to absorb the cost of failures, but at $10 per circuit card they are almost disposable.

Another decision was to determine if we would patent our design. The university is a nonprofit organization, and part of our mission is to perform research beneficial to the state. Since patenting the design would only limit the availability of the system, we decided instead to declare the design public domain.

In other words, we would make it available to other institutions wanting the information, enabling them to use our design and manufacture the equipment for themselves or have the equipment manufactured for them by one of the many circuit manufacturing houses located throughout the United States. The installation can be accomplished by in-house personnel or by outside contractors.

Our sister institution, the University of Nebraska Medical Center in Omaha, has made use of this design. They are in the process of removing an existing out-of-date commercial system and installing the UNL EMCS in twenty-two of their buildings.

IN SUMMARY

The design documentation for all of the system components that we have developed are available to any institution for the cost of duplication and shipping. We will also provide the software developed at UNL. The only restriction is that the design information must remain public domain. No one may restrict the use of this information by other parties.

If you choose to purchase a copy of the documentation, we will include lists of software, hardware, and components you will need to build a functioning EMCS, as well as schematic diagrams, parts lists, and assembly instructions.

The bottom line as I see it is commitment. There is not an EMCS in the country that will work very long without intelligent human involvement.

At UNL we decided to "do our own thing" by designing our own EMCS, but this may not be everyone's best choice. Regardless of the method you choose in acquiring an EMCS, your first order of business ought to be to hire an individual who is excited about what can be accomplished with the available technology and put that person in charge of the project. ■

Data Base Update

Howard Millman

SURMOUNTING OLD PROBLEMS WITH NEW TECHNIQUES

The Chief

Computer systems are either expandable or expendable. Accordingly, first-rate software should improve with time. And it will, providing it's periodically enriched to ensure its continued development.

Maintenance Automation Corporation follows that tactic with their facility maintenance software, The Chief. Available since 1982, The Chief has undergone numerous revisions and refinements based on the feedback of its 300-plus users. Consisting of eighteen interactive modules, The Chief easily allows users to expand and, via custom programming, tailor the system to meet their exact needs.

At The Chief's core is the aptly named "Workhorse" module. Here's where routine and special work orders as well as scheduled preventive maintenance work orders are issued, along with their respective printed tracking reports. Workhorse's equipment maintenance record and work order reports also recap costs by any combination of cost centers (department, building, shop, trade, and others) as well as overall type or specific piece of equipment or location.

Work orders are entered and issued on a random, usually daily, basis while PM is usually entered in advance and assignments issued weekly.

The Chief is a modular, dedicated data base management system. This means that institutions requiring more sophisticated features can add components such as the Advanced Management module. This module delivers additional features such as a custom Report Writer (generates printouts based on the user's criteria), data export to Lotus, Multiplan, DBase, variance of cost record (comparing the original with actual), and prioritized report printouts. Work order search parameters include searching by trade, shop, employee, account, department, building, and a dozen more. These features are especially useful in institutions that use zero base budgets or require audit trails for backcharging.

The advanced module also allows more flexibility in scheduling PM work, such as assigning specific employees to a PM task and generating a task list by craft or requestor.

The advanced module also generates various work order reports including open, summation, and backlog (by craft, resource, and location). These logs include, at the user's preference, extensive detail including hours, craft, labor/material dollars, and quantity.

These are the kind of reports and bulletproof facts users always wish for when they're meeting with thin-lipped financial types to explain variances or defend budget requests. How, where, and why were the dollars spent? Or, when meeting with a single-minded department head, you'll have the answers to that eternal "What have you done for me lately?" query.

GIGO

Just as a horseshoe is a good luck symbol only when it's on the winning horse, so then a computer system is only as dependable as its data. Remember the expression GIGO? That stands for "Garbage in, garbage out." No program can provide results that are more accurate than the keyboard-entered data.

To facilitate data acquisition and entry, The Chief contains data collection forms. While not all of the many forms supplied will be used by every facility, these reproducible forms ensure the uniform acquisition of equipment information (history, location, idiosyncrasies), as well as labor, shop, and financial data. The design of the data sheets parallels the way data will be entered into the program, thereby reducing data entry errors. It also serves as an introduction to the software by familiarizing the staff with the program's ways and words.

