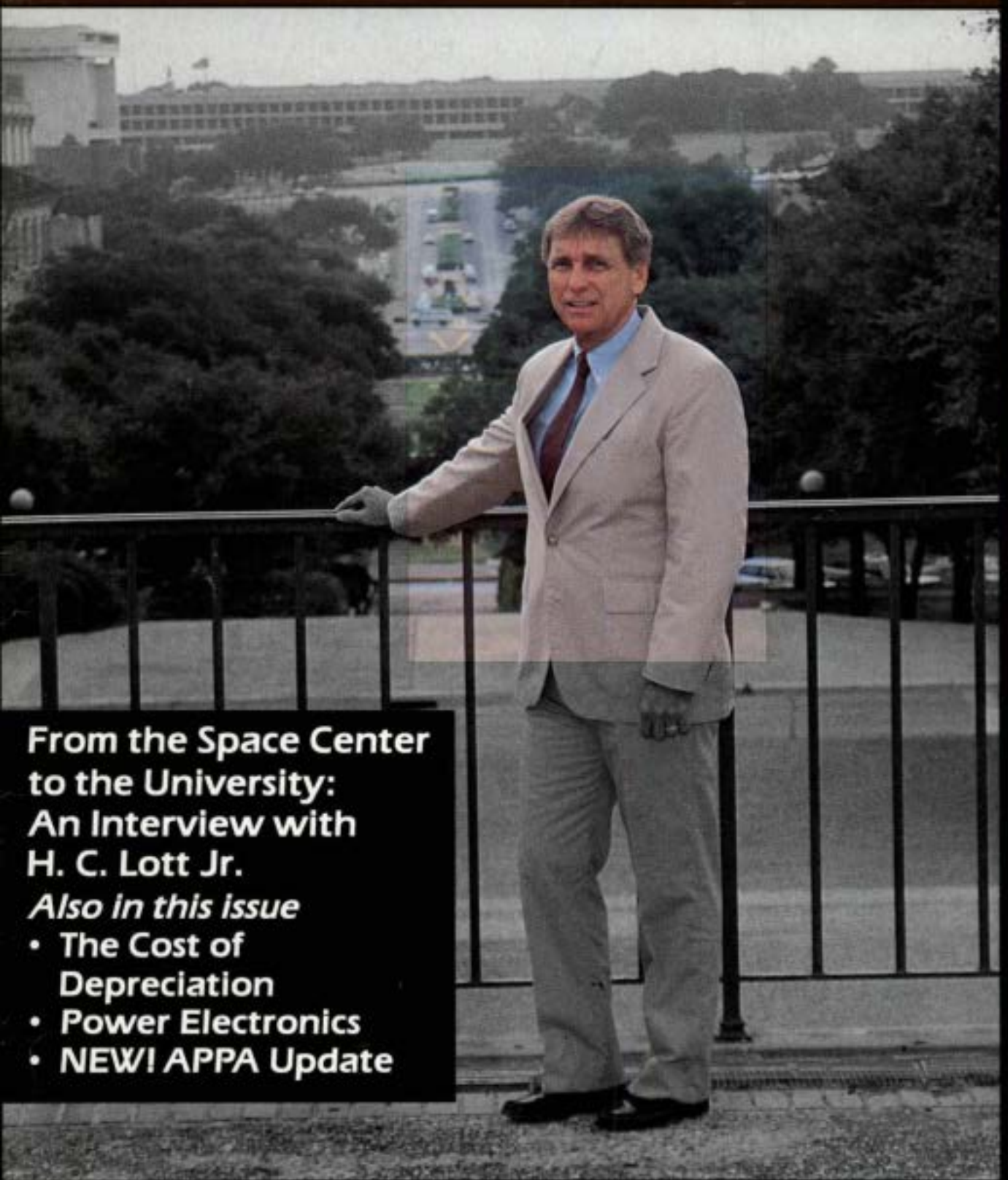
The official publication of the Association of Physical Plant Administrators of Universities and Colleges

Facilities Manager

Volume 3 Number 3 Fall 1987



From the Space Center to the University: An Interview with H. C. Lott Jr.

Also in this issue

- The Cost of Depreciation
- Power Electronics
- NEW! APPA Update

MANAGEMENT BASICS

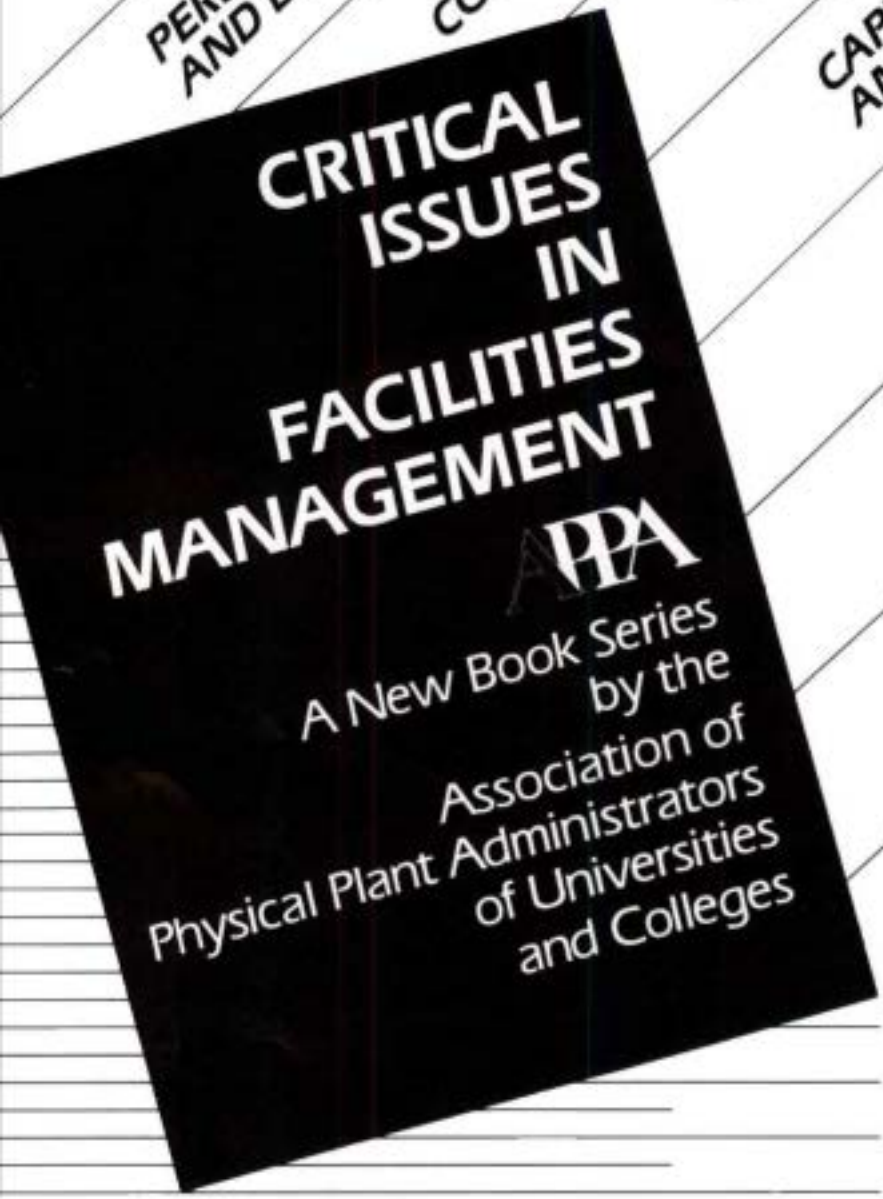
PERSONNEL MANAGEMENT AND DEVELOPMENT

COMPUTER APPLICATIONS

WORK ORDER CONTROL

CAPITAL RENEWAL AND DEFERRED MAINTENANCE

PREVENTIVE MAINTENANCE SYSTEMS



Critical Issues in Facilities Management

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

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

Computer Applications, the first in the series, outlines the myriad possibilities for computer use in the physical plant, regardless of size. Read how to make basic computer decisions, improve your productivity and efficiency, and prepare for future innovations so you won't be left behind. ISBN 0-913359-40-8.

Personnel Management and Development deals with the heart of every facilities operation—its people. Read how solid personnel policies can make the difference between mediocrity and excellence. ISBN 0-913359-41-6.

Work Order Control discusses centralized work management centers, provides case studies of successful programs, and gives you practical ideas for strengthening your day-to-day maintenance and operation activity. ISBN 0-913359-44-0.

Special Prepublication Offer

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

Now, for a limited time, APPA announces a special introductory offer. *APPA member institutions only* may purchase the first three books in the series for only $38—a 25 percent discount off the regular price! Add $9 for shipping/handling. **This offer expires December 31, 1987,** so act now!

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

Send purchase orders or payment (nonmembers *must* prepay) to
APPA Publications

APPA

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

Books will be sent as they are published.

Volume 3 Number 3
Fall 1987

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

Facilities Manager

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.

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

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Cover photo of H.C. Lott Jr. by Eric Sederholm.

From the Editor

Steve Howard

Introducing APPA Update

Beginning with this issue of *Facilities Manager* you will find a new section called APPA Update. This special section will provide you with up-to-date news from the Association of Physical Plant Administrators of Universities and Colleges and will serve as your newsletter four times a year.

News of federal legislation, announcements of upcoming APPA educational programs, updates on the Higher Education Facilities Trust, and listings of new APPA members are just a few of the features of APPA Update. And for those of you searching for a new position, Job Corner will also be included.

APPA Newsletter, your monthly membership communication, is being reduced to eight times a year; you will continue to receive *Facilities Manager* on a quarterly basis. Thus, you will receive an APPA periodical each and every month of the year. This minor change will cut APPA's expenses and still provide you with the information you need to maintain your facilities better and to develop professionally.

Newsletter editor Roger Kurtz is also editor of the APPA Update section of *Facilities Manager*. Contact Roger if you have any Job Corner listings, Information Exchange requests, promotions or retirements, or any other news of interest to APPA members.

The Rex Dillow Award

At APPA's 74th Annual Meeting last July, the first Rex Dillow Award for Outstanding Article in *Facilities Manager* was presented to Douglas K. Christensen, director of physical plant at Brigham Young University, Provo, Utah. His prize-winning article, "Integrating Capital Studies Within Physical Plant Operations," appeared in the Fall 1986 issue.

APPA's Professional Affairs Committee established the award in 1986 and reviewed eligible articles from 1985 and 1986 for the first award. Only staff members at APPA member institutions are eligible for the Rex Dillow Award. The Committee made its selection after reviewing each article's content for accuracy, interest of subject matter, and readability. We at APPA congratulate Doug Christensen for his excellent contribution, and we urge all our readers to consider submitting an article for possible publication. Call me if you have any ideas or questions.

The Rex Dillow Award was named for Rex O. Dillow, former and forever Marine, who retired from physical plant work at the University of Missouri/Columbia several years ago. He was active in APPA as vice president for professional affairs and saw the publication of many APPA books, including the first edition of *Facilities Management: A Manual for Plant Administration*, for which he served as technical editor.

Even after retirement Rex has stayed active in APPA. After a long tenure he is only now planning to "retire" as editor of the Central States regional newsletter. In 1985 he served six months as acting executive director of APPA during a period of transition and chaired the search committee for a new executive director. And last but not least, Rex has agreed to serve as editor-in-chief to oversee the publication of the second edition of the *Facilities Management* manual.

The following is a letter sent to APPA following the presentation of the first Rex Dillow Award:

> I extend to the APPA Professional Affairs Committee and the Board of Directors my appreciation for the singular honor of having my name identified with the new award for excellence in professional writing.
>
> It has been my good fortune to be associated with outstanding professionals on several APPA projects over the years, and any lasting achievements have been due to their collective efforts. I want to specifically recognize the APPA staff, whose massive detailed work in the implementation of projects is so essential to their success. I only hope that the award will somehow serve as a reminder of the achievements possible through cooperative efforts.
>
> My work with APPA has been the most rewarding experience of my life, and the establishment of this award is the highlight of it all. I extend my everlasting gratitude to all with whom I have been associated, and to all those involved in the establishment of this award.
>
> Rex O. Dillow
> Columbia, Missouri

PHOTO BY BOB BARTO

Douglas K. Christensen (center) receives first Rex Dillow Award for Outstanding Article from Vice President for Professional Affairs Philip G. Rector (left) and Rex O. Dillow.

APPA UPDATE

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

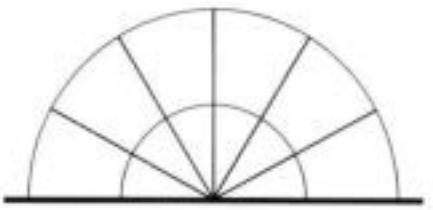
What APPA's Members Want to Know About HEFT

by Walter A. Schaw
APPA Executive Director

At the APPA annual meeting in New Orleans this year, APPA members took part in a round table discussion of the new initiatives proposed in the Higher Education Facilities Trust (HEFT). Questions and comments were written on cards by the participants.

The reason for this discussion was a belief by APPA's leadership that no matter how solid the program, the membership has to have opportunities to offer its opinions, ideas, and endorsement. HEFT will not succeed otherwise. HEFT must belong to, and benefit, every member!

While the enthusiasm and support for the HEFT initiative in New Orleans was greater than we could have reasonably expected, a number of questions were asked that you may also have. I'd like to offer some answers.



HIGHER EDUCATION FACILITIES TRUST

Is HEFT a separate organization from APPA?

Although no dues or other current revenue sources will support HEFT programs, it will function almost entirely within APPA's existing structure. All HEFT projects have already been assigned to vice presidents and committees. The APPA Board of Directors retains full governing authority—with one exception.

A HEFT Board of Trustees has been appointed to monitor and direct the investment of HEFT endowments independent of APPA. This is essential as part of our credibility in securing endowment funds from corporations and foundations. With this exception, APPA members—through the elected officers and Board—remain in full control and direction. You already belong to HEFT and it belongs to you!

Will APPA's fundraising rely on "arm-twisting" of our suppliers?

The primary fundraising focus is on those corporations that do business with facilities in higher education and expect a "bottom-line" benefit as HEFT's programs influence, for example, capital renewal or deferred maintenance funding. In discussions with exhibitors at the annual meeting, many immediately recognized HEFT's potential and expressed an enthusiastic interest. APPA's approach is a carefully designed, professional appeal that in no way obligates any individual member.

In fact, "arm-twisting" would be not only unprofessional but counter-productive in a campaign of HEFT's dimensions—a goal of $900,000 in the next year. One reason we have retained Charles Fazio, a highly-regarded association fundraiser, is to conduct a campaign that adds prestige and influence to APPA as well as resources.

Will individual members be asked to contribute?

Yes, an invitation was recently mailed to you to become a member of the HEFT Guarantor Society. We're looking for modest participation by APPA's members as part of our credibility in soliciting major gifts from corporations and foundations. Participation from our members, not major gifts, is our goal. And by the way, no solicitation will be made to colleges and universities as such.

Which HEFT programs have priority?

Executive development training has already been initiated, although we're pursuing the scholarship funding that will extend this (and other) opportunities to smaller schools by reducing fees. Deferred maintenance/capital renewal research—and the public relations campaign to get the attention of our presidents and trustees—is one such priority. Recent meetings with a donor prospect point to this project—at last—getting off the ground.

Will HEFT's programs be designed strictly for U.S. consumption? Will Canadians benefit?

Proposed HEFT programs are not restricted in design to the United States. Some research, however, will have a Canadian expansion or interpretation to be valid. Some preliminary conversations have been held with Ken Clements, of CAUBO, for advice and assistance. We will also rely on our Canadian members to identify major needs and differences. Know that *all* APPA members have to be part of HEFT in order for it to succeed.

How will HEFT, and APPA, enhance the profession?

APPA has been vigorously pursuing relationships with the higher education community in joint activities such as the APPA/ACE/NACUBO Natural Gas Purchasing seminars, or a briefing on APPA's evaluation of university facilities in China, or an address on deferred maintenance to 800 college presidents this month. APPA is being recognized.

HEFT gives our profession a focus in identifying our problems and developing responses to those problems—as well as providing a vehicle for external funding. We have already created an impression that we're not simply lobbying for more funding. We're posing solutions as well as problems, but we're also clearly saying that we (facilities) can't afford to be ignored!

(continued on p. 5)

Inside APPA

Large Schools Could Get DOE Refund for Past Oil Purchases

As the result of a recent policy adjustment, the United States Department of Energy (DOE) is issuing cash refunds to consumers who purchased petroleum products such as gasoline, diesel, and heating oil between August 1973 and January 1981. The refunds could significantly benefit many large colleges and universities.

The money that DOE is making available comes from part of the funds collected by the department for crude oil overcharges during the seven-and-a-half-year period of price controls. The refunds are estimated at $.0008 per gallon, or $800 per 1 million gallons of petroleum products.

The Washington, D.C. law firm of Abrams, Westermeier & Goldberg has informed APPA that the net benefits obtainable are not worth the cost of filing the application unless the gross refund exceeds $1,200. In order to obtain that amount, the applicant would have had to purchase 1.5 million gallons of petroleum products during the price control period, or about 200,000 gallons each year. Practically speaking, only large consumers who operate more than 50 motor vehicles, or who occupy more than 1 million square feet of space for which they purchase heating oil, or a combination of the two, can make an application worthwhile.

Any person or firm that has not filed a claim in the U.S. District Court of Kansas in the *DOE Stripper Well Exemption Litigation* is eligible for a refund, the law firm reports. Those applicants who are not end-users must prove injury—that is, that the higher price of the petroleum products was not passed on to customers. End-users are not required to produce proof of injury, however, since DOE assumes injury on their part.

Applications may be filed on a total firm consolidated basis, not by separate locations. This means that a college or university may file on behalf of all its campuses, buildings, vehicles, and operations. The applicant must be located in the United States.

Applications must be drafted in a legal descriptive format showing the unique operations and factual situation of the applicant. If records of actual volumes purchased are not readily available, an applicant is permitted to make a good faith estimate based on normal usage or derived from total costs shown on financial statements or other records that reflect the total cost of fuel oil for utilities or motor vehicles.

Applications must be filed before December 31, 1987, according to the DOE.

Some higher education institutions are using in-house or local counsel to file applications, said Lawrence I. Abrams, of Abrams, Westermeier & Goldberg. His law firm is among those willing to process applications on a no-cost, straight contingency basis.

Another resource is the National Technology Transfer Center (NTTC), which has written a book designed to guide applicants through the refund process. *Your Money Is in Their Bank: Now It's Up to You to Get It Back* is available for $40 from the Petroleum Energy Refund Center, c/o NTTC, P.O. Box 8375, Alexandria, VA 22306-8375; 800/628-2228 ext. 423.