Incidentally, should data extraction ultimately prove too cumbersome, yet another module of The Chief—the Intelligent Query Report Writer—simplifies retrieving data. Basically, it works by cataloging every field (building, shop, trade, and equipment type are examples of fields). Through a series of onscreen questions and answers, it determines then delivers what the user expects. As long as the user knows the field names, the required report can be extracted by entering a combination of those descriptive names.

The Chief stores a near-infinite number of work orders with 4,000 (8,000 optional) open at any one time. Closed work orders are moved from main (active) to archive (storage) directories monthly or at the users' directions. Date based tables allow retrieval of the work orders when needed. Equipment cost records and machine histories are compressed and stored as active files, facilitating their quick retrieval.

THE CHIEF Software™ Main Menu. A powerful family of interactive maintenance management tools.

These condensed equipment histories are cataloged by the equipments' tag/code number.

The Chief uses codes extensively. In some cases the codes are large enough to act as abbreviations. We'd rather see the user offered the option of substituting names for codes, especially for larger campuses. Smaller institutions or facilities with operators who have good memories are exempt. Codes for up to ninety-nine buildings are standard.

Since The Chief is a fully relational data base management system, data is entered only once. When data is required by another module or file it knows, via links, where the required information is stored. Most of The Chief's data is held in arrays called Lookup Tables. As the name implies, data is held in a central collection point waiting for the program to query it. Typical of the information in Lookup Tables are employee wages, trade classifications, account codes, and work order requests.

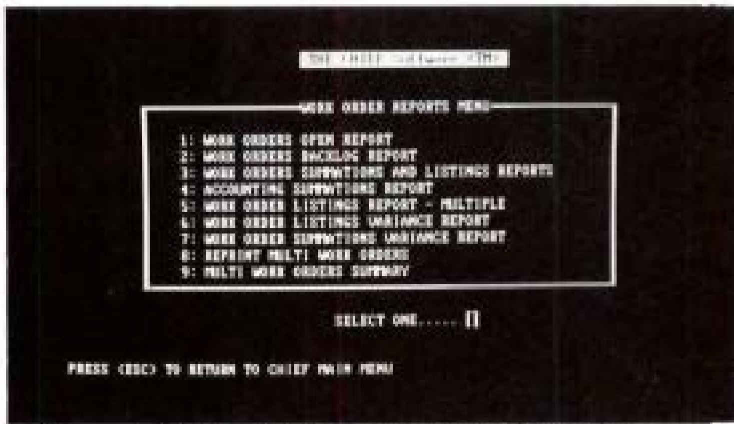
Pluses and Minuses

The Chief is written in Microsoft's compiled Basic, so execution of commands and disk access along with screen updates is acceptably quick. The Chief is easy to use, and throughout our tests we saw numerous examples of the care taken to minimize terminal trauma. Its intuitive and inclusive menus provide a simple user interface.

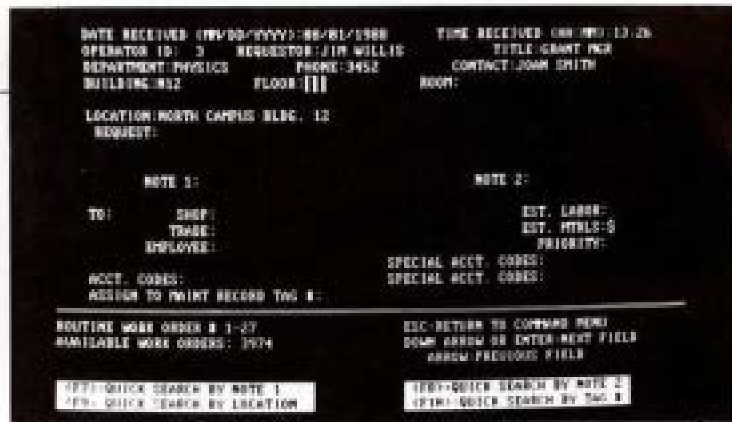
Everything has a price, however; The Chief's menus are its downside in that they only offer two choices—take it or leave it. Sophisticated "power users," therefore, might prefer a command driven program to save the seconds required in responding to the menus.