Interested persons can also directly contact the DOE division of hearings and appeals, at 202/586-2094.

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 **J. Roger Kurtz.**

Inside APPA

HEFT *(continued from p. 3)*

Is HEFT too big for APPA to tackle?

I'll offer a personal opinion: given what is happening around us, *we have no choice.* As I talk to people like Bob Atwell at ACE or Caspa Harris, NACUBO's new executive, I'm getting an even clearer picture of how factors like the accounting standard on depreciation going into effect in May 1988 are going to put a new focus on facilities as a capital asset. In time, I predict that as many as one-third of our institutions that look financially stable now won't look that way any more.

A lot that we've been warning about for years will all of a sudden become a key issue. And we're going to have a lot of so-called experts speaking out if we don't.

We must be prepared—as individuals, as a profession, and as an association. *We will be!*

Information Exchange

York University would appreciate hearing from anyone who has completed or is in the process of completing a service excellence program—in particular, those programs relating to the principles emphasized by Tom Peters in his *Pursuit of Excellence* text, where serving the customer well is the prime objective. The same principles are also set out in the text titled *Service America,* by Karl Albrecht and Ron Zemke. Contact D.A. Dawson, Director of Physical Plant Operations, York University, 4700 Keele Street, North York, Ontario, Canada M3J 1P3; 416/736-5350.

• • •

Eastern Montana College would like information about space standards for computers: Is there information available on the amount of space for each minicomputer, microcomputer, and computer terminal? What space is needed for the support hardware and software? Is there an average or recommended standard for the number of micros, minis, or terminals for FTE students per subject field? Contact Richard L. Hedman, Director of Physical Plant, Eastern Montana College, 1500 North 30th Street, Billings, MT 59101-0298; 406/657-2309.

Attend an APPA Fall Seminar!

There are educational opportunities for everybody in APPA's new fall seminar series. Beef up your knowledge in any number of topics now being offered in locations across the United States. Choose from the following:

- **Hazardous Materials on Campus**

Learn how to initiate a program to reduce environmental risks and liabilities. This two-day seminar focuses on current regulations, how they apply to colleges and universities, and how to develop a program to monitor hazardous materials. Topics include RCRA, LUST, Superfund, Right-to-Know, Asbestos, PCBs, and Enforcement.

October 13-14—Radisson Hotel, Denver, Colorado
October 15-16—St. Louis, Missouri
October 22-23—Omni Hotel, Baltimore, Maryland

Registration is $295 for APPA members, $345 for nonmembers.

- **Custodial Staffing and Standards Seminar**

Learn how to develop guidelines for custodial and building maintenance to help judge job productivity and staffing requirements. Focus on training programs and motivation techniques and how to measure your success.

October 26-27—Le Baron Hotel, San Jose, California
February 16-17—East Coast

Registration is $295 for APPA members, $345 for nonmembers.

- **Historic Restoration and Preservation Seminar**

Learn the how-to's and skills involved in preservation and restoration work. Workshops feature laboratories on finishing techniques, paint analysis, masonry conservation, roofing materials, window restoration, and creative financing options.

November 4-6—Omni Hotel, Charlottesville, Virginia

Registration is $325 for APPA members, $375 for nonmembers.

Or choose from one of these seminars, cosponsored by APPA:

- **Depreciation for Not-for-Profit Institutions**

Cosponsored by the National Association of College and University Business Officers (NACUBO).

October 27-28—Memphis, Tennessee
November 6—Cambridge, Massachusetts

- **Lighting Energy Solutions Conference**

Cosponsored by the Northeast Solar Energy Association.

November 1-3—Boston, Massachusetts

- **How to Improve Plant Management**

A seminar designed specifically for private, independent schools and small colleges. Cosponsored by Independent School Management.

November 11-13—St. Louis, Missouri

- **Roof Inspection, Diagnosis, and Repair**

Cosponsored by the Roofing Industry Educational Institute.

November 12-13—Denver, Colorado
April 21-22—Boston, Massachusetts

- **Train-the-Trainer Seminar**

Issues and techniques in dealing with asbestos. Cosponsored by the National Asbestos Training Center. *Coming this spring; dates and locations to be announced.*

Plan to join us for one or more of these sessions. If you have not received an application form, or for more information, contact the Department of Educational Programs, APPA, 1446 Duke Street, Alexandria, VA 22314; 703/684-1446.

Inside APPA

Record Numbers Graduate from August Institute

A record number of participants graduated from APPA's most recent Institute for Facilities Management, held in Milwaukee, Wisconsin August 16-21. Twenty-six persons completed their third track of the Institute's three-track program, with a total of 158 registrants participating in the five programs.

In addition to the three regular tracks, two special programs were offered at the August Institute. The Small College Program, offered for the third time, drew 25 participants from across the country to focus on the particular needs and administrative issues of small college environments. Management of Health Science and Medical Institutions, a first time offering, received excellent reviews from attendees. Participants included hospital administrators as well as managers from colleges and universities with medical facilities.

Two faculty members—Jack Hug, assistant vice chancellor for physical plant services at the University of California/San Diego, and Howard Cihak, consultant—were recognized for their outstanding service and contribution over the years to the APPA Institute for Facilities Management. Both have taught at ten sessions of the Institute. Hug teaches the course on employee training and development, and Cihak teaches computer applications.

Five persons attended the Institute for Facilities Management on APPA scholarships, and one on a regional scholarship for the program. Pictured above (l. to r.) are scholarship recipients James M. McPhearson, Western Montana College; Charles Bowers, The Citadel; Donna Davis, Maryville College (SRAPPA scholarship recipient); Evan J. Lopez-Stickney, Ohio Wesleyan University; Glenn Kirschner, Hofstra University; and John D. Rulfs, Stephen F. Austin State University.

For a break from the studies, about 70 people toured Milwaukee, visiting the Pabst Brewery, the Mitchell Park Conservatory, the Ambrosia Chocolate Factory, and the downtown area. Another group visited Marquette University for a guided tour of the campus and its facilities.

The Thursday evening keynote address by Dr. Kenneth Shaw was entitled "Productivity and Quality of Service." Shaw is president of the University of Wisconsin System.

The next Institute, to be held January 24-29, 1988 in Sacramento, California, will feature the basic three-track program as well as two special programs. The Small College program will be offered again for the benefit of APPA's West Coast members, and the other special program is a new offering—Capital Project Planning and Construction. Further information about the January Institute will be available in mid-October.

APPA Completes First Executive Development Program at Notre Dame

Twenty-nine senior facilities managers from universities and colleges throughout the United States completed APPA's first Executive Development Institute, held August 16-21 at the University of Notre Dame in South Bend, Indiana.

The six-day educational program was prepared by APPA in conjunction with the Executive Programs Division of the University of Notre Dame. Topics covered included leadership and motivation, accounting and control, organizational culture, strategic planning, decision making, and marketing services. Classes were held at the Center for Continuing Education, a W.K. Kellogg Foundation facility, with living and dining accommodations provided by the Morris Inn.

A second Executive Development Institute is being planned for April 10-15, 1988. Information and applications will be mailed to members soon.

Northern New England Chapter Meeting Planned

Health Issues and Maintenance Headaches are the two tracks on the program at the fall meeting of the Northern New England Chapter of the Eastern Region Association of Physical Plant Administrators (ERAPPA), to be held October 29-30 on the Dartmouth College campus in Hanover, New Hampshire.

Health-related topics will cover stress management, substance abuse, back problems, and right-to-know laws. Maintenance problems will be discussed in sessions on underground tanks, PCBs, hazardous waste disposal, and problems of new construction.

For more information contact R.W. Plummer, Director of Buildings and Grounds, Dartmouth College, Hanover, NH 03755; 603/646-2485.

Job Corner

Job Corner Deadlines

Job Corner classified advertisements cost $16 per column inch; display ads cost $21 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, **December 10** for the January issue, and **January 11** for the February issue. 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; 703/684-1446.

• • •

Director of Physical Plant. Bergen Community College, located in New Jersey and serving approximately 11,000 students, seeks a director to be responsible for the operation and maintenance of 500,000 square feet of physical plant facilities and 167 acres of grounds plus an off-site location. Scope of responsibility will include facilities planning, development of cost estimates and scheduling controls, management of construction and renovation programs, coordination of architects and construction firms, building and grounds maintenance, utility distribution systems, utility planning and management, code compliances, and staff supervision and training. Bachelor's degree in electrical or mechanical engineering and a master's degree or equivalent in business management preferred. Minimum of eight years of facilities management experience. Submit letter of application, resume, and salary requirements by **October 20, 1987** to: Professor R. Thompson, Bergen Community College, 400 Paramus Road, Paramus, NJ 07652. *An equal opportunity employer.*

Superintendent of Grounds, Salem Academy and College. Responsible for management of grounds maintenance on a 60-acre, highly landscaped campus. Candidates should possess a degree in horticulture or a related field, with five or more years of applicable grounds maintenance experience. Salary will be commensurate with experience. Applications will be accepted until the position is filled, and should be sent to: Mr. James L. Wall Jr., P.E., Director of Physical Plant, Salem Academy and College, P.O. Box 10548, Winston-Salem, NC 27108. *An equal opportunity/affirmative action employer.*

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CALL FOR PRESENTATIONS

Association of Physical Plant Administrators of Universities and Colleges
Seventy-Fifth Annual Meeting
Washington, D.C. Hilton
July 24-27, 1988

The 1987-88 Educational Programs Committee invites physical plant administrators, suppliers, and others to submit abstracts for papers to be presented at the 75th Annual Meeting of the Association of Physical Plant Administrators of Universities and Colleges at the Washington Hilton in Washington, D.C.

This is a special celebration for APPA as we host our 75th 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 11, 1987.** For a presentation submittal form, please contact:

Education Department
Association of Physical Plant Administrators
1446 Duke Street
Alexandria, VA 22314
703/684-1446

Job Corner

DIRECTOR OF PHYSICAL PLANT

Mesa College is a four-year, baccalaureate degree granting institution that serves 3,800 students in Western Colorado. The plant budget is $2 million, with 35 full-time employees and 10 to 40 part-time employees. The director is responsible for over 600,000 square feet of building space and 200 acres. The successful candidate will have a baccalaureate degree in the field of engineering and five to eight years' progressively responsible experience in the field of facility management, with at least two years' experience in a senior level physical plant position, preferably at a college or university. He or she will possess strong interpersonal, communicative, supervisory skills. The individual will have in-depth experience in planning, construction, and mechanical systems. Employment begins March 1, 1988. Salary range is $38,000 to $44,000 depending upon qualifications. Excellent fringe benefits.

Please forward resume, including salary history and at least three references to Mr. John A. Riccillo, Vice President for Business and Finance, Mesa College, P.O. Box 2647, Grand Junction, CO 81502 no later than **November 6, 1987.** *An equal opportunity employer.*

ASSOCIATE VICE PRESIDENT FACILITIES PLANNING AND CONSTRUCTION

CORNELL UNIVERSITY seeks a facilities planning/construction professional who will assume responsibility for effectively managing all phases of the University's capital project development. Reporting to the Senior Vice President, the incumbent will share responsibility with the Vice Provost for Budget and Planning for the development, implementation and maintenance of a full scale campus facilities plan covering building sites and infrastructure (e.g., utilities, roads, parking, landscape, etc.). In addition, the incumbent will be responsible for complete facilities programming, site selection and design, while maintaining an effective construction management organization which supports campus planning/space analysis and building project programs.

Qualifications: BS in Architecture or Engineering required. Advanced degree preferred. Fifteen (15) years of progressively responsible experience in architectural/engineering firm, construction management or similar position in a large, complex public or private organization required. Demonstrated leadership in design and construction of major capital projects and large-scale site plans essential. Effective communication and motivational skills along with the ability to work in a large decentralized environment necessary.

To apply send resume and cover letter by November 2, 1987 to:

Bettie H. Thompson, Manager, Staffing Services

Cornell University
160 Day Hall
Ithaca, New York 14853

An Affirmative Action/Equal Opportunity Employer

Jobs *(continued from p. 7)*

Assistant Mechanical Engineer, physical plant department, Indiana State University. Applicant to have B.S. in engineering, a minimum of two years' experience in the operation of computer-based energy management systems, college-level training in computer science, and working knowledge of HVAC systems and controls. The assistant will work under the direction of the mechanical engineer and will be expected to assume full responsibility for the management of energy conservation programs and the operation of the campus JC/85-40 system. Salary is commensurate with credentials and experience. Submit a letter of application, current resume, and phone numbers of three references to: Chairman of Search Committee, Physical Plant Department, Indiana State University, 951 Sycamore Street, Terre Haute, IN 47809, before **October 31, 1987.** *Indiana State University is an equal opportunity/affirmative action employer.*

Maintenance Manager (Mechanical Engineer C). Old Dominion University, a major urban institution located in the Tidewater, Virginia area, is seeking to fill a senior level management position within the physical plant department. Responsibilities include development and management of an operating budget in excess of $1.2 million, the maintenance of approximately 55 facilities with a gross square footage of 1.5 million square feet, and the management of an in-house staff

PROJECTS MANAGER

Administer construction projects; identify need, prepare drawings, cost estimates and timetables; supervise and monitor work. B.S. in engineering or architecture. Experience preferred. Competitive salary, excellent benefits. Send resume to Bryant College, Human Resources Office, 450 Douglas Pike, Smithfield, RI 02917-1284 prior to **October 31, 1987.** An equal opportunity employer.

BRYANT COLLEGE

Job Corner

consisting of approximately 45 employees. Individuals with highly developed plant management and mechanical engineering skills are encouraged to apply. Qualifications include: substantial experience in a large institutional setting; demonstrated ability to manage complex craft functions, including repairs and installations of highly technical mechanical systems; ability to communicate effectively both orally and in writing to all levels of the university community; and license or ability to obtain a license in mechanical engineering preferred. Starting salary $27,353 to $34,172. Persons interested in this position should submit their applications to Old Dominion University, Employment Office, 1509 49th Street, Norfolk, VA 23529. *Old Dominion University is an affirmative action, equal opportunity institution.*

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ENVIRONMENTAL HEALTH AND SAFETY OFFICER

Individual to serve as the College's "Right to Know" officer. Responsibilities include collection and maintenance of material safety data sheets and chemical fact sheets. Individual will conduct training for all staff annually and interpret federal, state, and local toxic and hazardous material codes and regulations, including the development and recommendation of policies and procedures for compliance. Additionally, the successful candidate will establish procedures for assessment, storage, and removal of hazardous and toxic waste on campus.

Qualifications: Bachelor's degree in a physical science required with Industrial Hygiene experience and excellent oral communications skills essential. Advanced degree in a physical science desirable. Comprehensive understanding of "Right to Know" laws necessary. This is a management-level position; salary commensurate with experience and is negotiable. Women and minorities are encouraged to apply. Send letter, resume, transcript(s), and three letters of reference by **October 25, 1987** to: Mr. Bernie G. Henderson, Vice President for Finance and Business, 705 Culkin Hall, State University of New York College at Oswego, Oswego, NY 13126.

An Equal Opportunity Employer

University of Montana
DIRECTOR OF UNIVERSITY FACILITIES

Responsible for the management of university facilities, which include programs for building maintenance, grounds, custodial, steam production, utilities distribution, and planning and construction.

Preferred Qualifications: Bachelor's degree with emphasis in architecture or engineering with professional license; four years' experience in university facilities management including budget planning and cost management, personnel supervision, collective bargaining, and communications skills.

Starting Date: January 1, 1988. Salary negotiable DOE.

Submit letter of application by **October 16, 1987** stating experiences and philosophies in facilities management, together with resume and three professional references to:

Sylvia Weisenberger, Chair
University Facilities Director Search
University of Montana, UH 316
Missoula, MT 59812
(406) 243-6606

Equal Opportunity Affirmative Action Employer

Senior Electrical Engineer

Our Operations Department has an opening for a Senior Electrical Engineer to plan, develop, and implement the installation and maintenance of campus utility electrical power systems and to provide a technical resource function for the operation and maintenance of the central utility distribution center. This person will also identify and develop cost control and reduction procedures and energy conservation measures, evaluate and recommend alternative power sources and preventative maintenance programs, interface with utility suppliers regarding service, and stay current with the electrical code and the latest information in electrical design and equipment.

If you have a BS degree in Electrical Engineering, are a registered Professional Engineer, and have at least 10 years of professional experience, we'd like to hear from you.

Please forward your resume and salary requirements to Susan Baxter, Personnel Office at the Cambridge address listed below. Refer to Req. 84168B.

Medical Area: 164 Longwood Ave., Boston, MA 02115
Cambridge: 1350 Mass. Ave., Cambridge, MA 02138

An affirmative action/equal opportunity employer.

HARVARD UNIVERSITY

Job Corner

Jobs *(continued from p. 9)*

Assistant Director of Physical Plant for Campus and Custodial Services. The University of Iowa invites applications from top-performing individuals experienced in directing large, diverse organizations. The assistant director is responsible for the following functions: maintenance of more than 400 acres of grounds, custodial services in academic and administrative buildings totalling 5 million gross square feet, campus mail service, and the university's motor pool with a fleet of 350 vehicles. Directs a staff of 300. Requires a bachelor's degree in business administration, public administration, or industrial engineering; more than five years' experience as a manager; or an equivalent combination of education and experience. Salary is commensurate with qualifications. Forward letter of application with resume to James E. Christenson, Director of Physical Plant, 103 West Burlington, Iowa City, IA 52242.

Director of Physical Plant. The Bloomington campus of Indiana University is actively seeking applicants for the position of physical plant director. The campus consists of over 200 buildings (55 major academic facilities) located on approximately 1,200 acres, and the physical plant employs approximately 700 full time staff. The director will report to the university vice president for facilities, and

ELECTRICAL UTILITIES ENGINEER

Physical Plant Department, Duke University seeks an Electrical Utilities Engineer. This position reports to the Manager of Utilities and is responsible for the maintenance, operation, design, and construction of the campus High Voltage Distribution System serving 8.5 million square feet.

Duties include supervision of the high voltage maintenance crew, review of construction documents, and coordination with the local utility. A Bachelor's degree in electrical engineering with five to ten years of progressive experience in the design, construction, and/or operation of electrical distribution systems is required.

A unique opportunity for the right individual to join a progressive management team at a private university located in the growing Piedmont area of North Carolina. Salary is commensurate with experience. Please send detailed resume and salary history to: Electrical Utilities Engineer, Search Committee, DUKE UNIVERSITY EMPLOYMENT OFFICE, Box 40001, Durham, North Carolina 27706.

Duke University is an Equal Opportunity/ Affirmative Action Employer.

Indiana State University
CONSTRUCTION MANAGER

RESPONSIBILITIES: The Construction Manager will represent Indiana State University in the coordination and inspection of major construction projects, be responsible for supervision and management of remodeling projects, and inspect and prepare reports on rehabilitation needs of existing facilities.

QUALIFICATIONS: Thorough understanding of relationship of Owner, Contractor, and Architect during construction project, minimum seven years' experience in building construction, knowledge of the construction process, methods, and techniques, ability to prepare construction drawings, specifications, estimates, and reports. A bachelor's degree in architecture or engineering is desirable.

SALARY: Negotiable.

Applicants should submit a resume along with the names and addresses of three references to Michael W. Smith, Associate Director of Physical Plant, Indiana State University, 951 Sycamore Street, Terre Haute, IN 47809.

INDIANA STATE UNIVERSITY IS AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.

UTILITIES OPERATION MANAGER
Rice University

The Physical Plant Department is seeking the services of an individual to manage all utility operations at Rice University. He or she will be responsible for the operation and maintenance of power plant equipment and for evaluation of the performance of all systems in order to achieve the most efficient utilization of energy. Equipment includes direct fired boilers, centrifugal chillers (both steam and electric driven), air compressors, pumps, cooling towers, and auxiliary equipment. Also included is a cogeneration system consisting of a gas-fired turbine, generator, heat reclaim steam generator, and absorption chillers.

Candidate must be experienced with various types of building heating and ventilating systems and capable of recommending retrofits to attain most efficient operation. Supervises a staff of air conditioning technicians who maintain this equipment and assure satisfactory operational control.

Salary to be commensurate with qualifications and experience. College degree required in Mechanical or Industrial Engineering, plus Professional Engineering Registration. Must have ability to work constructively within the campus community. Experience with other institutional facilities is highly desirable. Good benefits.

Equal Opportunity Employer

Job Corner

will be responsible for all aspects of physical plant administration and for coordinating the various activities of all units of the physical plant department, to include: building maintenance, building services (custodial), campus division (grounds), engineering services, and campus craft shop operations. Candidates should possess a B.S. degree in business and/or engineering and have a minimum of ten years' experience in physical plant administration. College or university experience and advanced engineering or business degree are preferred, and the successful candidate will have strong interpersonal and management skills and well developed written and oral communicative abilities. Excellent leadership and planning skills are required. Sensitivity to faculty and student concerns and the ability to work cooperatively within an academic setting are also qualities required for the position. Salary will be commensurate with experience. Excellent benefits package. Interested applicants should forward a resume and salary requirements to the following address no later than **November 1, 1987.** Mr. Richard Macek, Indiana University Personnel Administration, Poplars Building, 400 East Seventh Street, Bloomington, IN 47405. *An affirmative action/equal opportunity employer.*

Membership

New Institutional Members

CBM University, 1000 Centerville Turnpike, Virginia Beach, VA 23463; 804/424-7777. Representative: Robert Fiedler, manager of building services.

Middle Georgia College, Sarah Street, Cochran, GA 31016; 912/934-7771. Representative: Marion O. Hornsby, director of physical plant.

New Institutional Representatives

Eastern Illinois University, Charleston, IL: **Victor Robeson,** director of physical plant.

Indiana University Northwest, Gary, IN: **Rene Andreatta,** director of physical plant.

Lamar University, Beaumont, TX: **Robert Allen,** director of facilities maintenance and operations.

Marymount College, Tarrytown, NY: **Phoebe DeReynier,** vice president for finance.

Southeastern Massachusetts University, North Dartmouth, MA: **William E. Traubel,** director of facilities and physical plant.

University of Maryland/Eastern Shore, Princess Anne, MD: **Brooks Giles,** director of physical plant.

University of the Sacred Heart, Santurce, PR: **Adolfo Hernandez-Cruz,** director of physical plant.

University of South Carolina/Spartanburg, Spartanburg, SC: **Kenneth A. Rott,** director of physical plant.

Yale University, New Haven, CT: **Allan E. Braun Jr.,** director of facilities management.

New Associate Members

Adelphi University, Garden City, NY: **Craig Kennedy.**

Delta College, University Center, MI: **Martin A. Willett.**

Embry-Riddle Aeronautical University, Daytona Beach, FL: **James Becker, Jerry Miller.**

Fort Hays State University, Hays, KS: **Eric King.**

Hunber College of Applied Arts and Technology, Rexdale, ON: **John Hooiveld.**

Kansas State University, Manhattan, KS: **Reba Snavely.**

Lamar University, **Ken Courtade.**

San Jose State University, San Jose, CA: **Barbara Pluta.**

Southeastern Massachusetts University, North Dartmouth, MA: **Edwin Limoges.**

University of British Columbia, Vancouver, BC: **Terry Peterson.**

University of Colorado, Boulder, CO: **Gary Koenig.**

University of Louisville, Louisville, KY: **George Blake, W.F. Maillette, Nathan Norman.**

University of Missouri/Columbia, Columbia, MO: **Don Guckert, Paul R. Hoemann, John Rademeyer, Larry Wilson.**

University of New Hampshire, Durham, NH: **Judith H. Beliveau.**

University of Victoria, Victoria, BC: **G.A. Robson.**

Western Illinois University, Macomb, IL: **Ed Crahan.**

New Affiliate Members

Charlotte Public Schools, 378 State Street, Charlotte, MI 48813; 517/543-2810. Representative: Ed Dobbs, director of non-instruction services.

City of Carrollton, P.O. Box 110535, Carrollton, TX 75011-0535. Representative: Charles L. Thomas, facilities management manager.

U.S. Department of Energy, New York Support Office, Room 3437, 26 Federal Plaza, New York, NY 10278; 212/264-0123. Representative: William G. Klebous.

Subscribing Members

NK-Ferguson Company, One Erieview Plaza, Cleveland, OH 44114; 216/523-3487. Representative: Al Bliss, manager of business development. NK-Ferguson Company provides engineering, construction, and design capabilities for physical plant generating and distributing facilities.

Phoenix Controls Corporation, 83 Chapel Street, Newton, MA 02158; 617/965-8500. Representative: Gordon P. Sharp, president. Phoenix Controls Corporation manufactures integrated laboratory exhaust and make up airflow controls designed for energy conservation and laboratory safety.

Member Update

Procoat Products, Inc. in Stoughton, Massachusetts is the new name for Products Distribution Plus, Inc.

Coming Events

Oct. 13-14—**Hazardous Materials on Campus.** Radisson Hotel, Denver, CO. $295/APPA members, $345/nonmembers. Contact: Educational Programs, APPA, 1446 Duke Street, Alexandria, VA 22314; 703/684-1446.

Oct. 15-16—**Hazardous Materials on Campus.** St. Louis, MO. $295/APPA members, $345/nonmembers. Contact: APPA Educational Programs.

Oct. 22-23—**Hazardous Materials on Campus.** Omni Hotel, Baltimore, MD. $295/APPA members, $345/nonmembers. Contact: APPA Educational Programs.

Oct. 26-27—**Custodial Staffing and Standards Seminar**. Le Baron Hotel, San Jose, CA. $295/APPA members, $345/nonmembers. Contact: APPA Educational Programs.

Oct. 27-28—**Depreciation for Not-for-Profit Institutions.** Memphis, TN. Cosponsored by NACUBO.

Nov. 1-3—**Lighting Energy Solutions: A National Conference on Energy-Efficient Lighting.** Boston Park Plaza Hotel,, Boston, MA. Cosponsored by APPA. Contact: Lighting Energy Solutions, P.O. Box 541, Brattleboro, VT 05301; 802/254-2386.

Nov. 4-6—**Historic Restoration and Preservation Seminar.** Omni Hotel, Charlottesville, VA. $325/APPA members, $375/nonmembers. Contact: APPA Educational Programs.

Nov. 6—**Depreciation for Not-for-Profit Institutions.** Memphis, TN. Cosponsored by NACUBO.

Nov. 11-13—**How to Improve Plant Management.** St. Louis, MO. Designed specifically for private-independent schools and small colleges. Cosponsored by Independent School Management. Contact: ISM, 1316 N. Union St., Wilmington, DE 19806; 302/656-4944.

Nov. 12-13—**Roof Inspection, Diagnosis, and Repair.** Denver, CO. Cosponsored by the Roofing Industry Educational Institute.

Jan. 24-29—**Institute for Facilities Management.** Sacramento, CA. Special programs: Small College Management & Capital Project Planning and Construction. Contact: APPA Educational Programs.

Feb. 16-17—**Custodial Staffing and Standards Seminar**. East coast location. $295/APPA members, $345/nonmembers. Contact: APPA Educational Programs.

Apr. 10-15—**Executive Development Institute.** University of Notre Dame, South Bend, IN. Contact: APPA Educational Programs.

Apr. 21-22—**Roof Inspection, Diagnosis, and Repair.** Denver, CO. Cosponsored by the Roofing Industry Educational Institute.

To be announced—**Train-the-Trainer Seminar.** Cosponsored by the National Asbestos Training Center.

APPA Announces New Book Series

"Critical Issues in Facilities Management" is a new book series from APPA that addresses today's key topics in plant administration. Currently under production are titles on computer applications, personnel management, work order control, and more.

Watch your mailbox for APPA's special early-bird offer on this exciting series.

Audio-Cassette Tape Offer

The success of APPA's 74th Annual Meeting was due in part to its excellent educational sessions. Some of these sessions have been preserved on audio-cassette tape so that you can share their value with your colleagues.

This special offer is available only to APPA members and meeting attendees. If you purchase 5 tapes, you receive 1 FREE through this offer.

KEYNOTE ADDRESSES

- ☐ Facilities Management—The View From the Top
  Dr. Ronald Calgaard, President, Trinity University
- ☐ Facilities as a Capital Asset: Concerns of a University Trustee
  John W. Pocock, Trustee, the College of Wooster

FACILITIES PLANNING & CONSTRUCTION

- ☐ The Campus Plan: A Process of Engagement of Momentum
  Perry Chapman, Sasaki Associate, Inc.
- ☐ Do It Yourself Value Engineering
  F. Louis Fackler, University of California/Santa Cruz
- ☐ Management of Capital Construction Projects at the Small College
  H. Davis Byrd, Southern Baptist Theological Seminary
- ☐ The University as Developer
  William D. Middleton, University of Virginia

WORK MANAGEMENT AND CONTROL

- ☐ UCLA Facilities Management Information System
  Constance Freeman, University of California/Los Angeles & Eugene Simko, Daverman & Associates
- ☐ Work Management and Control
  Paul F. Tabolt, Pennsylvania State University

PLANT OPERATIONS AND MAINTENANCE

- ☐ Contracting Services: Why, When, and How
  Jerome Meyer, Medical College of Wisconsin
- ☐ Physical Plant Construction Company: In-House Contracting
  Richard C. Alexander, University of Illinois

MANAGEMENT SKILLS

- ☐ Public Relations, Communications & Marketing for the Physical Plant (2 tapes)
  Jim Antoine, Washington State University & Elsa Pena, Georgia State University
- ☐ Motivating the Unmotivated: Helping Supervisors Increase Employee Motivation
  Barbara Kunz & Adriel Williams, Duke University
- ☐ Responsibilities and Potential Liabilities of Environmental Management
  David V. Seyer, Hall, Estill, et al

SMALL COLLEGE PLANT MANAGEMENT

- ☐ Personal Computer Basics
  Robert Rounds, University of Delaware
- ☐ Management of Capital Construction Projects at the Small College
  H. Davis Byrd, Southern Baptist Theological Seminary

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From the Space Center to the University: An Interview with H. C. Lott Jr.

by Steve Howard

H. C. Lott Jr. is a native Texan. He attended Texas Christian University two years on a baseball scholarship. After serving with the U.S. Marine Corps during the Korean War, he enrolled at Texas A&M University to study engineering. Lott received a BSCE in 1958 and an MSCE in 1960.

He attended graduate school on a fellowship from the Humble (Exxon) Oil Company; he also did graduate work in industrial engineering and business management at Florida Institute of Technology and the University of South Alabama. After receiving his master's degree, Lott went to work as a project development engineer with the E.I. DuPont Heavy Construction Division and was responsible for research, design, and development of construction methods, techniques, tools, and materials.

From 1964 through 1971, Lott was assistant director and chief engineer for plant engineering and maintenance at the Kennedy Space Center in Florida. He was awarded NASA's Apollo Achievement Award in 1969 for "outstanding accomplishments culminating in Apollo 11's successful achievement of man's first landing on the moon, July 20, 1969." The medal accompanying this award was struck from metal that made the first trip to the moon.

In 1971 Lott accepted the position of director of corporate maintenance with Southern Industries Corporation, Mobile, Alabama. In 1973 he relocated to Dallas as manager of corporate industrial engineering and maintenance with General Portland, Inc.

Lott accepted the position of director of physical plant at the University of Texas/Dallas in 1974. In 1979 he was promoted to assistant vice president for business affairs, with responsibility for physical plant, university book store, food services, shipping and receiving, communications, mail services, staff services, transportation, and printing. In 1980 Lott transferred to the University of Texas/Austin as director of plant management and general services, and in 1985 he was promoted to assistant vice president for plant management and construction.

Lott is a registered Professional Engineer in several states in the disciplines of civil, industrial, and management engineering. He is also a Certified Plant Engineer and a member of the National Society of Professional Engineers, Association of Energy Engineers, and in the past was active as a leader in the American Institute of Plant Engineers.

Lott's APPA activities have included serving as past president of Texas APPA and the Central States region, faculty member for the Institute for Facilities Management, and a speaker at many chapter, regional, and national functions. He was the delegation leader on APPA's recent trip to the People's Republic of China.

PHOTO BY ERIC STEPHENS

Lott is responsible for 735 acres and nearly 11 million gross square feet of building space at the University of Texas/Austin, which has an enrollment of more than 47,000 students.

Facilities Manager: *You were in charge of plant engineering and maintenance for the Kennedy Space Center during seven eventful, dynamic, historic years in the U.S. space program. What memory will stay with you the longest from that experience?*

H.C. Lott Jr.: There are so many memories from those days that it's difficult to say which is the strongest. One memory that I will never forget is the total dedication of all the people involved in the space program. Everyone, from the custodial workers to the mission directors, worked as a team to meet a common goal—to put a man on the moon. In the month preceding a launch, sixteen-hour days, seven days a week, were common. I often had to tell people to go home, and then I'd find them back in their work areas or just moving around the center to see what was happening.

Steve Howard is editor of Facilities Manager *and APPA's director of publications. He wrote about the Higher Education Facilities Trust in the Spring issue.*

Of course, it would be difficult to forget the excitement and tension during the Apollo program of a final countdown and the roar of the Saturn V engines creating seven-and-a-half million pounds of thrust as they lifted more than six million pounds from the pad. And then you'd feel total relief when Mission Control announced that the spacecraft was in orbit.

Many people have questioned the value of the Mercury, Gemini, and Apollo projects and have difficulty justifying the vast amount of money, time, and effort that were expended on them. Twenty thousand firms with more than 400,000 people were involved. In my mind, however, it was very much justified. Project Apollo, which put men on the moon, was a mighty achievement, and I'm very proud to have been a part of it.

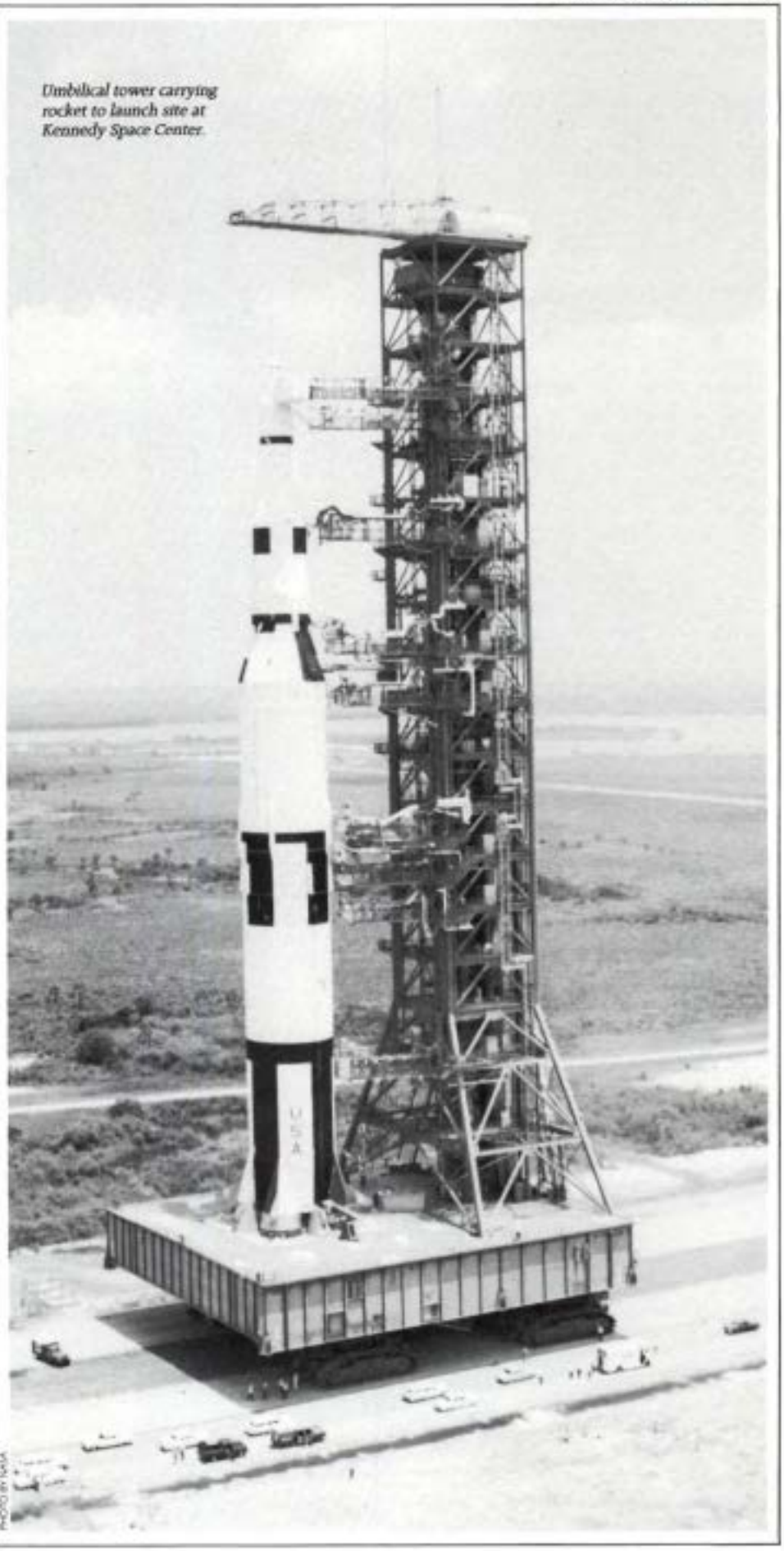
FM: *You were actually employed by TWA during this period. What was their arrangement with the space center?*

HCL: TransWorld Airlines was the base support contractor for NASA. Under our contract we were responsible for facilities engineering, maintenance and operation of facilities, fire protection, security, medical, food, and supply services.