We'd also like to see an enhanced graphics interface. The Chief's Fault Code (history) module links to Microsoft's Chart and thereby provides extensive bar, pie, and other charts. Beyond even this would be the appeal of directly importing graphics from an editor or scanner. The obvious advantage is the ability to enter manufacturer's parts/repair diagrams and repair data.

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.



THE CHIEF Software™ Work Order Reports Menu. Nine powerful multiple parameter families of reports based upon work order information.



THE CHIEF Software™ Work Order Input Screen. The upper portion of the screen provides fields for rapid entry of work order information. The lower portion of the screen displays user instructions.

While The Chief will operate on 8088 (PC) machines, it will respond faster with an AT (286) or 386 machine. In fact, network users require these fleeter systems along with an eager (28Ms), large capacity (40MB) hard disk. The Chief operates on IBM's token ring network as well as the more desirable Novell or 3COM systems.

Local area network software contains password security, which allows some users access to only certain modules. (For instance, stockroom personnel can only access the inventory/bar coding modules.) File updates can likewise be restricted. Access is granted or denied by the system coordinator.

Optional Modules

Some other optional modules are Time and Material, Spare Parts and Inventory, Quik PM, Quik Calls, and Project Management (useful for elementary project organization and time tracking; remember this is a maintenance package, not capital construction).

Quik Calls is a memory resident program. When a request for service call comes in, the terminal operator summons Quik Call, enters the data, sends it to a printer or remote display terminal, then returns to the previous application. This is accomplished without loading or unloading the original application, such as word processing, or spreadsheets.

While most work orders contain one task for one location, the Quick PM module is used to describe numerous related activities in one location. This feature could be used for inspecting dorms at the end of the semester, for example. Numerous steps are involved in this activity (check electrical outlets, sinks, furniture condition, window shades, etc.), steps that are the same for each location. This quick PM work order contains the expanded task description and is followed by a series of locations.

The spare parts and supplies inventory module interacts with the work order and PM modules. When parts are withdrawn for use they are charged to the order/job. Inventory on hand can be tallied using a handheld bar code reader. Bar code labels are generated by the module's software and require a dot matrix printer. Purchase and sale costs (if different) are automatically billed to the chargeable code. As a timesaver and to minimize errors, both the part and the requestor's badge can be scanned for automatic chargeback.

Easy as we say The Chief is to use, operator training is necessary to supplement the tutorials and instruction manuals. Training is available on site (approximately $600 per day); two or three days is usually required depending upon the number of people or modules and the size of the facility. Training is periodically available in Maintenance Automation's Hallendale, Florida office or at other locations at the user's request.

After the sale, maintenance contracts are available at 10 percent of the purchase price. This entitles the user to continued phone support (ninety days is included

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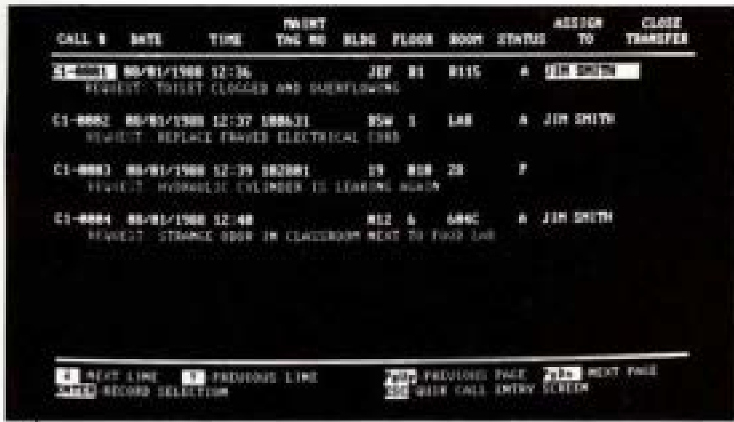
This is a special celebration for APPA as we host our 76th Annual Meeting to applaud excellence in facilities management for three-quarters of a century. We are looking for presentations in the following tracks: public relations, communications, and marketing for physical plant; strengthening management skills; developing employee skills and productivity; plant operations and maintenance; facilities planning and construction; managing the physical plant work load; and facilities management in small colleges, community colleges, and research and medical facilities.

Deadline for submission is **December 12, 1988.** For a presentation submittal form, please contact: APPA Educational Programs, 1446 Duke Street, Alexandria, VA 22314; 703/684-1446. FAX: 703/549-2772.



THE CHIEF Software™ Quik Calls™ Screen. Smart screen for paperless management of minor work requests. Perfect for pocket pager and radio dispatching.

THE CHIEF Software™ Work Order Listings Report—Multiple Screen. Commands the preparation of multiple listings of work orders within one pass through the data base of work orders.

with the purchase), periodic upgrades (about two per year), and fixes to the software due to any cause. Custom programming is ordinarily excluded from the maintenance contract, but it is available for $50 per hour, which is about what we pay for a plumber in New York City.

In every respect The Chief is one of the finest facility maintenance packages we've seen in its price range. Still, it is you who determines what products will meet your institution's needs. Even though you might like to trust everyone, you should still cut the cards. In other words, don't put a $5 saddle on a $500 horse.

Before you commit to this (or any) maintenance software system, request Maintenance Automation's $150 demo disk. Along with this demo they'll ship descriptive literature, a list of user installations, and survey results.

We don't exist in a utopian universe, so these latter two enclosures candidly include some institutions who were not fully satisfied with the package. The explanation, we suppose, is that they're confident of their product's performance. All of which reflects Maintenance Automation's credible approach in what they hope will develop into a long-term relationship. ■

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The Bookshelf

Time Management

Beyond Time Management: Organizing the Organization, by Jane Elizabeth Allen. Reading, Massachusetts: Addison-Wesley Publishing Company, Inc., 1986. 167 pp. $14.95, hardcover.

Have you ever wondered why, after spending the money and taking the time to attend a time management seminar, you still have not been able to get your act together? Have you sent others from your organization to time management seminars, hoping that the training will help them get up to speed? Did it work?

In *Beyond Time Management*, the author presents a good case for why traditional time management techniques fail. The techniques fail because, "Order may not be imposed by time management techniques. The arrangements may not make sense or be inherently meaningful to the individuals involved." Also, traditional time management techniques focus on the individual, require independence and freedom, and ignore the human systems and linkages that make up the fabric of our personal and work lives.

This book does not contain "to-do" lists or secret methods for saving time. It does, however, discuss developing organizational skills for individuals whose effectiveness is related to the actions of others. It addressess individuals as part of a "system," a work group whose organizational effectiveness is linked to members of the group.

The author's intention is to show readers how to understand and harmonize their own values, assumptions, and behaviors so that order is brought to their lives and to make sense of their time. Further, she wants to show the reader how to develop a system that organizes people, paper, objects, time, and space to maximize both individual and organizational efficiency.

The author begins with the premise that we all have a basic drive and purpose, are telic and sense-seeking, and that organizing is a process of discovery. It is a process of linking values, assumptions, and behaviors in a meaningful way. This, in turn, produces outcomes that are meaningful for individuals and organizations. The manager's role in this process is not exactly clear. I presume the author expects the manager to facilitate the process but this is not made clear to me. I found this somewhat distracting in an otherwise fine piece of work.

The first six chapters deal with the how and why of organizing and focuses on our need to make sense of our world. The author suggests some goal-setting exercises for both the individual and the work group. Once we identify where we want to go, the next step is to determine what goals we are achieving with our behaviors.

The author says, "Our behaviors are manifestations of important priorities because that's what we are choosing to do with our time." Time logs and time analysis help us identify and understand what we are doing which might not be the same as what we would like to be doing. We must deal with priority dissonance, the difference between what we are doing and what we want to do, in order to get organized. She suggests two techniques—change the goal or change the behavior.

I found the chapter on dealing with competing goals the most challenging and stimulating. It is clear that we cannot design a single system that can balance our goals with our ability to satisfy all of them. Instead, the author suggests that rather than trying to "get it all together, we should organize our lives to keep it all apart." By consciously acknowledging and assigning a place in our lives for each of our goals, we can give goals appropriate attention at the appropriate time.

The chapter on meetings is a good example of how to deal with competing goals and explain why we conduct meetings in the first place. The two goals of meetings is to get things accomplished (action) and get together to get things understood (relating).

The next two chapters cover "visual stressors" and "to-do" lists. The author criticizes "reminder" techniques that have been espoused by most teachers of time management. She claims that these techniques are unproductive because they criticize rather than prioritize, produce guilt feelings, and are perpetual visual stressors.