FM: *What were your unique responsibilities, both overall and day-to-day, at the space center?*

HCL: My initial assignment was as an engineering supervisor responsible for plant layout, activation, and outfitting of the new facilities at the Kennedy Space Center. The construction program was completed in 1966, with a total asset investment of more than $800 million. This included the buildings, site equipment, and utilities.

In 1966 TWA placed me in its "High Potential Employee Development Program." This was a five-year management training program with annual job assignments and promotions that train you for a staff vice president position. The first step in my development plan was as manager of facilities maintenance. This was my first experience in the facilities maintenance field, and what a way to start! I was supervising over 1,000 people in the maintenance of facilities for the largest and most advanced research and development program in the world. We had more



Umbilical tower carrying rocket to launch site at Kennedy Space Center.

PHOTO BY NASA

than 2,200 people in the department and I, when serving as chief engineer, had responsibility for 200 engineers of all disciplines, mechanical and electrical utilities, and a 150-person fire department, which included the highly critical function of astronaut rescue services.

FM: *How closely were you involved in actual launches?*

HCL: In addition to the normal functions of supplying electrical power and other utilities to the vehicle assembly, test areas, and launch pads, my departments provided over 300 emergency generators as backup for the launch systems and tracking facilities.

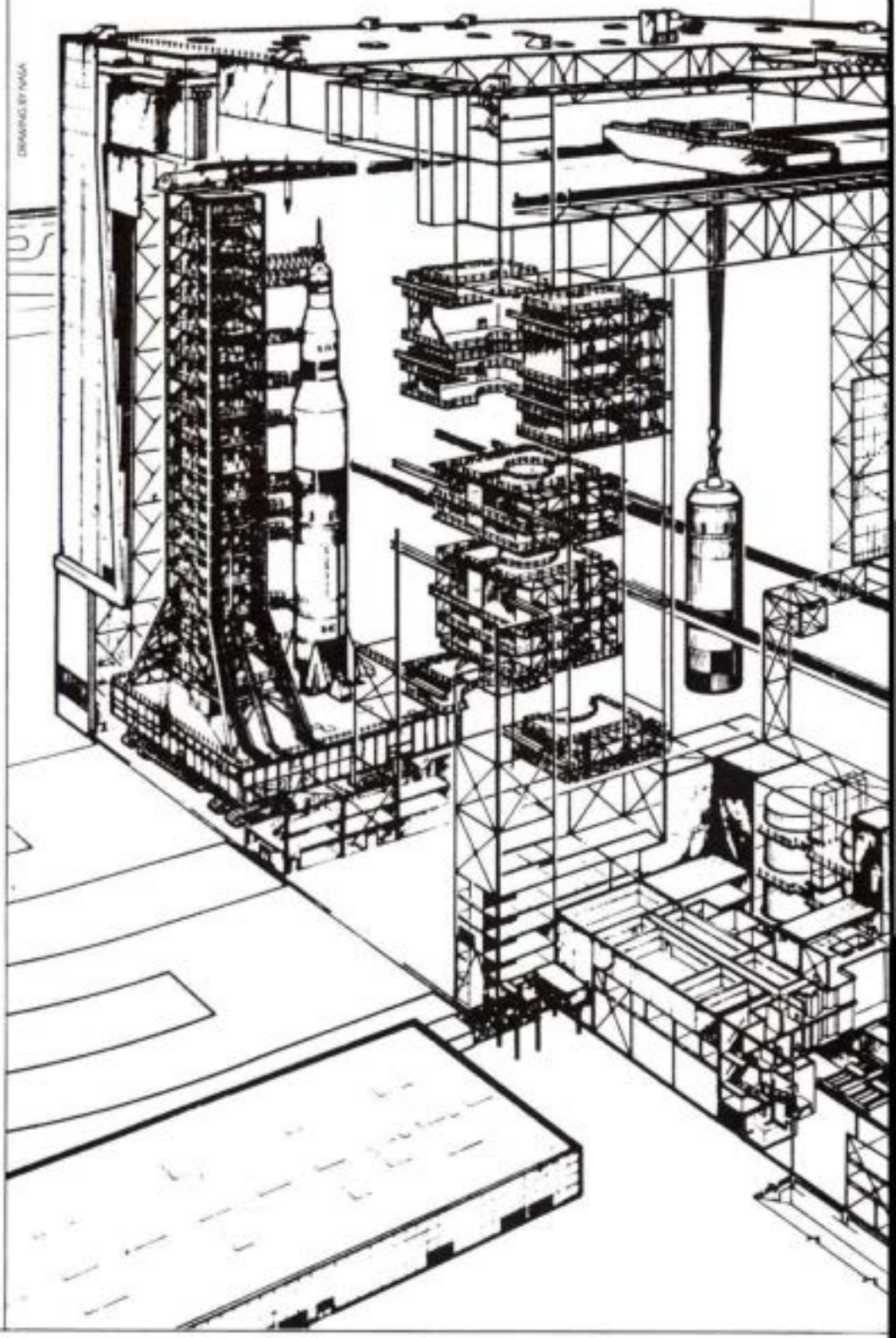
A unique function we provided for each launch was to create a surface of reduced friction at the launch pad to allow the crawler-transporter, which has a total weight of more than 17 million pounds, to maneuver more easily when setting the launch umbilical tower into place. As soon as the launch pad cooled down after a shot, usually in three to four hours, I had a team of engineers make a damage survey of the pad. Repairs and refurbishment were started immediately to get ready for the next launch.

FM: *You were also responsible for the maintenance of the Vehicle Assembly Building, a huge structure [518 feet wide, 716 feet long, 525 feet high, two million square feet of floor space]. What special functions did you have to be concerned with?*

HCL: The VAB is the largest building in the world in volume, 129 million cubic feet. It was where the space vehicle was assembled on the launch umbilical tower and where the crawler-transporter was checked prior to a launch. An unusual maintenance function we performed was the continuous cleaning of the exposed structural steel. Each piece towered more than 500 feet and had to be kept clean of all dirt and debris. It was such an extremely hazardous job that we had to develop a special "high crew" to do the work. The members of the high crew were selected from volunteers on the basis of their ability to work at extreme heights, and each one had to pass a rigid physical examination and a sixty-hour training course. Specialized safety equipment, procedures, and work methods had to be developed for this task.

Control of temperature and humidity was critical during checkout and required over 2,500 tons of air conditioning in the VAB. The design and construction of the launch complex and launch equipment ranks as one of history's great engineering achievements.

Because of its size alone, the 88,000-acre Kennedy Space Center presented many maintenance problems that could not be solved by conventional methods. The fast changing conditions, the critical nature of the launch support functions, and the scope of the work, which always involved other support and stage contractors, demanded the ultimate in efficiency and flexibility in planning, scheduling, task coordination and performance, and control.

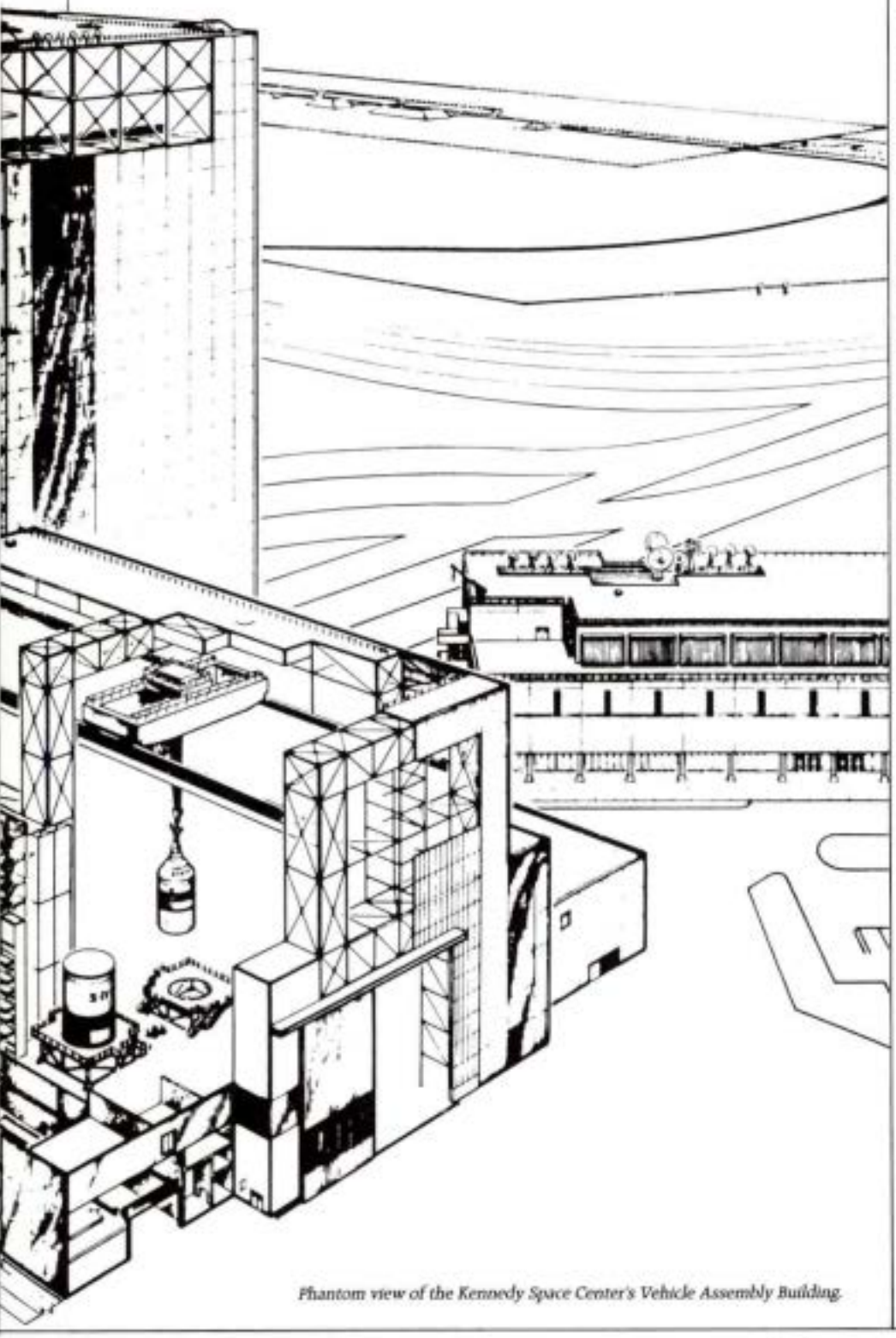


FM: *You then worked two years at Southern Industries Corporation as director of corporate maintenance. Southern is a highly diversified company; could you discuss the wide range of your activities with them?*

HCL: Southern Industries is a conglomerate with operations throughout the Southeast. The company is a large manufacturer of building products and materials, and they also make sugar, lime, chicken feed supplements, and ladies' lingerie. You're right, this is a highly diverse line of products, and the facilities and equipment to be maintained were equally diverse.

Some of the aggregates used in the building materials, the lime, and the chicken feed supplements were produced from oyster shells. We had large dredging operations in Galveston Bay, Chesapeake Bay, and Lake Pontchartrain. The equipment for this operation included large cutter-head dredges, ocean-going tug boats, and barges. Other unique and complicated equipment to maintain was in the sugar refinery located near New Orleans.

As director of corporate maintenance I was responsible for the overall management and control of corporate maintenance activities including engineering, development, and implementation of preventive maintenance programs, maintenance management systems, and annual costs.



Phantom view of the Kennedy Space Center's Vehicle Assembly Building.

FM: *How did your work in industry prepare you for higher education? What are the major similarities and differences between the two in regards to facilities management?*

HCL: My industrial experience was of no real benefit in preparing me for a career in higher education. In fact, it was probably more of a hindrance due to the differences in the two areas. The major similarities are in the engineering, technical, and maintenance management areas, but there is a vast difference in the type of facilities and equipment. Standard building structures and utility systems are basically the same, but the manufacturing and processing equipment puts the industrial facilities in a completely different world.

The working environments are also different, because the goals are so different. The goal in a manufacturing plant is to make a profit for the stockholders. The goal at a college or university is to provide the best education system possible, along with research and service to the community. Due to the profit motive, industry demands, and I feel obtains, more from their employees. The university environment is more laid back. You do not feel that sense of urgency as you do when you are constantly fighting the bottom line.

FM: *What attracted you to higher education? You had previously worked about as far from the college scene as you could get.*

HCL: My career in higher education was strictly incidental, which is probably true for many APPA members. In 1974 my travel requirements with General Portland had reached 100 percent, which was too much for me. I

was looking for a position that had little or no travel, saw an advertisement for the director's position at UT/Dallas, and sent in a resume. One day I was wading waist deep in cement at our Miami plant, helping the maintenance mechanics analyze a problem with a leaking ball grinding mill, when I was called by the vice president of business affairs. He asked me if I wanted to come to work at UT/Dallas, and my immediate answer was "Yes."

FM: *What benefits do you gain from working in a campus environment as opposed to industry?*

HCL: The physical environment itself is a major benefit. Most campuses have nice buildings and grounds that make a pleasurable work place. Office accommodations and equipment are much better than those found in many industries for equal positions. Libraries are easily available, as are recreational facilities. Opportunities exist for pursuing degrees on campus during the normal work day. It is stimulating to be able to work with and be involved with highly educated people.

FM: *The pay is certainly less in a college or university setting. Why would a facilities manager remain on or choose a campus setting for his or her career?*

What can APPA do to retain members so we don't lose them to industry or other private sector activities?

HCL: Actually, the pay gap between university and industry facilities manager has just about closed over the past few years, especially at the larger institutions. If this had not occurred, we would be seeing more of our facilities managers returning to industry. It would be difficult for a physical plant manager who was not an engineer and had not previously worked in industry to make the transition from a university to an industrial facilities manager.

APPA's educational programs and member involvement are probably the best services we can provide that helps to retain our members.

FM: *How did you first get involved in APPA? Did an APPA member encourage you to join and be active in the Association?*

HCL: I first heard about and got involved with APPA through the Central States Regional Association. I have always been very active in professional associations. I first met Walt Schaw, [APPA's executive director] when he

PHOTO BY PHILIP D. BITTER

PHOTO BY WILLIAM D. MIDDLETON

A professor of material science at Xi'an Jiaotong University explains his research to Lott during APPA's China trip.

was the executive director for AIPE [American Institute of Plant Engineers]. We worked together in establishing some AIPE chapters in Florida and Alabama.

FM: *Describe the unique qualities of the Texas chapter of APPA. Are you still involved in TAPPA?*
HCL: I was one of the founders and a charter member of TAPPA, and I have hosted two of its annual meetings—one at UT/Dallas and the other at UT/Austin. The association has over 100 members and is unique in that the majority of the members are from state institutions. This makes our problems, such as budgets, so common that we can discuss them as if we were all from the same institution. We enjoy fellowshipping with one another. Due to my activities in CSRA and APPA over the past few years, I have not been as active in TAPPA, but I am looking forward to being so in the future.

Lott and Li Huidong, deputy director of the Department of General Services of China's State Education Commission, sign June 10, 1987 agreement calling for further exchanges and training program development.

FM: *What is the importance of chapters and regions within the overall organization of APPA?*
HCL: The local chapters and regional associations are the grass roots that make APPA a strong and successful organization. APPA has gained many members through these organizations. The regional associations are a good training ground for APPA's officers, Board, and committees. A regional rep who spends two years on the APPA Board gets to know the internal governance procedures of APPA and is an active participant in the decision making.

A few years ago, there was a feeling of autonomy in the regions. They felt it best for their association if they were totally independent of APPA except for attending the APPA annual meetings. I am happy to say that this feeling no longer exists, except within a few individuals. The regions recognize the benefits of being involved with APPA, and APPA certainly recognizes the benefits it receives from the regions.

FM: *What can APPA do to improve and increase involvement from its members?*
HCL: One of the priorities in my campaign for the APPA presidency was to develop special programs that would permit a larger percentage of the membership to get involved with APPA's activities. At the present time fewer than 10 percent of the membership is directly involved in some APPA activity. I would like to see this figure at 35 to 40 percent. This can be accomplished if the HEFT funding develops as we have planned. One of the programs to be funded by HEFT is the development of standard preventive maintenance instructions that can be used by all institutions. This program will involve several hundred of our members and take a minimum of two years to complete. Our members are always ready to volunteer for APPA service, but we must have viable programs for them to work on. It is the responsibility of the Planning Committee and the Board of Directors to continuously assess the needs of the membership and plan programs to satisfy these needs.

FM: *You have been an Institute faculty member for eight years. Could you discuss the value of the Institute to facilities professionals and the benefits to higher education?*
HCL: APPA's Institute for Facilities Management is the only one of its kind in the country. It provides physical plant administrators at all career levels with management training from the basics to the most contemporary issues that we face today. In my eight years on the faculty I have seen the programs of the Institute improve each year and as a result, the interest and attendance keeps increasing. The Educational Programs Committee, the Institute Subcommittee, and the APPA staff are doing an outstanding job in continually upgrading all aspects of the Institute—from the programs to the meeting locations. Of all the APPA activities in which I am involved, I get more personal satisfaction from being on the Institute faculty than any other.

I see many positive results coming from the attendees. As an example, there are now two people on the Institute faculty who went through the Institute programs a few years ago when they were moving up the ladder in their respective organizations; both are now directors of physical plant. I am sure they owe some of their career success to the management training they received at the Institute. There have been many others who have contacted me to relate their successes in developing and implementing preventive maintenance programs based upon what they learned at the Institute. These testimonials are proof

PHOTO BY PHILIP G. HECTOR

Members of the delegation to China take a short break at Tsinghua University before signing ceremony. From left: Harvey Kaiser, Syracuse; Paul Tabolt, Penn State; Bill Middleton, Virginia; Lott; Walt Schaw, APPA.

enough that the Institute continues to provide a most valuable service for our members.

FM: *You led APPA's delegation to the People's Republic of China during its June trip. Did you accomplish the goals set out for the trip?*
HCL: The purpose of the China trip was to observe and evaluate the present practices, capabilities, and needs of the higher education facililities in that country. It was a very successful trip, and we accomplished the mutual goals that had been established with the Chinese prior to the trip. We visited eleven of their key universities and held informative discussions with the vice presidents and physical plant managers at each institution. We also presented two seminars that provided an overview of typical facilities management practices at U.S. colleges and universities. Approximately 150 of the Chinese vice presidents and managers attended the two sessions. We received a lot of questions at the seminars and found that the daily problems of the Chinese managers are identical to our own. If it had not been for the difference in languages, we would have felt that we were giving a typical three-track APPA Institute back in the states.

FM: *How important or historic is APPA's agreement with the Chinese Association of General Services? What does it stipulate for further exchange between our two nations?*
HCL: In a front-page article on our visit, *China Daily*, the country's major English-language newspaper, called the agreement we signed "the first of its kind in China." We can certainly say that it is the first of its kind for APPA. For this reason it is a major historical event in the seventy-four years of APPA history. It is important to APPA because it demonstrates that our organization has a world-wide interest in the advancement of higher education and that we are willing to donate our time and effort to help others improve their facilities, whether it be in Xian, China or Kansas City, Kansas.

This type of service to others not only will enhance APPA's image in the higher education world, but will also help those who participate grow as individuals and professionals. The agreement stipulates that there will be further exchanges of information and people, cooperative research in the areas of facilities management and maintenance, and mutually developed training programs for both crafts people and managers of higher education facilities.

FM: *What were your impressions of China and its people?*
HCL: Although China has one-fourth of the world's population within its boundaries, you do not get the feeling of being smothered by people as you do in New York or Chicago. This is especially true once you leave the big cities. The major reason why their big cities do not seem as crowded as ours is the lack of automobiles. The bicycle is the primary mode of transportation. The countryside, with its mountains, canals, and magnificent farms, is beautiful.

The Chinese people are extremely friendly, polite, and proud of their heritage. They are industrious and work six days a week; those who live in the communes and work in the fields do so from daylight to dark. It's just a matter of time before the Chinese will become real competitors in the world marketplace. They have the desire, intelligence, and certainly the human resources to become an industrial giant.

FM: *Describe the facilities you visited in China.*
HCL: Their higher education facilities are about where ours were in 1945 at the end of World War II. Although they have a major building program underway at their thirty-eight "key" universities, they are having a difficult time in keeping up with the projected growth. Most of the existing buildings are old and in need of renovation or major repairs. Air conditioning is virtually unknown, except in research and computer areas, and there is little heat

in the buildings in the winter. Most of the maintenance problems are a result of the original design and construction. The undergraduate labs are generally poorly equipped, but the graduate and research labs have the latest in modern research equipment. Each of the universities we visited had a computer and data processing facility that was used generally for business affairs, academic records, and teaching. We did not see any of their physical plant operations using computers.

FM: *What has happened with the Higher Education Facilities Trust since spring?*

HCL: HEFT was a top priority subject at APPA's 74th Annual Meeting in New Orleans last July. The President's Breakfast was dedicated to getting the word out to the membership and selected vendors. The roundtable discussions held at the breakfast were very successful in getting the members more familiar with HEFT. We received more than 300 feedback cards from the discussions. *[Ed. Note: See the APPA Update section of this issue for more details on the status of HEFT.]* In addition to the HEFT program presented during the President's Breakfast, more than forty of the major vendors at the annual meeting were personally contacted to introduce them to HEFT. Many of the vendors indicated that they were definitely interested in participating in HEFT.

Lott addresses the membership at APPA's 74th Annual Meeting.

PHOTO BY JOE BARTO

FM: *Where does APPA hope to be with HEFT by next July's 75th Annual Meeting in Washington?*

HCL: Our fund raising goal for this year is $900,000. It is APPA's hope that this goal can be attained. If so, it will become the springboard for the entire program and will make the ongoing fund raising much easier. I would like to see two or three of our priority programs funded by HEFT this year.

FM: *What will the long-term effects of the HEFT endowment be for the professional development of APPA and its members?*

HCL: If we can obtain the monetary goals established for the HEFT endowment, the long-term effects will be limited only by the time required by the APPA staff and volunteers to plan, develop, and implement the programs. HEFT will provide the means for the best of service of our 1,400 institutions and 3,000 members. The long-term effect will mean better trained facilities managers throughout higher education

Delegation members at Nankai University's computer center. With Lott (center) are Mo Qayoumi, San Jose State, and Bill Daigneau, Rochester.

PHOTO BY WILLIAM D. MIDDLETON

and a larger and better APPA to serve their needs.

FM: *What does HEFT have to offer not only to donors, but to higher education as well?*
HCL: The total investment in higher education facilities in the United States now exceeds $200 billion, and undoubtedly will continue to grow. This is a tremendous marketplace for the vendors that our members do business with every day. The vendors that choose to participate with APPA in the HEFT program will not be making a "donation." They will be investing in the opportunity to make a positive effect upon the bottom line of their financial statements. As a result of this business venture between APPA and the HEFT investors, all of higher education will benefit because its facilities managers will be better trained to respond to the increasing and changing demands of the institutional environment.

FM: *What is the major issue affecting your campus right now?*
HCL: The major issue presently facing the University of Texas/Austin, like many other campuses across the country, is funding. We have experienced reductions and budget restraints for the past two years and the next biennium does not look much better, although higher education in Texas was given some priority in the budget over other state agencies. It is very gratifying that the state legislature is finally realizing the importance that higher education and research play in the state economy. Our physical plant and utilities operations have offset the budget reductions by personnel freezes and lowering the standards for custodial and grounds maintenance and implementing other cost reduction programs. We also are saving $6 million a year by installing a forty-one-mile natural gas line directly to our power plant.

FM: *What can APPA do, or what is APPA doing, to keep its members on top of this issue?*
HCL: The shortage of funds not only affects the quality of our facilities but also all the other essential elements required to make an institution effective. Recruiting and retention of top faculty and researchers are a major concern to all institutional presidents. Resolving the nationwide funding problem of higher education is certainly beyond the realm of APPA's service, but we can continue to address the problems that the lack of funds has on such issues as deferred maintenance.

Two of the priority HEFT programs were developed specifically to address this issue. The Policy Forum program is designed for external individuals and groups with the potential to influence change in policy at the local, state, and national levels to meet with selected APPA experts to define the problems, examine solutions, and issue recommendations for change. The other program is the Capital Renewal/Deferred Maintenance program that will develop the documentation necessary to inform the state legislatures, boards of trustees, and college presidents of the dimensions of this problem and to recommend solutions.

FM: *What concerns will higher education facilities managers have to deal with in the year 2000 and into the new century? Do you see much overall change occurring in the future?*
HCL: I really don't see much change in the type of concerns we will be dealing with over the next thirteen years than what we face today. I feel we will still be struggling with many of our present problems—budgets, deferred maintenance, energy management, hazardous waste management, asbestos, and the lack of skilled maintenance mechanics, to name but a few. We will be faced with maintaining more complex equip-

Lott (center) with Ray Hartley, UT/Austin construction inspector (left), and Craig Eilers, construction superintendent, Clearwater Constructors, Inc.

PHOTO BY ERIC SIGMAN

ment and systems, especially in the research areas, such as microelectronics, robotics, and material science.

FM: *Could you give your thoughts on the introduction of new technologies into the campus facilities management operation? Are we moving too fast in this area—or too slow?*
HCL: The introduction of computers, especially the personal computers such as the IBM XT and the Apple MacPlus, by facilities managers into their daily operations is the most effective use of a new technology we have experienced to date. We are definitely not moving too fast in this area. The first preventive maintenance program I computerized was over twenty years ago at the Kennedy Space Center utilizing an IBM 360 system. Facilities managers in industry were approximately ten years ahead of higher education managers in the use of computers.

I was amazed when I became a member of APPA in 1975 at how little computers were being used in the physical plants. I really don't know why they were not being used, but I suspect it was due to the availability of the hardware and the difficulty in developing the software. Seldom, if ever, is the physical plant given a priority by the university data processing department. I feel there are very few physical plant administrators who are reluctant to adopt the use of computers. The major concern has been the initial cost, but the new PCs and the cost of the hardware and software are now within everyone's reach.

FM: *Are there any new technologies that APPA should familiarize itself with before we are left behind?*
HCL: Two computer-related technologies are beginning to get a lot of attention from facilities managers—bar coding and computer-aided design (CAD). The field paperwork required in a PM program can be virtually eliminated by using bar coding equipment, with a pocket-sized microprocessor that can be downloaded into a PC. Of course, the major concern with using CAD is the cost.

The use of infrared technology is also becoming a valuable tool for the maintenance manager. It can be used successfully in a maintenance program to detect roof problems, heat loss in buildings, and defective electrical equipment. Again, its cost probably makes its use prohibitive to many institutions. The physical plant director who cannot afford a computer or any other new technology should not be discouraged. He or she can still have a very efficient maintenance management program without it.

As we all know, the key to an effective physical plant operation does not depend upon a computer, but the elements of good organization, methods, and procedures; trained and productive personnel; and a meaningful management control system.

FM: *Are you looking forward to your year as APPA President?*
HCL: I sure am. It will be an exciting year for APPA as we near our 75th anniversary. I am definitely looking forward to meeting and working with as many APPA members as possible. ■

PHOTO BY LARRY MURPHY, UT NEWS & INFORMATION SERVICE

Aerial view of the main building and tower of the University of Texas/Austin.

PHOTO BY ERIC WORTHOLM

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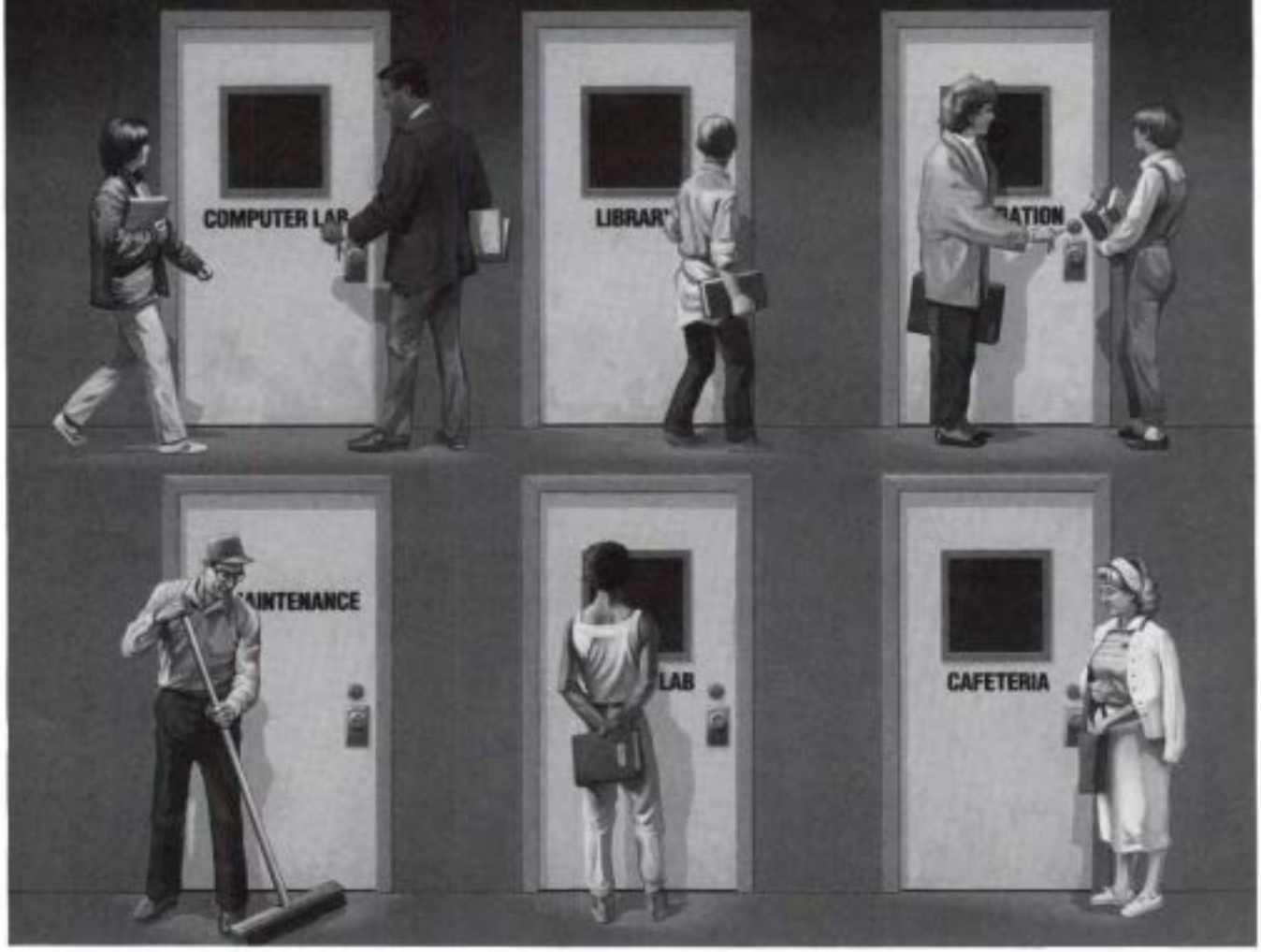

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The Cost of Depreciation: 4 Responses to FASB Statement 93

The Financial Accounting Standards Board (FASB) of the Financial Accounting Foundation establishes policy relating to the recording of financial statements. In August FASB released Statement 93, "Recognition of Depreciation by Not-for-Profit Organizations," which requires not-for-profit organizations, including colleges and universities, to recognize depreciation of its long-lived assets and to report this information in all external financial statements.

For the first time, many institutions will have to look at their facilities as an asset that depreciates over time. External financial statements will have to show the value of a building at its replacement cost, not at its historical cost. Deferred maintenance tabulations may reach increased, yet more accurate, levels.

But there are differing opinions on the merits of this new accounting standard. In order to provide timely information to our readers, *Facilities Manager* invited four experts to respond to Statement 93 and discuss the possible and probable affects that the FASB ruling will have on higher education facilities. While this topic may seem to be the exclusive purview of the business office, there will actually be a number of direct impacts upon the facilities management operation.

The following opinions are those of the authors and do not necessarily reflect those of APPA. They do provide different perspectives on the affect that Statement 93 will have on higher education. William Mutch is an accountant and APPA's treasurer. Thomas Nycum was previously in the physical plant field and has recently moved into business administration. Leonard Wesolowski chairs the Accounting Principles Committee of the National Association of College and University Business Officers. And James Fountain discusses the possibility that the Governmental Accounting Standards Board may exclude some not-for-profits from the FASB requirement regarding depreciation.

The requirements included in Statement 93 become effective with all external financial statements for fiscal years beginning after May 15, 1988. It is not too early to familiarize yourself with this ruling and its impact on your campus. APPA is planning a series of seminars with NACUBO to assist members in preparing for the collection and reporting of facilities depreciation data.

We invite your comments and letters on this topic. Tell us how Statement 93 will affect budgeting and deferred maintenance funding at your institution. To order a copy of Statement 93, send $4.40 to FASB, P.O. Box 30816, Hartford, CT 06150.

—The Editor

By William S. Mutch, CMA
Financial Officer
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University of Calgary
Calgary, Alberta, Canada

FASB's Statement 93 requires that all not-for-profit organizations do two things:

- recognize the cost of using up long lived assets (depreciation) in general purpose external financial statements; and,
- disclose information about depreciable assets and depreciation.

As far as the first requirement is concerned, this topic has been beaten to death over the years by the main North American bodies of the accounting profession, AICPA and CICA. There are some excellent arguments both for and against the recognition of depreciation expense for not-for-profit organizations, and I'm not going to rehash them.

Instead, I will state what I see as an acceptable conclusion reached by these bodies. It is that depreciation need not always be recorded and that depreciation based on useful life is significant where fixed assets are purchased, or the related debt repaid, from operating funds. It is less significant where fixed assets are purchased from grants or special fund raising.

Regarding the second requirement,

the conclusion reached is that supplementary information on fixed assets should be presented when depreciation is not recorded. Examples of information could be the original cost, the year of purchase, and the estimated useful life of individual significant fixed assets.

APPA members may think that an appropriate way to draw attention to the deterioration of the buildings and plant for which they are responsible would be to include depreciation as an expense. The resulting deficit would no doubt emphasize the lack of appropriate funding. I am fairly certain that the governing authorities of our institutions would look on this approach with a jaundiced eye because of the reflection that deficits have on the overall management of the institutions.

The opportunity for APPA members could arise in the disclosure of information concerning fixed assets.

Reference could be made on the notes accompanying the financial statements to the problem of deferred maintenance and obsolescence of physical facilities. The effect on the life of the fixed asset of deferred maintenance could also be noted.

The proposed Higher Education Facilities Trust research project in the area of deferred maintenance will produce valuable information for universities and colleges. The report could be an excellent reference for notes related to fixed assets in the financial statements. After all, financial accounting is primarily an information system; financial statements should provide users with information to assist them in their decision making. ■

By Thomas G. Nycum
Vice Chancellor for Administration
University of California/Riverside
Riverside, California

The introduction of depreciation into higher education via the Financial Accounting Standards Board is as welcome as spring in northern Michigan. While the methodology of depreciation has been around for quite a while, requiring the recognition of depreciation in the financial statements is long overdue. I realize that a difference of opinion exists within NACUBO as to whether or not depreciation should be recognized. But I believe the reporting of how the assets of public or higher education are being "used up" is a must in order to truly reflect the health of institutions of higher education.

There are three elements that constitute the makeup of any organization. First, there must be a reason or program for an organization to exist. Second, people must carry out the program and achieve the mission of the organization. The third part of this trilogy is the often forgotten or ignored "place" in which the people carry out the program.

Facilities are a required element in producing the "products" of higher education—educated students, research, and public service. Just as one puts miles on the family car, miles are put on the buildings, infrastructure, and equipment of our schools and universities. In order to continue to produce the products of higher education, these physical assets must be replaced as their useful lives expire. Depreciation is the term used to represent the using up of assets over time.

Why should the recognition of depreciation be so important to higher education, the public sector, and not-for-profit entities? A comparison to the private sector should help us understand. Audited financial statements of a private sector entity are scrutinized with great care by those who are considering whether or not to invest their resources in that company. The financial statements are one of the better indicators of the financial health and probable future health of that company. Depreciation expense is one of the elements of the financial statement that, when analyzed in conjunction with operating expenditures for maintenance and capital investment in physical plant, the reader can judge whether the owners are replacing the assets at least as fast as they are being used up.