The chapter on planners left me somewhat unsatisfied and a bit confused. The author explains how to use a planner, the components it should have, and how to construct one if you do not find an off-the-shelf planner that satisfies you. While the planner is obviously better organized and more inclusive, I am not quite sure how it differs from the "to-do" list.

Although most of the book focuses on the individual within the work group and the work group within the organization, the last chapter addresses the organization as a whole. Most organizing problems occur in work groups because most organizing is done at that level. Problems in the work group mean that training must be directed to all members of the group. Similarly, problems in the organization must be addressed by the entire organization.

The author concludes with an insightful and appropriate warning about the ideas she presents, "Don't meddle yourself or your organization into a mess." I translate that to mean, "Don't fix it if it ain't broke."

The concepts in *Beyond Time Management* are liberally supported with references from other works in the psychology and behavioral science fields. In discussions on problems of priority dissonance and organizing competing goals, the author skillfully constructs images from Greek mythology and effectively uses familiar examples from our daily lives. To facilitate the reader's understanding, she consistently develops ideas at the individual level, then applies them to the work group or organization. She uses an interesting device, "Adages to Organize By," to increase the impact of her key ideas. The book is succinct and readable.

The author suggests reading this book if you have been trying to get or stay organized, but something or someone keeps getting in your way, your work group has been trying to get or stay organized but the members always seem to get in each other's way, and/or you wish to improve the order in your work and thus enhance the meaningfulness and joy in your life.

Beyond Time Management should be valuable to anybody interested in self renewal or organizational renewal. I found the work fresh, thought-provoking, and worth the time. The book is a concise 167 pages and is a must for your management reading list.

Beyond Time Management: Organizing the Organization is available from Addison-Wesley Publishing Company, Inc., Reading, MA 01867; 617/944-3700.

—**Donald L. Mackel**
Assistant Director, Physical Plant
University of New Mexico
Albuquerque, New Mexico

Purposeful Long Range Planning

The Subjective Side of Strategy Making: Future Orientations and Perceptions of Executives, by T.K. Das. New York: Praeger Publishers. 1986. 271 pp. $35, hardcover.

As I envisioned the content of this book, based on its title, I expected to find guidelines and analysis on how to improve strategy making while exercising a leadership role at the executive level of an organization. However, I was disappointed.

In his preface, the author states that "the book proposes a conception of the corporate strategy making process that recognizes the individual strategy maker as a center-stage corporate actor." The initial screening of the book quickly communicates that the text is written as a result of a study and is an academic report more than a procedural analysis of the subject.

Several chapters deal with the subjective perceptions of strategy makers and is of some general value and use to the general line management practitioner. But the information is presented in such an academic proforma that it is a challenge to find the functional realities that most line managers are looking for when reading such a text. The balance of the book deals with the research methodology and results and their implications.

The purpose of the book, in the words of the author, "was provided by the relative neglect of the centrality of the individual in the strategy making process." Which is all well and good if one cares to read documented research written more for one researcher to another. However, my intent in reading the book, and I would presume that of most line managers, would be to find improved methods of strategy making as the title implies. The text did not accomplish this. Except for the first five chapters and portions of the concluding chapter, the balance of the text had no application to the line manager but rather to the research technician.

On the plus side, the author points out that "the traditional concept of strategy making emphasizes objective knowledge and rationality to developed neglect of the role of individual strategy makers." In addition, the book presents information to help one gain a better understanding of the subjective side of strategy making.

The book points out that long range plans tend to be based on projections of current operations into the future much more frequently than on clear definition of what the organizational leaders want their organizations to become. Long range plans invariably tend to be overly optimistic and are really more short range than anyone cares to admit.

It was interesting to note that the strategy makers in the study felt that three years was the appropriate planning horizon rather than the arbitrarily used five-year planning period, which "does not imply that the executives concerned are in practice looking that long into the future." The study also made another interesting observation that it would be better to place executives in accordance with their future orientations and their planning responsibilities, to help better utilize their capabilities. This would be in deference to placing all executives with the responsibility to provide overall planning for all the areas for a particular unit.

The book is more of a report on research than a text on strategy making. It therefore requires a lot of reading for very little content for the general line manager. This is not a book that would be of interest or value to a physical plant administrator or any other line executive, but rather to an academic researcher interested in the subject. Therefore, I would not recommend it to others for their reading list.