The elements of the financial statements should be no different for the public sector and not-for-profit organizations. The taxpayers, donors, boards of trustees, owners, or users should be made aware of how the assets are being used, maintained, or replaced over time and their relative value using the same measures required in the private sector. By using these same measures the legislators, boards of trustees, and all others who provide resources to higher education have a common basis for comparison that are acceptable and credible within the financial community. Until now, the public sector and not-for-profit organizations were not required to report depreciation in their financial statements.

FASB began its work on a conceptual framework for accounting and reporting in 1973. The need to consider the

objectives of general purpose external financial reporting by not-for-profit organizations was recognized at the time. In December 1980, FASB Concepts Statement Number 4, "Objectives of Financial Reporting by Nonbusiness Organizations," was made available for public comment. The Statement expressed concern about inconsistencies in financial reporting, particularly in the area of depreciation.

In December 1985, Concepts Statement Number 6, "Elements of Financial Statements," was distributed. This concept included the public and not-for-profit sector in those entities that should apply recognition of depreciation to the financial statement. In December 1986 the Exposure Draft of the financial accounting standard "Recognition of Depreciation by Not-for-Profit Organizations" was issued. The FASB approved this draft with minor revisions and released Statement 93 in August 1987. The date of implementation is May 15, 1988.

What does this mean to those of us responsible for the physical assets of the institution? To help in understanding what this means, the following excerpts apply.

Paragraph 104, Concepts Statement No. 6, "Elements of Financial Statements":

> Unless a not-for-profit organization maintains its net asset, its ability to continue to provide services dwindles, either future resource providers must make up the deficiency or services to future beneficiaries will decline. . . . The organization's net assets decrease as it uses up an asset unless its revenues and gains at least equal its expenses and losses, including the cost of consuming part of the asset during the period (depreciation). Even if that organization plans to replace the asset through future contributions from donors . . . it has not maintained its net assets during the current period.

Paragraph 19, Exposure Draft, "Recognition of Depreciation by Not-for-Profit Organizations":

> Using up assets in providing services . . . has a cost whether those assets have been acquired in prior periods or in the current period and whether acquired by paying cost, incurring liabilities, or by contribution.

Paragraph 26, Concepts Statement 6:

> Using up assets acquired involves a cost to the organization because the economic benefit used up is no longer available to the organization. That is as true for assets acquired without cost as it is for assets acquired at a cost.

The above excerpts, in my opinion, represent what facilities managers and others in the administration of higher education have been referring to in the past as deferred maintenance/capital renewal and replacement.

What does this mean to all of us in higher education now that this accounting standard has been adopted? There will be many impacts. The following are several that have significant meaning:

1. Depreciation is a cost of doing business. The using up of an asset must be identified and displayed in the university's financial statements. If the asset is not renewed, the financial statements will provide information about the decrease in net assets of the notion of deferred maintenance.

2. Accountants do not specify the

depreciation method to be used to calculate depreciation expense. It is management's responsibility to determine which method is to be used. Four generally used methods are straight line, sum-of-the-years-digits, declining balance, and units of production. It is also management's responsibility to estimate the useful life of the asset, any salvage value, and/or units produced. The facilities manager is the person most qualified to make these estimates for the physical plant and to determine the appropriate method. For example, a chiller in the cooling plant has an expected life of twenty years. On what curve does the chiller depreciate, or decline, in useful value? Using a building as an additional example, management could break a building into discrete components (structure, mechanical systems, electrical systems, finishes) and depreciate each component based on the activity or usage of the component. This depreciation method is called the units of production method.

3. Those who provide resources to an institution have the choice of whether to allow the net assets of the institution to decline over time, as is represented by deducting the annual depreciation from the value of the physical plant, or contribute resources to a sinking fund from which the assets could be replaced or renewed when needed. The notion put forth here is not as simple as the previous sentence might suggest. The concept of capital renewal/deferred maintenance must be considered. How the providers of resources view the maintenance and replacement of the physical assets and on what timetable has an effect on the ability of the institution to provide the expected products of higher education—educated students, research, and public service.

The requirement to recognize depreciation of assets in the financial statements of the institution is a proper step forward for higher education. For a long time higher education has needed an acceptable and credible method to explain to resource providers the deterioration or the protection (for those fortunate enough to have zero deferred maintenance) of the physical plant. The adoption of a financial accounting standard that requires the recognition of depreciation is indeed a big step. Many institutions have already developed the necessary data to easily comply with the standard. Others will have to do extensive work to inventory the assets and determine the depreciation required.

It is unfortunate that facilities managers were not made aware of the progress of the notion of depreciation as it has developed over the last several years. Not only would the input of this group of people have been valuable, but implementation of depreciation would have been a lot easier for the institution.

Implementation of this standard will provide the readers of the university's financial statements with additional useful information. For those universities that have kept pace with the replacement of the physical facilities over time, the readers may feel reassured about the ability of the institution to continue into the future. Those that have not kept pace may be terrified to find the need for renewal or replacement that had developed over time and the price tag awaiting the future resource providers. ■

By Leonard V. Wesolowski
Comptroller and Associate Vice President for Finance
Yale University
New Haven, Connecticut

Since 1973, the Financial Accounting Standards Board has been the designated organization for establishing those standards of financial accounting and reporting that govern the preparation of financial reports. Several years ago a separate rule-making body was estabished (Governmental Accounting Standards Board) to use similar standards for the public sector. In the event that statements issued by the FASB and the GASB conflict, the GASB statement would take precedence over the FASB in financial reporting for public colleges and universities.

FASB's final ruling, Statement 93, does not contain any drastic changes from the December 1986 Exposure Draft except for how it deals with the depreciation of art works and for extending the effective date for compliance from fiscal years beginning after May 15, 1987 to those beginning after May 15, 1988.

Statement 93 will require all not-for-profit organizations, including colleges and universities, to recognize the cost of using up long-lived tangible assets when preparing their general-purpose external financial statements. Reports

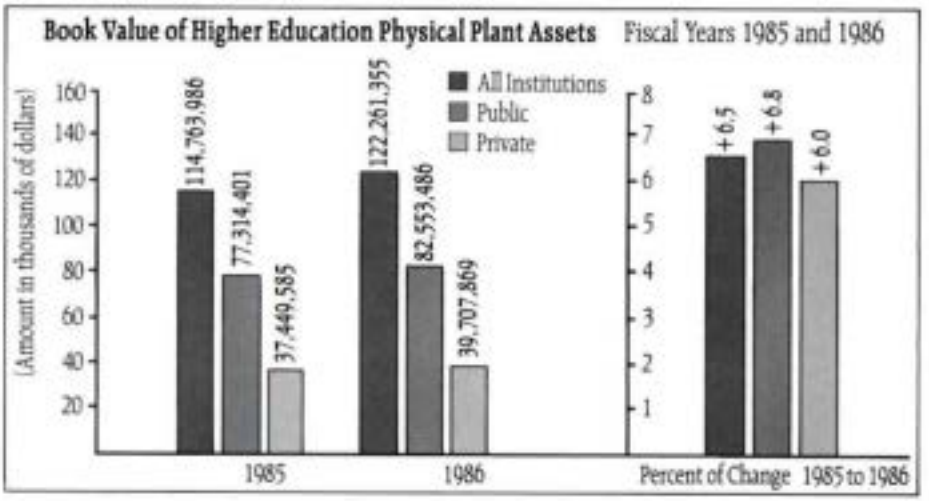
prepared for internal use will not be required to reflect this depreciation.

The generally accepted method for calculating depreciation is to allocate the cost or, if acquired by gift, the market value of each asset, less its salvage value, over the period during which it is to be used. Qualifying assets, including buildings and equipment, will be subject to depreciation regardless of whether they have been acquired with cash or by donor contribution.

In order to properly record depreciation expense in the future, colleges and universities must first resolve several signicant problems:

- Some colleges and universities have not recorded all of their assets on their books.
- Colleges and universities will have to develop a system for recording the asset value, salvage value, amount subject to depreciation, and the annual depreciation.
- In order to obtain more meaningful information and, perhaps, more useful information, colleges and universities may choose to do a componentization study in order to break down their building costs by plumbing system, electrical system, HVAC system, etc.
- Colleges and universities will have to estimate the useful lives of buildings and equipment.

How depreciation expense and the depreciation taken to date will ultimately be reflected in the financial statements of colleges and universities has not been determined at this point. A task force has been appointed to work on this project and until they make their recommendation to the FASB, who then in turn must issue a pronouncement, we can only speculate what the net result will be. At the present time, depreciation expense as well as the depreciation taken to date should be reflected in the Plant Fund section of the financial statements. ■



By James R. Fountain
Assistant Director of Research
Governmental Accounting Standards Boards
Stamford, Connecticut

After reviewing and analyzing the responses, expecially those of public colleges and universities, to the December 1986 FASB Exposure Draft, "Recognition of Depreciation by Not-for-Profit Organizations," and receiving recommendations from the Governmental Accounting Standards Advisory Council (GASAC), the Governmental Accounting Standards Board is considering initiating the due process that could lead to the issuance of a Statement excluding certain public entities, such as public colleges and universities, from the requirements of a FASB standard on recognition of depreciation by not-for-profit organizations. This process would begin with the Board's issuance of an Exposure Draft of a Statement so excluding public entities. The release of this document would provide the Board with a means of soliciting public input on this complex and sometimes emotional issue. Based on this input, the Board would then consider issuing a final Statement.

The GASB encourages expressions of individual views by its members and staff. Official positions of the GASB are determined only after extensive due process and deliberation.

Consideration of the need for an Exposure Draft on this subject resulted from two factors: 1) the GASB already has under way several projects that could affect a GASB decision concerning depreciation by the entities covered by the FASB Statement, and 2) the responses, especially from the GASB constituency, received by the FASB to its not-for-profit depreciation Exposure Draft had overwhelmingly been negative.

Respondents to the FASB Exposure Draft raised questions about the usefulness of depreciation information to the users of financial reports of not-for-profits, whether all fixed assets should be subject to depreciation accounting, and whether it is appropriate to require depreciation accounting before a decision has been made on display of financial information.

Because the GASB has three projects presently under way, all of which could provide insight into the value to financial statement users of the information, and because information required to be presented in financial reports should have benefits that are greater than its cost to gather and provide, the GASAC recommended that the Board seek a meeting with the FASB.

The GASB conveyed its views on the subject to the FASB in a public GASB meeting, which several FASB members and staff attended as observers. Subsequently the FASB considered the responses to its ED at a public meeting and instructed its staff to prepare a final statement. The GASB then instructed its staff to draft an Exposure Draft for consideration in June 1987. The Board's conclusion to pursue this course of action was predicated on concern that the applicability of the FASB standard at this time might be burdensome to preparers and confusing to users if the GASB were subsequently to establish standards different from the FASB's—a possibility that might result because of the following projects.

A GASB user-needs study of colleges and universities will identify the primary users of their financial reports. The project will survey these users to determine the role of the financial report in meeting accountability requirements, what information is needed to meet those requirements, the decisions being made by the users requiring financial information, and the role of financial reporting in providing that information. The results of their responses will provide the GASB with data beneficial to assessing not only user needs, but the value of different types of financial information, such as depreciation on fixed assets.

A GASB project on fixed assets and infrastructure is exploring not only the value of depreciation information, but whether depreciation accounting may be appropriate for some classes of fixed assets and not for others; whether maintenance and the cost of deferred maintenance may be a better measure of the cost of certain fixed assets; and whether information such as age, condition, and capacity measures are more important to users than depreciation.

In addition, the issue of financial reporting is being addressed in a GASB project that includes consideration for modifying the group of accounts (GFAAG and GLTDAG) and the debt service and capital project funds. Finally, an American Institute of CPAs (AICPA) task force is developing display recommendations for not-for-profit organizations. ■

A FOUR-PART SERIES ON ELECTRICAL ISSUES

PART 4
Power Electronics

by Mohammad H. Qayoumi, Ph.D.

Power electronics is an interdisciplinary field that includes electric machines, semiconductor devices, power distribution converters, and control theory. After 1957, with the development of silicon controlled rectifiers (SCR), a new era for semiconductor devices was started. Much of the power conversion equipment that was electromechanical in the past became likely candidates for this new technology—namely static conversion devices. The benefits of new devices versus electromechanical ones are smaller size, ruggedness, better efficiency, higher reliability, and lower cost. That is why in the past thirty years, as this technology has improved, more uses have been developed. The purpose of this article is to look at a number of different yet typical applications of power semiconductor devices.

Before any application is considered it is appropriate to briefly discuss the theory behind the physics of solid state electronics and review such devices. There are three different types of materials, namely conductors, insulators, and semiconductors. A conductor is a material that has free electrons in its outermost energy layers around the atom nucleus or conduction band. Therefore, very little electric potential difference is required to induce electric current. The resistivity of a good conductor is about 10^{-6} ohm-cm.

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An insulator is a material where the conduction band is empty and moving any electron from the next layer, i.e., valence band requires very large quantities of energy. The resistivity of insulators range from 10^{14} to 10^{22} ohm-cm. The resistance of a conductor increases at higher temperatures; the opposite is true for an insulator.

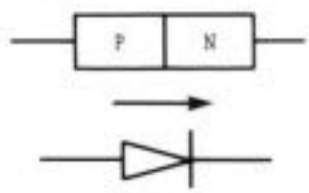
Semiconductors, on the other hand, are materials that have a resistivity ranging from 10^{-2} to 10^{9} ohm-cm. At absolute zero temperature it acts like an insulator, which means the conduction band will be empty and the valence band will be filled. As the temperature is increased and impurities are added, the conducting properties improve dramatically. This is what gives semiconductor materials their unique characteristics. Silicon and germinium are two common semiconductor materials, and when pure they are referred to as intrinsic semiconductors. With very small quantities of impurities, less than 10^{-9} percent, the characteristics of these change dramatically.

Impurities such as arsenic and anthimony increase the free electron density. If an intrinsic semiconductor is dopped with them, it is called "n-type" material. When impurities such as indium and tin increase the affinity of the semiconductor material to accept electrons, it is called "p-type" material. These two types of materials, p-type and n-type, are the building blocks of all semiconductor devices. This is a simplified explanation of semiconductor theory; for details refer to references 1 and 2. A few of the common semiconductor devices are diodes, silicon control rectifiers, triacs, and gate turn off thyristors.

Diode

A diode is the simplest electronic semiconductor device that has directional characteristics. It consists of p-type and n-type materials as shown in Figure 1. There are two terminals to a diode, an anode and a cathode. If a diode is connected across a battery such that the anode is connected to the positive and the cathode is connected to the negative terminal, then the diode will act like a short circuit where the voltage drop across the diode is a few tenths of a volt. This is called a forward biased circuit.

Figure 1
Schematics of a Diode



If the battery polarity is reversed, the diode will act like an open circuit. This is called a reversed biased circuit. Thus, in one direction a diode acts like a closed switch, and in the opposite direction it acts like an open switch. When a diode is reversed biased it can only withstand a certain amount of inverse voltage before it fails.

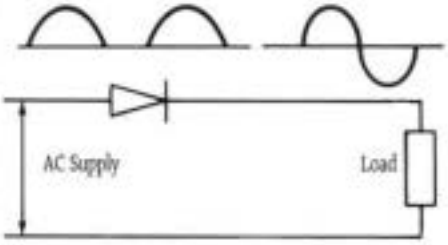
The breakdown voltage is referred to as peak inverse voltage. The peak inverse voltage can be as low as 50V or as high as a few thousand volts. The current carrying capacity of diodes differs greatly. It can be as low as a fraction of an ampere or as high as hundreds of amperes. If higher voltages

are needed, more than one diode will be connected in series. Also, diodes are connected in parallel if higher ampacities are needed. The diodes' directional characteristic is used to convert AC power to pulsating DC.

Half Wave Diode Rectifier

A diode connected in series in a single phase AC circuit makes a half wave rectifier. According to the diode characteristic the circuit will conduct in the positive half of the cycle from zero to 180 degrees and will not conduct in the negative half cycle from 180 to 360 degrees.

Figure 2
Half Wave Rectifier Circuit



Full Wave Diode Rectifier

To rectify both the positive and negative half cycles of a single phase circuit, a diode bridge is required. As shown in Figure 3, there are four diodes needed for a bridge. During the first half cycle only diodes 1 and 3 are conducting and in the second half cycle only diodes 2 and 4 are conducting. This results in a one current direction through the load in both half cycles.

Three Phase Half Wave Rectifier

In a balanced three phase system the voltages are 120 degrees out of phase with each other. Here, one end of three diodes are connected to a three phase power source, and the other ends are connected together to a single phase load. The other end of the load is connected to the neutral. This will make a half wave rectifier for a three phase system. Each of the three diodes will be conducting only one-third of the cycle. In order to obtain a variable

Figure 3
Full Wave Rectifier Circuit

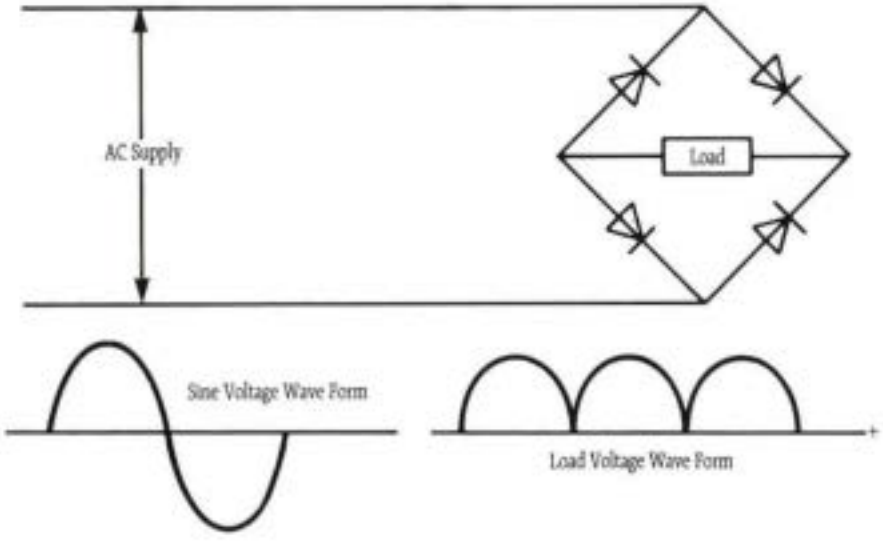
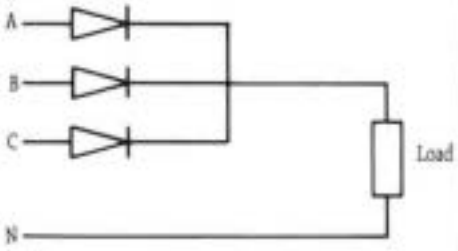


Figure 4
Three Phase Half Wave Rectifier Circuit

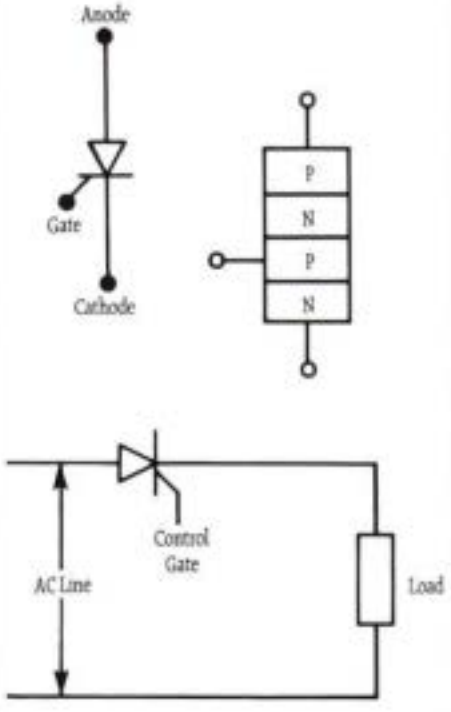


DC voltage from zero to the maximum AC line voltage, thyristors are utilized.

Thyristors

A thyristor (also known as a silicon control rectifier, or SCR) is like a diode and only conducts in the positive half cycle. But it will only start conducting if a pulse is applied to its control gate. So depending on the firing angle of the control gate, the conducting current can start only when between zero to 180 degrees and will stop at 180 degrees. Once it starts conducting it has the same characteristics as a diode. Thyristors have three terminals: an anode, a cathode, and a gate.

Figure 5A
Thyristor Schematics



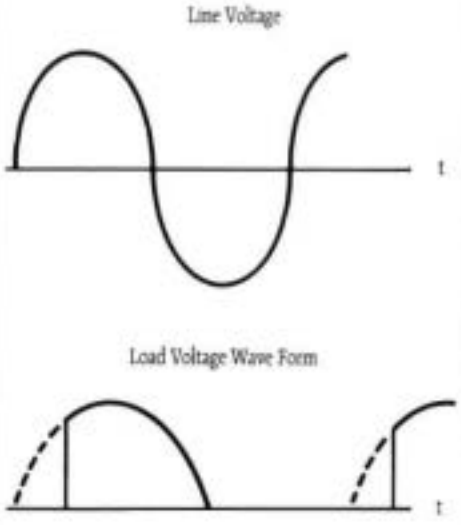
Halfwave Thyristor

For a single phase circuit, if a thyristor is connected in series with the circuit and the gate is connected to a pulse source, a halfwave thyristor rectifier circuit is obtained. Depending on the firing angle, the current flows for a specified position of the positive cycle resulting in any pulsating DC voltages from zero to the average line voltage over the half cycle. If the control gate pulses are synchronized for zero degrees, it will perform exactly like a halfwave diode rectifier.

Full Wave Thyristors

The four thyristors are connected similar to the diode bridge rectifier. With a full wave thyristor any pulsating DC voltage from zero to full wave rectification can be obtained depending on the firing angle of the thyristors. It must be noted that each time, two thyristors must be fired simultaneously.

Figure 5B
Half Wave Thyristor Rectifier Circuit



Three Phase Halfwave Thyristors

Similar to three phase halfwave diode circuits the thyristor version is also used for larger horsepower motors. Each one of the thyristors will conduct up 120 degrees depending on the firing angle of the control gates. Only one thyristor conducts because one is connected to the instantaneously applied highest voltage. However, at the instant a thyristor is gated, two thyristors will be conducting simultaneously for a short moment.

Gate Turn-Off Thyristors (GTO)

When the gate fires in a regular SCR, the circuit conducts until the circuit polarity changes. Before that the current cannot be stopped. But with a GTO the

Figure 6
Load Voltage of a Full Wave Thyristor Rectifier Circuit

current can be stopped anywhere before the purity changes also. Like an SCR it is a p-n-p-n device. But it has two control gates, one to start conduction and one to stop. GTO's high current capability and improved performance makes it a preferred device for inverter and chopper applications.

Triac

A triac is a bidirectional thyristor. It consists of a p-n-p-n device in parallel with an n-p-n-p device. It has one control gate that determines the firing voltage. A triac is cheaper than using two antiparallel thyristors; also, the control circuit is simpler. But it is only available at relatively lower voltages and is hard to apply with inductive loads. Moreover, the gate circuit sensitivity is lower and the turn-off time is larger. One of the common applications of a triac is for light dimming and heater controls as shown in Figure 7.

In addition to semiconductor devices for the conversion of AC to DC power, there are many other special purpose units. Some of these are silicon controlled switches (SCS), silicon unilateral and bilateral switches (SUS & SBS) unijunction transistors (UJT), programmable unijunction transistors (PUT), and light activated devices such as LASCR and LASCS. These devices are discussed in detail in the reference books listed at the end of the article. Another common application is converting DC to AC power with the use of an inverter.

Figure 7
Triac Circuit

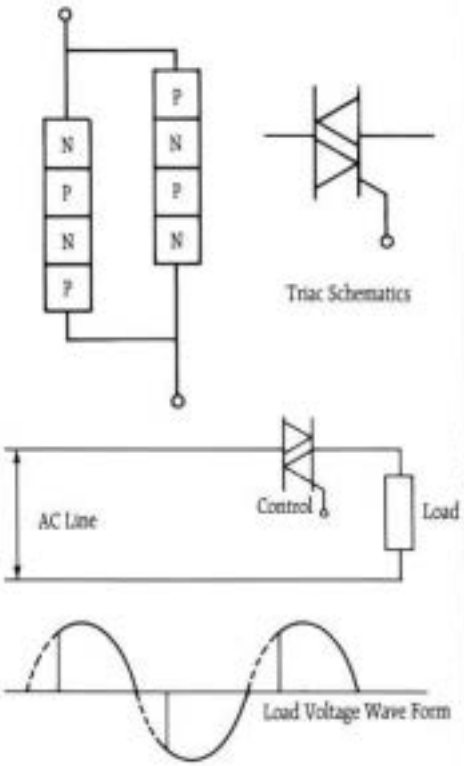


Figure 8
Schematics of AVI

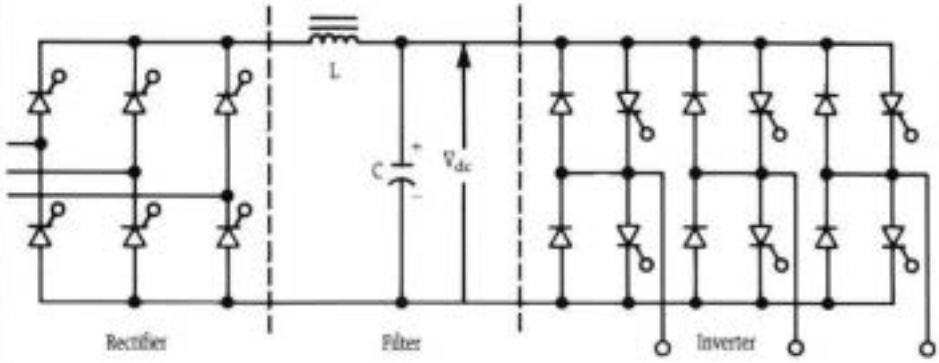


Figure 9
Schematics of a CSI

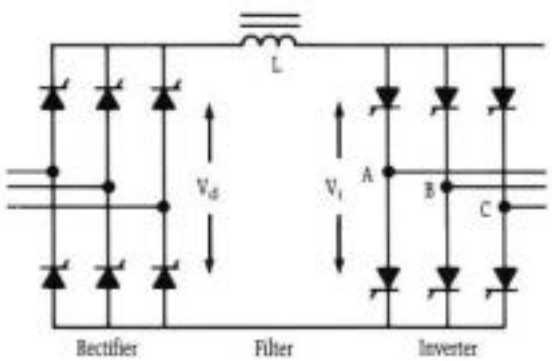
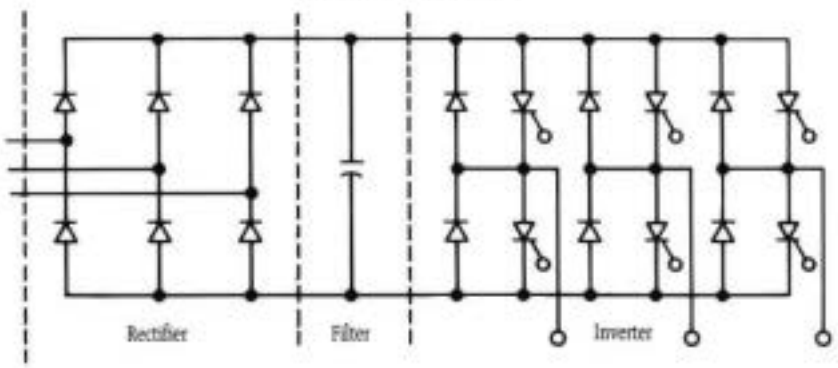


Figure 10
Schematics of a PWM



Three-Phase Inverter

An inverter circuit can change DC voltage into a three-phase variable voltage/variable frequency AC output. It consists of at least six thyristors—SCRs or GTOs—where each conducts for 180 degrees per cycle and the switching sequence produces a three-phase output voltage. The output frequency is determined by control circuitry.

There are three common types: adjustable voltage input (AVI), current source inverters (CSI), and pulse width modulation (PWM). For an AVI the voltage is controlled by the DC input to the inverter. This means that you will use either an SCR to carry input voltage, or diode rectifiers in conjunction with a chopper. It has the simplest of the three inverter types for control circuitry and also has regeneration capability.

The current source inverter has available DC input voltage supplied by an SCR bridge in a series with a large inductor to make the current source. With a PWM inverter the output voltage wave form is of constant amplitude whose polarity reverses periodically to provide the output frequency. Also, the output voltage is varied by changing the pulse width. PWM has the most complicated control logic and the lowest efficiency but it has less harmonic problems compared to the other two types. This is why PWM is becoming more popular for many applications.

So far we have explained various semiconductor devices and a few common circuits. Now let's look at the use of these circuits in common products such as variable frequency drives, uninterrupted power systems, asynchronous cogeneration units, and electronic fuses.

Variable Frequency Drives

Most of the industrial processes require variable speed motors. The speed of an AC motor is determined by the line frequency, which is 60 Hz. An effective way of varying motor speed is to use a variable frequency drive (VFD). A VFD consists of a DC rectifier and filter circuit, followed by an inverter as shown in Figure 11. Here, 60Hz line voltage is converted to DC and then transferred to AC voltage. The control circuit determines the output frequency and thus the speed of the motor.

Uninterruptible Power System

Most computer applications require an uninterruptible power system (UPS). This means that even if there are any power fluctuations or momentary interruptions, the supply to the loads is not affected. A UPS consists of an inverter that is supplied by a battery bank and a rectifier bridge. The rectifier bridge is powered by AC line and a generator. Under normal conditions the AC power is charged to DC by the rectifier bridge and reconnected to constant frequency AC power. When AC line power is interrupted, the transfer switch will connect the emergency generator to the system, which will power the rectifier. But while the transfer switch moves from normal power to emergency generator, the battery bank is supplying power to the inverter.

Asynchronous Generator

Nearly all of the small packaged cogeneration units use asynchronous generators for economic considerations. An asynchronous generator is simply an induction motor that runs at higher than 60Hz synchronous speed. Thus, the voltage it generates does not have constant frequency and cannot be connected directly to AC lines. One way to overcome this is to convert variable AC voltage to DC with a rectifier bridge and reconvert to constant frequency AC power. Since this circuit gets its control voltage from AC power lines, it is also called a line commutated inverter. Unlike a sychronous generator it does not require a synchronizing gear.

Brushless Generator

Generators require a DC excitation voltage to set up the magnetic field. One way of providing it is by having an auxiliary DC source whose power is transmitted to the rotor with the use of slip rings and brushes, which require a lot of maintenance. A better solution is to have two rotors on the main shaft, a main and an auxiliary rotor. The small auxiliary winding is initially excited by residual magnetism. The voltage generated in the winding is AC; when it goes

Figure 11
Block Diagram of a VFD

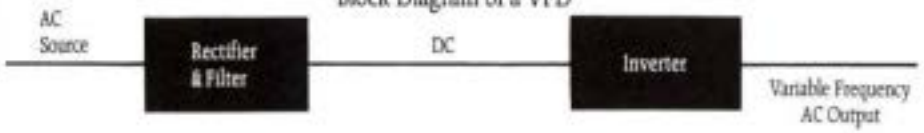


Figure 12
Block Diagram of a UPS

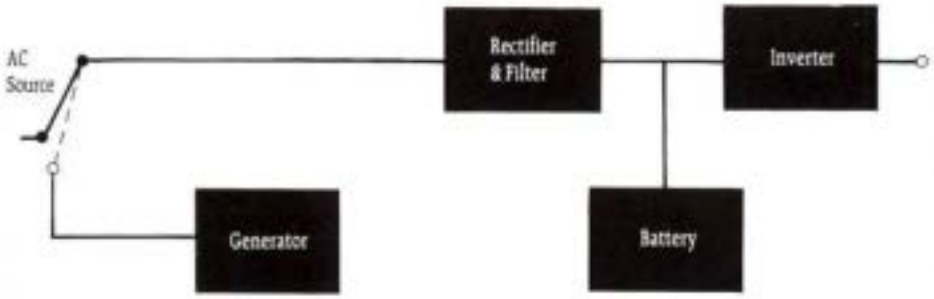
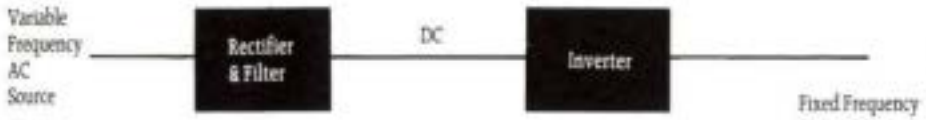


Figure 13
Block Diagram of a Line Commutated Inverter



through a bridge rectifier it is connected to DC and supplies power to the main rotor. Since the entire exciter circuit is on the same shaft, there is no need for brushes or slip rings. That is why these units are called brushless generators and require less maintenance than other generators.

Electronic Fuses

Electronic fuses are fault interrupting devices than can provide high continuous current ratings with efficient current limiting action, combined with a large selection of time current characteristic (TCC) curves. The principle of operation for an electronic fuse is quite different from a conventional fuse. In a conventional current limiting fuse, the fuse link carries current continuously, determines the time current characteristics, and interrupts the circuit current. The performance characteristics of the fuse link are a compromise between these conflicting needs. On the other hand, an electronic fuse has two separate components to perform the same task, namely the control module and the interrupting module.

The interrupting module contains two sections: the main current section, which carries current under normal conditions and consists of copper tubes at both ends connected by a copper rod in the center; and the current limiting section, which has two copper ribbon elements embedded in the sand and is electrically in parallel with the main current section.

The control module consists of an electronic sensing device, which monitors current continuously and responds according to preprogrammed time current characteristics. Since this module monitors the rate of charge of current, it provides fast response that reduces the peak current as well as the let-through current during fault interruption.

The operation sequence of an electronic fuse is as follows. When the control device senses a fault, the power cartridge is activated within 250 microseconds and produces a high pressure gas of 27,000 psi in less than 220 microseconds. The pressure will open a gap in the main current path and, in a total time of less than 480 microseconds, the current is transferred to the current limiting section. The current limiting ribbon melts in several locations and the fault is interrupted within a total time of 640 microseconds.

Electronic fuses have many other advantages over conventional current limiting fuses. Unlike circuit breakers, they do not rely on external sensing devices and do not generate damaging voltage surges. Moreover, due to the separate current paths for normal and faulted conditions, it is not subject to damage due to current surges and has independent continuous current ratings and current limiting characteristics. Electronic fuses can be used for a variety of applications in power systems, especially when a distribution system is faced with conflicting protection and coordination criteria.

Conclusion

This article was an overview of power electronics fundamentals and a few applications. Today there are hundreds of such applications that have replaced existing mechanical devices that are complex, inefficient, and expensive. In addition, these solid state devices are more rugged and reliable than the mechanical devices that performed similar functions.

The advent of VLSI (very large scale integration) and better performance thyristors are opening new horizons where extremely complex characteristics are being simulated. As the technology is improving, we are seeing more reliable products at lower cost.

Now there is hardly any power equipment that has not incorporated semiconductor technology to some extent. Therefore, it is essential that every facilities manager has some general knowledge of them to be able to make the best use of those technologies.

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Management Resources

J. Roger Kurtz

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Keeping Students at Your School

How can the physical plant help retain students? By employing them, claims Kansas State University. KSU's physical facilities department employs over 130 students each year to help with a variety of jobs. Experience has shown that making these jobs available means students are more likely to stay in school, according to administrators of the program. Student retention is beneficial for the physical plant in several ways. Since state-allocated funds are based on enrollment, more students means a larger budget. And student workers are an excellent resource for getting jobs done. "Our resource of student employees cannot be understated or overlooked," says Evelyn Hupe, administrative officer at KSU. "We find talent in them that contributes to the success of special projects, daily maintenance, schedules of the shops, custodial and grounds operations, and they do everything in support services from answering the telephones to donning black coats and ties and serving the president's dinners."

Adopt-a-What?

How can a corps of only six groundskeepers maintain a campus with 130 acres of natural beauty, old stone walls and buildings, and still manage to keep up with its numerous flowerbeds? By tapping the enthusiasm of the amateur gardeners on campus. Catonsville Community College in Catonsville, Maryland has started an "Adopt-a-Bed" program that allows groups or individuals to be responsible for maintaining a flowerbed on campus. "Our grounds staff is just not big enough to do all that we'd like," says Director of Physical Plant William Wade Jr., "so we started the Adopt-a-Bed program." The physical plant prepares the bed and supplies materials and plants; the individuals do the rest, including planting, weeding, and watering. All types of would-be gardeners get involved—students, instructors, classified employees, even entire departments. For instance, the library staff maintains the flowerbed in front of the library. "The idea has worked very well," says Wade. "The campus is beautified but the maintenance staff is not overburdened." Originally an idea from the campus beautification committee, the project has impressed observers both on and off campus—in a recent visit, an accreditation team cited the physical plant as having performed particularly well in making the campus a beautiful place.

PHOTO BY MIKE SCHUMANN

White alyssum, blue lobelias, marigolds, azuratum, and black-eyed susans are among the perennials in the adopted flowerbed maintained by Dena Ritter and the Catonsville Community College library staff.