The Subjective Side of Strategy Making is available from Greenwood Press, 88 Post Road West, Box 5007, Westport, CT 06881; 203/226-3571.

—**Gene B. Cross**
Assistant Vice Chancellor
for Facilities Management
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Berkeley, California

Managing Hazardous Waste

Hazardous Waste Management, ed. by George S. Dominiguez & Kenneth G. Bartlett. Boca Raton, Florida: CRC Press, Inc., 1986. 216 pp. $110, outside U.S. $125, hardcover.

The Environmental Protection Agency estimates that the twenty-eight thousand high schools, vocational schools, colleges, and universities in the United States generated 0.003 percent of the nation's total hazardous waste in 1985. Even though this amount is small, EPA was concerned enough to ask the Center for Environmental Management at Tufts University to study waste management in schools. The center's survey indicated the following:

1. School administrators are increasingly concerned about cost and liability issues associated with shipping school waste off-site.

2. Many administrators are not aware of the waste management requirements.

3. Most schools do not hire personnel to oversee waste management.

4. Most schools do not allocate adequate funds for waste management.

It appears that EPA's concern is valid. The survey indicates that school administrators are concerned about waste management but are not sure what to do about it and that school boards are not yet concerned with the issue.

Hazardous Waste Management reviews several aspects of hazardous waste laws. The editors purpose is "to provide working managers with a comprehensive introduction to practical operational aspects of hazardous waste management and with an extremely important foundation in relevant laws, rules, and regulations." They "concentrate on those aspects of hazardous waste management which we feel either have not been previously addressed, insufficiently examined, or most importantly, not considered in an integrated fashion."

The editors included chapters by various authors concerning hazardous waste management, hazardous waste legislation, the Resource Conservation and Recovery Act (RCRA), common law and statutory remedies for victims, and economic issues. I am not sure that they accomplish all of their objectives, but the book is useful in discussing and highlighting the legislation and the background from which the legislation stems. Most importantly, the authors make clear that waste management problems are not new and will not disappear.

Waste management is international in scope and costly, and sound waste management practices must be established so that the problem will not increase and require greater effort in the years ahead. The authors emphasize that developing and employing waste management procedures requires a systematic approach, not one based upon examining and considering discrete elements of the problem.

The introduction discusses concerns, classification concepts, and a philosophy for development of waste management programs. The author makes it clear that waste management is an institution-wide concern and that a specific individual should oversee the program.

The second chapter covers the history and issues that evolved from the Resource Conservation and Recovery Act of 1976 and its 1984 amendments, and the Superfund Act of 1980. RCRA is discussed in detail in chapter four beginning with its origins and continuing through the problems its broad objectives created, which ultimately resulted in the major amendment of 1984. Chapter five summarizes and analyzes the act.

The sixth chapter deals with the hazardous waste management program under the act. It is the most useful chapter for administrators because it provides EPA definitions and standards. It also provides the characteristics of hazardous waste and a checklist for identifying them.

Chapter seven presents remedies for toxic tort plaintiffs under common law and chapter eight discusses hazardous waste victims' rights under the statutes. While success for toxic tort plaintiffs under common law is difficult because of excessive costs and statutes of limitations, insurance requirements and EPA regulations are helping to lessen the hurdles. The emergence of federal and state statutes that enable private litigation is increaing and plaintiffs are benefitting as a result.

The last chapter evaluates economic issues including removal, transportation, storage, disposal, record keeping, liability, and capital purchases. These factors are considered as are future economic issues such as costs associated with changes in RCRA, the Post-Closure Liability Trust Fund, and victim compensation.

I found this book comprehensive, full of useful legal information, and current. With the exception of the opening chapter that encourages administrative concern for hazardous waste management and chapter six that gives guidance for management program establishment, I do not feel that the book was particularly useful to physical plant management. Should the campus have an individual with sole responsibility for hazardous waste management, however, this book would be beneficial.

Hazardous Waste Management is available from CRC Press, Inc., 2000 Corporate Boulevard, N.W., Boca Raton, FL 33431.

—**Gary Kent**
Assistant Director, Physical Plant
Buffalo State College
Buffalo, New York

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