Cooperative Training

The University of Oklahoma in Norman, Oklahoma has an excellent resource for training its physical plant employees right in its own back yard. For the past fifteen years the U.S. Postal Service has operated training courses for its personnel using facilities on the university campus. Courses will often have room for extra participants, providing a chance for physical plant staff to join. The USPS offers a wide array of courses, with training programs in electrical maintenance, elevator maintenance, and refrigeration being of most interest to physical plant employees. "It's a far more thorough program than anything we can do ourselves," reports Larry Agent, personnel director for the physical plant department. "There's a great deal of hands-on work in some very intensive courses." Courses last from two to six weeks and are offered throughout the year. Prospects look good for the future of the program, since the Postal Service is expanding into new, larger training facilities soon.

Keeping Up With Technology

Louisiana State University has entered into a $2.4 million cooperative endeavor with Digital Equipment Corporation to create a network of computers linking research centers across the campus, according to a report from CAUSE, the profesional association for computing and information technology in higher education. The project will greatly increase individual computing power for the university's researchers and will enable students and researchers to communicate interactively by computer. "It is with technologically advanced equipment such as this that LSU faculty scientists are able to keep the university on the leading edge in development, education, and research for the needs of tomorrow," said LSU Chancellor James Wharton.

Beating Obsolescence

The Kansas City Missouri School District squeezed $30,000 from its operating budget during the first ninety days after energy-saving improvements went into place as part of a pilot program at Southwest High School. And potential overall savings are more than $1.2 million each year for the school system, claims the consulting firm that was awarded

PHOTO BY GEORGE MASON UNIVERSITY

George Mason University's Patriot Center is maintained by a professional management organization—and is expected to make $400,000 for the school each year.

the energy management contract for the system. As in many institutions, Kansas City's physical plant includes many older facilities with outdated equipment and obsolete systems. Carefully planned upgrading using a performance-based approach is supported by external financing and guaranteed projected savings from the corporation. Specific changes included new boilers and hot-water heaters, a computerized energy management system, and more efficient lighting. If the pilot program continues to be successful, expansion of the project is almost certain, reports the school district.

All Gain, No Pain

When George Mason University in Fairax, Virginia prepared to replace its 2,800-seat gymnasium, it wanted to build a showcase benefiting the university and the community, but it didn't want to hassle with the headaches of programming and booking entertainment events. The answer: the 10,000-seat Patriot Center, where large crowds are being attracted to basketball games, concerts, and other events. And to avoid the hassles, the university is retaining a professional management organization to operate the center. University officials compare it to hiring out food services or bookstores, a practice that has been widespread in universities and colleges for years. The university pays the managing company $100,000 each year, plus 20 percent of any surplus after expenses. George Mason stages some of its own events, such as basketball games and graduation ceremonies, and pays the company for any direct costs. The center produced a small surplus in its first year of operation, school officials report, and is expected to eventually make $400,000 annually for the school.

Disaster Preparedness

If a major earthquake were to hit Los Angeles on a normal working day, 2,000 persons at the University of California campus there would die, according to Thomas Tobin, executive director of the California Seismic Safety Commission. Tobin was quoted in *The Chronicle of Higher Education* as saying that of California's 250 state buildings considered to be unsafe in the event of an earthquake, 80 percent are on university campuses. Since those findings were reported, UCLA has embarked on an earthquake safety program that will improve the condition of thirty-seven campus buildings at a cost of between $110 million and $150 million. "There are three areas where work is currently going on," reports Dave Deyell, senior architect at the university. "Some construction has begun, more study is being done, and sources of funding are being explored further." Part of the challenge is to carry out what in many instances are relatively major projects without interrupting the regular activities of the school. ■

The Bookshelf

Applying the Concept of Corporate Culture

Gaining Control of the Corporate Culture, by Ralph H. Kilmann, Mary J. Saxton, Roy Serpa, et al. San Francisco: Jossey-Bass, Inc., 1985. 451 pp. $28.95, hardcover.

Many books have been written about management, especially concerning the private sector. During the past decade, management literature has generally concluded that public sector management problems and solutions are not altogether different from those encountered in the private sector. In addition, the concept of "corporate culture" has recently been added to the field of foci employed for gaining a useful perspective on management theory. *Gaining Control of the Corporate Culture* provides useful information on this rather recent concept, and promotes its applicability in both sectors.

The book is interesting for several reasons in addition to its technical content. It is a joint publication in both the Jossey-Bass Management Series and Social and Behavioral Science Series; each series has featured publications that have been highly regarded in scholarly circles. In addition, the book presents the best papers from a conference sponsored by the University of Pittsburgh Graduate School of Business Program in Corporate Culture. The conference featured selected presentations on the subject of corporate culture from almost a hundred papers submitted by numbers of many expert groups, including the Academy of Management, American Psychological Association, and the Institute of Management Sciences.

The concept of corporate culture has been explored by both academics and practitioners; in the past few years both *Administrative Science Quarterly* and *Fortune* have featured the topic. The authors define this culture as ". . . the invisible force behind the intangibles and obervables in any organization, the social energy that moves people to act operationally, shared philosophies, ideologies, values, beliefs, assumptions, and norms."

The book has twenty chapters, organized into four major parts. The first chapter introduces the topic by discussing the five key cultural themes that pervade the book. These themes include: Does culture have an impact? How deep-seated is culture? Can organizations have more than one culture? Can culture be changed? Can culture be changed without changing other aspects of the organization? Part One of the book reviews the function and impact of culture on an organization. Part Two considers methods that are employed to understand and manage culture. Part Three contains the essence of the book, covering how cultures are formed and evolve in an organization. Part Four suggests specific methods for deliberately changing and managing organizational culture. The concluding chapter of the book attempts to evaluate the concept of corporate culture in the context of today's management environment; the authors suggest that it is not a passing fancy, but represents a fundamental shift of focus in an attempt to understand complex public and private organizations. They conclude by offering culture as an element of management theory, to be promoted and studied along with strategy, structure, reward systems, skills, and human resource management.

I found this book to be extremely interesting and well written, and I especially enjoyed the case studies used to define and emphasize the value of understanding the unique culture of each organization. The authors emphasize that ". . . culture is to an organization what personality is to an individual—a hidden yet unifying theme that provides meaning, direction, and mobilization." I would recommend that all APPA institutions purchase this book, along with the very successful *Corporate Cultures—The Rites and Rituals of Corporate Life*, by Terrence Deal and Allan Kennedy; Deal contributed a chapter in part three of *Gaining Control* that is the highlight of the book. Used together, these books will allow the reader to gain valuable insight into why certain organizations are successful, while others operating under the same formal rules are unsuccessful.

Gaining Control of Corporate Culture is available from Jossey-Bass, Inc., 433 California Street, San Francisco, CA 94104.

—John M. Casey
Engineering Department Manager
University of Georgia
Athens, Georgia

A New Phase for Community Colleges

Renewing the American Community College, ed. by William Deegan. San Francisco: Jossey-Bass, Inc., 1985. $24.95, hardcover.

Community colleges currently enroll almost half of the students in higher education in the United States. Our current day community colleges have developed over the past eighty years with strong roots and ties in both higher education and in our secondary schools. In this time frame, it is easy to categorize four periods in the development of the community college that we know today. The first generation (1900-1930) was an extension of our high schools. In the second generation (1930-1950) these schools were known as junior colleges. In the third generation, the concept of community colleges appeared (1950-1970). The fourth generation (1970-present) saw the development of the comprehensive community college. We are now on the horizon of the fifth generation.

The purpose of this book is to better understand where our community colleges have been and, using this information, develop specific strategies to deal with the new challenges that are facing our educational institutions. To accomplish this task, the book has been divided into four parts: The Community College in Perspective; Improving Teaching and Learning; Assessing Programs and Services; and Strengthening Governance, Finance, and Planning.

The first section is the historical view and helps to reference the rest of the book. Each of the remaining chapters begins by using this historical perspective as a foundation, looks at each of the four generations, then projects what can be expected for the future.

The authors discuss the fact that community colleges, along with most organizations, have seen a great deal of change in this century. Because of the diverse opportunities offered by community colleges, it is important for schools to emphasize specific missions and priorities for a sound footing

for the future. Community colleges must have a clear identity or they will be shorted on the limited resources that are and will be available.

The discussions continue with the idea that community colleges are vastly different from other colleges and universities in several ways—the characteristics of their students, their involvement with their communities, and the environment in which faculty operate. The future holds unlimited opportunities for the schools that accept and address the needs of the non-traditional students and the training and development for businesses within their service area. To accomplish this community service programming, schools must address such concerns as life stages and transactions, economic development, new population and social trends, use of delivery systems, and technology of the future. These "linkages" to the local community are vital to strengthen and support the overall mission of a comprehensive community college.

Although not without opposition and problems, the value of these associations far outweighs the costs. Part-time instructors can help add specific skills in the classroom, but full-time faculty must be retained as the backbone of the organization. This will continue to support the services that are so important to students. Some of these are admissions counseling, advising, accreditation, support services for re-entering students, job searches, and campus functions.

It would be impossible for a book to be written about educational institutions without some inference to planning and finances. This study of community colleges is no exception. As we look to the future it becomes more evident that planning must be effective and efficient to meet the fiscal constraints that are forthcoming because of decreased support from our federal and state governments.

This book is extremely informative and well written. Each author ties the subject matter for their chapter smoothly into the planned scheme. Most of the discussions deal with administrative views, but the overall information is excellent. The book is well researched and covers a nationwide sampling of schools and colleges. There are only short references to facilities in several chapters, but the content is helpful for long range plannning and the emphasis needed for capital improvement planning. I would recommend this book to anyone currently working in a community college or anyone who is considering such a move.

Renewing the American Community College is available from Jossey-Bass Publishers, Inc., 433 California Street, San Francisco, CA 94104.

—James O. Roberts
Director of Physical Plant
Barton County Community College
Great Bend, Kansas

Choosing the Cogen Option

Cogeneration and Small Power Production Manual, by Scott A. Spiewak. Lilburn, Georgia: The Fairmont Press, Inc., 1987. 653 pp. $85, softcover.

The author provides a well balanced emphasis of the major aspects in cogeneration: regulatory and environmental issues, engineering, utility contracts, and finance and tax considerations. The facilities manager will find particularly useful the in-depth attention to areas outside his or her normal purview, such as investment and tax issues. Also quite helpful is checklist information for consideration in developing technical feasibility studies, contracts, and financial evaluations. Cogeneration regulation is discussed in depth, providing both background and current rules enforced at federal

and state levels and the resultant obligations of utility companies and cogenerators. The reader will gain a good conceptual understanding of utility rate structures as mandated by the Public Utility Regulatory Policies Act (PURPA) and factors that affect those rates. Environmental issues are presented in the context of federal, state, and local regulations as well as a practical outline of the various emission and control technologies available.

Engineering focuses on developing an optimum plant design while educating the reader along the way to system selection methodology and operational considerations. Preliminary design and cost analyses are presented for five optimum system configurations. The analysis includes system schematics, energy balance schematics, system and site layouts, and preliminary specifications for all major components. Of particular interest to the facilities professional is a checklist of data elements that will be required for a good feasibility study. Supplementing the text is an appendix of cogeneration equipment, characteristics, and prices.

The section on contracts is based on research done under the auspices of the American Public Power Association. Provided are sample provisions and language used in actual contracts drawn with power companies throughout the country. Provisions include but are not limited to: conditions of delivery, rates for purchase and sales, operations, safety, and metering.

The last pieces of the puzzle are financing and tax considerations. The author provides an account of both partial and comprehensive methods for evaluating the cogeneration investment. The text is supplemented with a sample cost analysis, interest tables, and, for those considering alternative financing, extensive explanation of third-party financing. Background as well as current tax legislation is presented along with the specifics of leasing, energy credits, and energy sales contracts.

While not by any means a how-to book, the manual will educate the reader to a comfort level sufficient to direct a solid feasibility study, advise higher management, and make informed decisions. For the manager considering cogeneration, this publication is highly recommended as a starting point. For managers with a project in progress or in place, let this serve as a valuable reference for yourself, the project manager, engineering, and finance.

Cogeneration and Small Power Production Manual is available from The Fairmont Press, Inc., 700 Indian Trail, Lilburn, GA 30247.

—Eva Myking
Physical Plant Energy Analyst
University of California/San Diego
La Jolla, California

In Brief

Three guides for grounds maintenance are available from the Professional Grounds Maintenance Society (PGMS). *Grounds Maintenance Estimating Guidelines* (fourth edition) shows ways to calculate the various costs related to grounds maintenance and includes worksheets for developing estimates based on specific situations. *Grounds Maintenance Management Guidelines* (second edition) is a compilation of existing standards in the field, including a sample maintenance inspection report, recommendations for safety regulations and procedures, insurance information, and a listing of additional resources. *Grounds Maintenance Forms and Job Descriptions Guide* (first edition) gives sample forms and record-keeping tools for various areas, including contracts, estimating forms, seasonal calendar recommendations, work orders, warranty and complaint forms, time sheets, vehicle and equipment logs, and personnel job descriptions. The publications are free to PGMS members, or $9 for nonmembers ($22.50 for all three), from PGMS, 12 Galloway Avenue, Suite 1E, Cockeysville, MD 21030; 301/667-1833.

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Strategic Planning and Energy Management is a quarterly publication from the Association of Energy Engineers (AEE), focusing on a variety of energy topics. The most recent issue included articles on energy management in the plant, a shared savings retrofit project, oil price scenarios in 1989 and 1995, the effects of the new tax code on energy conservation investments, and desiccant-based energy technologies. Subscriptions in North America are $62 for one year, $106 for two years, and are available from SP&EM, 700 Indian Trail, Lilburn, GA 30247; 404/925-9388.

• • •

A new book from the National Institute of Building Sciences (NIBS) reports on strides American research is making in reducing the hazards of fires in buildings. The *Proceedings of the NIBS Fire Hazards Conference I* reproduces 95 pages of talks, discussions, and lectures given at the conference, held in Gaithersburg, Maryland in August 1986. The book notes that nearly 80 percent of fire deaths are due to smoke inhalation and that the United States has one of the poorest fire safety records in the world. It also reports on some of the little-known steps being taken by industry and government to improve American understanding of fire hazards and their control. The proceedings are available for $45 per copy from NIBS, 1015 15th Street, N.W., Suite 700, Washington, DC 20005; 202/347-5710.

Basic Programs for Steam Plant Engineers provides programs in the Basic computer language that could be of interest to persons designing heat exchangers or other boiler plant equipment. Programs include calculations for boiler efficiency, fluid flow and pressure drop, heat transfer, steam utilization, and the performance of heat transfer equipment. The book is part of a series of textbooks and reference books in the mechanical engineering field edited by L.L. Faulkner of Ohio State University and S.B. Menkes of City College of the City University of New York. The 152-page hardcover book is available for $39.75 from Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 10016; 212/889-9595. (This item contributed by Paul F. McNichol, director of physical plant at McMaster University in Hamilton, Ontario.) ■

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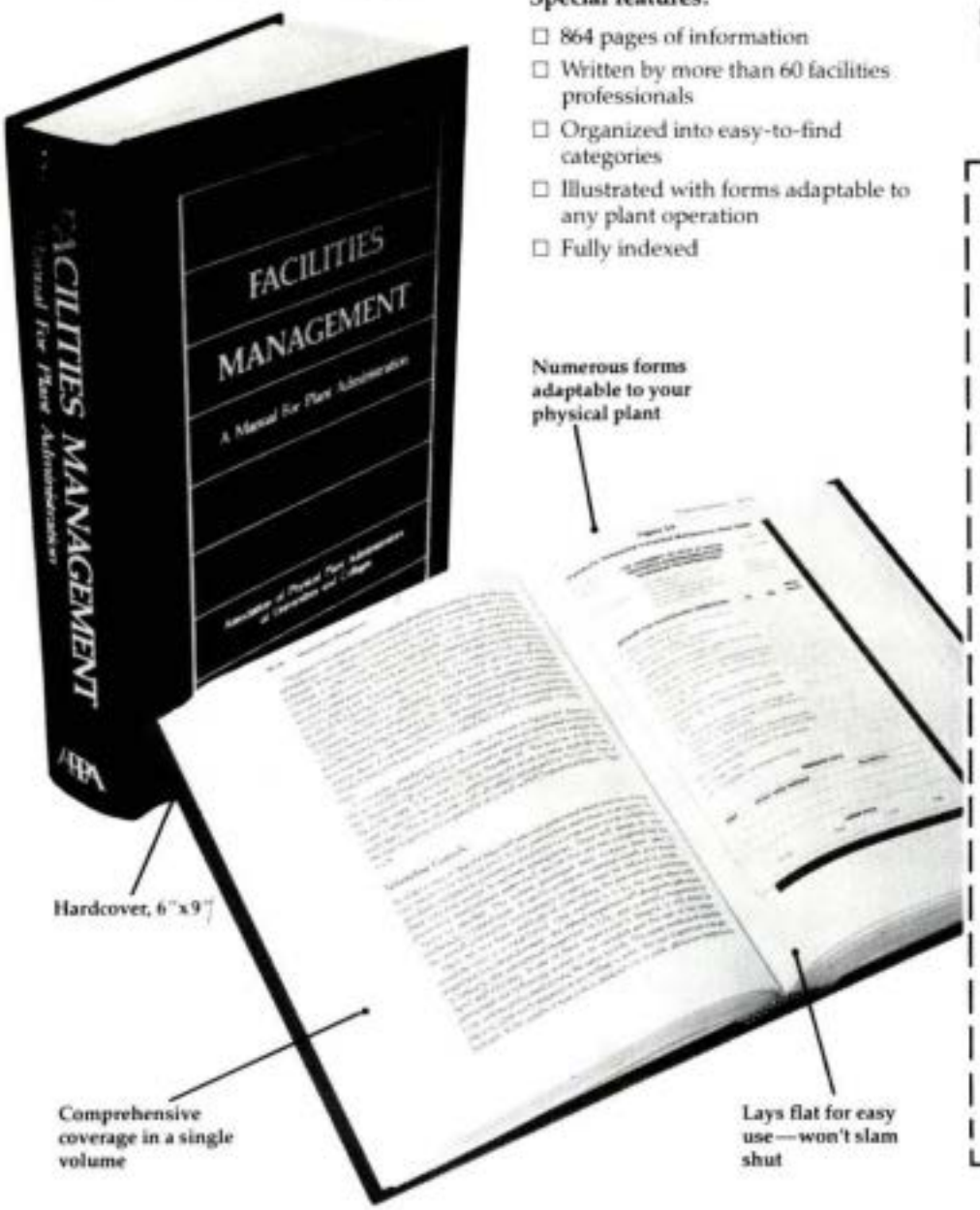

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